2027

PUBLICATION 15

INTERIM MEETING
of the
NATIONAL COUNCIL ON WEIGHTS AND MEASURES

REDONDO BEACH, CA
JANUARY 24 - 27, 2027

COMMITTEE AGENDAS FOR THE 2027 INTERIM MEETING

NCWM PUBLICATION 15

Agenda for the
2027 INTERIM MEETING

of the

National Council on Weights and Measures

Redondo Beach, California | January 24 – 27, 2027

Prepared in Cooperation with the National Council on Weights and Measures, National Type Evaluation Program, National Institute of Standards and Technology Office of Weights and Measures, Central Weights and Measures Association, Northeastern Weights and Measures Association, Southern Weights and Measures Association and Western Weights and Measures Association.

National Council on Weights and Measures Overview

National Council on Weights and Measures (NCWM), Inc. is a standards development organization for weights and measures regulatory agencies of the states, counties, and cities of the United States, as well as for federal agency use. The Interim Meeting brings together government officials and representatives of business, industry, trade associations, and consumer organizations for the purpose of hearing and discussing subjects that relate to the field of weights and measures technology and administration.

The programs of NCWM and its Committees explore the broad area of this economically important segment of governmental regulatory service. NCWM develops and recommends laws and regulations, technical codes for weighing and measuring devices used in commerce, test methods, enforcement procedures, and administrative guidelines for adoption by regulatory agencies in the interest of promoting uniformity of requirements and methods among state and local jurisdictions.

A major objective of NCWM is to foster understanding and cooperation among weights and measures officials and all industrial, business, and consumer interests. NCWM has been cited on numerous occasions for its outstanding success. The National Institute of Standards and Technology (NIST) has statutory responsibility for "cooperation with the states in securing uniformity of weights and measures laws and methods of inspection." Opinions expressed in submitted documents are those of the authors and not necessarily those of NCWM. Contributors are solely responsible for the content and quality of their material.

Jason Flint, NCWM Chair
New Jersey



Dear NCWM Colleagues,

Welcome to Redondo Beach, California, as we convene the 2027 NCWM Interim Meeting at the Sonesta Redondo Beach & Marina. Located along the scenic South Bay coastline, Redondo Beach offers beautiful beaches, the historic Redondo Beach Pier, and a variety of restaurants, shops, and outdoor activities. During your downtime, I encourage you to take some time to explore and enjoy all that the area has to offer.

Our primary focus during the Interim Meeting is to advance the development of the model laws, regulations, and standards published in NIST Handbooks 44, 130, and 133. This past fall, each regional association held hearings and deliberated on proposed changes to these handbooks. Those discussions generated valuable comments and perspectives that are now reflected in this meeting's agenda. Our standing committees will continue to hear from regulators and stakeholders, carefully consider their input, and deliberate on the status of each item as we prepare for the NCWM Annual Meeting.

In addition to our important standards development work, Sunday offers a variety of Task Group, and Subcommittee meetings, as well as informational sessions. These meetings provide Task Groups and Subcommittees with opportunities to collaborate and advance the items they are developing. The informational sessions offer insight into new and emerging technologies, helping regulators and stakeholders expand their knowledge and better prepare for the challenges and opportunities facing our profession. I encourage everyone to take advantage of these opportunities, as they provide valuable opportunities for learning, collaboration, and professional development.

NCWM is also pleased to offer two technical training sessions on Wednesday as part of our continued efforts to expand educational opportunities during our meetings. The first session will focus on the importance of metrology laboratories, the resources and capabilities they require, and the essential role they play in supporting an effective weights and measures program. The second session will feature portable digital density meters, an emerging technology with the potential to improve certain inspection processes. I encourage attendees to participate in these sessions and take advantage of the opportunity to learn from these presentations.

I sincerely look forward to meeting with all of you and hope you have a productive and enjoyable experience in Redondo Beach. Whether you are attending your first NCWM meeting or have participated for many years, please know that we value your involvement and welcome your participation. If you have any questions or need assistance during the meeting, please feel free to reach out to me, any member of the Board of Directors, a representative of our Member Education and Mentorship Subcommittee, or any member of our outstanding NCWM staff.

Thank you for your continued commitment to NCWM and to the advancement of the weights and measures profession. I look forward to our discussions, collaboration, and continued progress together.

Sincerely,



Jason R. Flint

Table of Contents

Title	Page
Schedule of Events	**iii**
Organization Chart	**vii**
Past Chairmen	**xxiv**
General Information	**GEN – 1**
Purpose	GEN – 1
Supporting Documents	GEN – 1
Items Grouped into Blocks	GEN – 1
First Time Attendees	GEN – 1
Agenda	GEN – 1
Written Comments or Oral Statements	GEN – 2
Joint Meetings for All Committees	GEN – 2
Participation	GEN – 2
Reports	GEN – 2
Annual Meeting	GEN – 2
Units of Measurement	GEN – 2
Board of Directors	**BOD – 3**
Laws and Regulations Committee	**L&R – 33**
Specifications and Tolerances Committee	**S&T – 233**
Professional Development Committee	**PDC – 435**
National Type Evaluation Program Committee	**NTEP – 455**

Schedule of Events

The schedule of events is tentative and subject to change.

Sunday, January 24, 2027		**Room**
8:00 a.m. – 10:00 a.m.	Coffee Service	Coral Foyer
8:00 a.m. – 5:00 p.m.	Registration and Exhibits	Coral Foyer
	Subcommittee & Task Group Meetings	
9:00 a.m. – 10:15 a.m.	CALM – Community for All Legal Metrologists	Bay/Catalina
9:00 a.m. – 10:15 a.m.	PALS – Packaging & Labeling Subcommittee	Redondo 1
9:00 a.m. – 10:15 a.m.	MEMS – Member Education & Mentorship Subcommittee	Redondo 2/3
9:00 a.m. - 11:30 a.m.	Meter Manufacturers Association	Promenade
10:30 a.m. – 11:30 a.m.	WWM – Women in Weights & Measures	Bay/Catalina
10:30 a.m. – 11:30 a.m.	WIM Vehicle Scale Task Group	Redondo 1
10:30 a.m. – 11:30 p.m.	Safety Subcommittee	Redondo 2/3
11:30 a.m. – 1:00 p.m.	Lunch on Your Own	
	Subcommittee & Task Group Meetings	
1:00 p.m. – 2:15 p.m.	FALS – Fuels & Lubricants Subcommittee	Bay/Catalina
1:00 p.m. – 2:15 p.m.	Metrology Subcommittee	Redondo 1
1:00 p.m. – 2:15 p.m.	Training Planning Task Group	Redondo 2/3
1:00 p.m. – 2:15 p.m.	LPG Temperature Compensation Task Group	Promenade
2:30 p.m. – 3:45 p.m.	Cannabis Task Group	Redondo 1
2:30 p.m. – 3:45 p.m.	EVSE Task Group	Redondo 2/3
2:30 p.m. – 3:45 p.m.	Dry Materials Flow Sensor Task Group	Promenade
4:00 p.m. – 5:00 p.m.	**Joint Committee Review**	Coral Ballroom
5:30 p.m. – 7:00 p.m.	**Chair's Reception:** Honoring Jason Flint	Sol

Monday, January 25, 2027		**Room**
7:30 a.m. – 9:00 a.m.	Light Breakfast	Coral Foyer
7:30 a.m. – 5:00 p.m.	Registration and Exhibits	Coral Foyer
8:00 a.m. – 8:30 a.m.	New Attendee Orientation	Coral Ballroom
	Committee hearings will occur in the order presented below. Hearing times are not firm, when one Committee finishes, the next Committee will begin.	
8:30 a.m. – 12:00 p.m.	**Official Session – Open Hearings** Laws and Regulations Committee Specifications and Tolerances Committee Professional Development Committee Board of Directors / NTEP Committee	Coral Ballroom
12:00 p.m. – 1:00 p.m.	Lunch on Your Own	
1:00 p.m. – 5:00 p.m.	Official Session – Open Hearings Continued	Coral Ballroom

Tuesday, January 26, 2027		**Room**
7:30 a.m. – 9:00 a.m.	Light Breakfast	Coral Foyer
7:30 a.m. – 5:00 p.m.	Registration and Exhibits	Coral Foyer
7:30 a.m. – 8:30 a.m.	Associate Membership Committee	Bay/Catalina

Committee hearings will occur in the order presented below. Hearing times are not firm, when one Committee finishes, the next Committee will begin.

8:30 a.m. – 12:00 p.m.	**Official Session – Open Hearings Continued**	Coral Ballroom
	Laws and Regulations Committee	
	Specifications and Tolerances Committee	
	Professional Development Committee	
	Board of Directors / NTEP Committee	
12:00 p.m. – 1:30 p.m.	Lunch on Your Own	
1:30 p.m. – 5:00 p.m.	**Committee Work Sessions**	
	Laws and Regulations Committee	Bay/Catalina
	Specifications and Tolerances Committee	Redondo 1
	Professional Development Committee	Redondo 2/3
	Board of Directors / NTEP Committee	Promenade

Wednesday, January 27, 2027		**Room**
7:30 a.m. – 9:00 a.m.	Light Breakfast	Coral Foyer
7:30 a.m. – 12:00 p.m.	Registration and Exhibits	Coral Foyer
8:30 a.m. – 9:30 a.m.	**Technical Session** Overview & Demonstration – Portable Digital Density Meters for Liquid Package Inspections *Speakers: David Sefcik, NIST OWM & Ron Hayes, Retired W&M Director (MO)*	Coral Ballroom
9:45 a.m. – 10:45 a.m.	**Technical Session** Foundations of Measurement: Building a Strong Metrology Lab *Speakers: Kate Smetana, Colorado & Tory Brewer, West Virginia*	Coral Ballroom
11:00 a.m. – 12:00 p.m.	**Joint Committee Meeting**	Coral Ballroom

2026-2027 Organization Chart

NCWM Board of Directors

Office	Name	Affiliation	Term Ends
NCWM Chair	Jason Flint	New Jersey	2027
NCWM Chair-Elect	Paul Floyd	Louisiana	2027
NCWM Immediate Past Chair	Kevin Schnepp	California	2027
Treasurer	Mahesh Albuquerque	Colorado	2029
Active Membership - Western	Bill Striejewske	Nevada	2027
Active Membership - Southern	Tory Brewer	West Virginia	2028
Active Membership - Northeastern	Jim Willis	New York	2029
Active Membership - Central	Daniel Walker	Ohio	2030
At-Large	Jason Glass	Kentucky	2028
At-Large	Sherry Turvey	Kansas	2031
Associate Membership	Ray Johnson	Fairbanks Scales	2028
Honorary NCWM President	Dr. Arvind Raman	NIST Director	NA
Executive Director	Don Onwiler	NCWM	NA
Executive Secretary	Dr. Katrice Lippa	NIST, Office of Weights and Measures	NA
NTEP Administrator	Jeff Gibson	NCWM	NA
Measurement Canada Advisor	Erica Garnier	Measurement Canada	NA

National Type Evaluation Program (NTEP) Committee

Office	Name	Affiliation	Term Ends
Committee Chair	Kevin Schnepp	California	2027
NTEP Administrator	Jeff Gibson	NCWM	NA
Members	Jason Flint	New Jersey	2028
	Paul Floyd	Louisiana	2028
	Daniel Walker	Ohio	2030
	TBD		

Finance Committee

Office	Name	Affiliation	Term Ends
Committee Chair	Paul Floyd	Louisiana	2027
Nominated Chairman-Elect	TBD		2027
Treasurer	Mahesh Albuquerque	Colorado	2029
AMC Representative	Ray Johnson	Fairbanks Scales	2028
Executive Director	Don Onwiler	NCWM	NA

Laws and Regulations Committee (L&R)

Office	Name	Affiliation	Term Ends
Chair	Michael Peeler	New Jersey	2027
Vice-Chair	Mike Harrington	Iowa	2028
Members	Austin Shepherd	San Diego County, CA	2029
	Jose Arriaga	Orang County, CA	2030
	Christina Osborn	Texas	2031
AMC Representative	Brent Price	Gilbarco	2028
Canadian Technical Advisor	Rowan Hemsing	Measurement Canada	NA
NIST Technical Advisors	John McGuire	NIST, Office of Weights and Measures	NA
	Loren Minnich	NIST, Office of Weights and Measures	NA
Committee Coordinator	Constantine Cotsoradis	NCWM	NA

Professional Development Committee (PDC)

Office	Name	Affiliation	Term Ends
Chair	Shane Ireland	Maine	2027
Vice-Chair	Leanne Garner	Kansas	2028
Members	Valerie Forbes	Delaware	2029
	Brent Ricks	Montana	2029
	Konrad Crockford	North Dakota	2031
AMC Representative	Perry Lawton	TESCO	2028
Canadian Technical Advisor	Marie-Paul Vanasse	Measurement Canada	NA
Safety Liaison	John Satterlee	Abbott Laboratories	NA
NIST Liaison	Vacant	NIST, Office of Weights and Measures	NA
Committee & Exam Coordinator	Jerry Buendel	Retired	NA

Specifications and Tolerances Committee (S&T)

Office	Name	Affiliation	Term Ends
Chair	Mark Lovisa	Louisiana	2028
Vice-Chair	Brett Willhite	Minnesota	2029
Members	Scott Dolan	Vermont	2027
	Nathan Waldron	Nevada	2030
	Steve Timar	New York	2031
Canadian Technical Advisor	Éric Turcotte	Measurement Canada	NA
NIST Technical Advisors	Loren Minnich	NIST, Office of Weights and Measures	NA
	Jan Konijnenburg	NIST, Office of Weights and Measures	NA
NCWM Technical Advisors	Greg Gholston	NCWM, NTEP Specialist	NA
	Allen Katalinic	NCWM, NTEP Evaluator	NA
Committee Coordinator	Brian Terry	Arkansas	NA

Nominating Committee

Office	Name	Affiliation	Term Ends
Chair	Kevin Schnepp	Californina	2027
Members	Bill Callaway	OWL Services	2027
	Dr. Matthew Curran	Florida	2027
	Kurt Floren	Los Angeles County, CA	2027
	Valerie Forbes	Delaware	2027
	Frank Greene	Connecticut	2027
	Mike Harrington	Iowa	2027

Credentials Committee

Office	Name	Affiliation	Term Ends
Chair	Kate Smetana	Colorado	2027
Coordinator	Jeff Gibson	NCWM, NTEP Administrator	NA
Members	Brian Terry	Arkansas	2028
	Tyrone Gulley	City of Boston, MA	2029

Appointed Officials

Office	Name	Affiliation	Term Ends
Chaplain	Scott Simmons	Retired	2027
Parliamentarian	Chuck Corr	Retired	2027
Presiding Officers	Robert Huff	Delaware	2027
	Andrew Montanye	Nebraska	2027
	Mike Smith	New York	2027
	Nathan Waldron	Nevada	2027
Sergeants-at-Arms	TBD	Tennessee	2027
	TBD	Tennessee	2027

Associate Membership Committee (AMC)

Office	Name	Affiliation	Term Ends
Chair	Jim Pettinato	Guidant Measurement	2031
Vice-Chair	Brent Price	Gilbarco	2031
Secretary/Treasurer	Reid Wagner	Growth Energy	2031
Members	Bill Callaway	OWL Services	2030
	Ray Johnson	Fairbanks Scales	2030
	Bryan Just	API	2030
	Perry Lawton	TESCO	2030
	Bob Murnane	Seraphin Test Measure	2030
	Christopher Wagner	National Propane Gas Association	2030
	Liz Mashie	Wal-Mart	2031

Fuels and Lubricants Subcommittee (FALS)

Office	Name	Affiliation
Chair	Vanessa Benchea	Florida
Vice-Chairs	Ron Hayes	Retired
	Randy Jennings	Retired
Secretaries	Jennifer Green	CITGO
NIST Technical Advisors	John McGuire	NIST, Office of Weights and Measures
	Loren Minnich	NIST, Office of Weights and Measures
Public Sector Members	Mahesh Albuquerque	Colorado
	David Deroche	Lousisana
	Uriel Fuentes	New Mexico
	Mike Harrington	Iowa
	Dr. Marcus Helfrich	North Carolina
	Megan McWayne	California
	Kevin Schnepp	California
	Bill Striejewske	Nevada
	Dr. Jenny Tabbert	Colorado
	Kevin Upschulte	Missouri
	Timothy White	Michigan
	Jennifer Wong	Nevada
Private Sector Members	Holly Alfano	Independent Lubricant Manufacturers Association
	Teresa Alleman	Holly Energy
	Stephen Benjamin	TSL Consulting
	Scott Boorse	PEI
	Chuck Corr	Retired
	Scott Fenwick	Clean Fuels Alliance America
	Marilyn Herman	Herman and Associates
	Joanna Johnson	Johnson Policy Associates
	Brian Kernke	Love's Travel Stops
	David A. Kovach	BP Products
	Russ Lewis	Marathon Petroleum
	Kristy Moore	KMoore Consulting
	Jeanelle Morris	Navistar
	Jim Rocco	Energy Marketers of America
	Matthew Sheehan	Chevron U.S.A.
	Reid Wagner	Growth Energy
Advisory Member	Curtis Williams	Retired

Member Education and Mentorship Subcommittee

Office	Name	Affiliation
Chair	Brian Fuller	Iowa
Vice-Chair	Christina Osborn	Texas
Public Sector Members	Cheryl Ayer	New Hampshire
	Ethan Bogren	Westchester County, NY
	Joanna Cartee	Georgia
	Scott Ferguson	Michigan
	Dave Finck	Ohio
	Valerie Forbes	Delaware
	Miland Kofford	Utah
	Brent Ricks	Montana
	Brian Terry	Arkansas
	Jim Willis	New York
Private Sector Members	Jerry Buendel	Retired
	Chuck Corr	Retired
	Scott Fenwick	Clean Fuels Alliance America
	Bob Murnane	Seraphin Test Measure

Metrology Subcommittee

Office	Name	Affiliation
Chair	Frank Greene	Connecticut
Vice-Chair	Lisa Corn	Texas
NIST Technical Advisor	Micheal Hicks	NIST, Office of Weights and Measures
Public Sector Members	Tory Brewer	West Virginia
	Whitney Corley	Louisiana
	Scott Dolan	Vermont
	David Fraser	Montana
	Travis Garding	Alaska
	Leslie German	Washington
	James Kellames	Nevada
	Lina Ng	Los Angeles County, CA
	Marc Paquette	Vermont
	Bill Rigby	Utah
	Kiara Riske	Nevada
	Kate Smetana	Colorado
	Bill Striejewske	Nevada
	Brian Terry	Arkansas
	Daniel Walker	Ohio

Standards Development Subcommittee

Office	Name	Affiliation
Chair	Jason Flint	New Jersey
S&T Committee Coordinator	Brian Terry	Arkansas
L&R Committee Coordinator	Constantine Cotsoradis	NCWM
PD Committee Coordinator	Jerry Buendel	Retired
NIST Representative	John McGuire	NIST, Office of Weights & Measures
Parliamentarian	Chuck Corr	Retired
WWMA Representative	Bill Striejewske	Nevada
SWMA Representative	Tory Brewer	West Virginia
NEWMA Representative	Jim Willis	New York
CWMA Representative	Daniel Walker	Ohio
NCWM Executive Director	Don Onwiler	NCWM

Packaging and Labeling Subcommittee (PALS)

Office	Name	Affiliation
Chair	Chris Guay	Retired
NIST Technical Advisor	John McGuire	NIST, Office of Weights and Measures
Public Sector Member	Cheryl Ayer	New Hampshire
	Chad Pilie	Arizona
	Eric Rauch	Iowa
	Michael Smith	New York
Advisory Sector Members	Krister Hard af Segerstad	Retired
	Zina Juroch	Retired

Safety Subcommittee

Office	Name	Affiliation
Chair	John Satterlee	Abbott Laboratories
Public Sector Members	John Bell	Missouri
	Brian Eden	Florida
	David Fraser	Montana
	Michael Kelly	Westchester County, New York
	Michael Peeler	New Jersey
Private Sector Members	Bill Callaway	OWL Services
	Robert LaGasse	Mulch and Soil Council
	Christopher Wagner	National Propane Gas Association

Women in Weights and Measures Subcommittee

Office	Name	Affiliation
Chair	Cheryl Ayer	New Hampshire
Vice-Chair	Brandi Harder	Rice Lake Weighing Systems
Public Sector Members	Vanessa Benchea	Florida
	Teri Berken	Louisiana
	Nathalie Campeau	Measurement Canada
	Joanna Cartee	Georgia
	Heather Chappell	Tompkins County, NY
	Roxanne Chepsongol	New Mexico
	Delia Cioc	Riverside County, CA
	Whitney Corley	Louisiana
	Melissa Cregan	Fresno County, CA
	Valerie Forbes	Delaware
	Erica Garnier	Measurement Canada
	Elaine Grillo	City of Boston, MA
	Sabine Koerner	Louisiana
	Samantha Lange	Wisconsin
	Lauren Lee	Michigan
	Misael Martinez	Riverside County, CA
	Michelle McCulley	Maryland
	Vanessa Miles	Louisiana
	Lina Ng	Los Angeles County, CA
	Christina Osborn	Texas
	Cheryll Parker	USDA
	Amanda Perez	New Mexico
	Cathy Roach	Alemeda County, CA
	Kate Smetana	Colorado
	Dr. Jenny Tabbert	Colorado
	Isabelle Tremblay	Measurement Canada
	Annie Tsou	Los Angeles County, CA
	Sherry Turvey	Kansas
	Marie-Paul Vanasse	Measurement Canada
	Alison Wilkinson	Maryland
Private Sector Members	Christie Cordova	Georgia-Pacific Wood Products
	Jessica Ferree	Mettler-Toledo
	Marilyn Herman	Herman and Associates
	Jennifer Hopes	USDA/AMS/FTPP Packers and Stockyards Div.

Cannabis Task Group

Office	Name	Affiliation
Chair	Evan Foisy	Minebea Intec, Inc.
Public Sector Members	Brad Bachelder	Maine
	Kipp Blauer	Nevada
	Ethan Bogren	Westchester County, NY
	James Cassidy	Retired
	Mark Ciociolo	City of Worcester, MA
	Dr. Matthew Curran	Florida
	Jason Flint	New Jersey
	Kurt Floren	Los Angeles County, CA
	Frank Greene	Connecticut
	Elaine Grillo	City of Boston, MA
	Ivan Hankins	Iowa
	Mike Harrington	Iowa
	Robert Huff	Delaware
	Mauricio Mejia	Florida
	Angel Nazario	City of Boston, MA
	Bill Rigby	Utah
	Kate Smetana	Colorado
	Dedrick Stephens	City of Cleveland, OH
	Ron Valinski	City of Worcester, MA
	Craig VanBuren	Michigan
	Jim Willis	New York
	Aaron Yanker	Colorado
Private Sector Members	Michael Bronstein	ATACH
	Chris Guay	Retired
	Joanna Johnson	Johnson Policy Associates
	Chuck Olivier	DBS
	Ben Raham	WIPOTEC-OCS

Dry Materials Flow Sensor Task Group

Office	Name	Affiliation
Chair	Paul Hebenstreit	Accurate Superior Scale Company
NCWM Technical Advisors	Greg Gholston	NCWM, NTEP Specialist
	Jeff Gibson	NCWM, NTEP Administrator
NIST Technical Advisor	Loren Minnich	NIST, Office of Weights and Measures
Public Sector Members	Steve Carter	Illinois
	Konrad Crockford	North Dakota
	Andrew Montanye	Nebraska
	Eric Rauch	Iowa
	Jeffrey Vanfossan	USDA/AMS/FGIS
	Jimmy Williams	Missouri
Private Sector Member	Royce Schulte	CADARO

EVSE Task Group

Office	Name	Affiliation
Chair	Scott Dolan	Vermont
Vice-Chair	Alison Wilkinson	Maryland
NCWM Technical Advisor	Jeff Gibson	NCWM, NTEP Administrator
NIST Technical Advisors	Loren Minnich	NIST, Office of Weights and Measures
	Michael Stocker	NIST, Office of Weights and Measures
Canadian Technical Advisor	Ben Samutthananont	Measurement Canda
Public Sector Members	Mahesh Albuquerque	Colorado
	Jose Arriaga	Orange County, California
	Matt Douglas	California
	Jason Flint	New Jersey
	Brian Fuller	Iowa
	Sumner Kuehne	Vermont
	John Lee	New York
	Joseph Lundeen	San Bernadino County, California
	Dave Rodrigues	Massachusetts
	Nick Santori	Minnesota
	Austin Shepherd	San Diego County, California
Private Sector Members	Bill Callaway	OWL Services
	Isaac Carrera	EV Test Solutions
	Josh Cohen	Swtch
	Andrew Fraser	E-Motion LLC
	Steve Griffith	NEMA
	Michael Krauthamer	EV Advisor
	Perry Lawton	TESCO Metering
	Mal Skowron	Tesla
	Justin Wilson	ChargePoint

Fraud Prevention and Education Task Group

Office	Name	Affiliation
Chair	Alan Walker	Florida
Vice-Chair	Matthew Williams	Texas
Public Sector Members	Paul Floyd	Louisiana
	Mike Harrington	Iowa
	Robert Huff	Delaware
	Michael Kelly	Westchester County, NY
	John Larkin	California
	John McGuire	NIST, Office of Weights and Measures
	Michael Peeler	New Jersey
Private Sector Members	Scott Boorse	PEI
	Brent Price	Gilbarco
	Mike Roach	Madic Group

LMD Density Correction Task Group

Office	Name	Affiliation
Chair	Andrew Montanye	Nebraska
Vice-Chair	Alison Wilkinson	Maryland
NCWM Technical Advisor	Allen Katalinic	NCWM, NTEP Evaluator
NIST Technical Advisors	John McGuire	NIST, Office of Weights and Measures
	Loren Minnich	NIST, Office of Weights and Measures
Public Sector Members	Marcus Belshe	Missouri
	Tory Brewer	West Virginia
	Steve Carter	Illinios
	Konrad Crockford	North Dakota
	Bill Nebot	New York
	Eric Rauch	Iowa
	Sherry Turvey	Kansas
	Scott Wagner	Colorado
	Brett Willhite	Minnesota
Private Sector Members	Bryan Just	API
	Jim McDonell	Marathon Petroleum
	Jim Pettinato	Guidant Measurement
	Prentiss Searles	API
Advisory Members	Chuck Corr	Retired
	Randy Jennings	Retired
	Scott Simmons	Retired

LPG Temperature Compensation Task Group

Office	Name	Affiliation
Chair	Christopher Wagner	NPGA
NIST Technical Advisor	John McGuire	NIST, Office of Weights and Measures
Public Sector Members	Tory Brewer	West Virginia
	Mike Brooks	Arizona
	Matt Douglas	California
	Scott Wagner	Colorado
	Kristin Walter	Arkansas
	Jim Willis	New York
Private Sector Members	Jeff Christiansen	Midwest Computer Register Corp. dba MID:COM
	Rondey Cooper	Red Seal Measurement
	Treyton Drake	Advanced Flow Solutions, Inc. dba Liquid Controls
	Christopher Hanson	Propane Education and Research Council
	John Hathaway	Murray Equipment, Inc.
	Michael Keilty	Endress + Hauser Flow USA, Inc.
	Eric Kuster	Propane Education and Research Council
	Gene Morrison	Gas Equipment Company

Milk Measuring Task Group

Office	Name	Affiliation
Chair	Aaron Yanker	Colorado
Vice-Chair	Joel Northrop	USDA
NTEP Technical Advisor	Allen Katalinic	NCWM, NTEP Evaluator
NIST Technical Advisor	G. Diane Lee	NIST, Office of Weights and Measures
Canadian Technical Advisor	Éric Turcotte	Measurement Canada
Public Sector Members	Mitchell Marsalis	Louisiana
	Joseph Smith	Wisconsin
	Jim Willis	New York

Moisture Allowance Task Group

Office	Name	Affiliation
Chair	Tory Brewer	West Virginia
NIST Technical Advisor	John McGuire	NIST, Office of Weights and Measures
Public Sector Member	Lisa Corn	Texas
	Kurt Floren	Los Angeles County, CA
	Joseph Smith	Wisconsin
	Steve Timar	New York
	Craig VanBuren	Michigan
	Ken Vehrkens	New Jersey

NCWM Standards Development Task Group

Office	Name	Affiliation
Chair	Jason Flint	New Jerrsey
Industry Representative	Chuck Corr	Retired
SWMA Representative	Matt Curran	Florida
WWMA Representative	Kurt Floren	Los Angeles County, CA
CWMA Representative	Mike Harrington	Iowa
NIST OWM Representative	John McGuire	NIST, Office of Weights and Measures
NCWM Representative	Don Onwiler	NCWM

Policy and Bylaw Review Task Group

Office	Name	Affiliation
Chair	Chuck Corr	Retired
Executive Director	Don Onwiler	NCWM
Public Sector Member	Mahesh Albuquerque	Colorado
	Bill Striejewske	Nevada
Private Sector Members	Chris Guay	Retired

Training Planning Task Group

Office	Name	Affiliation
Chair	Mahesh Albuquerque	Colorado
NCWM	Danyelle Dolan	NCWM, Project Specialist
	Jeff Gibson	NCWM, NTEP Administrator
	Elisa Stritt	NCWM, Director of Operations
Board of Directors	Kevin Schnepp	California
	Daniel Walker	Ohio
NIST	Dr. Katrice Lippa	NIST, Office of Weights and Measures
	David Sefcik	NIST, Office of Weights and Measures
	Mike Stocker	NIST, Office of Weights and Measures
Associate Membership Committee	Bill Callaway	OWL Services
Professional Development Committee	Ethan Bogren	Westchester County, NY
	Scott Dolan	Vermont
	Jason Flint	New Jersey
	Perry Lawton	TESCO
	Alison Wilkinson	Maryland
	Jim Willis	New York
EV Industry	Steve Griffith	NEMA
	Mal Skowron	Tesla
	Justin Wilson	ChargePoint

Transportation-for-Hire Systems Task Group

Office	Name	Affiliation
Chair	Mark Lovisa	Louisiana
NTEP Technical Advisor	Jeff Gibson	NCWM, NTEP Administrator
NIST Technical Advisor	John McGuire	NIST, Office of Weights and Measures
Public Sector Members	Katrina Eberly	New Jersey
	Michael Peeler	New Jersey

Uniform Shipment Law Task Group

Office	Name	Affiliation
Chair	Miland Kofford	Utah
NIST Technical Advisor	John McGuire	NIST, Office of Weights and Measures
Canadian Technical Advisors	Nathalie Campeau	Measurement Canada
	Rowan Hemsing	Measurement Canada
	Laurentiu Paunescu	Measurement Canada
Public Sector Members	Cheryl Ayer	New Hampshire
	Rowan Hemsing	Measurement Canada
	Mark Lovisa	Louisiana
	Robert Meadows	Kansas
	Erik Stanton	New Hampshire
	Ken Vehrkens	New Jersey
Private Sector Members	Karen Claussen	Heatlines
	James Hannum	Subject Matter Specialist
	John Lawn	Rice Lake Weighing Systems
	Victor Mata	NMFTA – National Motor Freight Traffic Association

WIM Vehicle Scale Task Group

Office	Name	Affiliation
Chair	Jim Willis	New York
NIST Technical Advisors	Jan Konijnenburg	NIST
	Loren Minnich	NIST
Public Sector Members	Tory Brewer	West Virginia
	Jason Flint	New Jersey
	Paul Floyd	Louisiana
	Mike Harrington	Iowa
	Robert Huff	Delaware
	Chad Parker	North Carolina
	Kristin Walter	Arkansas
	Alison Wilkinson	Maryland
Private Sector Member	Kiel Clasing	Kistler Instrument Corporation

NTEP Grain Analyzer Sector

Office	Name	Affiliation
Chair	Jimmy Williams	Missouri
NTEP Technical Advisors	Greg Gholston	NCWM, NTEP Specialist
	Jeff Gibson	NCWM, NTEP Administrator
	Brian Maser	NCWM, NTEP Evaluator
NIST Technical Advisor	G. Diane Lee	NIST, Office of Weights and Measures
Public Sector Members	Steve Carter	Illinois
	Ivan Hankins	Iowa
	Robert Meadows	Kansas
	Loren Minnich	NIST, Office of Weights and Measures
	Kate Smetana	Colorado
	Stephanie Somers	Illinois
	Jeffrey Vanfossan	USDA
Private Sector Members	Jeffrey Adkisson	Grain and Feed Association of Illinois
	Jeff Behme	Simple Physics Agriculture
	Rachel Beiswenger	TSI Incorporated
	Casey Frakes	The Steinlite Corporation
	Charles Hurburgh, Jr.	Iowa State University
	Jess McCluer	National Grain and Feed Association
Advisory Member	Cassie Eigenmann	Retired

NTEP Measuring Sector

Office	Name	Affiliation
Chair	Brent Price	Gilbarco
NTEP Technical Advisors	Greg Gholston	NCWM, NTEP Specialist
	Jeff Gibson	NCWM, NTEP Administrator
	Allen Katalinc	NCWM, NTEP Evaluator
NIST Technical Advisor	Jan Konijnenburg	NIST, Office of Weights and Measures
Canadian Technical Advisor	Farhad Sharifi	Measurement Canada
Public Sector Members	Steve Carter	Illinois
	Alison Wilkinson	Maryland
	Jack Witt	California
Private Sector Members	Steve Bar	Bennett Pump Company
	Lyle Baron	Fill-Rite
	Craig Cavanaugh	Tuthill Transfer Systems
	Rodney Cooper	Consultant
	Rick Costa	Wingfield Scale Company
	Treyton Drake	Advanced Flow Solutions dba Corken
	Ronnell Gallon	Zenner Performance Meters
	John Hathaway	Murray Equipment
	Michael Keilty	Endress + Hauser Flowtec AG, USA
	Douglas Long	RDM Industrial Electronics
	Mark McMurtrey	Wayne Fueling Systems
	Richard Miller	Guidant Measurement
	Andre Noel	Neptune Technology Group
	Robin Parsons	Parafour Innovations
	Jim Pettinato	Guidant Measurement

NTEP Software Sector

Office	Name	Affiliation
Chair	Jim Pettinato	Guidant Measurement
NTEP Technical Advisors	Greg Gholston	NCWM, NTEP Specialist
	Jeff Gibson	NCWM, NTEP Administrator
	Brian Maser	NCWM, NTEP Evaluator
NIST Technical Advisor	Jan Konijnenburg	NIST, Office of Weights and Measures
Secretary	Teri Gulke	Liquid Controls
Public Sector Members	Tom Buck	Ohio
	Jeremy Coffey	Ohio
	Barry Stone	Ohio
	Alison Wilkinson	Maryland
	Jack Witt	California
Private Sector Members	Mary Abens	Emerson Process Management
	Rick Costa	Wingfield Scale Company
	Kevin Detert	Avery Weigh-Tronix
	Petar Georgiev	AMPECO Ltd.
	Dion Harste	AgCode
	Dominic Meyer	KSi Conveyors
	Richard Miller	Guidant Measurement
	Vere Miller	Mettler-Toledo
	Chris Oldham	7-Eleven
	Mike Roach	PDI
	Ryan Rowell	Pearce Renewables
	David Vande Berg	Vande Berg Scales
	John Wind	Ossid
	Kraig Wooddell	Hobart Corporation

NTEP Weighing Sector

Office	Name	Affiliation
Chair	Jessica Ferree	Mettler-Toledo
NTEP Technical Advisor	Greg Gholston	NCWM, NTEP Specialist
	Jeff Gibson	NCWM, NTEP Administrator
	Brian Maser	NCWM, NTEP Evaluator
NIST Technical Advisor	Jan Konijnenburg	NIST, Office of Weights and Measures
Public Sector Members	Tom Buck	Ohio
	Kevin Chesnutwood	NIST, Mass and Force Group
	Robert Meadows	Kansas
	Loren Minnich	NIST, Office of Weights and Measures
	Barry Stone	Ohio
	Pascal Turgeon	Measurement Canada
Private Sector Members	Steven Beitzel	Systems Associates
	Rick Costa	Wingfield Scale Company
	Scott Davidson	Mettler-Toledo
	Tom Dorward	Mettler Toledo North America
	Andrew Goddard	Marel
	Brandi Harder	Rice Lake Weighing Systems
	Jon Heinlein	Transcell Technology
	Scott Henry	Zebra Technologies
	Sam Jalahej	Totalcomp
	Ben Raham	OCS Checkweighers
	Thomas Schuller	Cardinal Scale Manufacturing Company
	Taylor Simonelli	Mettler-Toledo
	Wes Strawn	Red Seal Measurement
	Richard Suiter	Richard Suiter Consulting
	John Wind	Ossid
Advisory Members	Robert Feezor	Retired
	Edward Luthy	Retired

NTEP EVSE Work Group

Office	Name	Affiliation
Chair	Andrei Moldoveanu	NEMA
NTEP Technical Advisors	Greg Gholston	NCWM, NTEP Specialist
	Jeff Gibson	NCWM, NTEP Administrator
NIST Technical Advisor	Juana Williams	NIST, Office of Weights and Measures
Public Sector Members	Tom Buck	Ohio
	Alison Wilkinson	Maryland
	Jack Witt	California
Private Sector Members	Craig Denson	DENT Instruments
	Petar Georgiev	AMPECO Ltd.
	Michael Krauthamer	Alliance for Transportation Electrification
	Dave Parmelee	Control Module
	Amit Ranjan	Kempower Inc.
	Mal Skowron	Tesla

NTEP MDMD Work Group

Office	Name	Affiliation
Chair	Chris Senneff	Avery Weigh-Tronix
NTEP Technical Advisors	Greg Gholston	NCWM, NTEP Specialist
	Jeff Gibson	NCWM, NTEP Administrator
NIST Technical Advisor	Loren Minnich	NIST , Office of Weights and Measures
Canadian Technical Advisors	Joshua Foster	Measurement Canada
	Pascal Turgeon	Measurement Canada
Public Sector Member	Tom Buck	Ohio
Private Sector Members	Sprague Ackley	Digimarc
	Rick Costa	Wingfield Scale Company
	Scott Davidson	Mettler-Toledo
	Brandi Harder	Rice Lake Weighing Systems
	Scott Henry	Zebra Technologies
	John Lawn	Rice Lake Weighing Systems
	Sameer Parmar	SICK
	Phil Peterson	SICK
	Joe Rickey	Rice Lake Weighing Systems
	Tony Romeo	Datalogic
	Adrian Ruthe	Loadscan
	Raghavendra Tenkasi Shankar	Zebra Technologies
	Michael Stutler	UPS
	Richard Suiter	Richard Suiter Consulting
	Matthew Walz	Walz Scale
	Scott Wiggington	UPS

Northeastern Weights and Measures Association (NEWMA)

www.newma.us

States	Connecticut Maine Massachusetts	New Hampshire New Jersey New York	Pennsylvania Puerto Rico Rhode Island	Vermont		
Contact	Steve Timar State of New York			845-437-5150 steve.timar@agriculture.ny.gov		
Annual Meeting	Portsmouth, New Hampshire			April 26 – 29, 2027		
Interim Meeting	Mystic, Connecticut			September 26 – 29, 2027		

Central Weights and Measures Association (CWMA)

www.cwma.net

States	Illinois Indiana Iowa	Kansas Michigan Minnesota	Missouri Nebraska North Dakota	Ohio South Dakota Wisconsin	
Contact	Sherry Turvey Kansas Department of Agriculture			785-564-6682 sherry.turvey@ks.gov	
Annual Meeting	Lincoln, Nebraska			May 3 – 6, 2027	
Interim Meeting	TBD			TBD	

Western Weights and Measures Association (WWMA)

www.westernwma.org

States	Alaska Arizona California	Colorado Hawaii Idaho	Montana Nevada New Mexico	Oregon Utah Washington	Wyoming
Contact	Miland Kofford Utah Department of Agriculture and Food			801-982-2261 mkofford@utah.gov	
Annual Meeting	Kellogg, Idaho			September 26 – 30, 2027	

Southern Weights and Measures Association (SWMA)

www.swma.org

States	Alabama Arkansas Delaware	District of Columbia Florida Georgia	Kentucky Louisiana Maryland	Mississippi North Carolina Oklahoma	South Carolina Tennessee Texas	US Virgin Islands Virginia West Virginia
Contact	Valerie Forbes Delaware Department of Agriculture			302-698-4602 valerie.forbes@delaware.gov		
Annual Meeting	Hot Springs, Arkansas			October 3 – 6, 2027		

Past Chairmen

Annual Meeting	Year	Location	Chairman	Affiliation
1st	1905	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
2nd	1906	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
3rd	1907	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
4th	1908	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
	1909	Meeting Was Not Held		
5th	1910	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
6th	1911	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
7th	1912	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
8th	1913	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
9th	1914	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
10th	1915	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
11th	1916	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
	1917	Meeting Was Not Held		
	1918	Meeting Was Not Held		
12th	1919	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
13th	1920	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
14th	1921	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
15th	1922	Washington, D.C.	Dr. S.W. Stratton	National Bureau of Standards
16th	1923	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
17th	1924	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
18th	1925	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
19th	1926	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
20th	1927	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
21st	1928	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
22nd	1929	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
23rd	1930	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
24th	1931	Washington, D.C.	Dr. George Burgess	National Bureau of Standards
	1932	Meeting Was Not Held		
	1933	Meeting Was Not Held		
	1934	Meeting Was Not Held		
25th	1935	Washington, D.C.	Dr. Lyman Briggs	National Bureau of Standards
26th	1936	Washington, D.C.	Dr. Lyman Briggs	National Bureau of Standards
27th	1937	Washington, D.C.	Dr. Lyman Briggs	National Bureau of Standards
28th	1938	Washington, D.C.	Dr. Lyman Briggs	National Bureau of Standards
29th	1939	Washington, D.C.	Dr. Lyman Briggs	National Bureau of Standards
30th	1940	Washington, D.C.	Dr. Lyman Briggs	National Bureau of Standards
31st	1941	Washington, D.C.	Dr. Lyman Briggs	National Bureau of Standards
	1942	Meeting Was Not Held		
	1943	Meeting Was Not Held		
	1944	Meeting Was Not Held		
	1945	Meeting Was Not Held		
32nd	1946	Washington, D.C.	Dr. E.U. Condon	National Bureau of Standards
33rd	1947	Washington, D.C.	Dr. E.U. Condon	National Bureau of Standards
	1948	Meeting Was Not Held		
34th	1949	Washington, D.C.	Dr. E.U. Condon	National Bureau of Standards
35th	1950	Washington, D.C.	Dr. E.U. Condon	National Bureau of Standards
36th	1951	Washington, D.C.	Dr. E.U. Condon	National Bureau of Standards
37th	1952	Washington, D.C.	Dr. A.V. Astin	National Bureau of Standards
38th	1953	Washington, D.C.	Dr. A.V. Astin	National Bureau of Standards
39th	1954	Washington, D.C.	Dr. A.V. Astin	National Bureau of Standards

Past Chairmen

Annual Meeting	Year	Location	Chairman	Affiliation
40th	1955	Washington, D.C.	Dr. A.V. Astin	National Bureau of Standards
41st	1956	Washington, D.C.	Dr. A.V. Astin	National Bureau of Standards
42nd	1957	Washington, D.C.	Dr. A.V. Astin	National Bureau of Standards
43rd	1958	Washington, D.C.	J.P. McBride	Massachusetts
44th	1959	Washington, D.C.	C.M. Fuller	California
45th	1960	Washington, D.C.	H.E. Crawford	Florida
46th	1961	Washington, D.C.	R.E. Meek	Indiana
47th	1962	Washington, D.C.	Robert Williams	New York
48th	1963	Washington, D.C.	C.H. Stender	South Carolina
49th	1964	Washington, D.C.	D.M. Turnbull	Washington
50th	1965	Washington, D.C	V.D. Campbell	Ohio
51st	1966	Denver, CO	J.F. True	Kansas
52nd	1967	Washington, D.C.	J.E. Bowen	Massachusetts
53rd	1968	Washington, D.C.	C.C. Morgan	Indiana
54th	1969	Washington, D.C.	S.H. Christie	New Jersey
55th	1970	Salt Lake City, UT	R.W. Searles	Ohio
56th	1971	Washington, D.C.	M. Jenning	Tennessee
57th	1972	Washington, D.C.	E.H. Black	California
58th	1973	Minneapolis, MN	George Johnson	Kentucky
59th	1974	Washington, D.C.	John Lewis	Washington
60th	1975	San Diego, CA	Sydney Andrews	Florida
61st	1976	Washington, D.C.	Richard Thompson	Maryland
62nd	1977	Dallas, TX	Earl Prideaux	Colorado
63rd	1978	Washington, D.C.	James Lyles	Virginia
64th	1979	Portland, OR	Kendrick Simila	Oregon
65th	1980	Washington, D.C.	Charles Vincent	Texas
66th	1981	St. Louis, MO	Edward Stadolnik	Massachusetts
67th	1982	Atlanta, GA	Edward Heffron	Michigan
68th	1983	Sacramento, CA	Charles Greene	New Mexico
69th	1984	Boston, MA	Sam Hindsman	Arkansas
70th	1985	Washington, D.C.	Ezio Delfino	California
71st	1986	Albuquerque, NM	George Mattimoe	Hawaii
72nd	1987	Little Rock, AR	Frank Nagele	Michigan
73rd	1988	Grand Rapids, MI	Darrell Guensler	California
74th	1989	Seattle, WA	John Bartfai	New York
75th	1990	Washington, D.C.	Fred Gerk	New Mexico
76th	1991	Philadelphia, PA	N. David Smith	North Carolina
77th	1992	Nashville, TN	Sidney Colbrook	Illinois
78th	1993	Kansas City, MO	Allan Nelson	Connecticut
79th	1994	San Diego, CA	Thomas Geiler	Massachusetts
80th	1995	Portland, ME	James Truex	Ohio
81st	1996	New Orleans, LA	Charles Gardner	New York
82nd	1997	Chicago, IL	Barbara Bloch	California
83rd	1998	Portland, OR	Steven Malone	Nebraska
84th	1999	Burlington, VT	Aves Thompson	Alaska
85th	2000	Richmond, VA	Wes Diggs	Virginia
86th	2001	Washington, DC	Louis Straub	Maryland
87th	2002	Cincinnati, OH	Ronald Murdock	North Carolina
88th	2003	Sparks, NV	Ross Andersen	New York
89th	2004	Pittsburgh, PA	Dennis Ehrhart	Arizona

Past Chairmen

Annual Meeting	Year	Location	Chairman	Affiliation
90th	2005	Orlando, FL	Wes Diggs	Virginia
91st	2006	Chicago, IL	Don Onwiler	Nebraska
92nd	2007	Salt Lake City, UT	Michael Cleary	California
93rd	2008	Burlington, VT	Judy Cardin	Wisconsin
94th	2009	San Antonio, TX	Jack Kane	Montana
95th	2010	St. Paul, MN	Randy Jennings	Tennessee
96th	2011	Missoula, MT	Tim Tyson	Kansas
97th	2012	Portland, ME	Kurt Floren	California
98th	2013	Louisville, KY	Stephen Benjamin	North Carolina
99th	2014	Detroit, MI	John Gaccione	New York
100th	2015	Philadelphia, PA	Ronald Hayes	Missouri
101st	2016	Denver, CO	Jerry Buendel	Washington
102nd	2017	Pittsburgh, PA	Kristin Macey	California
103rd	2018	Tulsa, OK	James Cassidy	Massachusetts
104th	2019	Milwaukee, WI	Brett Gurney	Utah
105th	2020	Lansing, MI	Craig VanBuren	Michigan
106th	2021	Rochester, NY	Hal Prince	Florida
107th	2022	Tacoma, WA	Ivan Hankins	Iowa
108th	2023	Norfolk, VA	Mahesh Albuquerque	Colorado
109th	2024	Cleveland, OH	Gene Robertson	Mississippi
110th	2025	Reno, NV	Marc Paquette	Vermont
111th	2026	Philadelphia, PA	Kevin Schnepp	California

General Information

PURPOSE

NCWM meetings are held throughout the year to develop the national standards that are adopted by NCWM and published in *Handbooks 44*, *130*, and *133*. At the NCWM Interim Meeting, Committees will conduct Open Hearings where all attendees have a direct impact on the national standards through their testimony. Following Open Hearings, the Committees will convene in work sessions to consider testimony and all other information at their disposal to further develop agenda items and determine the status of each for the Annual Meeting in July. Committees will report these decisions at the Joint Committee Meeting on Wednesday. Items given voting status by the Committees will be presented at the NCWM Annual Meeting in July.

SUPPORTING DOCUMENTS

Additional letters, presentations and data may have been part of the Committee's consideration. Please refer to www.ncwm.com/publication-15 to review these documents.

ITEMS GROUPED INTO BLOCKS

The Committee may group related items into blocks to be considered as a group. This provides for more efficient open hearings and voting sessions since each item within a block is not presented individually.

FIRST TIME ATTENDEES

All attendees who are participating for the first time are encouraged to ask NCWM staff, Chair, Board members and/or Committee members questions.

AGENDA

The subject matter listed on each Standing Committee's agenda will be open for discussion as noted. The Committee may also take up routine or miscellaneous items brought to its attention after the preparation of this document. The Committee may decide to accept items for discussion that are not listed in this document, providing they meet the criteria for exceptions as presented in *NCWM Policy 3.2.2. Procedures to Modify Handbooks, Part E, Exceptions to Policy for Submission of Items to the NCWM Committee Agenda; Submission of Priority Items*. The Committees have not determined whether the items presented will be Voting or Informational, Developing or Withdrawn in status for the Annual Meeting in July; these determinations will be made in their deliberations at the Interim Meeting.

The agendas:

- Shall include items brought to the attention of the Standing Committees prior to the submission deadline of August 15, 2026, and approved for inclusion in their agendas by the Committees; and
- Shall serve as the basis for the Standing Committee Interim Reports; to be printed in the program and Committee reports of *NCWM Publication 16, Committee Reports for the 112th Annual Meeting* to be held July 11th-15th, 2027 at the Marriott Knoxville Downtown in Knoxville, TN. The final reports of the Committees will be published following the 112th NCWM Annual Meeting in the *Annual Report of the 112th National Council on Weights and Measures*.

WRITTEN COMMENTS OR ORAL STATEMENTS

Any person or organization wanting to provide a formal presentation during a committee session should make the request in writing to the Executive Director. Reasonable limitations on time allotted for presentations will be imposed. *Note: Only registered attendees may make presentations.*

National Council on Weights and Measures
Attn: Don Onwiler, Executive Director
9011 South 83rd Street | Lincoln, Nebraska 68516
402-434-4880, don.onwiler@ncwm.com

JOINT MEETINGS FOR ALL COMMITTEES

A Joint Meeting for all Committees will be held:

- Sunday, January 24, 2027

PARTICIPATION

All sessions are open to registered attendees of the meeting. If a Committee must discuss any issue that involves proprietary information or other confidential material; that portion of the session dealing with the special issue may be closed provided that:

- NCWM Chairman or, in their absence, the Chairman-Elect approves;
- the Executive Director is notified, and
- an announcement of the closed meeting is posted on or near the door to the meeting session and at the registration desk.

If possible, the posting will be done at least a day prior to the planned closed session. Please note that a one-day notice will not be possible if a closed meeting is called on Sunday. Since participants may make their travel reservations in order to attend technical meetings scheduled for Sunday, every effort will be made to limit any required closed meetings to only part of Sunday.

REPORTS

There will not be a transcript made of the proceedings of NCWM Interim Meetings. Each Committee will prepare its report containing its recommendations based upon the presentations, discussions, and deliberations on all matters on its agenda that were addressed during the Interim Meeting. These reports will be published in *NCWM Publication 16, Committee Reports for the 111th Annual Meeting*, to be posted online at www.ncwm.com in early April. Printed copies of *NCWM Publication 16* will be distributed to meeting attendees at the NCWM Annual Meeting in July.

ANNUAL MEETING

The 111th NCWM Annual Meeting will be held at:

Philadelphia Marriott Old City | July 26th-30th, 2026

UNITS OF MEASUREMENT

In keeping with the provisions of the Omnibus Trade and Competitiveness Act of 1988, which establishes the metric system as the preferred system of measurement for commerce and trade, units of the metric system have been used in this document, except where industry has not yet converted from the inch-pound system. In some instances, submitted proposals quoted in the Committee agendas may appear in inch-pound units only.

2026 Interim Meeting Agenda
NCWM Board of Directors

Jason Flint, NCWM Chairman
New Jersey

INTRODUCTION

The Board of Directors (hereinafter referred to as the "Board") will address the following items in Table A during the Interim Meeting. Table A identifies the agenda items by reference key, title of item, page number and the appendices by appendix designations. The first three letters of an item's reference key are assigned from the Subject Series List. The next 2 digits represent the year the item was introduced. The acronyms for organizations and technical terms used throughout the agenda are identified in Table B. In some cases, background information will be provided for an item. The fact that an item appears on the agenda does not mean it will be presented to the National Council on Weights and Measures (NCWM) for a vote. The Board will review its agenda and may withdraw some items, present some items for information meant for additional study, issue interpretations, or make specific recommendations for change to the publications identified, which will be presented for a vote at the Annual Meeting. The Board may also take up routine or miscellaneous items brought to its attention after the preparation of this document. The Board may decide to accept items for discussion that are not listed in this document, providing they meet the criteria for exceptions as presented in *NCWM Policy 3.1.4. Handbooks, Procedures to Modify Handbooks*. The Board has not determined whether the items presented will be Voting or Informational in nature; these determinations will result from their deliberations at the Interim Meeting.

Items may be grouped into “Blocks” if they are:

- **Opposing Items:** Items in direct conflict with each other, and only one may be adopted,
- **Interdependent Items:** Items addressing a similar topic where, if one is adopted, all need to be adopted, and
- **Related Items:** Items addressing a similar topic across multiple codes or regulations.

An "Item Under Consideration" is a statement of proposal and not necessarily a recommendation of the Board. Suggested revisions are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in ***bold faced italics***. Additional letters, presentations and data may have been part of the committee's consideration. Please refer to www.ncwm.com/publication-15 to review these documents.

All sessions are open to registered attendees of the meeting. If the Board must discuss any issue that involves proprietary information or other confidential material; that portion of the session dealing with the special issue may be closed if (1) NCWM Chairman or, in their absence, NCWM Chairman-Elect approves; (2) the Executive Director is notified; and (3) an announcement of the closed meeting is posted on or near the door to the meeting session and at the registration table. If possible, the posting will be done at least a day prior to the planned closed session.

Note: It is policy to use metric units of measurement in publications; however, recommendations received by NCWM technical committees and regional weights and measures associations have been printed in this publication as submitted. Therefore, the report may contain references to inch-pound units.

Subject Series List

Activity Reports ..... ACT Series
Strategic Planning, Policies, and Bylaws ..... SPB Series
Financial ..... FIN Series
Other Items ..... OTH Series

Table A
Table of Contents

Reference Key		Title of Item	BOD Page
ACT – ACTIVITY REPORTS			**5**
ACT-1	I	Membership	5
ACT-2	I	Meetings	6
ACT-3	I	Participation in International Standard-Setting	6
ACT-4	I	Associate Membership Committee Activity	6
ACT-5	I	Task Groups, Subcommittees, Steering Committees	7
ACT-6	I	Regional Association Activities	9
SPB – STRATEGIC PLANNING, POLICIES, AND BYLAWS			**10**
SPB-27.1		Professional Development Program	10
FIN – FINANCIAL			**12**
FIN-1	I	Treasurer's Report	12

APPENDICES

A ACT-3: Report of the Activities of the International Organization of Legal Metrology (OIML) and Regional Legal Metrology Organizations A15
B ACT-4: Associate Membership Committee (AMC) Agenda and Draft Meeting Minutes B30

Table B
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
AMC	Associate Membership Committee	NTEP	National Type Evaluation Program
NCWM	National Council on Weights and Measures	OIML	International Organization of Legal Metrology
NIST	National Institute of Standards and Technology	OWM	Office of Weights and Measures

Details of All Items
(In order by Reference Key)

ACT – ACTIVITY REPORTS

ACT-1 I Membership

The chart and graph below show NCWM membership levels of recent years by membership categories. October 1 is the lowest level of membership for each fiscal year because it is the day that any memberships that were not renewed lapse. Significant growth is realized over the following 12 months as additional members return and new members are added. The potential growth remains significant, and NCWM continues to enhance programs and services that add value to membership.

Year / Type	Oct. 2018	Oct. 2019	Oct. 2020	Oct. 2021	Oct. 2022	Oct. 2023	Sept. 2024	Oct. 2025	Oct. 2026
Associate	643	636	607	608	609	573	720	607	587
Foreign Associate	70	79	77	91	86	76	110	82	94
Total Associate	**713**	**715**	**684**	**699**	**695**	**649**	**830**	**689**	**681**
State Government	739	744	614	698	644	564	722	626	622
Local Government	412	406	397	389	380	350	418	319	328
Total Active	**1151**	**1150**	**1011**	**1087**	**1024**	**914**	**1140**	**945**	**950**
NIST	15	17	16	15	19	14	15	14	15
Other Federal Government	10	8	7	7	5	7	14	11	7
Foreign Government	14	14	13	13	14	15	19	17	24
Retired	225	235	241	245	248	353	185	140	133
Total Advisory	**264**	**274**	**277**	**280**	**286**	**389**	**233**	**182**	**179**
Grand Total	**2128**	**2139**	**1972**	**2066**	**2008**	**1952**	**2203**	**1816**	**1810**

ACT-2 I Meetings

Interim Meetings:

- January 24-27, 2027 Sonesta Redondo Beach & Marina: Redondo Beach, California
- January 23-26, 2028 Biltmore Los Angeles, Los Angeles: California
- January 21-24, 2029 The Shores Resort & Spa, Daytona Beach Shores, Florida

Annual Meetings:

- July 11-15, 2027 112th Annual Meeting: Marriott Knoxville Downtown, Knoxville, Tennessee
- July 23-27, 2028 113th Annual Meeting: Hyatt Regency St. Louis Arch, St. Louis, Missouri
- July 15-19. 2029 114th Annual Meeting: The Clyde Hotel, Albuquerque, New Mexico.

NCWM strives to plan meetings in locations that have reasonably priced airline service and are within government per diem rates. For more information about our meetings, contact Ms. Elisa Stritt, NCWM Director of Operations, at (402) 434-4872 or elisa.stritt@ncwm.com.

ACT-3 I Participation in International Standard-Setting

Katya Delak, representing the NIST Office of Weights and Measures, provided a report of its important efforts in international standard-setting at the NCWM Annual Meeting in July. See Appendix A for the report.

ACT-4 I Associate Membership Committee Activity

Approximately 40% of NCWM members are Associate members. The Associate Membership Committee (AMC) is organized under the Bylaws of the National Conference on Weights and Measures, Inc. The AMC also operates under separate Bylaws, which are available on the Committee page of www.ncwm.com. AMC meets at least 2 times per year in conjunction with NCWM Interim and Annual Meetings, and they invite all to attend. The AMC consists of between 5 and 10 members who, amongst themselves, elect officers to serve as Chair, Vice-Chair, and Secretary/Treasurer. See Appendix B for information on current members and officers.

AMC has established a reputation for promoting and improving NCWM and has demonstrated its desire to improve understanding of weights and measures activities in the public and private sectors.

The NCWM membership dues for Associate members of $115 are $15 higher than those for Active or Advisory members. The extra $15 is not for NCWM but rather is placed in a separate account referred to as the AMC Fund. The AMC has the discretion to allocate the funds in various ways. One means of allocating these funds is to provide grants in support of weights and measures training. The Committee receives applications and awards training grants from the AMC Fund following its "Guidelines for Selection and Approval of Training Funds," which are posted on the Committee's webpage at www.ncwm.com. Downloadable applications for training grants and reimbursement forms are also available at this site.

The criteria for receiving AMC funds for training are as follows:

1. Funding request forms that are complete, specific, and detailed will receive priority attention for approval.

Based on the degree of missing or ambiguous information provided, individual requests may not be given any consideration during the AMC review process, pending further clarification.

2. Preference is given to training requests that benefit higher numbers of participants over those for fewer or single-person benefit. The Committee also gives priority consideration to multi-state training that encourages uniformity.

3. In general, attending meetings such as NCWM Annual Meetings, Interim Meetings, or regional associations

meetings will not be considered training.

4. As a lower priority, the committee will consider requests for the purchase of training materials but not requests for the purchase of assets (such as projectors).

5. Reasonable funding for travel and expenses will be considered if it is necessary to acquire an "expert trainer" that would benefit a high number of weights and measures officials. This will be an option when qualified volunteers are not available.

ACT-5 I Task Groups, Subcommittees, Steering Committees

Task Groups, Subcommittees, Steering Committees:
Focus groups, task groups, subcommittees, and steering committees are created by the NCWM Chairman and operate as defined in NCWM Policy 1.5.1. Subgroups Supporting the Work of the Organization. A task group is given a specific charge, and it reports to the appropriate NCWM standing committee. A task group will disband after completing its assignment. A subcommittee is charged with ongoing responsibilities in support of a standing committee in a specific field of expertise. A steering committee is charged with unbiased fact-finding to assist NCWM membership in decision-making on difficult issues. A steering committee will disband upon completion of its specific charge.

NCWM offers resources to these task groups and subcommittees including meeting space at Interim and Annual Meetings, conference calling and web meeting services, group email services, a dedicated web page for posting and archiving documents related to their work, and broadcast e-mail services to reach targeted audiences. Additionally, NIST OWM has provided technical advisors and web meeting forums. These tools enable year-round progress of task group and subcommittee work.

Because NCWM task groups and subcommittees are part of the NCWM organizational structure and report directly to its standing committees, their proposals may appear in *NCWM Publication 15* without first being vetted through a regional association. NCWM vets any such proposals through its open hearings.

At the 2026 Interim Meeting, the board received updates from the following groups that report to the board:

Current task groups and subcommittees are listed here.

Reporting to the Board of Directors:

Policy and Bylaw Review Task Group
Chair: Chuck Corr
563-357-4167, chuckcorrconsulting@gmail.com

Training Planning Task Group
Chair: Mahesh Albuquerque
303-318-8502, mahesh.albuquerque@state.co.us

EVSE Task Group
Chair: Scott Dolan
802-828-2436, scott.dolan@vermont.gov

NCWM Standards Development Subcommittee
Chair: Jason Flint
973-420-8915, flintj@dca.njoag.gov

Reporting to the Laws and Regulations Committee:

Fuels and Lubricants Subcommittee
Chair: Vanessa Benchea
813-868-8263, Vanessa.Benchea@fdacs.gov

Packaging and Labeling Subcommittee
Chair: Chris Guay
513-652-6597, guay.cb@gmail.com

Uniform Shipment Law Task Group
Chair: Miland Kofford
801-538-7158, mkofford@utah.gov

Moisture Allowance Task Group
Chair: Tory Brewer
304-722-0602, tory.d.brewer@wv.gov

LPG Electronic Temperature Compensation Task Group
Chair: Christopher Wagner
610-308-3822, cwagner@npga.org

LMD Density Correction Task Group
Chair: Chair: Andrew Montayne
402-471-3422, andrew.montanye@nebraska.gov

Reporting to the Specifications and Tolerances Committee:

Cannabis Task Group:
Chair: Evan Foisy
631-560-3497, EFoisy@andonline.com

Milk Meter Tolerance Task Group
Chair: Aaron Yanker
719-250-1851, aaron.yanker@state.co.us

Verification Scale Division (e) Task Group
Chair: Evan Foisy
631-560-3497, EFoisy@andonline.com

Transportation-for-Hire Systems Task Group
Chair: Mark Lovisa
225-925-3780, mlovisa@ldaf.state.la.us

WIM Vehicle Scale Task Group
Chair: Jim Willis
518-485-8377, james.willis@agriculture.ny.gov

LMD Density Correction Task Group
Chair: Andrew Montayne
402-471-3422, andrew.montanye@nebraska.gov

Dry Materials Flow Sensor Task Group
Chair: To be Determined

Reporting to the Professional Development Committee:

Safety Subcommittee
Chair: John Satterlee
217-785-8480, john.satterlee@illinois.gov

Women in Weights and Measures Subcommittee
Co-Chair: Cheryl Ayer
303-318-8502, cheryl.e.ayer@agr.nh.gov
Co-Chair: Brandi Harder
715-234-9171, bharder@ricelake.com

Metrology Subcommittee
Chair: Frank Greene
860-713-7237, frank.greene@ct.gov

Member Education and Mentorship Subcommittee
Chair: Brian Fuller
515-201-5413, Brian.Fuller@IowaAgriculture.gov

Fraud Prevention and Education Task Group
Chair: Alan Walker
805-274-9044, alan.walker@FDACS.gov

Neutral Comments: No Comments

Industry:

- 2026 Annual Meeting: The Chair of the former Promotional Toolkit Task Group announced the completion of a new video highlighting state metrology laboratories. The video was presented to membership followed by robust applause.

ACT-6 I Regional Association Activities

2027 Meetings

NEWMA Annual Meeting
April 26-29, 2027
Portsmouth, New Hampshire
Contact: Steve Timar, steve.timar@agriculture.ny.gov

NEWMA Interim Meeting
September 26-29, 2027
Mystic, Connecticut
Contact: Steve Timar, steve.timar@agriculture.ny.gov

CWMA Annual Meeting
May 3-6, 2027
Lincoln, Nebraska
Contact: Sherry Turvey, Sherry.Turvey@ks.gov

CWMA Interim Meeting
To Be Determined
Contact: Sherry Turvey, Sherry.Turvey@ks.gov

WWMA Annual Meeting
September 26-30, 2027
Silver Mountain Resort
Contact: Brent Ricks, bricks@mt.gov

SWMA Annual Meeting
October 3-6, 2027
Hot Springs, Arkansas
Contact: Valerie Forbes, valerie.forbes@delaware.gov

SPB – STRATEGIC PLANNING, POLICIES, AND BYLAWS

SPB-27.1 Professional Development Program

Source:
NCWM Board of Directors

Purpose:
Amend the National Council on Weights and Measures Bylaws to provide additional clarification of the duties and field of responsibility of the Professional Development Committee.

Item under Consideration:
Amend NCWM Bylaws Article IX Section 5 – Duties and Fields of operations of Board of Directors and Committees, C. Professional Development Committee as follows:

C. PROFESSIONAL DEVELOPMENT COMMITTEE

The Professional Development Committee annually presents a report for Corporation action.

The mission of the Committee is:

To provide leadership to develop and implement uniform, quality weights and measures services in the areas of:

1. effective program management,
2. education, and
3. ~~**public relations**~~**training progams**.

Areas of focus:

1. NATIONAL TRAINING PROGRAMS

The focus of national training is to increase technical knowledge, strengthen credibility, and improve the professionalism of the individual weights and measures official. Strong training programs ~~**would**~~ promote uniformity across the nation. **The Committee oversees the development and ongoing improvement of NCWM training programs.**

2. NATIONAL CERTIFICATION

National certification provides confidence that an individual has a strong understanding of U.S. weights and measures standards adopted by NCWM and published in NIST Handbooks 44, 130, and 133. The Committee oversees the development and ongoing improvement of professional certification.

3. COUNCIL TRAINING TOPICS

The Committee ~~**would**~~ **is to** be the focal point for gathering and recommending workshops or symposia on leadership, management, and emerging issues to be presented during the **Interim and** Annual Meeting. These topics would provide a forum for the exchange of ideas and discussion of changes in the marketplace.

~~**4. UNIFORMITY OF DATA**~~

~~**The Committee would develop standard categories for devices and inspection areas so that such things as the number of devices, compliance rates, frequency of inspection and other areas could be compiled and compared at the national level. These statistics could be used to benchmark organizations and to communicate the value of weights and measures to the public and to decision makers.**~~

(Amended **20XX**)

Previous Status:
2027: New Proposal

Original Justification:
The educational and training needs of the NCWM membership have evolved, and the role of the Professional Development Committee (PDC) should be refined and expanded to better reflect the current and future needs of the organization. The PDC no longer serves as the public relations arm of NCWM, and the organization has not collected categorical data on devices and inspection areas since 2010.

Moving forward, the PDC's primary focus should be on identifying, procuring, reviewing, and updating relevant training topics for presentation at both the Interim and Annual Meetings. Additionally, the Committee should take a more active role in developing and coordinating training programs and educational opportunities hosted by NCWM to support the continued professional development of its membership.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
•

Item Development:
New Proposal

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

FIN – FINANCIAL

FIN-1 I Treasurer's Report

Overall, NCWM's finances remain healthy, and there are no concerns. All financial transactions and balances have been appropriately recorded and reported, and our internal controls and reviews effectively ensure the accuracy and reliability of the financial information. The most recent fiscal year audit by Dana F. Cole & Company, LLP confirms these statements.

I recommend continuing to monitor NCWM's financial performance and taking proactive measures to ensure its long-term financial stability.

Respectfully submitted by Mahesh Albuquerque, Treasurer.

ASSETS	**September 30, 2025**	**September 30, 2026**
Current Assets	$	$
Associate Member Fund	18,975.61	24,387.18
Certificates of Deposit	274,278.41	280,273.38
Equities	1,136,077.80	1,313,279.89
Money Market Fund	152,921.37	305,290.01
Checking	39,057.63	25,148.60
Savings	11,050.44	5.75
Total Checking/Savings	1,632,361.26	1,948,384.81
Accounts Receivable	62,691.13	70,977.22
Other Current Assets	390,858.44	398,055.22
Fixed Assets	-83,457.23	-83,457.23
Other Assets	449,308.00	460,591.90
TOTAL ASSETS	**2,451,761.60**	**2,794,551.92**
LIABILITIES & EQUITY		
Liabilities		
Current Liabilities	509,866.26	505,492.75
Total Liabilities	509,866.26	505,492.75
Equity		
Designated - Associate Membership	32,730.32	30,395.96
Opening Balance Equity	0.00	1,026.26
Unrestricted Net Assets	1,732,313.95	1,913,174.73
Net Income	176,851.07	344,462.22
Total Equity	1,941,895.34	2,289,059.17
TOTAL LIABILITIES & EQUITY	**2,451,761.60**	**2,794,551.92**

Jason Flint, New Jersey | NCWM Chairman
Paul Floyd, Louisiana | NCWM Chairman-Elect
Kevin Schnepp, California | NTEP Committee Chair
Mahesh Albuquerque, Colorado | Treasurer
Daniel Walker, Ohio | Active Membership - Central
James Willis, New York | Active Membership – Northeastern
Tory Brewer, West Virginia | Active Membership - Southern
Bill Striejewske, Nevada | Active Membership - Western
Jason Glass, Kentucky | At-Large
Sherry Turvey, Kansas | At-Large
Ray Johnson, Fairbanks Scales | AMC Representative

Don Onwiler, NCWM | Executive Director
Katrice Lippa, NIST, OWM | Executive Secretary
Erica Garnier, Measurement Canada | Advisor
Jeff Gibson, NCWM | NTEP Administrator

Board of Directors

Appendix A
July 2026 Report of the Activities of the International Organization of Legal Metrology (OIML) and Regional Legal Metrology Organizations

National Institute of Standards and Technology (NIST), Office of Weights and Measures (OWM)



International Legal Metrology Program

NIST



Dr. Katya Delak
Group Leader

Electrical metering, digitalization, and supply blockchain systems



Jan Konijnenburg
Scientific Engineer

Weighing instruments, digitalization, and software security



Dr. Michael Nelson
Physical Scientist

Chemical analyzers, medical instruments, and electric vehicle supply equipment

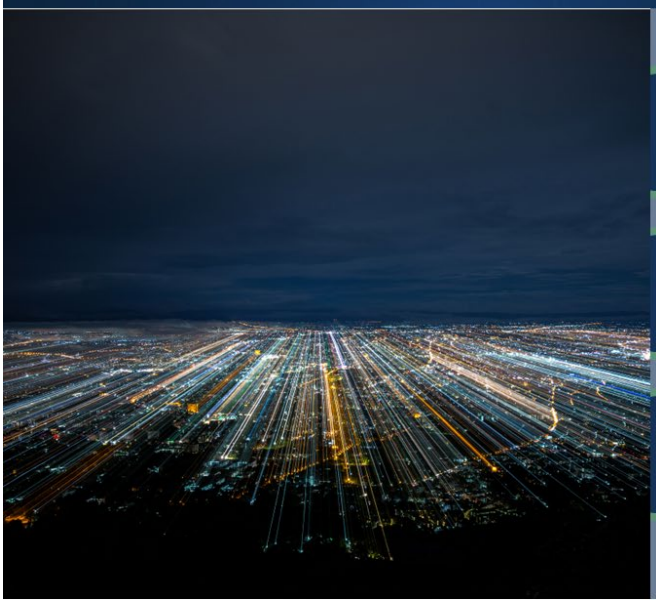


Isabel Chavez-Baucom
Quality Manager

Legal metrology regulations, document digitalization, and international accreditation frameworks

Benefits of Participation

NIST



- Global network of expertise
- Horizon scanning
- Requirements for manufacturers

OIML High Priority Projects & Publications

NIST

OIML-CS Certificates issued	Anticipation of future demand
Broadly referenced documents	Documents used regionally as normative



OIML Top Projects

NIST



Electricity



Weighing



Volume

OIML Top Projects: Electricity



- **G22 "Electric Vehicle Supply Equipment (EVSE)"**
  2WD issued following a 1CD in June. Test modes, accuracy are in discussion.
- **R46 "Electrical Energy Meters"**
  Work on 3CD. Issues related to paradigm shift in reactive and apparent energy measurement. Synchronizing revision with IEC and ANSI C12 revisions.
- **New project: "DC Electricity Meters"**
  Relevant to EVSE. Review of 2WD in progress. Unresolved areas involve testing conditions, specifically voltage and current combinations.

OIML Top Projects: Weighing Systems

All of the following OIML Recommendations are currently in active revision:

R51 "Catchweighers"

R76 "Non-automatic weighing Instruments (NAWI)"

R134 "Weigh-in-Motion (WIM) Systems"



OIML Top Projects: Volume



OIML revisions to be carried to completion

R 71 Fixed Storage Tanks
R 85 Automatic Level Gauges

Isabel Chavez-Baucom and Elizabeth (Els) Koncki convening.

Re-initiated PG work. Documents at 2WD status are receiving comments in the summer of 2026.



OIML Top Projects: Volume

Liquefied Natural Gas (LNG)
Covered by OIML R117 "Dynamic measuring systems for liquids other than water"

Hydrogen
US in conjunction with NL has proposed revision of R117 to include liquid hydrogen. CIML vote to approve this year.

New Project: OIML G24
Fixed storage and transportable tanks. Calibration using electro-optical distance-ranging method.

NIST NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

Opportunities

Propose revision for R121 Multi-dimensional Measuring Instruments based on HB 44 text

Volumetric Measuring Devices

Other upcoming projects

R21 Taximeters

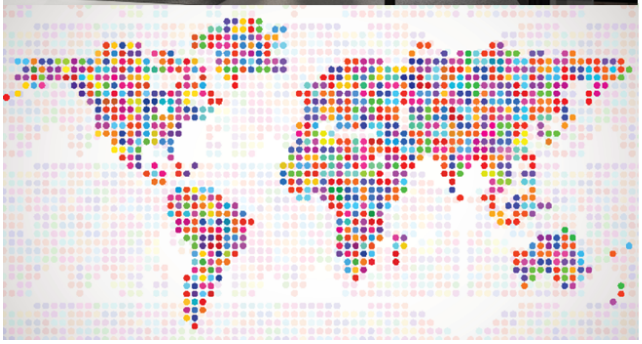
R139 Compressed Gaseous Fuel Measuring Systems for Vehicles

NIST NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY U.S. DEPARTMENT OF COMMERCE

Decisions from CIML 60

NIST





New Project Approval

Fixed Storage and Transportable Tanks - Calibration Using Optical Distance Ranging Method

Approval of Final Drafts

- R142 Automated Refractometers
- R91 Traffic Speed Meters
- R111 Weights of Classes E_1, E_2, F_1, F_2, M_1, M_{1-2}, M_2, M_{2-3} and M_3 (update only)

Cancelled Projects

- R95 Ships' Tanks – General Requirements
- R125 Measuring Systems for the Mas of Liquids in Tanks
- Combined revision R 101 & R 109 Indicating and Recording Pressure Gauges, Vacuum Gauges and Pressure-vacuum Gauges with Elastic Sensing Elements.

Interim Completed Publications

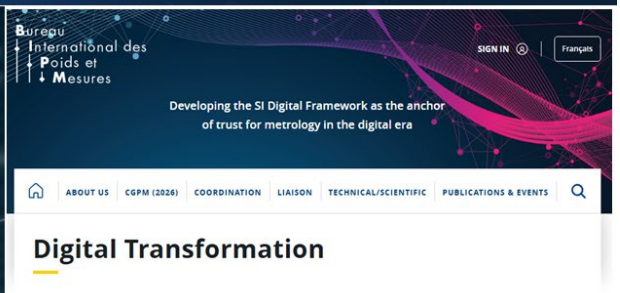


D11 General Requirements for Measuring Instruments – Environmental Conditions

R54 pH Scale for Aqueous Solutions

OIML Digitalization Efforts





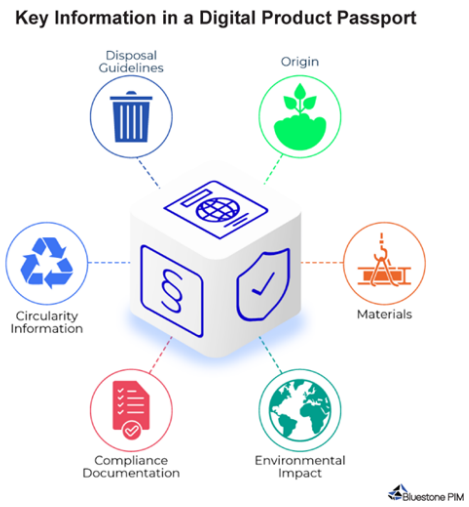
Digital Transformation

Joint Statement of Intent on the digital transformation in the international scientific and quality infrastructure

- **E-Learning**
- **Artificial Intelligence**
- **Digital OIML Recommendations**

Digital Quality Infrastructure

NIST



ISO/IEC JTC 5
Digital Product Passport

First meetings July

Motivated by EU Digital Product Passport
Ecodesign for Sustainable Products Regulation (ESPR)

- Clothing
- Batteries
- Later to include electronics.

Other countries – China, UAE, Turkey

Digital Quality Infrastructure

NIST



ISO/IEC JTC 5
Digital Product Passport

First meetings July

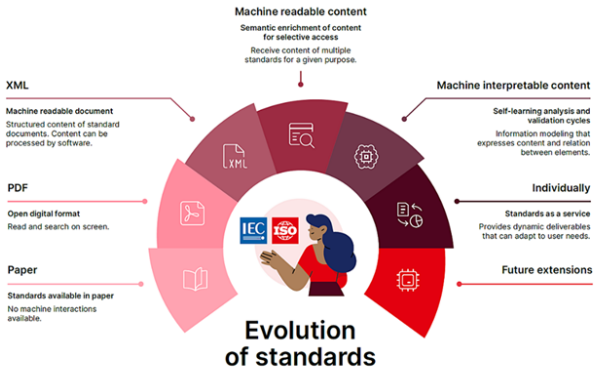
Motivated by EU Digital Product Passport
Ecodesign for Sustainable Products Regulation (ESPR)

- Clothing
- Batteries
- Later to include electronics.

Other countries – China, UAE, Turkey

Digital Type Evaluation Certificate

OIML Work in Digitalization

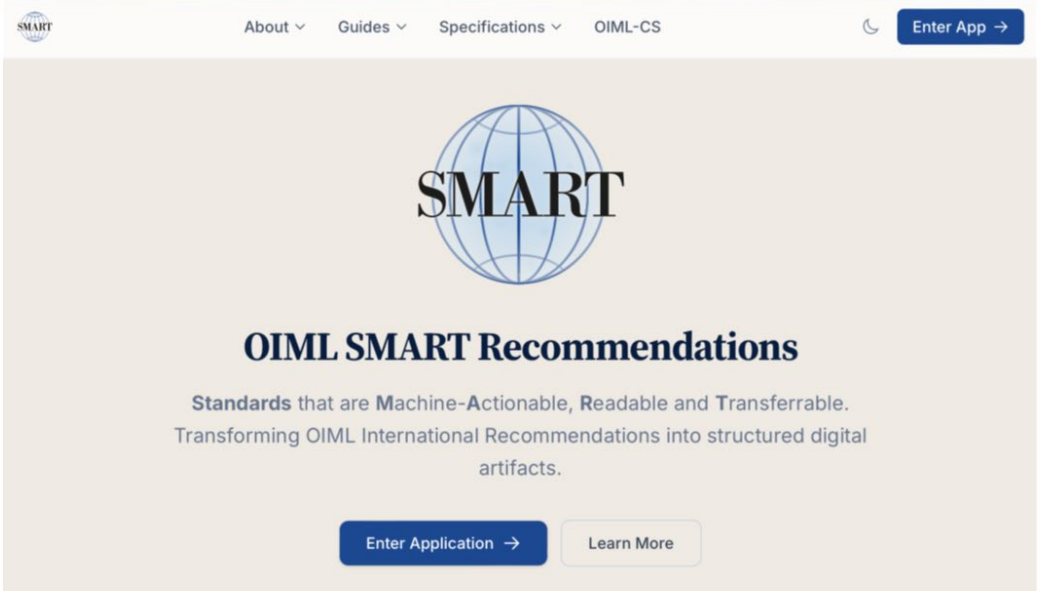


Credit: IEC/ISO SMART

Machine Readable Standards

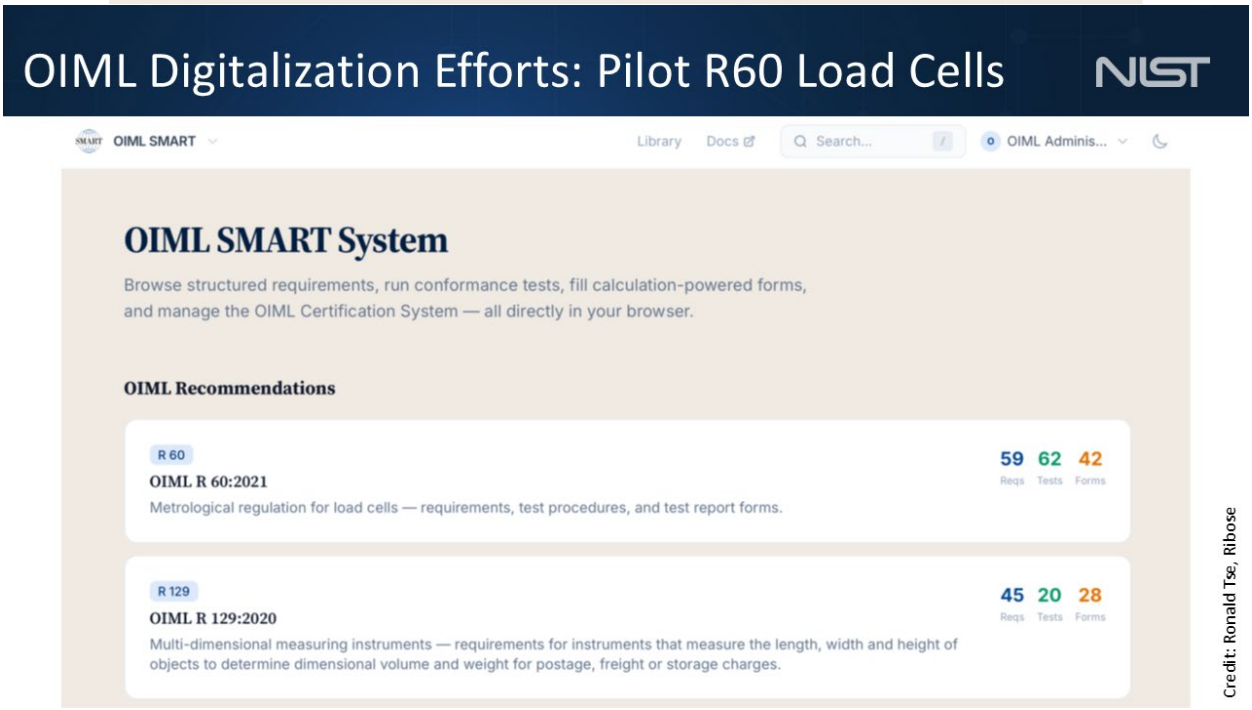
- Pilot R 60 Load Cells
- Test Report
- Type Evaluation Report

OIML Digitalization Efforts: Pilot R60 Load Cells

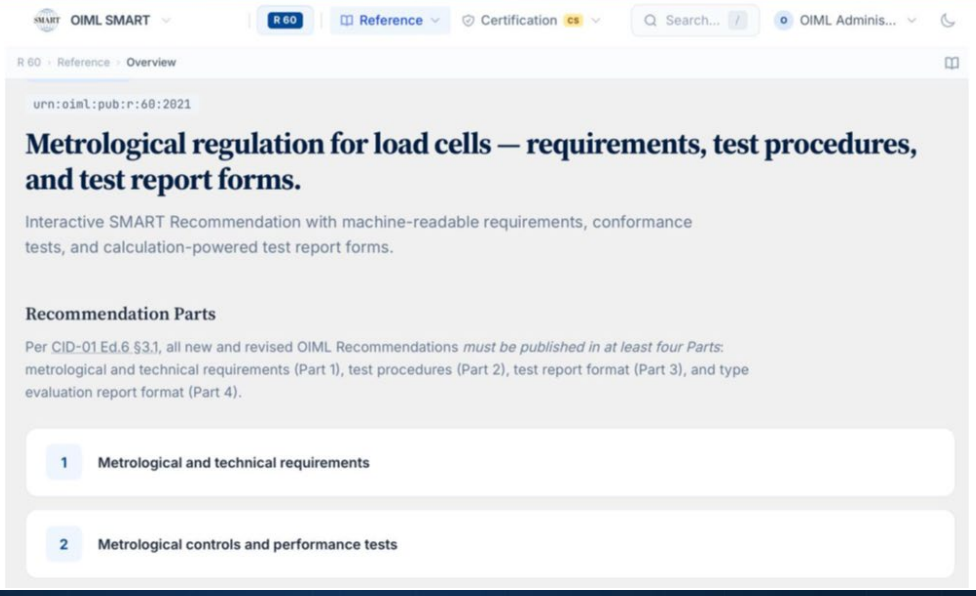


Credit: Ronald Tse, Ribose


OIML Digitalization Efforts: Pilot R60 Load Cells
NIST
About
Guides
Specifications
OIML-CS
Enter App
SMART
OIML SMART Recommendations
Standards that are Machine-Actionable, Readable and Transferrable.
Transforming OIML International Recommendations into structured digital artifacts.
Enter Application
Demo Site: oimlsmart.org
Credit: Ronald Tse, Ribose

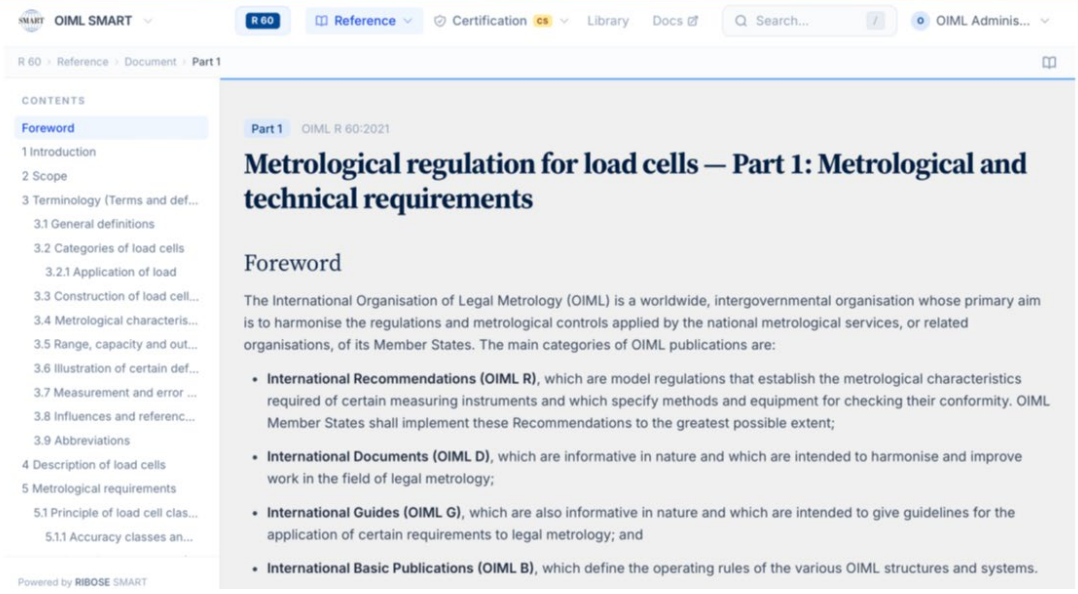

OIML Digitalization Efforts: Pilot R60 Load Cells
NIST
OIML SMART
Library
Docs
Search...
OIML Adminis...
OIML SMART System
Browse structured requirements, run conformance tests, fill calculation-powered forms, and manage the OIML Certification System — all directly in your browser.
OIML Recommendations
R 60
OIML R 60:2021
Metrological regulation for load cells — requirements, test procedures, and test report forms.
59 Reqs
62 Tests
42 Forms
R 129
OIML R 129:2020
Multi-dimensional measuring instruments — requirements for instruments that measure the length, width and height of objects to determine dimensional volume and weight for postage, freight or storage charges.
45 Reqs
20 Tests
28 Forms
Credit: Ronald Tse, Ribose

OIML Digitalization Efforts: Pilot R60 Load Cells



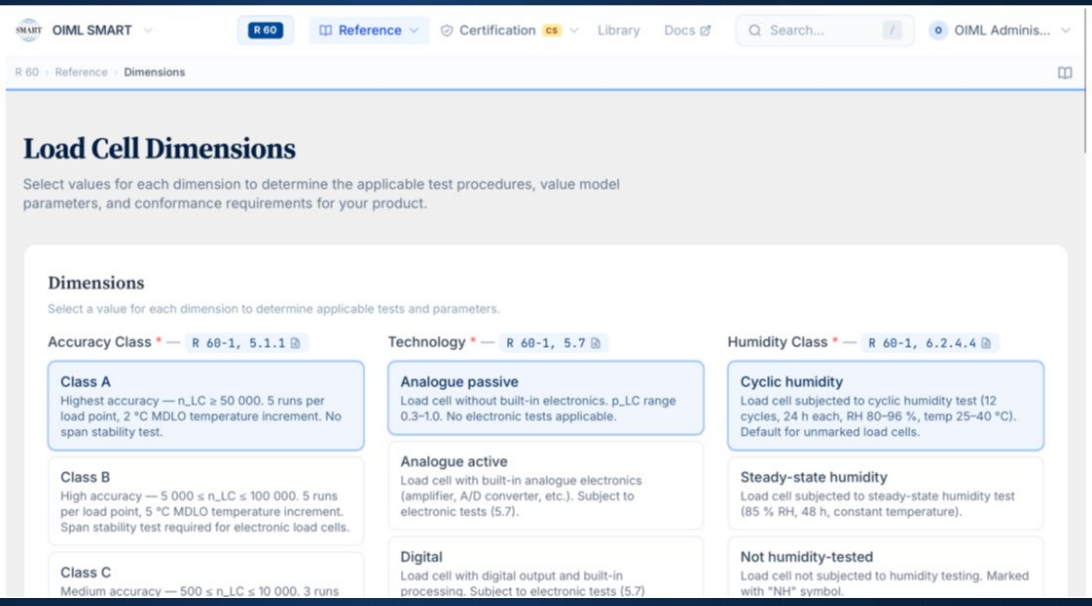
Credit: Ronald Tse, Ribose

OIML Digitalization Efforts: Pilot R60 Load Cells



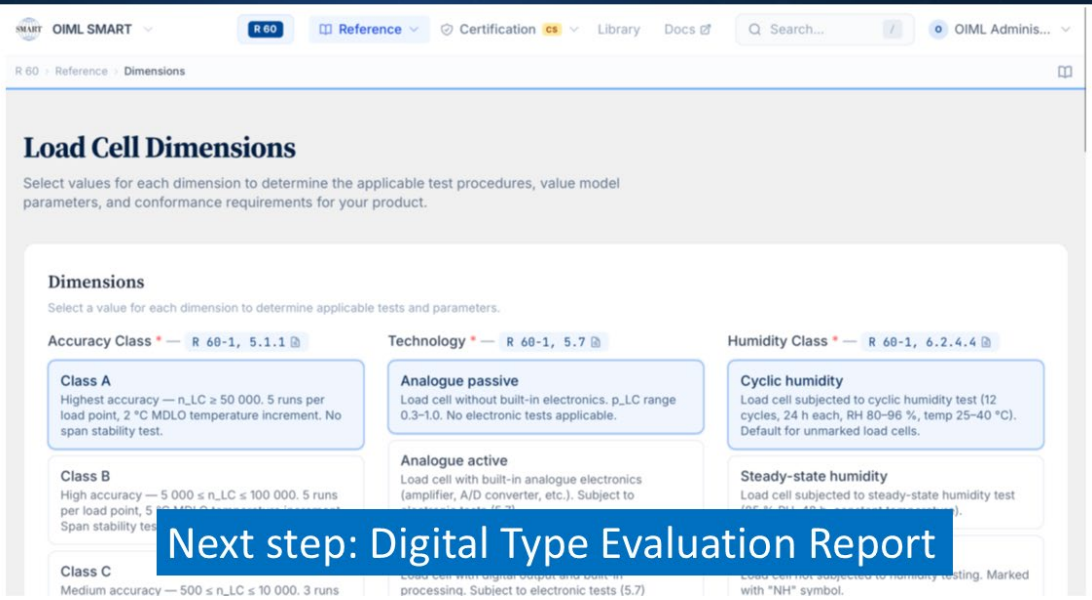
Credit: Ronald Tse, Ribose

OIML Digitalization Efforts: Pilot R60 Load Cells



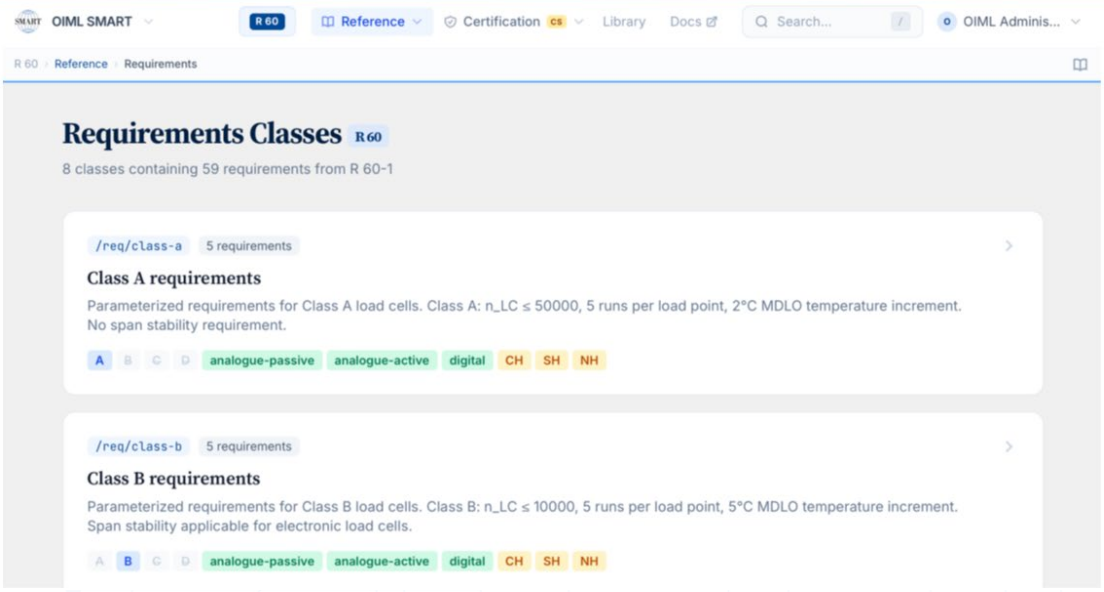
Credit: Ronald Tse, Ribose

OIML Digitalization Efforts: Pilot R60 Load Cells



Credit: Ronald Tse, Ribose

OIML Digitalization Efforts: Pilot R60 Load Cells



Credit: Ronald Tse, Ribose

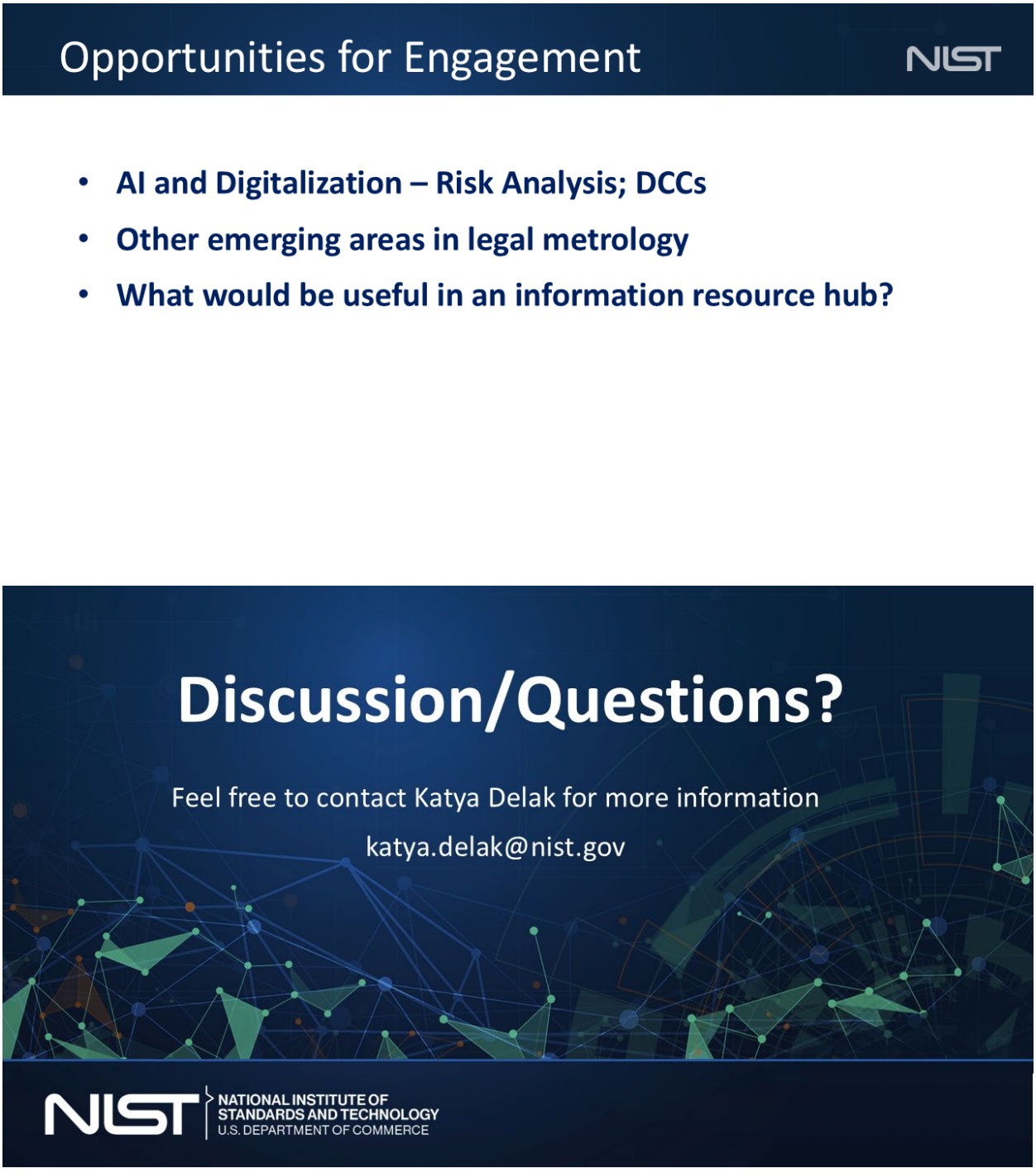
Annual CIML Meeting

- The 61st CIML Meeting is currently scheduled to be held in October 2026.

OIML Certification System (OIML-CS)

- Certification System is now mature
- 37 OIML Recommendations are now in OIML-CS

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE


Opportunities for Engagement
NIST
• AI and Digitalization – Risk Analysis; DCCs
• Other emerging areas in legal metrology
• What would be useful in an information resource hub?
Discussion/Questions?
Feel free to contact Katya Delak for more information
katya.delak@nist.gov
NIST
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

OIML High Priority Publications

Pub.	Title	Status
B6	*Directives for OIML technical work*	In revision
D11	*General requirements for measuring instruments – Environmental Conditions*	Published 2026
D31	*General requirements for software controlled measuring instruments*	In revision (2CD)
R46	*Active electrical energy meters*	In revision (2CD)
R49	*Water meters for cold potable water and hot water*	Published 2024
R51	*Automatic catchweighing instruments*	8WD; active
R60	*Metrological regulation for load cells*	OIML-CS Review
R76	*Non-automatic weighing instruments*	In revision
R91	*Radar equipment for the measurement of the speed of vehicles*	Published 2026
R117	*Dynamic measuring systems for liquids other than water*	New revision – liquid H2 approved; to start.
R137	*Gas meters*	In revision
R139	*Compressed gaseous fuel measuring systems for vehicles*	OIML-CS Review

OIML High Priority Projects

PG	Pub.	Title	Status
TC5/SC1/p2	D31	*General requirements for software controlled measuring instruments*	In revision
TC12/p1	R46	*Active electrical energy meters*	3CD released with PG meeting in June.
TC12/p3	Rxxx	*Electric Vehicle Supply*	2WD released in advance of PG meetings in June
TC12/p4	Rxxx	*DC Electricity metering*	2WD issued following 1CD; PG meetings June 2026 to work on 2WD
TC9/SC1/p1	R76	*Non-automatic weighing instruments*	Last activity Nov 2025. Core team working on this.
TC6/p6	R87	*Prepackage template*	No updates since April 2022
TC7/SC4/p3	R91	*Radar equipment for the measurement of the speed of vehicles*	Published 2026

Associate Membership Committee Meeting Minutes
Wednesday, July 29th, 2026
NCWM 2026 Annual Meeting – Philadelphia, PA

Call to order: Chairman Jim Pettinato called the meeting to order at 7:33 AM EDT.

Roll call/Introductions: All attendees were asked to introduce themselves and sign the attendance sheet. The Associate Member Committee members present were:

- Jim Pettinato [Chair]
- Brent Price [Vice-chair and L&R Representative]
- Reid Wagner [Secretary/Treasurer]
- Ray Johnson [BOD Representative]
- Perry Lawton [PDC Representative]
- Bill Callaway
- Bob Murnane
- David Boykin
- Chris Wagner

There were approximately 28 attendees overall present at the meeting.

Approval of agenda: The committee reviewed and approved the meeting agenda.

Approval of last meeting minutes: The committee reviewed and approved the previous minutes of the 2026 Interim meeting held in Mobile, AL.

Financial Report: The committee reviewed and approved the financial report. In summary, the account balance as of 6/30/2026 was $24,384.11. Approved payments pending in the amount of $4,123.12 were noted in the committee financial report for the toolkit. Net available funds, less approved pending payments, was reported to be $20,260.99.

NCWM Standing Committee Reports: The committee heard reports from standing committee representatives in attendance.

Board of Directors (BOD): Ray Johnson delivered the BOD report.

- BOD held June strategic planning meeting.
- The proposed increase of AMC dues, from $115 to $140, was approved. The dues increase will take effect FY27/28.
- The work recently completed by the Standards Development Task Group to evaluate the NCWM Charter Team 2 Report of 2018 was noted to be comprehensive, and AMC members are encouraged to review the recommendations.
    - Link: Final Report from the NCWM SDTG (Published June 1, 2026)

Laws & Regulations (L&R): Brent Price delivered the L&R report.

- Three voting items were considered, two with voting consent and no changes of status on items from the 2026 NCWM Interim Meeting.
- Several items are assigned to task groups, and the Committee is awaiting their work and updates to be presented at the 2027 NCWM Interim Meeting.

Professional Development Committee (PDC): Perry Lawton delivered the PDC report.

- The PDC is working to improve communication between various working groups and the PDC.
- The PDC is also investigating capabilities to uplift professional development courses that are emphasizing soft skills.

Old Business:

- The AMC received one training reimbursement inquiry from Wisconsin, but no application has been formally submitted. No additional funding requests have been received since the 2026 NCWM Interim Meeting.
- The increase in associate membership dues and response timing to requests was reviewed.
    - The increase from $115 to $140 was clarified to take effect in fiscal year (FY27/28)
        - Current invoices still reflect $115 for FY26/27
    - Typical response times to funding requests are noted to be on the order of days, which is dependent upon the time it takes to receive sufficient responses from the committee to reach a majority decision.

New Business:

- Assignments to the Committee
    - Jim Pettinato, Brent Price, Reid Wagner, and David Boykin terms expire in 2026 (at the end of the Annual Meeting). All but David Boykin expressed a willingness to continue as AMC committee members. Additionally, Prentiss Searles has retired, leaving another position open. It was communicated to the attendees that anyone interested in an appointment was welcome to volunteer. After some discussion, two additional committee members were appointed:
        - Bryan Just, API
        - Liz Mashie – Wal-Mart
- Election of officers:
    - There was a motion from the floor to nominate the current officers to continue in their roles for the 2026-2027 NCWM session. Motion was seconded and passed. The following Officers positions are retained:
        - Chairman: Jim Pettinato, Guidant
        - Vice-Chairman: Brent Price, Gilbarco
        - Secretary/Treasurer: Reid Wagner, Growth Energy
- Pending requests for funding:
    - AMC agreed to reimburse half of the expenses incurred to develop the promotional video debuted during the NCWM General Session. $623.12 was previously approved for reimbursement under the Toolkit Task Group, however, the total required reimbursement came out to approximately $1465. The AMC requested that Stephen Benjamin put in a new request for additional reimbursement to cover the remaining costs. The additional reimbursements will be reflected in the next AMC financial report.

- Discussion ensued noting the value of promotional and training content such as videos or handouts. The value was widely recognized by the committee.
    - A motion and second was made to allocate $5000 toward the development of “promotional and training content”. The motion passed after brief discussion.
    - The remaining Toolkit Task Group promotional video reimbursements would be deducted from this new fund.
- Pending funding for Connecticut metrology training was also discussed due to the appearance of the line item across multiple AMC financial reports.
    - The funds were originally requested for Connecticut metrology training, which also aimed to create a mentorship program.
    - To date, the funds have not been spent on the program, and the committee was unsure if the work to commence the program has begun.
    - The NCWM Director will reach out to the requestor to get an updated status.
- The committee discussed an addition, or change, to the funding application form, process, or AMC bylaws to help ensure funds requested are utilized in a reasonable timeframe.

- After discussion, consensus was reached that 18 months would be an appropriate timeframe for submitting a reimbursement request for pending approved funding.
- AMC will work to draft a policy document, suggest new language on the application form, or make a recommendation to change the bylaws which will be reviewed at the 2027 NCWM Interim Meeting.

Next Meeting: The next meeting is planned in conjunction with the 2027 NCWM Interim Meeting during the week of January 24th in Redondo Beach, CA; exact time and date TBD.

Meeting Adjournment: Meeting adjourned at 8:26 AM EDT.

Associate Membership Committee:

- *Jim Pettinato (Chair)*
- *Brent Price (Vice-chair, L&R representative)*
- *Reid Wagner (Secretary/Treasurer)*
- *Ray Johnson (BOD representative)*
- *Perry Lawton (PDC representative)*
- *Bill Callaway*
- *Bob Murnane*
- *Bryan Just*
- *Liz Mashie*

Chris Wagner

2027 Interim Meeting Agenda
Laws and Regulations (L&R) Committee

Michael Peeler, Committee Chair
New Jersey

INTRODUCTION

The L&R Committee will address the following items in Table A during the Interim Meeting. Table A identifies the agenda items by reference key, title of item, page number and the appendices by appendix designations. The headings and subjects apply to *Handbook 130, Uniform Laws and Regulations in the Areas of Legal Metrology an Engine Fuel Quality, 2026 Edition*, and *Handbook 133, Checking the Net Contents of Packaged Goods, 2026 Edition*. The first three letters of an item's reference key are assigned from the Subject Series List. The next 2 digits represent the year the item was introduced. The acronyms for organizations and technical terms used throughout the agenda are identified in Table B. In some cases, background information will be provided for an item. The fact that an item appears on the agenda does not mean it will be presented to the National Council on Weights and Measures (NCWM) for a vote. The Committee will review its agenda and may withdraw some items, present some items for information meant for additional study, issue interpretations, or make specific recommendations for change to the publications identified, which will be presented for a vote at the Annual Meeting. The Committee may also take up routine or miscellaneous items brought to its attention after the preparation of this document. The Committee may decide to accept items for discussion that are not listed in this document, provided they meet the criteria for exceptions as presented in *NCWM Policy 3.1.4. Handbooks, Procedures to Modify Handbooks*. The Committee has not determined whether the items presented will be voting, informational, assigned for further development, or withdrawn; these determinations will result from its deliberations at the Interim Meeting.

Items may be grouped into "Blocks" if they are:

- **Opposing Items:** Items in direct conflict with each other, and only one may be adopted,
- **Interdependent Items:** Items addressing a similar topic where, if one is adopted, all need to be adopted, and
- **Related Items:** Items addressing a similar topic across multiple codes or regulations.

An "Item Under Consideration" is a statement of proposal and not necessarily a recommendation of the Committee. Suggested revisions are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in ***bold faced italics***. Additional letters, presentations and data may have been part of the committee's consideration. Please refer to www.ncwm.com/publication-15 to review these documents.

In some cases, there may be proposed changes affecting multiple model laws or regulations that share the same purpose or proposed changes to one model law or regulation may be dependent on the adoption of proposed changes to another. The Committee may group such items into "Blocks" to facilitate efficient handling for open hearings and voting. These blocks are identified in the Committee's agenda.

All sessions are open to registered attendees of the meeting. If the Committee must discuss any issue that involves proprietary information or other confidential material; that portion of the session dealing with the special issue may be closed if (1) NCWM Chairman or, in their absence, NCWM Chairman-Elect approves; (2) the Executive Director is notified; and (3) an announcement of the closed meeting is posted on or near the door to the meeting session and at the registration table. If possible, the posting will be made at least a day before the planned closed session.

Note: The policy of NIST is to use metric units of measurement in all its publications; however, recommendations received by NCWM technical committees and regional weights and measures associations have been printed in this publication as submitted. Therefore, the report may contain references to U.S. customary units.

Subject Series List

Handbook 130 – General ..... GEN Series

- Uniform Laws
  - Uniform Weights and Measures Law ..... WAM Series
  - Uniform Weighmaster Law ..... WML Series
  - Uniform Fuels and Automotive Lubricants Inspection Law ..... FLL Series
- Uniform Regulations
  - Uniform Packaging and Labeling Regulation ..... PAL Series
  - Uniform Regulation for the Method of Sale of Commodities ..... MOS Series
  - Uniform Unit Pricing Regulation ..... UPR Series
  - Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices ..... RSA Series
  - Uniform Regulation for National Type Evaluation ..... NTP Series
  - Uniform Fuels and Automotive Lubricants Regulation ..... FLR Series
  - Uniform E-commerce Regulation ..... ECM Series
- Examination Procedure for Price Verification ..... PPV Series
- NCWM Policy, Interpretations, and Guidelines ..... POL Series

Handbook 133 ..... NET Series

Other Items ..... OTH Series

Table A
Table of Contents

Reference Key		Title of Item	L&R Page
MOS – UNIFORM REGULATION FOR THE METHOD OF SALE OF COMMODITIES			**37**
MOS-27.3		1.12. Ready-to-Eat Food	37
MOS-26.2	A	2.21.2. Metered Sales by Liquid Volume.	41
MOS-26.3	A	Section 2.20 Gasoline and Gasoline Oxygenate Blends	44
MOS-27.4		2.33.2. Method of Sale.	58
RSA – UNIFORM REGULATION FOR THE VOLUNTARY REGISTRATION OF SERVICEPERSONS AND SERVICE AGENCIES FOR COMMERCIAL WEIGHING AND MEASURING DEVICES			**61**
RSA-27.1		Section 4. Voluntary Registration	61
RSA-27.2		Section 8. Placed in Service Report	64
FLR – UNIFORM FUELS AND AUTOMOTIVE LUBRICANTS REGULATION			**66**
FLR-27.3		3.2. Automotive Gasoline and Automotive Gasoline Oxygenate Blends (Including Racing Gasoline)	66
FLR-26.1	A	7.2. Reproducibility Limits	69
NET – HANDBOOK 133			**73**
NET-27.1		1.2.6.1. Deviations Caused by Moisture Loss or Gain and Table 2-3. Moisture Allowances.	73
NET-27.2		2.3.5. Procedures for Determining Tare. and 2.3.5.2. Special Procedures for Determining Tare.	81
NET-27.3		NIST Handbook 133, Chapter 2 Reformatting	88
NET-27.4		NIST Handbook 133, Chapter 3 Reformatting	104
OTH – OTHER ITEMS			**133**
OTH-24.1	A	X. Uniform Shipment Law	133
OTH-27.1		X. Uniform Shipment Regulation	139
OTH-07.1	D	Fuels and Lubricants Subcommittee	147
OTH-11.1	D	Packaging and Labeling Subcommittee	150
ITEM BLOCK 1 (B1)		**PREMIUM DIESELL FUEL**	**152**
B1: MOS-27.1		2.39.2. Premium Diesel Fuel.	152
B1: FLR-27.1		2.2.1. Premium Diesel Fuel.	154
ITEM BLOCK 2 (B2)		**~~MTBE~~ETBE**	**156**
B2: MOS-27.2		2.20.1. Method of Retail Sale, 2.20.2. Product Transfer Document (PTD) Requirements.	157
B2: FLR-27.2		~~1.46. MTBE. – Methyl tertiary butyl ether, the chemical compound (CH3)3COCH3 [C5H12O].~~, 1.X. ETBE. – Ethyl tertiary-butyl ether, the chemical compound (CH3CH2OC(CH3)3 [C6H14O]., 3.2.4. Method of Retail Sale., 3.2.5. Product Transfer Document (PTD) Requirements., Appendix A. ~~MTBE, Methyl tertiaryubutyl ether~~, ETBE, Ethyl tertiary-butyl ether	159
ITEM BLOCK 4 (B4)		**MOISTURE ALLOWANCE CONSIDERATION**	**161**
B4: POL-25.1	A	2.6.12. Point-of-Pack Inspection Guidelines.	162
B4: NET-25.1	A	1.2.6.1. Applying a Moisture Allowance Consideration, 2.3.8. Moisture Allowance~~s~~ Considerations, 4.10.2.2. Moisture Shrinkage Allowance Consideration for Structural Plywood and Wood-based Structural Panels, 4.11.2.1. Shrinking Allowance Consideration	162
APPENDICIES			
A		OTH-11.1 Quantity-Related Expressions on a Principal Display Panel	A184

Table B
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
ASTM	ASTM International	NEWMA	Northeastern Weights and Measures Association
API	American Petroleum Institute	NIST	National Institute of Standards and Technology
CFR	Code of Federal Regulations	NCWM	National Council on Weights and Measures
CWMA	Central Weights and Measures Association	OWM	Office of Weights and Measures
FALS	Fuels and Lubricants Subcommittee	PALS	Packaging and Labeling Subcommittee
FDA	Food and Drug Administration	S&T	Specifications and Tolerances
FTC	Federal Trade Commission	SAE	SAE International
HB	Handbook	SWMA	Southern Weights and Measures Association
ILMA	Independent Lubricant Manufacturers Association	UPLR	Uniform Packaging and Labeling Regulation
L&R	Laws and Regulations	USDA – FSIS	U.S. Department of Agriculture – Food Safety and Inspection Service
LPG	Liquefied Petroleum Gas	USNWG	U.S. National Work Group
MAV	Maximum Allowable Variation	WWMA	Western Weights and Measures Association

Details of All Items
(In order by Reference Key)

MOS – UNIFORM REGULATION FOR THE METHOD OF SALE OF COMMODITIES

MOS-27.3 1.12. Ready-to-Eat Food

Source
New Jersey Weights and Measures

Purpose:
Create clarity surrounding restaurant-style foods, consumer habits, and methods of sale.

Item under Consideration:
Amend NIST Handbook 130 Uniform Regulation for the Method of Sale of Commodities as follows:

1.12. Ready-to-Eat Food.

1.12.1. Definition. – ~~**Restaurant style food**~~ **Meals or portions of prepared foods** offered or exposed for sale, whether in restaurants, supermarkets, or similar food service establishments, that ~~**is**~~ **are** ready for immediate human consumption, though not necessarily on the premises where sold, ~~**and**~~ which do~~**es**~~ not require any ~~**cooking or heating**~~ **further** preparation by the customer, **and which are serve or transferred to the customer through a direct service counter**. Ready-to-eat food does not include sliced luncheon products, such as meat, poultry, or cheese when sold separately.

~~**Some examples of ready-to-eat food items: (This list is not intended to be all inclusive.)**~~
~~**· servings of pasta, potato, or coleslaw;**~~
~~**· servings of salads, vegetables, or grains such as rice;**~~
~~**· pizzas, whole or sliced;**~~
~~**· meat/vegetable pockets/pies;**~~
~~**· tacos, fajitas, enchiladas, tostadas;**~~
~~**· cooked, whole chickens or turkeys;**~~
~~**· buckets, tubs, or individual pieces of cooked chicken or fish;**~~
~~**· cooked ribs by the slab or piece;**~~
~~**· stuffed clams, oysters, shrimp, and fish;**~~
~~**· cooked shrimp or crab cakes;**~~
~~**· slices of cake, pie, or quiche;**~~
~~**· donuts, bagels, or rolls for individual sale;**~~
~~**· cookies or brownies for individual sale;**~~
~~**· sandwiches, eggs, or spring rolls;**~~
~~**· servings of prepared chili or soup;**~~
~~**· stuffed peppers, tomatoes, and cabbage;**~~
~~**· knishes; and**~~
~~**· pickles.**~~

NOTE: The sale of an individual piece of fresh fruit (like an apple, banana, or orange) is allowed by count. (Added 2004) (Amended 2017, **20XX**)

1.12.2. Method~~s~~ of Sale. – Ready-to-eat food **prepared and** sold ~~**from retail cases displaying product in bulk or in servings prepared**~~ on the premises may be sold by weight, measure, or count (i.e., by piece, portion, or serving) **if served or transferred to the customer from a direct service counter**. If pre-packaged, the product shall have the appropriate statement of quantity set forth in the current edition of NIST Handbook 130, Uniform Packaging and Labeling Regulation (UPLR).
(Amended 1993) (Amended 2017 ~~**and,**~~ 2023**, and 20XX**)

Previous Status:
2027: New Proposal

Original Justification:
Prior justifications for defining ready-to-eat food included changing consumer habits and the need for supermarkets to compete with restaurants and other retail food establishments by offering "restaurant-style foods". Consumer habits continue to change, as do the offerings from restaurants and supermarkets, which causes confusion for businesses and regulators under the current language.

When using the term "restaurant-style foods", one has to look at what occurs in a restaurant. When ordering from a restaurant, a customer sits down to order, orders from a kiosk or counter, or orders from an app; the food is prepared and served by an employee, packaged and given to us by an employee, or delivered to our door by an employee of the restaurant or a delivery service. Aside from a few niche restaurants, customers rarely prepare food and serve themselves.

When a customer goes to a supermarket, they can choose from prepared food that is in display cases where they can grab it and walk away; or order from a kiosk or direct service counter, where it is given to them by an employee. But most often, the meals and portions of prepared foods are pre-packaged, and the customer has no contact with an employee; rather, they choose something and walk away.

The key difference is whether a customer is served or serves themselves. If a customer has to ask for a meal or portion of prepared food at a direct service counter, it may be sold by the piece, serving, or portion, as they would expect at a restaurant. A pre-packaged meal or portion of prepared food that is readily available for a customer to take without requesting it should have an appropriate net content statement as outlined in the current edition of NIST Handbook 130, Uniform Packaging and Labeling Regulation.

Some consumers like to eat cold pizza or cold chicken, neither of which requires reheating if previously cooked. Both of these products are available hot and cold in supermarkets, with different requirements for method of sale and net content statement requirements, depending on the location in which they are offered for sale. While the hot versions of these foods may allow customers to make value comparisons with restaurants, they cannot make the same value comparison with the cold versions of these foods, which often appear in a nearby case in the supermarket.

The Council has recently moved towards removing lists and examples from our Handbooks. Examples, by nature, are never all-inclusive and can create grey areas. In this case, as consumer habits shift, or retailers introduce new products, additional examples may need to be added for clarification.

Replacing the term "restaurant-style food" with "meals or portions of prepared food", and adding "direct counter service" gives more clarity to both retailers and regulators. Removing "cooking or heating" and replacing it with "further preparation" updates a shift in consumer habits. Striking the list of examples is consistent with other proposals adopted by NCWM.

Opposing arguments:
Opponents may indicate that this would require additional labeling and inhibit the sales of ready-to-eat meals in retail food establishments. Some regulators may insist that a list of examples is needed.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

One regulator opposed this change but did like the intent.

Another regulator liked the idea of keeping the examples because the examples provide guidance for new inspectors.

On line 13 the word "serve" should be "served".

The committee recommends a developing status.

WWMA 2026 Annual Meeting:

Mr. Robbie Parke (Washington Department of Agriculture) supported the intent of the proposal and the removal of lists from the handbook. He asked if "direct service counter" should be defined and if this would include a cash register or a deli-style counter. Mr. Parke recommended a DEVELOPING status.

Mr. Steve Harrington (Oregon Weights & Measures) noted that lists can help guide inspectors. He spoke to the distinction between a restaurant and a store, noting that the marketplace is complex. Mr. Harrington recommended a DEVELOPING status.

Mr. Mahesh Albuquerque (Colorado Division of Oil and Public Safety – Representing Aaron Yanker, Colorado Department of Agriculture Weights & Measures) questioned the merit and development of this item. He also noted that if the item moves forward 1.1.2.1. and 1.1.2.2. should be separated into two sections. He recommended the item be WITHDRAWN.

Mr. John McGuire (NIST OWM) stated that NIST is in the process of developing their L&R analysis. Mr. McGuire also noted that NIST had a special work group for this. His recommendation was that the item be ASSIGNED.

Mr. Kurt Floren (County of Los Angeles, California) had concerns about lists and asked Mr. McGuire about the former task group from 2016-2017. He recommended a DEVELOPING status.

Mr. Kevin Schnepp (California Division of Measurement Standards) echoed that lists can be both beneficial and limiting, he suggested the use of a "notes" section rather than the inclusion of lists and recommended a DEVELOPING status.

Mr. Floren asked Mr. McGuire about the recommended assigned status; would the item be assigned to the former task group or a new one? Mr. McGuire stated that NIST OWM is looking to assign the item to a hybrid group that would include both former and new members to work on this item.

Based on the comments heard during open hearings, the WWMA L&R Committee recommends a DEVELOPING status for this item. The committee further recommends that the NCWM L&R Committee consider the forming of a task group to address the concerns expressed on this item.

NEWMA 2026 Interim Meeting:

A Regulator from NJ questioned whether items like donuts and pickles should be considered restaurant-style foods and emphasized that the proposal is intended to clarify when net content statements are required. In-store prepared foods may be sold by the count when requested from staff at a service counter. If packaged food is displayed for customers to grab and take, it must have a net content statement consistent with HB 130 UPLR Section 6.4. The proposal would also remove the list of examples. Foods behind the counter may be sold by count when they are a meal or portion of a meal. NJ recommends Developing status so the submitter can continue addressing feedback.

A Regulator from VT supports the proposal and removal of the examples but recommends replacing "Ready- Eat" to-with "Made-to-Order" to avoid including packaged foods such as cereal and crackers.

Regulators from NY and NH agree with NJ's recommendation for removal of the example list, and for the item to be Developing.

The committee recommends a developing status.

SWMA 2026 Annual Meeting:

Submitter recommends voting status.

Paul Floyd representing the state of Louisiana supports this item and recommends voting status.

Alison Wilkinson representing the state of Maryland supports this item and recommends voting status.

Brian Terry representing the state of Arkansas supports this item but recommends a developing status due to confusion with methods of sale for items that already have a method of sale already in the NIST Handbook 130 and states with the way the item is written that there could be abuse of the application as written.

Robert Huff representing the state of Delaware supports this item and recommends voting status.

Mauricio Mejia representing the state of Florida supports this item but has concerns with direct service counter and recommends the item be given an informational status.

SWMA Laws and Regulations committee recommends this item to be given voting status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

MOS-26.2 A 2.21.2. Metered Sales by Liquid Volume.

Source:
National Propane Gas Association

Purpose:
Modify 2.21.2 (b) and (c) of IV. Uniform Regulations B. Uniform Regulation for the Method of Sale of Commodities, to require automatic temperature compensation to be performed electronically to ensure the most immediate reaction time of compensation equipment due to questionable reaction time data for mechanical temperature compensation devices in low flow applications.

Item under Consideration:
Amend NIST Handbook 130 Uniform Regulation for the Method of Sale of Commodities as follows:

2.21.2. Metered Sales by Liquid Volume. – All metered sales by liquid volume shall be accomplished using metering systems as follows:

(a) Sales using metering systems with a maximum rated capacity greater than 20 gal/min shall be accomplished using a metering system that automatically compensates for the effects of temperature.

(b) Sales using metering systems with a maximum rated capacity equal to or less than 20 gal/min that were placed into service after January 1, 202~~6~~7, shall be accomplished by use of a metering system that automatically **and electronically** compensates for the effects of temperature.

(c) Effective January 1, 2034, all metered sales **~~(through all capacities of metering devices, regardless of installation and service date)~~through devices with a maximum rated capacity equal to or less than 20 gal/min that were placed into service prior to January 1, 2027,** shall be accomplished by use of a metering system that automatically **and electronically** compensates for **the effects of** temperature.

Previous Status:
2026: Assigned to the LPG Temperature Compensation Task Group

Original Justification:
Existing data has been presented by way of a Linco-Electromatic, Inc.Technical Paper that calls into question the efficacy of mechanical temperature compensation equipment when connected to low flow pumping or dispensing systems. This paper calls out a reaction time ranging from three to six minutes before adequate compensation begins. With this lag time no single container filled by a LP Gas dispenser would receive compensated product if utilizing a mechanical temperature compensator. To ensure equity for propane sellers and buyers proper and immediately reactive temperature compensation equipment is needed.

The submitter acknowledged that State Weights and Measures officials have stated that during the conduction of meter proving with mechanical temperature compensation they have not witnessed the slow reaction times stated in the Linco-Electromatic, Inc. Technical Paper, although there is a flush performed prior to the actual meter flow test and not from direct start up.

The submitter requested Voting status in 2026.

Comments in Favor:

Regulatory:
- None

Industry:
- None

Advisory:
- None

Comments Against:

Regulatory:
- None

Industry:
- None

Advisory:
- None

Neutral Comments:

Regulatory:
- NCWM 2026 Interim: The Committee heard from multiple weights and measures officials who recommended the item to be Developing or Assigned to a Work Group. They expressed concerns regarding the additional burden placed on the industry, the availability of these devices as well as their suitability and accuracy under normal testing conditions. Most of them concurred on the need for a study to obtain sound data supporting an electronic temperature compensation requirement.

Industry:
- NCWM 2026 Interim: Representatives from the National Propane Gas Association and Meter Manufacturers Association recommended the item be assigned to a Work Group.

Advisory:
- NCWM 2026 Interim: The representative of NIST OWM supported the item to be Developing or assign it to a Work Group.

Item Development:
NCWM 2026 Annual Meeting: NCWM 2026 Annual: Mr. Christopher Wagner, from the National Propane Gas Association provided the Committee with an update as Chair of the LPG Temperature Compensation Task Group.

He said that following the interim meeting a task group was assigned to coordinate and oversee, in conjunction with industry, the design and execution of a study to determine the effectiveness and cost-efficient viability of electronic temperature compensation.

Task group conducted a kickoff meeting and reviewed all actions taken to date by an independent industry project team. A recommendation was offered to blend the two groups into one, but following consultation with NCWM it was identified that to participate or join an NCWM task group membership is required. NPGA has contacted the Propane Education and Research Council to seek their joining of NCWM so that the proposed funder of the project may participate in the task group.

During the last meeting NPGA sought feedback from W&M officials regarding any need for travel expense reimbursement for participation in witnessing of testing. This funding will be added into the budget of the PERC Docket request once identified.

This item continues to be assigned to the LPG Temperature Compensation Task Group.

Contact: Christopher Wagner
LPG Temperature Compensation Task Group Chair
cwagner@npga.org

NCWM 2026 Interim Meeting:
Taking into consideration the concerns of those that provided comments and the request of the submitter, the Committee decided to recommend that this item be assigned to a Work Group and keep open the effective dates proposed in it. The work group will coordinate and oversee, in conjunction with the industry, the design and execution of a study to determine the effectiveness and cost-efficient viability of electronic temperature compensators in all applications before they become a requirement. Depending on the results of the study, if established the item has merit, the Work Group will recommend final language, any required alignment of it with other publications, and effective dates.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends this item remain assigned.

WWMA 2026 Annual Meeting:

WWMA L&R Committee Chair Mr. Matt Douglas recused himself from the open hearings and working sessions for this item.

During open hearings, Acting Chair Mr. Cory Gandara asked for any updates regarding this item.

Mr. Kevin Schnepp (California Division of Measurement Standards) inquired whether any updates have been provided from the task group or the submitter since the last meeting.

Mr. Steve Harrington (Oregon Weights & Measures) asked if anyone could provide an update on this item and recommended an ASSIGNED status.

Mr. Jason Flint (NCWM Chair) stated that he received an email regarding adding additional members to the task group and that work would commence shortly.

Mr. Matt Douglas (California Division of Measurement Standards), speaking as a member of the LPG Temperature Compensation Task Group, stated that the task group has met once and discussed the intention to do testing in order to collect data, but no additional information is available at this time.

Based on the comments heard during open hearings the WWMA L&R Committee recommend this item remain ASSIGNED.

NEWMA 2026 Interim Meeting:

A representative from NPGA recommends that this remains in Assigned status. Since initial meetings conducted with the NCWM assigned task group, a request was submitted to NCWM seeking the addition of 10 additional members to the task group. The requested individuals included NIST, meter manufacturers, dispenser manufacturers, and the Propane Education and Research Council. These additions need to wait for the next membership year for appointment due to many of them not holding prior membership within NCWM. Upon the opening of the 2027 membership year, all non-members applied, paid dues, and expressed their willingness to participate. NCWM Chair, Jason Flint, has approved the addition of the 10 requested members. It is expected that task group meetings will be recommended for biweekly meetings in late October or early November.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

Chris Wagner representing NPGA commented the following:
NPGA recommends that this item remains in assigned status. The task group was formed following the 2026 interim meeting and last met in May of 2026. During this meeting it was identified that no manufacturers or potential funding sources were part of the task group, which was a barrier to proceeding forward. Upon further investigation of NCWM rules it was identified that only NCWM members may serve on assigned item task groups. NPGA lobbied multiple

non-members for consideration of membership and successfully identified four entities who were willing to join NCWM in the 2027 membership year. Upon the opening of the 2027 membership year, all identified parties joined NCWM as dues paying members and agreed to participate in the task group upon agreement and appointment by the NCWM Chair. The NCWM subsequently agreed to the addition of ten requested individuals representing NIST, manufacturers, and a designated funding source (Propane Education and Research Council). NCWM staff has updated the task group roster and mailing list. It is the intent of NPGA to reconvene the task group for biweekly meetings upon the conclusion of the SWMA Annual Conference. These meetings will be conducted on a recurring day of the week that is best suited to maximize attendance with the intent to present a path forward for testing during the NCWM 2027 Interim meeting.

SWMA Laws and Regulations committee recommends this item to be given assigned status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

MOS-26.3 A Section 2.20 Gasoline and Gasoline Oxygenate Blends

Source:
American Petroleum Institute

Purpose:
Add requirements to the method of sale for liquid measuring devices that perform temperature compensation and/or density correction.

Item under Consideration:
Amend NIST Handbook 130 Uniform Regulation for the Method of Sale of Commodities.

2.20. Gasoline and Gasoline Oxygenate Blends

2.20.1. Method of Retail Sale. – Type of Oxygenate must be Disclosed. **All automotive gasoline or automotive gasoline oxygenate blends shall be sold, offered or exposed for sale in terms of liquid volume by the liter or the gallon.**

2.20.1.1. Wholesale.

(a) Gross - If sold, offered, or exposed for sale on an observed temperature basis it shall be by the liter (defined as 1 liter at the observed temperature) or the gallon (defined as 231 in^3 at the observed temperature).

(b) Temperature Compensation - If sold, offered, or exposed for sale on a temperature compensated basis it shall be by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in3 at 60 °F).
(Added 20XX)

(c) Density correction - An automotive gasoline oxygenate blend that is the result of combining separately measured gasoline or gasoline regulated blendstocks and ethanol, may be sold, offered, or exposed for sale on a density corrected basis by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in3 at 60 °F)
(Added 20XX)
(Amended 20XX)

2.20.12. Method of Retail Sale, Type of Oxygenate must be Disclosed. — – All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold at retail containing at least 1.5 mass percent oxygen shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read "contains ethanol" or "with MTBE." The

oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.3 % by volume methanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (1/2 in) in height, 1.5 mm (1/16 in) stroke (width of type).
(Amended 1996)

2.20.2<u>3</u> <u>Retail Sale,</u> Product Transfer Document (PTD) Requirements. – The retailer shall be provided information that complies with PTD requirements for gasoline, gasoline additives, and gasoline regulated blendstocks **<u>40 C.F.R. § 1090.1110,</u>** at the time of delivery of the fuel, on product transfer documents such as an invoice, bill of lading, shipping paper, or other documentation. Additional declarations may be required for specific fuels **<u>and/or</u> <u>measuring devices:</u>**

(a) For fuels containing multiple oxygenates or oxygenates other than ethanol a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase "contains MTBE or other ethers."

(b) For fuels containing more than 0.3 % by volume methanol a declaration shall be identified as "with" or "containing" methanol.
(Added 1984) (Amended 1985, 1986, 1991, 1996, 2014, 2022, and 2023)

**<u>(c) For automotive gasoline or automotive gasoline-oxygenate blends an invoice based on a reading of a system that is equipped with an automatic or nonautomatic temperature compensator shall identify the delivered net volume by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F).
(Added 20XX)</u>**

**<u>(d) For automotive gasoline-oxygenate blends an invoice based on the reading of a system that is equipped with an automatic or nonautomatic temperature compensator and a density correction system shall, in addition to the values required by (c) above, identify the net excess volume, that is the change in volume attributed to the change in density.
(Added 20XX)</u>**

Previous Status:
2026: Assigned to the LMD Density Correction Task Group– Language Changes

Original Justification:
Section IV., B. Method of Sale of Commodities, gasoline and gasoline oxygenate blends does not have a requirement for an invoice to include a statement that a calculated volume has been adjusted to a temperature of 15 °C (60 °F). The proposed language adds such a requirement.

Handbook 44 allows the use of automatic and nonautomatic temperature compensators to be used to calculate the net volume of the product at a reference temperature, but there is not a requirement in the Method of Sale to reflect that information on the invoice, though it is industry practice to do so. Additionally, due to the fact that the volume of gasoline and ethanol when blended is more than the volume of the two liquids measured separately, a proposal to modify Handbook 44 has been submitted to the NCWM to clarify that it is acceptable to use specific density-correction methods that allow for the accurate determination of volume growth that occurs when gasoline is blended with ethanol to make finished gasoline.

Automatic temperature compensators have been used for decades throughout the United States to calculate the net volume of the fuel being sold at terminals. Including a statement on the invoice to that effect identifies that the calculation has been done.

In 2019, the American Petroleum Institute published a Manual of Petroleum Measurement Standards (MPMS) Chapter 11.3.4, *Miscellaneous Hydrocarbon Properties - Denatured Ethanol and Gasoline Component Blend Densities and Volume Correction Factors,* that identifies multiple blending scenarios to calculate the excess volume that occurs when gasoline and ethanol are blended. Ch. 11.3.4 is a subchapter of the parent document Ch. 11, *Physical Properties Data*.

Ch. 11 is used throughout the petroleum industry to ensure the physical properties of the fuels are properly assessed to ensure that the fuel measured throughout the manufacturing and distribution system is done accurately and transparently using industry recognized standards. Indeed, measurements are taken at the refinery when fuel is moved into a pipeline, when the fuel is moved out of the pipeline into a terminal, and when the fuel is loaded from the terminal into a truck for delivery to a retail gasoline station. A recently released video by NIST states that every drop of fuel "passes through a meticulous system of measurements" from where the crude oil is extracted to the terminal to "prevent costly losses." [Source: Trust in Transactions: The Economic Power of Data – Moser April 9, 2025, https://www.nist.gov/pml/owm/weights-and-measures-economic-index.] The meticulous system of measurements often use API approved standards that are developed by the API Committee on Petroleum Measurement (COPM). Consequently, it is not a stretch to say that it is "firmly established trade custom and practice" to use the API MPMS standards to measure fuels throughout the industry worldwide. [see reference to HB 130, III. Uniform Laws, A. Weights and Measures Law, Section 16, Method of Sale (p. 29)]

The requirements for invoices in Handbook 130 – Section IV., Sec. B. Uniform Regulation for the Method of Sale of Commodities, Paragraph 2.20. Gasoline and Gasoline Oxygenate Blends – are minimal in scope providing only a reference to the U.S. Environmental Protection Agency (EPA) rules. These rules, summarized below require only the volume of the product being transferred to be identified.

> **EPA Rules at 40 C.F.R. § 1090.1110, PTD requirements for gasoline, gasoline additives, and gasoline regulated blendstocks**, paragraph "(a) ***General requirements.*** On each occasion when any person transfers custody or title of any gasoline, gasoline additive, or gasoline regulated blendstock, other than when fuel is sold or dispensed to the ultimate end user at a retail outlet or WPC facility, the transferor must provide the transferee PTDs that include the following information: (1) All applicable information required under § 1090.1100 and this section." [emphasis added]
>
> **Section "1090.1100 General Requirements"** states (a)(1)(iii) a PTD must include a set of information including (iii) **"The volume of the product being transferred."** [emphasis added]

This proposed change to HB 130 Method of Sale makes it clear that if the volume of a product is calculated and changed to reflect a change in volume, that the invoice reflects that change and cites the reference temperature.

Today multiple API standards (identified below) ensure accurate and transparent measurement. Further, sales agreements may state that where temperature compensation is used, those calculations incorporate the methods and procedures specified in API MPMS Chapter 11.[1]

- Ch. 8.1 Manual Sampling of Petroleum Products (ASTM D4057)
- Ch. 5.x Metering (5.1 General Considerations for Measurement by Meters, with specific chapters that address for displacement meters, turbine meters, Coriolis meters, ultrasonic flow meters, Fidelity and Security of Flow Measurement Pulsed-Data Transmissions Systems)
- Ch. 6.x – Metering Systems (6.1 Metering Assemblies- General Considerations, with specific chapters for - Truck and Rail Loading and Unloading Measurement Systems; - Pipeline and Marine Loading/Unloading Measurement Systems; and Lease Automatic Custody Transfer Systems)

[1] https://www.api.org/-/media/files/publications/2024-catalog/2024-publication-catalog.pdf.

- Ch. 4.x Proving Systems (Displacement Provers, Master-Meter Provers, Field Standard Test Measures, Methods of Calibration for Displacement and Volumetric Tank Provers, Part 1—Introduction to the Determination of the Volume of Displacement and Tank Provers)
- Ch. 7.4 Dynamic Temperature Measurement
- Ch. 11 Physical Properties Data (ASTM D1250, Adjunct)
    - Chapter 11.1 - Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils
    - Ch. 11.3.3 Miscellaneous Hydrocarbon Product Properties—Denatured Ethanol Density and Volume Correction Factors
    - Ch. 11.3.4 Miscellaneous Hydrocarbon Properties - Denatured Ethanol and Gasoline Component Blend Densities and Volume Correction Factors
    - Ch. 11.4.1 Density of Water and Water Volumetric Correction Factors for Water Calibration of Volumetric Provers
- Ch. 12.2 Calculation of Petroleum Quantities using Dynamic Measurement Methods and Volumetric Correction Factors
- Ch. 21.2 Electronic Liquid Measurement Using Positive Displacement and Turbine Meters

Why should we use and accept API standards? Handbook 130, Uniform Weights and Measures Law, Section 16, recognizes “firmly established trade custom and practice” that dictate how liquid fuels are sold. Specifically, it states,

Section 16. Method of Sale

Except as otherwise provided by the Director or by firmly established trade custom and practice,

(a) commodities in liquid form shall be sold by liquid measure or by weight; and

(b) commodities not in liquid form shall be sold by weight, by measure, or by count.

The method of sale shall provide accurate and adequate quantity information that permits the buyer to make price and quantity comparisons.

(Amended 1989)

In 2024, the U.S. customers consumed 137 billion gallons of gasoline (most of which was 10% ethanol) and 63 billion gallons of diesel fuel. Another 24 billion gallons of jet fuel were consumed in the U.S. At each stage of the process from producing the crude oil to selling the finished fuel to a retail gasoline station the product is measured. So, while there is over 224 billion gallons of finished product consumed in the U.S., those molecules have likely been measured many times over. These measurements are so important that the API Committee on Petroleum Measurement (COPM) meets twice a year, with over 700 people in attendance, at each meeting to review the standards that are used in the U.S. and around the world. By definition, the petroleum industry uses the API standards which are firmly established trade custom and practice.

Some have raised concerns that metering systems should not modify the volume of the product after it has gone through the custody meter. This concern appears to be premised on the belief that the gross volume **and** the net standard temperature compensated volume are measured. In practice, the only measured volume is the gross volume and that is measured by counting pulses from the meter in accordance with an API standard. The gross volume is then used by the custody transfer system or the automatic terminal management system to calculate the net volume using another set

of API standards including Chapters 5.x, 6x, 7.4, 11.1, 11.3.3, 11.3.4, 12.2, and 21.2. Please see above for the names of these standards.

Some have indicated that HB 130, IV. Uniform Regulations, A. Uniform Packaging and Labeling Regulation, Paragraphs 7.4.(b) and 7.5.(b) may already include a requirement.

7.4. SI Units: Mass, Measure.

(b) in units of liquid measure shall be in terms of the liter or milliliter, and shall express the volume at 20 °C, except in the case of petroleum products or distilled spirits, for which the declaration shall express the volume at 15.6 °C, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of malt beverages or a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at 4 °C;

(Amended 1985)

7.5 U.S. Customary Units: Weight, Measure.

(b) in units of liquid measure shall be in terms of the United States gallon of 231 cubic inches or liquid quart, liquid pint, or fluid ounce subdivisions of the gallon and shall express the volume at 68 °F, except in the case of petroleum products or distilled spirits, for which the declaration shall express the volume at 60 °F, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at 40 °F, and except also in the case of malt beverages, for which the declaration shall express the volume at 39.1 °F;

(Amended 1985)

The submitter requested that this be a Voting Item in 2026.

Comments in Favor:

Regulatory:

- None

Industry:

- NCWM Interim 2026: The Submitter representing the American Petroleum Institute gave a presentation and explained that the purpose of the item is to show adjustments made to correct inaccuracy in volume when blending ethanol and gasoline and that he believes the item is fully developed. He recommended putting the item forward as Voting and others from industry agreed with the submitter and recommended a voting status.

Advisory:

- None

Comments Against:

Regulatory:

- NCWM Interim 2026: A weights and measures official from Illinois presented a handout opposing this item which is available on the NCWM site under supporting documents.

Industry:

- None

Advisory:

- NCWM Interim 2026: The Chair of FALS shared that there was both support and opposition to this item in the FALS meeting. For this reason, FALS took no position.

Neutral Comments:

Regulatory:

- NCWM Interim 2026: Numerous weights and measures officials spoke on the proposed item and agree this should have an Assigned or Developing status.

Industry:

- NCWM Interim 2026: The submitter after hearing comments from the floor agreed that this item should align between L&R and S&T.

Advisory:

- NCWM Interim 2026: The representative of NIST OWM stated that there should be harmonization between MOS and FLR and need to move the items before S&T and L&R together. They recommended assigning this item and the S&T item to a Work Group.

Item Development:

NCWM 2026 Annual: This item continues to be assigned to the LMD Density Correction Task Group as it is not yet fully developed.

Mr. Andrew Montanye, Work Group Chair, provided the Committee with the language shown above under Item Under Consideration requesting it to be included in the Committee's report for membership consideration.

Contact: Andrew Montayne
LMD Density Correction Task Group Chair
andrew.montanye@nebraska.gov

NCWM 2026 Interim: The Committee received comments in favor of this item from several industry representatives; they expressed the item was fully developed and recommended voting status. On the other hand, no weights and measures officials supported the item as written. A representative from Illinois recommended withdrawn, some others recommended further development, and many recommended it to be assigned to a Work Group for further review and development. weights and measures officials, Advisors from NIST OWM, FALS, and even the submitter concurred the proposed language in this item shall also be included in FLR 3.2.5. In addition, several weights and measures officials and NIST Advisors recommended this item to move forward contingent to Item LMD-26.1 from the L&R agenda moving forward as voting.

The Committee recommends this item be assigned to a Task Group for further vetting and developing. The Task Group will be charged with determining if the item is needed or not, and if yes, developing the final language and including it in FLR 3.2.5 to align both sections. In addition, the group will recommend if the items shall move forward as voting contingent to one another or not.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

Two representatives from industries gave prepared comments and were in favor of a voting status.

Three representative regulators stood in opposition.

It was recommended to place the word gallons before liters throughout the text.

The committee recommends this item remain assigned.

WWMA 2026 Annual Meeting:

WWMA L&R Committee member Mr. Russ Lewis recused himself from the open hearings and working sessions for this item.

During open hearings, Mr. Stephen Benjamin (Representing API) provided edits to the WWMA L&R Committee and reviewed them with the body. These edits originated from the LMD Density Correction Task Group but did not make it into the WWMA L&R Agenda.

Mr. Stephen Benjamin (Representing API) noted that the LMD Density Correction Task Group believes that the two L&R (MOS-26.3) and S&T (LMD-26.1) items are linked. He also noted that the following editorial changes were submitted but not reflected in the L&R Committee Agenda: L&R page 12, line 10 - struck "retail" and left "method of sale"; page 12, line 20 - changed "in2" to "in3"; page 12, line 29 – "Method of" was stricken, added "Retail". He also noted that the FLR section was added by the task group to reflect the MOS language. Mr. Benjamin recommended a VOTING status.

Mr. Matthew Sheehan (Chevron) believes this item is of value to terminals as well as retailers by providing transparency in invoicing. Mr. Sheehan recommended a VOTING status.

Mr. Steve Harrington (Oregon Weights & Measures) suggested the proposals from the L&R Agenda and the S&T Agenda should be linked. Mr. Harrington supported a VOTING status.

Mr. Kurt Floren (County of Los Angeles, California) posed a question for Mr. Benjamin as to why the word "retail" was struck in 2.20.1.? Mr. Benjamin explained that since compensation is only occurring at the wholesale transfer, and not retail, it is not a method of sale for retail transactions.

Mr. Russ Lewis (Marathon Petroleum) expressed that, like Chevron, Marathon is both a buyer and seller at wholesale and so this item impacts them on all levels. Mr. Lewis recommended a VOTING status.

Mr. Kevin Schnepp (California Division of Measurement Standards) Feels the task group has completed their work. Mr. Schnepp supported a VOTING status.

Mr. Mahesh Albuquerque (Colorado Division of Oil and Public Safety) stated that Colorado is leaning towards support. In Colorado, they do allow the option to do temperature compensation. This item places the focus on wholesale where it would be appropriately used. It does not conflict with Colorado statutes, but it does differ from what is allowed. Mr. Albuquerque supported a VOTING status.

Based on the comments heard during open hearings the WWMA L&R Committee recommends a VOTING status for this item with the edits presented during open hearings. There were also comments heard that item MOS-26.3 on the L&R Agenda and LMD-26.1 on the S&T Agenda are connected. The WWMA L&R Committee agrees with these comments and that these items should move forward together.

The edits presented during open hearings are included below:

2.20. Gasoline and Gasoline Oxygenate Blends

2.20.1. Method of ~~Retail~~ Sale. ~~— Type of Oxygenate must be Disclosed.~~ **All automotive gasoline or automotive gasoline oxygenate blends shall be sold, offered or exposed for sale in terms of liquid volume by the liter or the gallon.**

2.20.1.1. Wholesale.

(a) Gross - If sold, offered, or exposed for sale on an observed temperature basis it shall be by the liter (defined as 1 liter at the observed temperature) or the gallon (defined as 231 in^3 at the observed temperature).

(b) Temperature Compensation - If sold, offered, or exposed for sale on a temperature compensated basis it shall be by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in3 at 60 °F).

(Added 20XX)

(c) Density correction - An automotive gasoline oxygenate blend that is the result of combining separately measured gasoline or gasoline regulated blendstocks and ethanol, may be sold, offered, or exposed for sale on a density corrected basis by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in3 at 60 °F)

(Added 20XX)

(Amended 20XX)

2.20.~~1~~2. ~~Method of~~ Retail Sale, Type of Oxygenate must be Disclosed. ~~—~~ – All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold at retail containing at least 1.5 mass percent oxygen shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read "contains ethanol" or "with MTBE." The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.3 % by volume methanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (1/2 in) in height, 1.5 mm (1/16 in) stroke (width of type).

(Amended 1996)

2.20.~~2~~3 Retail Sale, Product Transfer Document (PTD) Requirements. – The retailer shall be provided information that complies with PTD requirements for gasoline, gasoline additives, and gasoline regulated blendstocks **40 C.F.R. § 1090.1110,** at the time of delivery of the fuel, on product transfer documents such as an invoice, bill of lading, shipping paper, or other documentation. Additional declarations may be required for specific fuels **and/or measuring devices:**

(a) For fuels containing multiple oxygenates or oxygenates other than ethanol a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase "contains MTBE or other ethers."

(b) For fuels containing more than 0.3 % by volume methanol a declaration shall be identified as "with" or "containing" methanol.

(Added 1984) (Amended 1985, 1986, 1991, 1996, 2014, 2022, and 2023)

(c) For automotive gasoline or automotive gasoline-oxygenate blends an invoice based on a reading of a system that is equipped with an automatic or nonautomatic temperature compensator shall identify the delivered net volume by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F).

(Added 20XX)

(d) For automotive gasoline-oxygenate blends an invoice based on the reading of a system that is equipped with an automatic or nonautomatic temperature compensator and a density correction system shall, in addition to the values required by (c) above, identify the net excess volume, that is the change in volume attributed to the change in density.

(Added 20XX)

NEWMA 2026 Interim Meeting:

A representative from the American Petroleum Institute is in support of the proposed changes to both Handbook 44 LMD-26.1 of the S&T Committee and to Handbook 130 MOS-26.3 of the L&R Committee. API stated that he was part of the NCWM Density Correction Task Group. The Task Group completed its charge in developing language for these items and returned them to the respective committees prior to the Annual Meeting. Furthermore, API supports the TG's decision that the two proposals are contingent upon one another and that the FLR regulations in section 3.2.5 would need to be updated to align with the MOS section. API also supports the inclusion of the most recent version of ASTM D4057 Standard Practice for Manual Sampling of Petroleum and Petroleum Products in LMD-26.1 UR sections 3.6.1.2. and 3.6.2.2, instead of API MPMS Chapter 8.1. (Note: Proposed language for MOS and FLR is posted under L&R Supporting Documents on the NEWMA website). The proposed changes to the regulations would occur as a wholesale business transaction at the petroleum terminal and do not include or impact retail transactions between seller and buyer. In previous testimony, API presented information and demonstrated that gasoline blended with 10% ethanol expands, about, 0.2%, depending on the density of the gasoline blendstock. The need for calculating volume expansion led to the development of the API standard Chapter 11.3.4 in the Manual of Petroleum Measurement Standards (MPMS).

API Chapter 11.3.4 is not a departure from accepted petroleum measurement practice, but rather the recognized methodology identified within the industry's principal net volume correction standard. API requests moving these items to Voting status.

A regulator from NJ stated This practice is already happening. Regardless of what happens with the S&T item, it should absolutely appear on the PDT. There is also a need to align the language in HB130 Fuels and Lubricants Regulation if this passes. Both should go in tandem. NJ recommends Voting status

A regulator from NY stated that: The wording on p. L&R 11, lines 30-31, "…1.5 mass percent oxygen…" should have been replaced with "…0.3% volume…" with the passage of 2023 B2:MOS-23.2. This change was added in the addendum sheet, was voted upon, and passed with no dissent that year.

A representative from NIST commented that this has been handled as an editorial change in the 2027 version of HB130

Further comments from NY: The proposed wording on p. L&R 12, line 29, Sec. 2.20.12 should be fixed to read Sec. 2.20.1.2

The proposed wording on p. L&R 12, line 42, Sec. 2.20.23 should be fixed to read Sec. 2.20.2**.**3.

For 2.20.2**.**3.(d) (L&R p.13, line 16) –The proposal in this section only makes density conversions for "automotive gasoline-oxygenate blends". He also questioned if the proposal is intended to make density conversions for any ethanol blended gasoline, and if so, what about density conversions for "automotive gasoline"? Giving the reasoning is based on the following:

- Neither term is defined in HB130 directly.
- However, Uniform Fuels and Automotive Lubricants Regulation, Sec.3.2- adopts 16 CFR Part 306. https://nvlpubs.nist.gov/nistpubs/hb/2025/NIST.HB.130-2026.pdf. Part 306.0 Definitions, Sub (i).1.
- And, "Automotive Fuels"-1. "Gasoline" – includes gasoline ethanol blends to 10%. https://www.ecfr.gov/current/title-16/chapter-I/subchapter-C/part-306.

NY proposes that L&R p.13, line 16 read: **(d) For automotive gasoline or automotive gasoline-oxygenate blends…** and recommends continued Assigned status.

The committee recommends an assigned status.

SWMA 2026 Annual Meeting:

Steve Benjamin representing API commented the following:
During the Annual NCWM meeting, the Density Correction Task Group returned language to both the S&T and L&R committees. However, that language did not make it to the L&R committee report and the regional agendas. For MOS

26.3, the language is correct, but some of the strike throughs did not appear in the agenda and I have highlighted them on the attached. Additionally, there are a couple of editorial changes regarding cubic inches.
Part of the task group's assignment was to decide if similar language should also appear in the Fuels and Lubricants section. They felt it should and the FLR document is what they provided. It is the same language as the MOS but numbered accordingly for the FLR section. Mr. Benjamin conveyed that these developments will appear on the NCWM publication 15 at interim.

Alison Wilkinson representing the state of Maryland, opposed the item and commented that this item lacks merit and recommends withdraw.

Bryan Just representing API commented the following:
Good afternoon, Madam Chair, my name is Bryan Just and I'm representing the American Petroleum Institute in support of the proposed changes to both Handbook 130 MOS-26.3 of the L&R Committee and to Handbook 44 LMD-26.1 of the S&T Committee.

I will send a copy of today's statement to the respective committees.

THIS PAST SUMMER, I WAS PART OF THE NCWM DENSITY CORRECTION TASK GROUP. THE TASK GROUP COMPLETED ITS CHARGE TO "OVERSEE FURTHER VETTING AND DEVELOPMENT OF ITEM MOS 26.3 OF THE LAWS AND REGULATIONS COMMITTEE AND ITEM LMD 26.1 OF THE SPECIFICATIONS AND TOLERANCES COMMITTEE, DETERMINE WHETHER BOTH ARE NEEDED, AND DECIDE WHETHER THEY SHOULD MOVE FORWARD CONTINGENT UPON EACH OTHER."

THE TASK GROUP MODIFIED THE PROPOSALS AND SENT LANGUAGE BACK TO THE STANDING COMMITTEES. THE TASK GROUP DECIDED THAT IF THE PROPOSALS MOVE FORWARD, THEY ARE CONTINGENT UPON ONE ANOTHER AND THAT THE FLR REGULATIONS WOULD NEED TO BE UPDATED TO ALIGN. THE TASK GROUP ENGAGED IN A DISCUSSION THAT UTILIZING ASTM D4057 AS A REFERENCE IN THE SECTIONS MAY BE BETTER SUITED THAN API MPMS CHAPTER 8.1.

API supports the Density Correction Task Group's decision that the two proposals are contingent upon one another and that the FLR regulations in section 3.2.5 need to be updated to align with the MOS section. API also supports the inclusion of the most recent version of ASTM D4057 Standard Practice for Manual Sampling of Petroleum and Petroleum Products in LMD-26.1 UR sections 3.6.1.2. and 3.6.2.2, instead of API MPMS Chapter 8.1.

FURTHERMORE, API AGREES WITH THE MODIFICATIONS TO THE LANGUAGE PUT FORTH BY THE TASK GROUP, INCLUDING THE UPDATES TO FLR-3.2.5 TO ALIGN WITH MOS-26.3, AND SUPPORTS THE PROPOSALS BEING SENT BACK TO THE RESPECTIVE COMMITTEES.

API would like to highlight the proposed changes to the regulations would occur as a wholesale business transaction at the petroleum terminal and do not include or impact retail transactions between seller and buyer.

This is Science
When blending ethanol with gasoline, the physical and chemical nature of the finished, blended product changes due to influences on molecular bonding. The addition of ethanol increases the vapor pressure of the fuel, changes the distillation profile, and increases octane of the finished blend as a result of these molecular influences.

Similarly, when ethanol is blended with gasoline, the density decreases while the volume increases because of molecular bonding changes. Therefore, an adjustment is necessary because the sum volume of the two individual

components is less than what is physically present in the blended volume. NIST OWM recognizes that when blending ethanol and petroleum products, due to the physical characteristics of these products, a chemical change occurs, which results in a greater volume of the blended product than the sum of the volume of the separate products when corrected to the reference temperature of 15 °C (60 °F).

In previous testimony, API presented information and demonstrated that gasoline blended with 10% ethanol expands, about, 0.2%, which is just an example of the typical volume expansion observed. The actual expansion is dependent on the density of the gasoline blendstock and can range from 0.1% to 0.4%. Furthermore, the range of expansion most often falls within maintenance tolerance of Table T.2. in Handbook 44, making it difficult to see in a prover.

Why a Blend-Specific Method Is Needed
The need for calculating volume expansion led to the development of the API standard Chapter 11.3.4 in the Manual of Petroleum Measurement Standards (MPMS).
The petroleum industry has long recognized that custody transfer methodologies may vary depending on the physical properties of the product and the commercial terms of the transaction. Quantities may be determined on a gross volume basis, a net standard volume basis, or by mass measurement. Net standard volumes are commonly calculated using the temperature and density correction procedures contained in API Manual of Petroleum Measurement Standards (MPMS) Chapter 11 and ASTM D1250, which directs users to MPMS Chapter 11.3.4 for procedures applicable to gasoline and denatured ethanol blend Volume Correction Factors (VCFs).

API Chapter 11.3.4 is not a departure from accepted petroleum measurement practice, but rather the recognized methodology identified within the industry's principal net volume correction standard.

When applied consistently and in accordance with the agreed commercial basis of sale, Chapter 11.3.4 supports accurate, transparent, and equitable custody transfer transactions and is consistent with the principles embodied in NIST Handbook 44.

API believes that LMD-26.1 of Handbook 44 and MOS-26.3/FLR-2.3 of Handbook 130 are fully developed and recommends a Voting status

Thank you.

Tory Brewer representing the state of West Virginia commented that the item is fully developed, echoed the comments mentioned on the floor by Steve Benjamin and recommended a voting status.

Russ Lewis representing Marathon Petroleum commented the following:
My name is Russ Lewis, representing Marathon Petroleum Company (MPC). MPC is both buyer and seller using this approach of calculating volume gain when blending gasoline and ethanol. We support it for equity and consistency on the wholesale level.

MPC supports this item for Voting status.

The item is fully developed. The NCWM task group completed its work which included the revisions of FLR-3.2.5, and we support the addition of the FLR language that goes along with MOS-26.3.

During the S&T open hearings, I gave testimony on the science behind the calculations, why the calculations are needed, the challenges to conducting validation at the rack, and how API MPMS 11.3.4 was developed by API and vetted by both API and ASTM for adoption. I will not restate those here but refer you to my earlier testimony.

SWMA L&R during the fall 2025 annual meeting recommended the item be moved forward as VOTING. Since then, the item has had additional language added by the national work group for FLR which was not present in the 2025 proposal. The item is now fully developed.

MPC supports this as voting item.

Bryan Just speaking on behalf of Matt Sheehan with Chevron U.S.A. Inc commented the following:
Chevron owns and operates facilities involved in refining, pipeline transmission, terminal distribution, and retail sales of gasoline and gasoline-ethanol blends. We participate on both sides of commercial transactions, selling and shipping gasoline-ethanol blends from our terminals, and purchasing and receiving gasoline-ethanol blends for our retail sites.
We believe that adding language specifying that the use of temperature compensation and density correction be disclosed on product transfer documents and invoices will promote the fair trade of gasoline-ethanol blend products.
At the January 2026 Interim Meeting of the National Conference on Weights and Measures, this item was assigned to the NCWM Density Correction Task Group. The task group completed its assessment of MOS-26-3 and reported its findings at the 2026 Annual Meeting.
Chevron believes that this item is fully developed and respectfully requests Voting status.

SWMA Laws and Regulations committee recommends this item to be given a voting status and recommends NCWM accept all editorial changes suggested by API that was made by the density correction task group.
See highlighted changes that have been suggested since the conference in July 2026:

2.20. Gasoline and Gasoline Oxygenate Blends

2.20.1. Method of ~~Retail~~ Sale. ~~— Type of Oxygenate must be Disclosed.~~ **All automotive gasoline or automotive gasoline oxygenate blends shall be sold, offered or exposed for sale in terms of liquid volume by the liter or the gallon.**

2.20.1.1. Wholesale.

(a) Gross - If sold, offered, or exposed for sale on an observed temperature basis it shall be by the liter (defined as 1 liter at the observed temperature) or the gallon (defined as 231 in^3 at the observed temperature).

(b) Temperature Compensation - If sold, offered, or exposed for sale on a temperature compensated basis it shall be by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in3 at 60 °F).

(Added 20XX)

(c) Density correction - An automotive gasoline oxygenate blend that is the result of combining separately measured gasoline or gasoline regulated blendstocks and ethanol, may be sold, offered, or exposed for sale on a density corrected basis by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in3 at 60 °F)

(Added 20XX)

(Amended 20XX)

2.20.~~1~~2. ~~Method of~~ Retail Sale, Type of Oxygenate must be Disclosed. ~~—~~ – All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold at retail containing at least 1.5 mass percent oxygen shall be identified as “with” or “containing” (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read “contains ethanol” or “with MTBE.” The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase “or other ethers” or alternatively post the phrase “contains MTBE or other ethers.” In addition, gasoline-methanol blend fuels containing more than 0.3 % by volume methanol shall be identified as “with” or “containing” methanol. This information shall be posted on the upper 50 %

of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (1/2 in) in height, 1.5 mm (1/16 in) stroke (width of type).

(Amended 1996)

2.20.~~2~~3 Retail Sale, Product Transfer Document (PTD) Requirements. – The retailer shall be provided information that complies with PTD requirements for gasoline, gasoline additives, and gasoline regulated blendstocks **40 C.F.R. § 1090.1110,** at the time of delivery of the fuel, on product transfer documents such as an invoice, bill of lading, shipping paper, or other documentation. Additional declarations may be required for specific fuels **and/or measuring devices:**

(a) For fuels containing multiple oxygenates or oxygenates other than ethanol a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase "contains MTBE or other ethers."

(b) For fuels containing more than 0.3 % by volume methanol a declaration shall be identified as "with" or "containing" methanol.

(Added 1984) (Amended 1985, 1986, 1991, 1996, 2014, 2022, and 2023)

(c) For automotive gasoline or automotive gasoline-oxygenate blends an invoice based on a reading of a system that is equipped with an automatic or nonautomatic temperature compensator shall identify the delivered net volume by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F).

(Added 20XX)

(d) For automotive gasoline-oxygenate blends an invoice based on the reading of a system that is equipped with an automatic or nonautomatic temperature compensator and a density correction system shall, in addition to the values required by (c) above, identify the net excess volume, that is the change in volume attributed to the change in density.

(Added 20XX)

Additional changes suggested by API and agreed on by the SWMA Laws and Regulations committee are to add similar language to the Fuel and Lubricant Regulation to promote uniformity in the NIST 130.

See recommended editorial changes:

3.2. Automotive Gasoline and Automotive Gasoline Oxygenate Blends (Including Racing Gasoline)

…

3.2.4 – Method of Sale. – All automotive gasoline or automotive gasoline oxygenate blends shall be sold, offered or exposed for sale in terms of liquid volume by the liter or the gallon.

3.2.4.1. Wholesale. –

(a) Gross – If sold, offered, or exposed for sale on an observed temperature basis it shall be by the liter (defined as 1 liter at the observed temperature) or the gallon (defined as 231 in^3 at the observed temperature).

(b) Temperature Compensation – If sold, offered, or exposed for sale on a temperature compensated basis it shall be by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F),

(c) Density Correction – An automotive gasoline oxygenate blend that is the result of combining separately

measured gasoline or gasoline regulated blendstocks and ethanol, may be sold, offered, or exposed for sale on a density corrected basis by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F).

(Added 20XX)

(Amended 20XX)

3.2.4.5. – Method of Retail Sale,. - Type of Oxygenate must be Disclosed. – All automotive gasoline or automotive gasoline-oxygenate blends, or racing gasoline kept, offered, or exposed for sale, or sold at retail containing at least one volume percent oxygenate shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read "contains ethanol" or "with methyl tertiary-butyl ether (MTBE)." The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.3% by volume ethanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50% of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (1/2 in) in height, 1.5mm (1/16 in) stroke (width of type).

(Amended 1996**, 2018, and 20XX**)

3.2.**5.6. Retail Sale, Product Transfer Document (PTD) Requirements**. – The retailer shall be provided information that complies with the requirements for gasoline, gasoline additives, and gasoline regulated blendstocks, 40. C.F.R. § 1090.1110 when the fuel contains ethanol. Additional declarations may be required for specific fuels

(a) For fuels containing multiple oxygenates other than ethanol, **information** a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e. the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase "contains MTBE or other ethers."

(Added 2014) (Amended 2022**, 2023, and 20XX**)

(b) For fuels containing more than 0.3% by volume methanol a declaration shall be identified as "with" or "containing" methanol.

(Added 2014) (Amended 2018 and 2023)

(c) For automotive gasoline or automotive gasoline-oxygenate blends an invoice based on a reading of a system that is equipped with an automatic or nonautomatic temperature compensator shall identify the delivered net volume by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F).

(Added 20XX)

(d) For automotive gasoline-oxygenate blends an invoice based on the reading of a system that is equipped with an automatic or nonautomatic temperature compensator and a density correction system shall, in addition to the values required by (c) above, identify the net excess volume, that is the change in volume attributed to the change in density.

(Added 20XX)

(Amended 1996, 2014, 2018, 2022, 2023, and 20XX)

3.2.6.7. EPA Labeling Requirements. – Retailers and wholesale purchaser-consumers of gasoline shall comply with the EPA pump labeling requirements for gasoline containing greater than 10 volume percent (v%) up to 15 volume

percent (v%) ethanol (E15) under E15 labeling provisions, **40 C.F.R. § 1090.1510**. (For additional information, refer to section 3.8.2. FTC Labeling Requirements.)

(Added 2012) (Amended 2018 and 2022)

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

MOS-27.4 2.33.2. Method of Sale.

Source:
PlugInSites.org

Purpose:
Section 2.33.2 as currently written permits fees for "other services" without defining what qualifies as a service or requiring that all costs be reflected in the per-unit price. This has enabled operators to set the per-kilowatt-hour price at or near $0.00 while recovering the bulk of the fueling cost through time-based or fixed fees assessed during the charging session, leaving consumers with no meaningful basis for price comparison at the point of sale. This proposal limits permissible ancillary fees to those genuinely independent of energy delivery, requiring full cost disclosure in the per-unit price, and clarifying that a time-based fee assessed after active energy delivery to the vehicle has ceased is permissible as a distinct post-session service, triggered by the physical cessation of electricity flow to the vehicle.

Item under Consideration:
Amend NIST Handbook 130 Uniform Regulation for the Method of Sale of Commodities as follows:

> **2.33.2. Method of Sale. -** All electrical energy kept, offered, or exposed for sale and sold at retail as a vehicle fuel shall be in units in terms of the kilowatt-hour (kWh). ~~**In addition to the fee assessed for the quantity of electrical energy sold, fees may be assessed for other services; such fees may be based on time measurement and/or a fixed fee.**~~ **All costs to the consumer, including taxes, must be included in the cost per kilowatt-hour of electrical energy sold. A fee based on time may be assessed only after active energy delivery to the vehicle has ceased and the vehicle remains connected to the supply equipment. Such fee shall be calculated based on the duration of continued connection following cessation of energy delivery and shall be itemized separately on the customer's receipt.**

Previous Status:
2027: New Proposal

Original Justification:
Florida Administrative Code Rule 5J-28.007, promulgated following Florida SB 1084 (2023), has implemented substantively identical method-of-sale requirements at the state level. The Florida rule provides a regulatory model that has been in effect and subject to enforcement in a major electric vehicle market. The proposed language draws directly on the Florida rule while incorporating a clarification regarding post-fueling connection fees. Specifically, the amendment anchors the permissible post-fueling fee to the physical cessation of active energy delivery rather than to a network-defined session boundary, ensuring that the consumer protection intent of the provision cannot be circumvented through session management practices.

Some operators and industry groups may argue that time-based and session fees reflect legitimate business costs beyond energy delivery, such as network connectivity, payment processing, and station maintenance, and that requiring all costs to be reflected in the per-unit price would force a pricing structure that does not accurately represent the economics of operating a charging network.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends a voting status.

WWMA 2026 Annual Meeting:

Ms. Mal Skowron (Tesla) commented that the item is unnecessary and may lead to unintended consequences, such as restricting the use of time-based fees. This would affect operators of EV charging sites by preventing them from applying time-based charges when charging rates slow, which could increase wait times and negatively impact end users. She also noted that the requirement may conflict with state jurisdictional tax laws. She recommended a WITHDRAWN status.

Mr. Steve Harrington (Oregon Weights & Measures) commented that the item would require disclosing all costs on the receipt and would be difficult to achieve and regulate. He also mentioned the item would further restrict the ability to charge based on time after charging is complete. He recommended a DEVELOPING status.

Mr. Scott Wagner (Colorado Division of Oil and Public Safety) commented the item restricts the method of sale, charging on the basis of time, which is a common method used by industry. He believes the item lacks merit, fails to meet transparency standards and may be more appropriate in Handbook 44. He recommended a WITHDRAWN status.

Mr. John Sorfleet (Santa Clara County, California) stated he generally supports the intend of the item by requiring charges based only on the kilowatt hour which promotes uniformity. He further commented that the item as written may be impractical and requires further development. He recommended a DEVELOPING status.

Mr. Kevin Schnepp (California Division of Measurement Standards) stated the intention of this item provides equity with other petroleum type fuel stations by including other associated fees and taxes. He expressed concerns that the item as written is too prescriptive and lacks clarity. He recommended a DEVELOPING status.

Mr. Kurt Floren (County of Los Angeles, California) agreed with Mr. Schnepp noting that other petroleum type fuel stations include taxes and fees and questioned if that was the purpose behind the item. He would like more clarification on the item. He recommended a DEVELOPING status.

Ms. Mal Skowron (Tesla) added clarification on previous comments. She stated the item does not prohibit time-based fees however; they would only be allowed after the vehicle is fully charged. She added, once the vehicle charge exceeds 80% of charge capacity, charging of the vehicle slows down dramatically. The inability to charge for time would significantly impact throughput at EV charging locations, creating a negative impact on customers who have to wait longer.

Mr. Steve Harrington (Oregon Weights & Measures) further commented that time-based fees would be allowable after the vehicle has been fully charged. He maintains the recommendation of DEVELOPING status.

Based on the comments received during the open hearings, the WWMA L&R Committee recommends assigning this item a DEVELOPING status. The committee further recommends that the submitter refine the item's language to clearly state its purpose and address the concerns raised, including potential impacts on time-based charging, customer throughput, and the extent to which listing applicable fees and taxes on receipts may affect various jurisdictions.

<u>NEWMA 2026 Interim Meeting:</u>

A representative from ChargePoint opposes this item. This proposal is a large change to the current language in Handbook 44, which currently provides flexibility for EV charging providers to develop their consumer pricing based on the unique operational conditions. ChargePoint believes this proposal goes beyond defining a method of sale to dictating underlying business models of EV charging operators. For example, a common practice today is to begin changing a time-based fee when a vehicle reaches a charging state of 80%. This proposal would prohibit this approach. Additionally, EV charging is a fundamentally different product from other fueling applications where a charging session is on a L2 charger.

The language as proposed also appears to prohibit the ability to tax time-based fees as it states "all cost to the consumer, including taxes must be included in the cost".

Finally, no other fuel in HB 130 has this requirement. The Method of Sale provisions consistently define the unit of sale and leave pricing structure and tax treatment to the market and other regulatory authorities. MOS 27.4 would single out EV charging for a restriction that applies to no other fuel. ChargePoint proposes Assigning this to the EV Task Group, if NEWMA believes these changes are necessary.

A regulator from NJ stated this would require that all taxes, fees, time fees, etc. be included in the kilowatt-hour unit price. NJ opposes this item, and recommends Withdrawn status.

A regulator NY agrees with NJ and ChargePoint, and agrees with Withdrawn status.

A Regulator from Vermont supports this language as it would provide the consumer with more straightforward pricing information for price comparison between competing EV Chargers.

The committee recommends this item be withdrawn.

SWMA 2026 Annual Meeting:

Submitter recommends voting status.

Cuong Nguyen representing Tesla recommends a withdrawn and states this change to would be hard to apply across state lines due to different tax rates.

Alison Wilkinson representing the state of Maryland recommends an editorial change to remove the statement "including taxes" from the item. Maryland disagrees with the additional fees that are being issued to consumers for reasons outside of the underlining purpose of the device which is to charge for energy. Other fees include time based or activation fees. Due to irregular network activity these additional charges have been found overcharging consumers for services not received. Maryland supports this item and recommends voting status with the editorial changes.

Brian Terry representing the state of Arkansas supports this item with the recommended editorial changes suggested by Maryland and recommends a voting status.

Mauricio Mejia representing the state of Florida supports this item due to statues within his jurisdiction that prohibit time-based fees. Recommend informational status.

Robert Huff representing the state of Delaware supports the item with the recommended editorial changes suggested by Maryland and recommends a voting status.

SWMA Laws and Regulations committee recommends this item to be given voting status and recommend the following editorial changes be made to the item. That the words "included taxes" be removed from line 18 in the agenda.

> **2.33.2. Method of Sale. -** All electrical energy kept, offered, or exposed for sale and sold at retail as a vehicle fuel shall be in units in terms of the kilowatt-hour (kWh). ~~**In addition to the fee assessed for the quantity of electrical energy sold, fees may be assessed for other services; such fees may be based on time measurement and/or a fixed fee.**~~ **All costs to the consumer, ~~including taxes~~, must be included in the cost per kilowatt-hour of electrical energy sold. A fee based on time may be assessed only after active energy delivery to the vehicle has ceased and the vehicle remains connected to the supply equipment. Such fee shall be calculated based on the duration of continued connection following cessation of energy delivery and shall be itemized separately on the customer's receipt.**

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

RSA – UNIFORM REGULATION FOR THE VOLUNTARY REGISTRATION OF SERVICEPERSONS AND SERVICE AGENCIES FOR COMMERCIAL WEIGHING AND MEASURING DEVICES

RSA-27.1 Section 4. Voluntary Registration

Source:
Delaware

Purpose:
Delete duplicate entry.

Item under Consideration:
Amend NIST Handbook 130 Uniform Regulation for the Voluntary Registration of Service Persons and Service Agencies as follows:

Section 4. Voluntary Registration

An individual or agency qualified by training, experience, and/or certificate(s) granted by a recognized standards development organization or other jurisdictional authority approved by the Director; may apply for registration to service weighing devices or measuring devices on an application form supplied by the Director. Said form, duly signed and witnessed, shall include acknowledgement by the applicant that the individual or agency is fully qualified to install, service, repair, or recondition whatever devices for the service of which competence is being registered; has in possession or available for use, and will use, all necessary testing equipment and standards; and has full knowledge of all appropriate weights and measures laws, orders, rules, and regulations. Each applicant, whether an individual or an agency, also shall submit an appropriate certificate(s), license(s) evidence, and/or references as to their qualifications to the Director. The certificate(s) shall apply to the types of weighing devices and measuring devices inspected and tested by the individual or agency. Device types without available certificate(s) available from a recognized standards development organization or other jurisdictional authority approved by the Director may be exempted from the certificate requirement. ~~**Application for registration shall be voluntary, but the Director is authorized to reject or limit any application.**~~ Application for registration shall be voluntary, but the Director is authorized to reject or limit any application. (Added 1966) (Amended 1984 and 2024)

Previous Status:
2027: New Proposal

Original Justification:
This will eliminate a duplicate entry.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

One regulator voiced he was in favor of this proposal only after deleting line 9 because it is duplicate wording.

The committee recommends a voting status.

WWMA 2026 Annual Meeting:

Mr. John McGuire (NIST OWM) stated that the item includes duplicative language which should be deleted. He suggested that NIST OWM could handle this editorially.

Mr. Steve Harrington (Oregon Weights & Measures) agreed with Mr. McGuire that the item should be handled editorially.

Mr. Mahesh Albuquerque (Colorado Division of Oil and Public Safety – Representing Aaron Yanker, Colorado Department of Agriculture Weights & Measures) agreed with Mr. McGuire and is supportive of the item so long as the language "…the director is authorized to reject or limit any application" remains in the paragraph.

Mr. Kevin Schnepp (California Division of Measurement Standards) agreed that the language is duplicative and is in support of the suggestion from Aaron Yanker to be considered by NIST OWM. If this cannot be accomplished editorially, the item should move forward with a VOTING status.

Based on the comments heard during open hearings the WWMA L&R Committee recommends a VOTING status for this item. The WWMA L&R Committee further recommends that the NCWM L&R Committee consider working with NIST OWM to determine whether they can resolve this issue editorially.

NEWMA 2026 Interim Meeting:

No comments were heard from the floor.

The committee gives no recommendation.

SWMA 2026 Annual Meeting:

Submitter recommends voting.

Brian Terry representing the state of Arkansas supports this item and recommends voting status.

Maricio Mejia representing the state of Florida supports this item and recommends voting status.

SWMA Laws and Regulations committee recommends this item to be given voting status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

RSA-27.2 Section 8. Placed in Service Report

Source:
Delaware

Purpose:
Allow for electronic notifications (e.g., fax, email).

Item under Consideration:
Amend NIST Handbook 130 Uniform Regulation for the Voluntary Registration of Service Persons and Service Agencies as follows:

Section 8. Placed in Service Report

This publication is available free of charge from https://doi.org/10.6028/NIST.HB.130-2026 The Director ~~**shall**~~ **may** furnish each registered serviceperson and registered service agency with a supply of report forms to be known as "Placed in Service Reports." Such a form ~~**shall be executed in triplicate,**~~ shall include the **location and details of the work performed**, assigned registration number, and shall be signed by a registered serviceperson or by a serviceperson representing a registered agency for each rejected device restored to service and for each newly installed device placed in service. Within 24 hours after a device is restored to service or placed in service, the original of the properly executed Placed in Service Report, together with any official rejection tag removed from the device, shall be forwarded to the Director at _____(address) or electronically. ~~The~~ ~~**duplicate**~~ **A copy** of the report shall be handed to the owner or operator of the device, and **a** ~~**the triplicate**~~ copy of the report shall be retained by the Registered Serviceperson or Registered Service Agency. (Added 1966) (Amended 2005)

Previous Status:
2027: New Proposal

Original Justification:
Updating the terminology by removing the words "triplicate" and "duplicate" will allow for electronic notifications. Changing "shall" to "may" allows states to accept service companies' Placed in Service Reports or to continue to provide their own.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

Two regulators voiced they were in favor of this proposal. One regulator wants to delete the first sentence of line 17 and added this should begin with The Director….

The committee recommends a voting status.

WWMA 2026 Annual Meeting:

Mr. John McGuire (NIST OWM) stated that the opening sentence referencing "This publication is available free of charge from https://doi.org/10.6028/NIST.HB.130-2026" should not be in the item and recommended striking that phrase.

Mr. Steve Harrington (Oregon Weights & Measures) supported removing references to duplicate and triplicate copies on the forms and recommended a VOTING status.

Mr. Scott Wagner (Colorado Division of Oil and Public Safety) stated the purpose of the item is to allow for electronic notifications, recommended an editorial change on line 25 to replace "shall be handed to" with "provided for" or "made available to", and recommended a VOTING status.

Mr. John Sorfleet (Santa Clara County, California) echoed Mr. Wagner's comments, noting that "handed to" implies a physical copy, and recommended changing the language to allow for electronic reports.

Mr. Mahesh Albuquerque (Colorado Division of Oil and Public Safety – Representing Aaron Yanker, Colorado Department of Agriculture Weights & Measures) expressed agreement with removing the term "triplicate" and resolving duplication in the text, and supported the line 25 language change regarding "handed" as stated earlier.

Mr. Kevin Schnepp (California Division of Measurement Standards) supported the intent of the item with the suggested editorial edits, noting that the phrase "details of the work performed" seems vague, and suggested a revision to "shall include at a minimum..." for clarity, and recommended a VOTING status.

Based on the comments heard during open hearings the WWMA L&R Committee made the edits suggested by the body and recommends a VOTING status for this item as edited below with the WWMA L&R Committee changes noted in red font and double underlined:

Section 8. Placed in Service Report

~~**This publication is available free of charge from https://doi.org/10.6028/NIST.HB.130-2026**~~ The Director ~~**shall**~~ **may** furnish each registered serviceperson and registered service agency with a supply of report forms to be known as "Placed in Service Reports." Such a form ~~**shall be executed in triplicate,**~~ shall include the **location and details of the**

work performed as required by the Director, assigned registration number, and shall be signed by a registered serviceperson or by a serviceperson representing a registered agency for each rejected device restored to service and for each newly installed device placed in service. Within 24 hours after a device is restored to service or placed in service, the original of the properly executed Placed in Service Report, together with any official rejection tag removed from the device, shall be forwarded to the Director at _____(address) or electronically. ~~The~~ ~~duplicate~~ **A copy** of the report shall be ~~handed~~ **provided** to the owner or operator of the device, and **a** ~~the triplicate~~ copy of the report shall be retained by the Registered Serviceperson or Registered Service Agency. (Added 1966) (Amended 2005 **and 20XX**)

NEWMA 2026 Interim Meeting:
A regulator from NY stated that changing the term from "shall" to "may", as currently written could be misinterpreted, and does not read as the proposal intends - that the RSA can use their own form. Further, the removal of the term "triplicate copies" does not limit a person to paper copies. The three copies of the forms are designated as to whom receives each copy, NY recommends Withdrawal

The committee recommends this item be withdrawn.

SWMA 2026 Annual Meeting:

Submitter recommends voting status.

Alison Wilkinson representing the state of Maryland supports this item and recommends voting status.

Brian Terry representing the state of Arkansas supports this item and recommends voting status.

SWMA Laws and Regulations committee recommends this item to be given voting status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

FLR – UNIFORM FUELS AND AUTOMOTIVE LUBRICANTS REGULATION

FLR-27.3 3.2. Automotive Gasoline and Automotive Gasoline Oxygenate Blends (Including Racing Gasoline)

Source:
NCWM LMD Density Correction Task Group

Purpose:
Align the Uniform Fuel and Automotive Lubricants Regulation with a potential change to the Uniform Regulation for the Method of Sale of Commodities in the instance the API proposals for LMD-26.1 and MOS-26.3

Item under Consideration:
Amend the NIST Handbook 130 Uniform Fuels and Automotive Lubricants Regulation as follows:

3.2. Automotive Gasoline and Automotive Gasoline Oxygenate Blends (Including Racing Gasoline)

…

3.2.4 – Method of Sale. – All automotive gasoline or automotive gasoline oxygenate blends shall be sold, offered or exposed for sale in terms of liquid volume by the liter or the gallon.

3.2.4.1. Wholesale. –

(a) Gross – If sold, offered, or exposed for sale on an observed temperature basis it shall be by the liter (defined as 1 liter at the observed temperature) or the gallon (defined as 231 in^3 at the observed temperature).

(b) Temperature Compensation – If sold, offered, or exposed for sale on a temperature compensated basis it shall be by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F),

(c) Density Correction – An automotive gasoline oxygenate blend that is the result of combining separately measured gasoline or gasoline regulated blendstocks and ethanol, may be sold, offered, or exposed for sale on a density corrected basis by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F).

(Added 20XX)

(Amended 20XX)

3.2.4.5. – ~~Method of~~ Retail Sale,~~.~~ Type of Oxygenate must be Disclosed. – All automotive gasoline or automotive gasoline-oxygenate blends, or racing gasoline kept, offered, or exposed for sale, or sold at retail containing at least one volume percent oxygenate shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read "contains ethanol" or "with methyl tertiary-butyl ether (MTBE)." The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.3% by volume ethanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50% of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (1/2 in) in height, 1.5mm (1/16 in) stroke (width of type).

(Amended 1996**, 2018, and 20XX**)

3.2.~~5.~~6. **Retail Sale, Product Transfer Document (PTD) Requirements**. – The retailer shall be provided information that complies with the requirements for gasoline, gasoline additives, and gasoline regulated blendstocks, 40. C.F.R. § 1090.1110 when the fuel contains ethanol. Additional declarations may be required for specific fuels

(a) For fuels containing multiple oxygenates other than ethanol, ~~information~~ a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e. the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase "contains MTBE or other ethers."

(Added 2014) (Amended 2022**, 2023, and 20XX**)

(b) For fuels containing more than 0.3% by volume methanol a declaration shall be identified as "with" or "containing" methanol.

(Added 2014) (Amended 2018 and 2023)

(c) For automotive gasoline or automotive gasoline-oxygenate blends an invoice based on a reading of a system that is equipped with an automatic or nonautomatic temperature compensator shall identify the delivered net volume by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in^3 at 60 °F).

(Added 20XX)

(d) For automotive gasoline-oxygenate blends an invoice based on the reading of a system that is equipped with an automatic or nonautomatic temperature compensator and a density

correction system shall, in addition to the values required by (c) above, identify the net excess volume, that is the change in volume attributed to the change in density.

(Added 20XX)

(Amended 1996, 2014, 2018, 2022, 2023, and 20XX)

3.2.~~6.~~7. EPA Labeling Requirements. – Retailers and wholesale purchaser-consumers of gasoline shall comply with the EPA pump labeling requirements for gasoline containing greater than 10 volume percent (v%) up to 15 volume percent (v%) ethanol (E15) under E15 labeling provisions, **40 C.F.R. § 1090.1510**. (For additional information, refer to section 3.8.2. FTC Labeling Requirements.)

(Added 2012) (Amended 2018 and 2022)
(Amended 2018 and 2022)

Previous Status:
2026: New Proposal

Original Justification:
The LMD Density Correction Task Group was charged with aligning the FLR code with a potential change to the MOS code in the instance the API proposal's for LMD 26.1 and MOS 26.3.

Some may oppose setting strict methods of sale for Automotive gasoline and gasoline and oxygenated blends.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal 2027

Regional Associations' Comments:
New Proposal 2027

CWMA 2026 Interim Meeting:

Not applicable.

WWMA 2026 Annual Meeting:

Not applicable.

NEWMA 2026 Interim Meeting:

Not applicable.

SWMA 2026 Annual Meeting:

Not applicable.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

FLR-26.1 A 7.2. Reproducibility Limits

Source:
Colorado Division of Oil and Public Safety

Purpose:
This proposal aims to clarify section 7.2.5. – Enforcement Action in the Uniform Fuels Regulation to address misleading and inadequate language from 2008.

Item under Consideration:
Amend NIST Handbook 130 Uniform Fuels and Automotive Lubricants Regulation as follows:

7.2. Reproducibility Limits.

7.2.1. AKI Limits. – When determining the antiknock index (AKI) acceptance or rejection of a gasoline sample, the AKI reproducibility limits as outlined in the latest version of ASTM D4814, "Standard Specification for Automotive Spark-Ignition Engine Fuel," Appendix X1 shall be acknowledged for enforcement purposes.

7.2.2. Reproducibility. ~~**– The reproducibility limits of the standard test method used for each test performed shall be acknowledged for enforcement purposes, except as indicated in Section 2.2.1. Premium Diesel Fuel and Section 7.2.1. AKI Limits. No allowance shall be made for the precision of the test methods for aviation gasoline or aviation turbine fuels.**~~

(a) The reproducibility limits of the standard test method used for each test performed shall be acknowledged for enforcement purposes, except as indicated in Section 7.2.1. AKI Limits. No allowance shall be made for the precision of the test methods for aviation gasoline or aviation turbine fuels. (Amended 20xx)

(b) Notwithstanding the provisions in 7.2.2. (a), the Director may initiate enforcement action when several independent test results of the same product, sampled from the same source location on separate occasions following new product deliveries, are greater than the maximum or less than the minimum specification limits, posted values, certified values, or registered values.

7.2.3. SAE Viscosity Grades for Engine Oils. – With the exception of the low-temperature cranking viscosity, all values required to define SAE Viscosity Grades, as defined in the latest version of SAE J300, "Engine Oil Viscosity Classification", are critical specifications as defined by the latest version of ASTM D3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications". (Added 2008) (Amended 2021)

7.2.4. Dispute Resolution. – In the event of a dispute over a reported test value, the guidelines presented in the latest version of ASTM D3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications," shall be used to determine the acceptance or rejection of the sample.

~~**7.2.5. Additional Enforcement Action. The Director may initiate enforcement action in the event that, based upon a statistically significant number of samples, the average test result for products sampled from the same source location is greater than the legal maximum or less than the legal minimum limits (specification value), posted values, certified values, or registered values.**~~

~~**(Added 2008) (Amended 2018)**~~

Previous Status:

2026: Assigned to the Fuels and Lubricants Subcommittee– Language Changes

Original Justification:

Nationwide, all state jurisdictions that are adopting the fuel quality regulations of NIST HB 130 acknowledge reproducibility* limits of

analytical test methods for enforcement action purposes.

Though these reproducibility limits (R) are acknowledged by these state regulatory agencies authorized to assure fuel quality, the objective and intent for all parties involved is to meet legal requirements, not to exploit the space given between a legal limit and the (acknowledged) reproducibility limit.

With the intent to avoid the exploitation of such R values by any regulated party, section 7.2.5. – Additional Enforcement Action was originally published in 2008 and amended in 2018.

The applicable section currently reads:

"7.2.5. Additional Enforcement Action. The Director may initiate enforcement action in the event that, based upon a statistically significant number of samples, the average test result for

products sampled from the same source location is greater than the legal maximum or less than the legal minimum limits (specification value), posted value, certified values, or registered values."

However, the current language insufficiently articulates its intent, and obscures proper approach and conditional parameters. More specifically, the current Enforcement Action language does not articulate that its intent is to address situations where fuel quality characteristics are within reproducibility limits but often outside legal requirements. In addition, the language "the average test result for products sampled from the same source location" can mislead a regulatory agency to average a number of test results obtained from the same sample specimen**. However, "the average test result" shall be calculated from a number of independent test results obtained from independent sample specimens, each of which represent the same product, from the same location, sampled at different times. Finally, the word "additional" in the title "Additional Enforcement Action" implies that other enforcement action(s) already took place.

However, that won't be the case because in most scenarios no enforcement actions will have been taken after each individual sampling and testing event, because the regulating agency acknowledged reproducibility limits at the conclusion of each individual sampling and testing event though the single test result exceeded legal limits.

When these discrepancies were first brought to the Fuels and Lubricants Subcommittee's attention during the NCWM Interim Meeting in January of 2025, a focus group*** comprising of 13 diverse stakeholders from fuel industry and regulatory agencies was established. After email correspondence, two virtual meetings and an in-person meeting during the Annual NCWM Meeting in July of 2025, consensus on the following language was reached within the diverse focus group:

"To avoid the exploitation of a test method's reproducibility limits by any regulated party, the Director may initiate enforcement action when several independent test results, of the same product sampled from the same source location at different times, are exceeding legal limits (such as specification values, posted values, certified values, or registered values). (Added 202X)."

Consensus on the title and position within section 7. Test Methods and Reproducibility Limits were also reached by the focus group, and are as follows:

7.2.2.1. Enforcement Action

This title resolves the currently inaccurate title, and the sub-placement of this Enforcement Action regulation as 7.2.2.1 links it directly to its intended scope:

Section 7.2.2. Reproducibility.

In addition, Section 7.2.4. Dispute Resolution represents a process possibly necessary AFTER enforcement actions were initiated by a regulating agency. Hence, dispute resolutions should conclude Section 7. Test Methods and Reproducibility Limits, instead of end with 7.2.5 Additional Enforcement Action as currently published in HB 130.

* Reproducibility (R) of a standard test method is most often defined by the standard organization ASTM as the variability between single analytical test results obtained in different laboratories, each of which has applied the test method to test specimens taken from a single quantity of homogenous material.

** A sample specimen is a portion taken from a storage tank, truck, or dispenser, etc., is representative of a larger amount of product, and is used for testing to determine the quality, composition, as well as performance and safety suitability of a fuel product.

*** Enforcement Action Focus Group members: Kevin Adlaf, Vanessa Benchea, Scott Fenwick, Steven Harrington, Marilyn Herman, Randy Jennings, Russ Lewis, Vernon Miller, Timothy

Morales, Tamara Paik, Matthew Sheehan, and Jenny Tabbert.

It is not expected that there will be any opposition as this proposal is simply clarifying language in HB 130.

The submitter requested Voting status in 2026.

Comments in Favor:

Regulatory:

- NCWM Interim 2026: A weights and measures official representing Colorado stated that the item is fully developed and recommended Voting status.

Industry:

- None

Advisory:
- None

Comments Against:

Regulatory:
- None

Industry:
- None

Advisory:
- None

Neutral Comments:

Regulatory:
- None

Industry:
- None

Advisory:
- NCWM Interim 2026: The FALS Chair requested that the item be assigned to FALS for further development.

Item Development:
NCWM 2026 Annual: This item remains assigned to the Fuels and Lubricants Subcommittee (FALS) because it is not yet fully developed. FALS presented the latest proposed language, shown under the Item Under Consideration above, for submission to the Regionals.

Contact: Vanessa Benchea
Fuels and Lubricants Subcommittee Chair
Vanessa.Benchea@fdacs.gov

NCWM 2026 Interim: The Committee assigned this item to FALS for further development.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A regulator commented on what FALS reported.

The committee recommends this proposal go back to FALS for lack of information on what has transpired in the group.

WWMA 2026 Annual Meeting:

WWMA L&R Committee members Mr. Russ Lewis (Marathon Petroleum) and Mr. Scott Wagner (Colorado Division of Oil and Public Safety) recused themselves from the open hearings and working sessions for this item.

Mr. Mahesh Albuquerque (Colorado Division of Oil and Public Safety) supported this item which was submitted by Jenny Tabbert. Mr. Albuquerque stated the item was ready and recommended a VOTING status.

Mr. Steve Harrington (Oregon Weights & Measures) agreed with Mr. Albuquerque and stated that he was supportive of the item. Mr. Harrington recommended a VOTING status.

Based on the comments heard during open hearings, the WWMA L&R Committee recommends a VOTING status for this item.

NEWMA 2026 Interim Meeting:

No comments were heard from the floor.

The committee has no recommendation for this item.

SWMA 2026 Annual Meeting:

FALS chair and representative from the state of Florida Vanessa Benchea commented on behalf of the subcommittee and her state. Ms. Benchea stated the item is fully developed and recommends voting status.

SWMA Laws and Regulations committee recommends this item to be given voting status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

NET – HANDBOOK 133

NET-27.1 1.2.6.1. Deviations Caused by Moisture Loss or Gain and Table 2-3. Moisture Allowances.

Source:
Dr. Squatch LLC

Purpose:
Provide for a 5% moisture allowance for cold process bar soap and solid deodorant products.

Item under Consideration:
Amend NIST Handbook 133 as follows:

1.2.6.1. Applying a Moisture Allowance

Some packaged products may lose or gain moisture and, therefore, lose or gain weight or volume after packaging. The amount of moisture loss depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. Moisture loss may occur even when manufacturers follow good distribution practices. Loss of weight "due to exposure" may include solvent evaporation, not just loss of water. For loss or gain of moisture, the moisture allowances may be applied before or after the package errors are determined.

To apply an allowance before determining package errors, adjust the Nominal Gross Weight (see Section 2.3.6. "Determine Nominal Gross Weight and Package Errors"), so the package errors are increased by an amount equal to the moisture allowance. This approach is used to account for moisture loss in both the average and individual package errors.

It is also permissible to apply the moisture allowances after individual package errors and average errors are determined.

Example:

A sample of a product that could be subject to moisture loss might fail because the average error is minus or the error in several of the sample packages are found to be unreasonable errors (i.e., the package error is greater than the Maximum Allowable Variation (MAV) permitted for the package's labeled quantity).

You may apply a moisture allowance after determining the package errors by adding the allowance to the Sample Error Limit (SEL) and then, comparing the average error to the SEL to determine compliance. The moisture allowance must be added to the MAV before evaluating sample errors to identify unreasonable minus errors.

(Amended 2010)

This handbook provides "moisture allowances" for some meat and poultry products, flour, pasta, *Cannabis* (this only includes plant material but does not include products containing *Cannabis*)**, ~~and~~** dry pet food**, cold-process bar soap and solid deodorant products**. (see Chapter 2, Table 2-3. "Moisture Allowances") These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or more information must be collected before deciding lot compliance or noncompliance.

(Amended 2024)

Test procedures for flour, some meat, and poultry are based on the concept of a "moisture allowance" also known as a "gray area" or "no decision" area (see Section 2.3.8. "Moisture Allowances"). When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the "gray area," the lot is said to be in the "gray" or "no decision" area. The gray area is not a tolerance. More information must be collected before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the "moisture allowance" or "gray area."

(Amended 2002)

…

Table 2-3.
Moisture Allowances

Verifying the labeled net weight of packages of:	Moisture Allowance is:	Notes
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Pasta products	3 %	Pasta products means all macaroni, noodle, and like products packaged in kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.
Borax	see Section 2.4. Borax	
Cannabis	3 %	*Cannabis* means plant material only, and not products containing *Cannabis*, whether containing more than 0.3 % Total Delta-9 THC (also known as cannabis, Marijuana, or Marihuana) or containing 0.3 % or less Total Delta-9 THC (also known as Hemp).
Solid cold process bar soap products and solid deodorant products	**5%**	**Solid cold process bar soap means all shapes of soap used for human personal care and cleaning, that are manufactured using saponification without the application of additional, external heat and sold in solid, bar form (whether packaged or unpackaged).** **Solid deodorant products means all shapes of deodorant products used for human personal care and deodorizing, that are sold in solid (e.g., stick) form.**
Wet Tare Only[1]		

Table 2-3. Moisture Allowances		
Fresh poultry	3 %	Fresh poultry is defined as poultry above a temperature of − 3 °C (26 °F) that yields or gives when pushed with the thumb.
Franks or hot dogs	2.5 %	
Bacon, fresh sausage, and luncheon meats	0 %	For packages of bacon, fresh sausage, and luncheon meats, there is no moisture allowance if there is no free-flowing liquid or absorbent material in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Used Dried Tare are equivalent.
[1] Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th edition of NIST Handbook 133 by reference in 2008 but not the "Wet Tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).		
Notes: (1) There is no moisture allowance when inspecting meat and poultry from a USDA inspected plant when Used Dry Tare and "Category A" sampling plans are used. (2) For the Wet Tare Only section of Table 2-3. "Moisture Allowances," free-flowing liquid and liquid absorbed by packaging materials in contact with the product are part of the wet tare. (Note Added 2010)		

(Amended 2010, 2013, and 2024)

Previous Status:

2027: New Proposal

Original Justification:

1. Purpose

This report summarizes the results of testing commissioned by Dr. Squatch, LLC ("Dr. Squatch"), which demonstrates that, under ordinary and customary environmental conditions, cold-process bar soap naturally loses weight over time due to expected post-production moisture evaporation. The test results support inclusion of cold-process bar soap within a defined 5 percent moisture allowance under NIST Handbook 133.

2. Product Characteristics

Cold-process bar soap is manufactured through saponification without the application of external heat. The finished product contains inherent water content that contributes to bar structure, curing, and consumer use characteristics. After molding, demolding, cutting, and packaging, the bar continues to undergo natural moisture evaporation.

This gradual evaporation is a well-recognized physical property of cold-process soap and is not indicative of product defect, formulation change, or deceptive packaging practices. Rather, it reflects the natural equilibration of water content with ambient environmental conditions.

3. Stability and Environmental Testing

a.Testing Methodology

Dr. Squatch submitted multiple 5 oz cold process bar soap samples to a third-party laboratory, Micro Quality Labs (now known as Certified Laboratories), for formal stability evaluation under controlled environmental conditions in accordance with the laboratory's protocol.

Testing was conducted on multiple SKUs per protocol, with samples stored in their proposed packaging. Bars were placed sideways in environmental chambers and evaluated at defined time intervals.

Testing was performed on one representative lot per product, per protocol consistent with standard cosmetic stability study design.

Testing was conducted under the following controlled conditions:

<u>Real Time Stability</u>

- 25°C ± 2°C
- 60% RH ± 5%
- Evaluated at: Initial, 1, 2, 3, 6, and 12 months

<u>Accelerated Stability</u>

- 40°C ± 2°C
- 75% RH ± 5%
- Evaluated at: Initial, 1, 2, 3, and 6 months

<u>Elevated Temperature Stress</u>

- 50°C ± 2°C
- Evaluated at: Initial and 1 month

<u>Freeze/Thaw Stress</u>

- −10°C to −20°C

- Three consecutive cycles

At each interval, the following parameters were evaluated:

- Appearance
- Texture
- Color
- Odor
- Package compatibility
- % Weight loss/gain
- Water activity
- Freeze/thaw integrity (3 cycles)

The soaps were stored under real time, accelerated, and stress conditions. Weight was measured at defined intervals throughout the study, and loss/gain was recorded as part of the physical & analytical testing specifications.

Weight measurements were conducted as part of the stability study under controlled environmental conditions (25 ± 2 °C / 60% ± 5% RH, 40 ± 2 °C / 75% ± 5% RH, and 50 ± 2 °C). Designated samples were assigned specifically for weight evaluation at predefined intervals.

Initial weights were recorded at study initiation using a calibrated analytical balance, and each sample was labeled accordingly to ensure traceability. At each testing interval, the designated sample was removed from the chamber and equilibrated to ambient conditions for approximately 24 hours prior to measurement to ensure consistent and reliable readings. Samples were then reweighed using the same calibrated balance, and all measurements were documented in the laboratory's data recording system.

Weight loss was calculated using the formula: (Final Weight – Initial Weight) / Initial Weight × 100.

b. Testing Results

The measured results show, under the conditions set forth above, there is measurable, predictable weight loss and moisture loss over time:

- Under controlled stability conditions, bars lost up to approximately 4 percent of net weight over six months and up to approximately 6 percent over twelve months.
- Under accelerated low-humidity exposure conditions, moisture loss plateaued at approximately 11 percent.

The progressive weight reduction under ordinary storage conditions is consistent with the applied environmental exposure and required stability measurements and supports the conclusion that the observed weight loss is attributable to natural moisture evaporation. Moisture loss was further evaluated through water activity (a_w) testing using a calibrated water activity meter, which determines a_w by measuring the equilibrium relative humidity (ERH) of the headspace in a sealed chamber containing the sample. The measured a_w values showed a corresponding decrease in available moisture and correlated with the observed weight reduction, confirming that the weight loss is attributable to moisture evaporation.

Weight Loss Under Controlled Stability Conditions		
Starting Weight (oz.)	0-6 Month Weight (oz.), Reflecting 4% Loss	6-12 Weight (oz.), Reflecting 6% Loss
5	4.8	4.7
5.1	4.9	4.8
5.2	5.0	4.9
5.3	5.1	5.0
5.4	5.2	5.1
5.5	5.3	5.2
5.6	5.4	5.3
5.7	5.5	5.4
5.8	5.6	5.5
5.9	5.7	5.5
6	5.8	5.6
6.1	5.9	5.7
6.2	6.0	5.8

These profiles reasonably reflect common environmental conditions (e.g., temperature and relative humidity). These findings demonstrate that measurable weight and moisture loss occurs within normal commercial timeframes and is sensitive to environmental heat and humidity, factors outside the manufacturer's control once product enters distribution.

4. Manufacturing Controls

Under common manufacturing practices, in order to account for moisture loss, cold-process soap bars can be intentionally manufactured above labeled net weight. This overfill framework ensures that, at the time of manufacture and packaging, products comply with labeled net weight requirements. However, the ability for over-filling to account for all reasonably expected environmental conditions is imperfect. Indeed, post-packaging moisture evaporation may reduce weight over extended distribution periods, particularly under relatively elevated heat or relatively low humidity conditions that are outside of the manufacturer's controls.

5. Observed Weight Reduction Over Time

Applying observed stability loss rates to a 5.3 oz. manufactured bar (i.e., overfilled to yield a target a bar product weighing at least 5 oz.):

- A 4 percent reduction results in a weight of approximately 5.1 oz.
- A 6 percent reduction results in a weight of approximately 5.0 oz.
- Under more extreme environmental conditions, reductions may approach higher levels, including those observed in accelerated testing.

These results demonstrate that natural post-production moisture loss can reasonably approach the magnitude of a 5 percent allowance over time, even where the product was compliant at time of manufacture.

6. Regulatory Relevance

NIST Handbook 133 recognizes that certain products may experience unavoidable moisture loss due to ordinary and customary exposure to distribution conditions. The data summarized above demonstrate that cold-process bar soap exhibits the same physical characteristics as other products currently listed in Table 2-3 for moisture allowances.

The observed weight changes:

- Occur after packaging.
- Are driven by ambient environmental conditions.
- Are predictable and scientifically explainable.
- Are not the result of deceptive or deficient fill practices.
- Are outside of the manufacturer's control.

Accordingly, inclusion of cold-process bar soap within a defined 5 percent moisture allowance aligns regulatory application with established product science and promotes uniform, science-based enforcement.

7. Conclusion

The attached data demonstrate that cold-process bar soap naturally and predictably loses moisture under normal distribution conditions, with documented reductions approaching 4 to 6 percent within commercially relevant timeframes.

A defined 5 percent moisture allowance for cold-process bar soap would appropriately account for this unavoidable physical property while preserving net quantity integrity at the time of manufacture. Such clarification would ensure consistent and scientifically grounded application of Handbook 133 across jurisdictions.

The submitter requested that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

One regulator is requesting more data on this proposal.

The committee recommends a developing status.

WWMA 2026 Annual Meeting:

Ms. Wendy Hahn (Stanislaus County, California) wondered whether the issue identified by this item may be industry-wide and not necessarily limited to cold process bar soap.

Mr. David Aguayo (San Luis Obispo County, California) pointed out that the data provided focuses on a single commodity and manufacturer and does not provide further data to address deodorant products and their different formulations. The item also does not include a definition for the commodities intended to be provided with a moisture loss allowance.

Mr. John Sorfleet (Santa Clara County, California) had difficulty determining whether this item was addressing a single product or an entire classification of products and also expressed that more data was necessary to support a 5% moisture loss allowance. He recommended a DEVELOPING status.

Mr. Mahesh Albuquerque (Colorado Division of Oil and Public Safety – Representing Aaron Yanker, Colorado Department of Agriculture Weights & Measures) questioned the merit of the proposal and whether it was fully developed. He also questioned how the study on soap was conducted and noted that deodorant was not addressed by it. His recommendation was that the item be WITHDRAWN or DEVELOPING.

Mr. Kurt Floren (County of Los Angeles, California) agreed with the observations about the lack of data for deodorant and felt that there was not enough data to support the 5% moisture loss allowance for cold process bar soap. He also expressed that he would like to see more commodities added to Table 2-3 (moisture loss allowance table). Mr. Floren stated that he had not seen the study in question and would like to review it. He encouraged the submission of data to support more commodities to be included in Table 2-3 and did not want to see this item withdrawn. He recommended a DEVELOPING status.

Mr. Mike Brooks (Arizona Weights & Measures) supported the comments made by Mr. Floren and encouraged participation from other industry stakeholders. He recommended a DEVELOPING status.

Mr. Kevin Schnepp (California Division of Measurement Standards) agreed with the concerns raised by others and agreed that thoroughly vetted peer-reviewed data would be necessary for this item to be considered. He recommended a DEVELOPING status.

Based on the comments heard during open hearings, the WWMA L&R Committee recommends a DEVELOPING status for this item. The committee also encourages the submitter to solicit more industry engagement in the development and collection of peer-reviewed data to justify the 5% moisture loss allowance reflected in this item for both cold process bar soap and deodorant representative of the industries.

NEWMA 2026 Interim Meeting:

A Regulator from NJ stated the submitter asks that both cold-process bar soap and solid deodorant be given a 5% moisture allowance, but there is only one study for soap, nothing for deodorant. Additionally, it is not clear what "flavors" of soap were used in this study and that some "flavors" of this brand consistently weigh more, and others

consistently weigh less. Further, the study only encompasses one brand and is not representative of the industry as a whole. NJ would like to see a wider data set, and recommends a Developing status.

A Regulator from NY stated they don't disagree that bar soaps and solid deodorants lose moisture or are subject to moisture loss, but the commodities listed in Table 2-3 are not an all-inclusive list, nor are they the only commodities subject to a moisture allowance. NY appreciates the test data and results that have been submitted for justification, but more research and data (including regulatory involvement) is necessary before we add more commodities to this table. That being said, any commodity that is subject to a moisture allowance can and should be considered by the regulator. Therefore, this item should be a Developing item.

A Regulator from Vermont needs to see the details of this study. It appears to only involve one brand and a limited number of items, so Vermont would not support a moisture allowance based on this "study". Vermont recommends a Developing status.

The committee Recommends a developing status.

SWMA 2026 Annual Meeting:

Submitter recommends voting status.

Robert Huff representing the state of Delaware opposes this item and recommends withdrawing.

Alison Wilkinson representing the state of Maryland opposes this item and recommends withdrawing

Brian Terry representing the state of Arkansas commented that there was not sufficient data and that stick deodorant was not was completely excluded from the study. Arkansas opposes this item and recommends withdraw.
Mark Lovisa representing the state of Louisiana commented that the data proves that the commodity does lose moisture, however he suggests this could possibly be addressed with a simple change to the packaging. Louisiana opposes this item and recommends withdrawing.

Tory Brewer representing the state of West Virgina commented that the proposer did provide data showing that moisture loss is occurring on this commodity however he agrees there should be more data submitted to support this item moving forward. Mr. Brewer does not want to discourage industry from conducting studies to determine if moisture loss is occurring on commodities. West Virigina recommends developing status.

SWMA Laws and Regulations committee recommends this item to be withdrawn.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

NET-27.2 2.3.5. Procedures for Determining Tare. and 2.3.5.2. Special Procedures for Determining Tare.

Source:
County of Los Angeles Department of Agricultural Commissioner/Weights and Measures

Purpose:
Establish a standardized procedure for preparing gel soaker pads for use as used dry tare during net content inspections of meat and poultry packages. Clear, reliable, uniform, and demonstrably consistent guidance to inspectors on means to establish that a gel soaker pad is considered adequately dried for tare determination is necessary to promote consistent inspection practices, to improve the accuracy and repeatability of net content verification, and to reduce variations in enforcement among jurisdictions.

Item under Consideration:
Amend NIST Handbook 133 as follows:

2.3.5. Procedures for Determining Tare

There are three types of tare for the inspection of packaged goods. The tare weight may vary considerably from package to package as compared with the variability of the package net contents, even for packages in the same production lot. The basic test procedure in this handbook considers the variation for all tare materials.

a. Used Dry Tare

Used Dry Tare is used tare material that has been air dried, or dried in some manner to simulate the unused tare weight. It includes all packaging materials that can be separated from the packaged product, either readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than "normal" household recovery procedures, but not including laboratory procedures like oven drying. Labels, wire closures, staples, prizes, decorations, and such are considered tare. Used Dry Tare is available regardless of where the packages are tested. The net content verification procedures described in this handbook reference Used Dry Tare.

Note: When testing frozen foods with Used Dry Tare, the frost found inside frozen food packages is included as part of the net contents, except in instances in which glazed or frozen foods are tested according to Section 2.6. "Net Weight of Encased-in-Ice and Ice Glazed Products."

Note: When testing meat or poultry packages that contain a gel soaker pad*, follow the procedure in Section 2.3.5.2.(c) to prepare the gel soaker pad(s) for use as Used Dry Tare during package testing.

2.3.5.2. Special Procedures for Determining Tare

a. Aerosols and Other Pre-Pressurized Containers

Aerosol and other pre-pressurized containers (aerosols) are handled differently for two reasons: first, regulations in NIST Handbook 130 under the Uniform Packaging and Labeling Regulation (UPLR) require that packages designed "to deliver" the product under pressure, "must state the net quantity of the contents that will be expelled when the instructions for use as shown on the container are followed." This means that any product retained in aerosol containers after full dispersion is included in the tare weight. Second, aerosol containers must not be opened because they are pressurized; for safety reasons they should not be punctured or opened. When emptying aerosol containers to determine a tare weight, exhaust them in a well-ventilated area (e.g., under an exhaust hood or outdoors) at least 15 m (50 ft) from any source of open flame or spark.

To ensure that the container properly dispenses the product, read and follow any dispensing instructions on the package. If shaking during use is specified in the instructions, periodically shake (at least two or three times during expulsion of the product). If directions are not given, shake the container five times with a brisk wrist twisting motion. If the container has a ball agitator, continue the shaking procedure for one minute after the ball has shaken loose.

b. Vacuum Packed Coffee

The gross weight of a container (typically a metal can) of vacuum-packed coffee will be more after the seal is broken and air enters the can. In the procedure to determine the tare weight of the packaging material, correct the gross weight determined for unopened cans as follows. Use the initial tare sample packages, weigh, and record the gross weight of the product-filled cans before and after breaking the vacuum seal. Compute the average gross weight difference (open weight minus sealed weight) and record this in Box 13a of the report form. The nominal gross weight equals the average tare weight minus the average difference in gross weights plus the labeled weight (Box 14): Box 13 − Box 13a + Box 1.

(Amended 2002)

c. Used Dry Tare for Gel Soaker Pads in Packaged Meat and Poultry

When testing meat or poultry packages that contain a gel soaker pad*, follow the procedure below to prepare the gel soaker pad(s) for use as Used Dry Tare during package testing.

Procedure for Preparing the gel soaker pad as Used Dry Tare:

1. Place a layer of two paper towels on a firm surface and lay the used gel soaker pad(s) atop them.

2. Place two paper towels over the gel soaker pad(s).

3. Gently press or squeeze the pad to transfer excess liquid into the paper towels, ensuring that pressure from hands does not burst or damage the integrity of the gel soaker pad(s).

4. Replace the paper towels as they become wet and continue gentle pressing with fresh paper towels as described in Steps 1, 2, and 3.

5. Repeat this process until there is no observable moisture transfer to the paper towels.

Once there is no observable moisture transfer to the paper towels, the gel soaker pad is considered ready for use as the Used Dry Tare.

***Gel soaker pad is an absorbent liner often found in meat, poultry, and seafood packages. It is designed to absorb and trap excess liquids (e.g., purged water and blood) to prevent bacterial growth and extend product shelf life. They typically consist of food-safe silica gel (purified sand) or plant cellulose, which is wrapped in a perforated, non-toxic polymer (plastic) shell.**

Previous Status:

2027: New Proposal

Original Justification:

NIST Handbook 133 currently defines Used Dry Tare but does not provide a specific procedure for preparing (removing moisture to an acceptably "dry" state) gel soaker pads commonly found in meat and poultry packages. As a result, inspectors may use different methods to determine when a gel soaker pad has been sufficiently dried, leading to inconsistent tare weights and variability in net content determinations. Establishing a simple, practical procedure using paper towels and repeated, consistent manual pressure until no moisture is transferred from the gel soaker pads provides an objective and repeatable method that can be performed in both field and laboratory settings. This promotes uniform enforcement and improves the consistency and reliability of net content inspections without changing the existing definition of Used Dry Tare.

The submitter noted the following possible concerns:

1. No standardized amount of pressure
2. Not representative of "Used Dry Tare"
3. May encourage excessive manipulation

The submitter requested that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:

•

Industry:

•

Advisory:

•

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

Two representatives voiced concerns on how the data was obtained and the fairness in testing to the producer.

The committee recommends a developing status.

WWMA 2026 Annual Meeting:

WWMA L&R Committee member Mr. Khoa Lam recused himself from the open hearings and working sessions for this item.

During open hearings a presentation was provided by Ms. Annie Tsou (County of Los Angeles, California – representing the submitter of the item), a copy of the presentation is available on the WWMA website.

Mr. Kurt Floren (County of Los Angeles, California) recognized that any procedure to be used would need to be standardized; this procedure uses paper towels to absorb moisture. Mr. Floren shared proposed edits, those edits are also available on the WWMA website. Mr Floren recommended a VOTING status with these edits.

Mr. Mike Brooks (Arizona Weights & Measures) applauded the work that went into this item and emphasized that the process should not be limited to poultry as other prepackaged products use soaker pads. He also expressed that the item may not be ready for a vote and wondered whether a 25-pound standard, for instance, could be used to provide standardized pressure. The use of standard is something Arizona is attempting to collect information on currently. Mr. Brooks recommended a DEVELOPING status.

Mr. Kevin Schnepp (California Division of Measurement Standards) supported the edits provided by Mr. Floren but also shared the concerns raised by Mr. Brooks.

Mr. Kenn Burt (San Luis Obispo County, California) expressed concerns that gel soaker pads vary significantly in their composition and that they do not allow the liquid in the pad to come out; the trapped liquid cannot be removed even if

the outside of the pad is dry. Mr. Burt recommended a DEVELOPING status, possibly with a note that not all moisture will be able to be extracted.

Ms. Misael Martinez (Representing the WWMA L&R Committee) asked the submitter of the item about observable moisture: was there a range across pads regarding the number of paper towels used?

Ms. Tsou responded to the L&R Committee expressing that it depends on pads, of which there is a variety, and the initial moisture, noting that she recalled a range of about 20 to 50 paper towels. Ms. Tsou also explained that through her studies, using a paper towel takes approximately 30 minutes and that training is required for the inspector to apply pressure appropriately; but that this method is more effective than the use of a standardized weight which could burst the soaker pad, additionally a paper towel absorbs the moisture. She also agreed that not all the moisture would be extracted and shared that after 5 samples she found that it takes 24 hours to 14 days for the pads to dry completely.

Mr. John McGuire (NIST OWM) stated that NIST has not formulated their analysis, so they do not have a formal status recommendation, however he did support the edits provided by Mr. Floren.

Mr. Brooks recognized that the pads take a long time to dry and expressed that he understands the intent. He cautioned that the language may be too subjective for a National Standard.

Mr. Floren explained that gel soaker pads are unique and that their purpose by design is to keep moisture in; that they will never return to their original state. Mr. Floren acknowledged the concerns about pressure, and that their office had attempted the use of standardized weights, but the results did not support their use. Mr. Floren also expressed that should the item remain on the agenda that it should be assigned to a work group which would be able to collect the information necessary to develop the item further. Mr. Floren recommended an INFORMATIONAL status.

Mr. John Sorfleet (Santa Clara County, California) supported the item but recognized the concerns that the language may be subjective.

Mr. Mahesh Albuquerque (Colorado Division of Oil and Public Safety – Representing Aaron Yanker, Colorado Department of Agriculture Weights & Measures) expressed that he was appreciative of the work that has been put into this item and was prepared to support a voting status for this item but based on the testimony heard during open hearings he recommends an INFORMATIONAL status.

Mr. Richard Suiter (Richard Suiter Consulting) suggested that manufacturers of gel soaker pads be required to provide a tare weight that can be used when performing package inspections.

The WWMA L&R Committee recommends an INFORMATIONAL status based on these comments, including the edits provided at open hearings as shown below in red font and double underlined. The WWMA L&R Committee further recommends that the NCWM L&R Committee requests that the NCWM Chair form a task group, and that this item be assigned to that task group.

2.3.5. Procedures for Determining Tare

There are three types of tare for the inspection of packaged goods. The tare weight may vary considerably from package to package as compared with the variability of the package net contents, even for packages in the same production lot. The basic test procedure in this handbook considers the variation for all tare materials.

a. Used Dry Tare

Used Dry Tare is used tare material that has been air dried, or dried in some manner to simulate the unused tare weight. It includes all packaging materials that can be separated from the packaged product, either readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than “normal” household recovery procedures, but not including laboratory procedures like oven drying. Labels, wire closures, staples, prizes, decorations, and such are considered tare. Used Dry Tare is available regardless of where the packages are tested. The net content verification procedures described in this handbook reference Used Dry Tare.

Note: When testing frozen foods with Used Dry Tare, the frost found inside frozen food packages is included as part of the net contents, except in instances in which glazed or frozen foods are tested according to Section 2.6. "Net Weight of Encased-in-Ice and Ice Glazed Products."

Note: When testing packages of meat, ~~or~~ poultry, seafood, or similar products ~~packages~~ that contain a gel soaker pad* and employing Used Dry Tare procedures, follow the procedure in Section 2.3.5.2.(c) to prepare the gel soaker pad(s) for use as Used Dry Tare during package testing.

2.3.5.2. Special Procedures for Determining Tare

a. Aerosols and Other Pre-Pressurized Containers

Aerosol and other pre-pressurized containers (aerosols) are handled differently for two reasons: first, regulations in NIST Handbook 130 under the Uniform Packaging and Labeling Regulation (UPLR) require that packages designed "to deliver" the product under pressure, "must state the net quantity of the contents that will be expelled when the instructions for use as shown on the container are followed." This means that any product retained in aerosol containers after full dispersion is included in the tare weight. Second, aerosol containers must not be opened because they are pressurized; for safety reasons they should not be punctured or opened. When emptying aerosol containers to determine a tare weight, exhaust them in a well-ventilated area (e.g., under an exhaust hood or outdoors) at least 15 m (50 ft) from any source of open flame or spark.

To ensure that the container properly dispenses the product, read and follow any dispensing instructions on the package. If shaking during use is specified in the instructions, periodically shake (at least two or three times during expulsion of the product). If directions are not given, shake the container five times with a brisk wrist twisting motion. If the container has a ball agitator, continue the shaking procedure for one minute after the ball has shaken loose.

b. Vacuum Packed Coffee

The gross weight of a container (typically a metal can) of vacuum-packed coffee will be more after the seal is broken and air enters the can. In the procedure to determine the tare weight of the packaging material, correct the gross weight determined for unopened cans as follows. Use the initial tare sample packages, weigh, and record the gross weight of the product-filled cans before and after breaking the vacuum seal. Compute the average gross weight difference (open weight minus sealed weight) and record this in Box 13a of the report form. The nominal gross weight equals the average tare weight minus the average difference in gross weights plus the labeled weight (Box 14): Box 13 − Box 13a + Box 1.

(Amended 2002)

c. Used Dry Tare for Gel Soaker Pads in Packaged Meat, ~~and~~ Poultry, Seafood, or Similar Products when employing Used Dry Tare Procedures

When testing packages of meat, ~~or~~ poultry, seafood, or similar products ~~packages~~ that contain a gel soaker pad* and employing Used Dry Tare procedures, follow the procedure below to prepare the gel soaker pad(s) for use as Used Dry Tare during package testing.

Procedure for Preparing the gel soaker pad as Used Dry Tare:

1. **Place a layer of two paper towels on a firm surface and lay the used gel soaker pad(s) atop them.**

2. **Place two paper towels over the gel soaker pad(s).**

3. Gently press or squeeze the pad to transfer excess liquid into the paper towels, ensuring that pressure from hands does not burst or damage the integrity of the gel soaker pad(s).

4. Replace the paper towels as they become wet and continue gentle pressing with fresh paper towels as described in Steps 1, 2, and 3.

5. Repeat this process until there is no observable moisture transfer to the paper towels.

Once there is no observable moisture transfer to the paper towels, the gel soaker pad is considered ready for use as the Used Dry Tare.

NOTE: Due to variances that can occur among packages in a lot, including use of differing sizes or numbers of gel soaker pads, this procedure should be applied to every package in the sample under testing.

***Gel soaker pad is an absorbent liner often found in meat, poultry, and seafood packages. It is designed to absorb and trap excess liquids (e.g., purged water and blood) to prevent bacterial growth and extend product shelf life. They typically consist of food-safe silica gel (purified sand) ~~or plant cellulose~~, which is wrapped in a perforated, non-toxic polymer (plastic) shell.**

NEWMA 2026 Interim Meeting:

A Regulator from NH stated prepackaged chicken injected with liquid solutions undergoes significant moisture purge over time (often taking up to three weeks from packing plant to retail shelf). Liquid collects in soaker pads and cannot be easily removed. Using an official dry tare procedure, a package of chicken declared at 3.5 pounds was found to be 0.5 pounds underweight. On-site packed items do not experience this same level of degradation. Consumers should not bear the loss for underweight packages. Packers must align their tare determination methods with what is actually found in the retail case after multiple days. NH believes the proposal has merit and recommends Developing status to refine tare analysis expectations for packers.

A Regulator from NY stated they appreciate adding a uniform procedure to prepare gel soakers for testing. But, they are not sure that used soaker pads will weigh the same as unused soaker pads by using this procedure, in cases where the gel pads are completely saturated. These pads may need to be dried out over time or using another means. When unused dry tares are available, this should be the first option. If this is not an option, the inspector would have to consider what the best procedure would be to dry the pads to the best of their ability to duplicate the weight of an unused soaker pad. NY recommends this item be Developing status.

A Regulator from Vermont supports this proposal as having a recognized procedure for something that is generally good but are unsure if this procedure is fully developed. Vermont would recommend a Developing status.

A regulator from NJ recommends replacing the word “blood” with “myoglobin”. The regulator is unsure what “gentle pressure” is and recommends Developing status

The committee recommends a developing status.

SWMA 2026 Annual Meeting:

Submitter recommends voting status.

Mark Lovisa representing the state of Louisiana supports this item but has some concerns that federal law specifically USDA would require the use of the unused dry tare procedure to determine tare. Louisiana recommends voting status.

Brian Terry representing the state of Arkansas echoes comments made from the state of Louisiana, is neutral on this item, and recommends working with NIST OWM to determine if this is an appropriate procedure.

Robert Huff representing the state of Delaware does not support this item and does not believe that this procedure would result in the soaker pad being dried in sufficient enough time to determine a correct tare. Recommends the item be withdrawn.

Chad Parker representing the state of North Carolina echoes the comments made from the state of Delaware and recommends withdraw.

SWMA Laws and Regulations committee recommends this item be withdrawn.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

NET-27.3 NIST Handbook 133, Chapter 2 Reformatting

Source:
NIST Office of Weights and Measures

Purpose:
Update Handbook 133 to NIST Library Standards and HTML Formatting requirements. These requirements are necessary to transition from the printed publication to an electronic/digital one.

Item under Consideration:
Amend NIST Handbook 133, Chapter 2 as follows:

Chapter 2 NIST Handbook 133

2.1 Scope

The gravimetric test method uses weight measurement to determine the net quantity of contents of packaged goods. This chapter includes general test methods to determine the net quantity of contents of packages labeled in terms of weight. Gravimetric testing is the preferred method of testing most products because it reduces destructive testing and improves measurement accuracy.

Note: If Multiunit or Variety Packages are to be inspected, refer to Chapter 5. "Specialized Test Procedures" for guidance in testing. If a total quantity declaration is being verified and the **Maximum Allowable Variation (**MAV**)** to be applied is not based on a percentage of the labeled quantity, refer to Section 1.2.4.1. "Total Quantity MAV for Multiunit and Variety Packages."

(Note Added 2022 **& Amended 20XX)**

2.2.1 Scale Requirements

Use a scale (for this handbook, the term "scale" includes balances) that has at least 100 scale divisions. It must have a load-receiving element of sufficient size and capacity to hold the packages during weighing. It also requires a scale division no larger than 1/6 of the ~~Maximum Allowable Variation (~~MAV~~)~~ for the package size being weighed. The MAV/6 requirement ensures that the scale has adequate resolution to determine the net contents of

the packages. Subsequent references to product test results requiring the agreement to within one scale division are based on scale divisions that are equal to or only slightly smaller than the MAV/6. (see Appendix A, Table 2-5. "Maximum Allowable Variations (MAVs) for Packages Labeled by Weight.")

Example:
The MAV for packages labeled with a net weight 113 g (0.25 lb) is 7.2 g (0.016 lb). Divide (÷) the MAV by 6 to obtain the maximum scale division that can be used to determine the gross, tare and net weights for a package size.

7.2 g (0.016 lb) ÷ 6 = 1.2 g (0.002 lb)

In this example, a 1 g (0.002 lb) scale division would be the maximum scale division appropriate for weighing these packages.

(Amended 2010 **& Amended 20XX)**

2.2.4.1 Increasing-Load Test

Use **traceable** ~~certified~~ mass standards to conduct an "increasing-load test" with all test loads centered on the load-receiving element. Start the test with the device on zero and progress with increasing test loads to a "maximum test load" of at least 10 % more than the gross weight of the packages to be tested. Use at least three different test loads of approximately equal value to test the device up to the "maximum test load." Verify the accuracy of the device at each test load. Include the package tare weight as one of the test points.

(Amended 20XX)

2.2.5. Other Test Equipment Requirements

Specifications, tolerances, and other technical requirements for the other measurement standards and test equipment cited in this handbook are specified in the following NIST publications. ~~These~~**The most current** publications may be obtained from the Office of Weights and Measures **website** (**www.nist.gov/pml/owm/nist-handbook-105-series**).

1. Mass Standards. Use NIST Handbook 105-1, "Specifications and Tolerances for Field Standard Weights" ~~(2019)~~

2. Volumetric Flasks and Cylinders. Use NIST Handbook 105-2, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures – Field Standard Measuring Flasks" ~~(1996)~~

3. Stopwatches. Use NIST Handbook 105-5, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures – Field Standard Stopwatches" ~~(1997)~~

~~4.~~ Thermometers. Use NIST Handbook 105-6, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures – Specifications and Tolerances for Thermometers" ~~(1997)~~

(Amended 20XX)

2.3 Basic Test Procedure for Gravimetric Testing of Net Weight

The following steps apply when gravimetrically testing any type of packaged product except borax and glazed or frozen foods. If the tested products contain borax, refer to Section 2.4. "Borax." If encased-in-ice or ice glazed food is tested, refer to Section 2.6. "~~Determining the~~ Net Weight of Encased-in-Ice and Ice Glazed Products."

- Identify and define the inspection lot.
- Select the sampling plan.
- Record inspection data using an official inspection report.
- Select the random sample.
- Select and determine tare.
- Determine nominal gross weight and package errors.
- Evaluate compliance with the Maximum Allowable Variation (MAV) requirement and the average requirement.

Each step will be described in more detail in the following sections.

(Amended 20XX)

2.3.1 Define the Inspection Lot

The **inspector** ~~official~~ defines which packages are to be tested and the size of the inspection lot. The lot may be smaller or larger than the production lot defined by the packer. Only take action on the packages contained in the lot that has been defined.

Lots may be made up of either standard or random weight packages. Standard packages are those with identical net content declarations such as containers of soda in 2 L bottles and 2.26 kg (5 lb) packages of flour. "Random packages" are those with differing or no fixed pattern of weight, such as packages of meat, poultry, fish, or cheese.

Notes:

Typically, the inspector will not have ~~Normally, there will never be~~ access to the entire "production lot" from a manufacturer. The "inspection lot" is selected from packages that are available for inspection/test at any location in the distribution chain.

When packages are tested in retail stores, it is not necessary to sort by lot code. If lot codes are mixed during retail testing, be sure to record the lot codes for all of the packages included in the sample so that the inspector and other interested parties can follow up on the information. For special reasons, such as a large number of packages or the prior history of problems with the product or store, the inspector may choose to define a lot as only one type of packaged product (e.g., ground beef). Another reason to narrowly define the lot is if the results of an audit test indicate the possibility of a shortage in one particular lot code within a particular product.

Example:
An inspection lot should consist of all of the cans of a single brand of peach halves, labeled with a net quantity of 453 g (1 lb).

(Amended 20XX)

2.3.3. Record Inspection Data

Use an official inspection report to record information. Attach additional worksheets, test notes, and other information as needed. This handbook provides random and standard packaged products model inspection report forms in Appendix C, "Model Inspection Report Forms." ~~(Refer to Appendix C for instructions on how to complete the forms' box numbers.)~~ Modify the model reports and the box numbers to meet your agency's needs. Other formats that contain more or less information may be acceptable. The procedure below describes how to record inspection data using the "Model Inspection Report Forms" in Appendix C. The same information should be recorded regardless of the form used.

Note: Inspection reports should be legible and complete. Good recordkeeping practices typically include record retention for a specified period of time.

(Amended 20XX)

2.3.3.1. Procedure for Recording Data

1. Record the product identity, packaging description, lot code, location of test, and other pertinent data.

2. Record the labeled net quantity of contents in Box 1. Record both metric and U.S. customary declarations if they are provided on the package label.

   Example:
   If the labeled weight is 453 g (1 lb), record this in Box 1.

   Note: When the declaration of net quantity on the package includes both the International System of Units (SI) (metric) and U.S. customary units, the larger of the two declarations must be verified. The rounding rules in NIST Handbook 130, Uniform Packaging and Labeling Regulations **(UPLR), Appendix B** permit packers to round declarations up or down based on their knowledge of their package filling targets and the accuracy of packaging equipment.

3. Determine the larger of the values by converting the SI declaration to U.S. customary units, or vice versa, using conversion factors **in Appendix E., "General Tables of Units of Measurement,"** that are accurate to at least six places. Compare the values, and use the larger value in computing the nominal gross weight (see later steps). Indicate on the report which of the declarations is being verified when packages labeled with two units of measure are encountered.

   Example:
   *If the net weight declared on a package is 1 lb, the metric equivalent (accurate to six significant digits) is 453.592 g. Do not round down or truncate values in the calculations until the nominal gross weight is determined and recorded. If the package is labeled 454 g, then the metric declaration is larger than the U.S. customary ~~declaration~~ **(1 lb),** and **the metric (454 g) declaration** should be used to verify the net contents of the package.*

4. Record the unit of measure in Box 2. The unit of measure is the minimum division of the unit of measurement used to conduct the test. If a scale is used that reads to thousandths of a pound, the unit of measure is 0.001 lb even if the scale division is 0.002 lb or 0.005 lb.

   Examples:
   If the scale has a scale division of 0.5 g, the unit of measure is 0.1 g. If a weighed package ~~that~~ has an error of "− 0.5 g," record the error as "− 5" using "dimensionless units."

   $$-0.5\ g \div 0.1 = 5 \text{ dimensionless units}$$

If the scale indicates in increments of 0.002 lb, the unit of measure is 0.001 lb. If a weighed package has an error of "+ 0.016," record the error as "+ 16" using "dimensionless units."

0.016 lb ÷ 0.001 = 16 dimensionless units

Notes:

(1) When using dimensionless units, multiply package errors by the unit of measure to obtain the package error in weight.

(2) The Basic Test Procedure does not prohibit the use of units of weight instead of dimensionless units when recording package errors, nor does it prohibit the use of software programs to determine product compliance. Refer to Appendix F, "Glossary," for the definition of dimensionless units.

5. Enter the appropriate MAV value in Box 3 for the type of package (weight, volume, etc.), the labeled net contents, and the unit of measure using Appendix A. Tables 2-5 through 2-10.

6. Determine the MAV in dimensionless units and record in Box 4 on the **Appendix C-Model Inspection Report Forms** ~~Standard Package Report form~~ (a dimensionless unit is obtained by dividing the MAV recorded in Box 3 by the unit of measure recorded in Box 2).

7. Determine how many minus package errors are permitted to exceed the MAV (errors known as unreasonable minus errors ~~[UMEs]~~), see Column 4 in either Table 2-1. "Sampling Plans for Category A" or Table 2-2. "Sampling Plans for Category B" (refer to Appendix A). Record this number in Box 8.

(Amended 20XX)

2.3.5. Procedures for Determining Tare

There are three types of tare for the inspection of packaged goods. The tare weight may vary considerably from package to package as compared with the variability of the package net contents, even for packages in the same production lot. The basic test procedure in this handbook considers the variation for all tare materials.

a. Used Dry Tare

Used Dry Tare is **the** used tare material that has been air dried, or dried in some manner to simulate the unused tare weight. It includes all packaging materials that can be separated from the packaged product, either readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than "normal" household recovery procedures, but not including laboratory procedures ~~like~~ **such as** oven drying. Labels, wire closures, **ties,** staples, prizes, decorations, and such are considered tare. Used Dry Tare is available regardless of where the packages are tested. The net content verification procedures described in this handbook reference Used Dry Tare.

Note: When testing frozen foods with Used Dry Tare, the frost found inside frozen food packages is included as part of the net contents, except in instances in which glazed or frozen foods are tested according to Section 2.6. "Net Weight of Encased-in-Ice and Ice Glazed Products."

b. Unused Dry Tare

Unused Dry Tare is all unused packaging materials (including glue, labels, **wire closures,** ties, etc.) that contain or enclose a product. It includes prizes, gifts, coupons, or decorations that are not part of the product. If testing

packages in retail store locations where they are packaged and sold in small quantities to the ultimate consumers, the basic test procedure may be modified by using samples of the packaging material available in the store.

c. Wet Tare

Wet Tare is **the** used tare material where no effort is made to dry the tare material. Free-flowing liquids are considered part of the tare weight.

Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The USDA Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST Handbook 133 by reference in 2008, but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).

If the jurisdiction uses wet tare to determine net weight, follow the procedures described below that reference Used Dry Tare, except make no effort to dry the tare material. If Wet Tare is used to verify the net weight of the packages, the inspector must allow for moisture loss.

(Amended 2010 **& 20XX)**

2.3.6.1 Determine Nominal Gross Weight

A nominal gross weight is used to calculate package errors. To compute the nominal gross weight, add the average tare weight (recorded in Box 13) to the labeled weight (recorded in Box 1), **and subtract the tare correction (Box 13a), if applicable.** Record in Box 14.

The nominal gross weight is represented by the formula:

Nominal gross-weight = average tare weight + ~~l~~abeled weight ***– Tare Correction***

(Amended 20XX)

2.3.6.2. Determine Package Error

To obtain the package error, subtract the nominal gross weight from each package's gross weight. The package error is represented ~~by the~~ **in** formula:

Package error = gross weight −~~-~~nominal gross weight

(Added 2010)

Determine the errors of the packages opened for tare by subtracting the nominal gross weight recorded in Box 14 from the individual package gross weights recorded for each package (Pkg. 1, Pkg. 2, etc.) in Block a, "Gross Wt." The nominal gross weight must be used, rather than the actual net weight, for each package to determine the package error. This ensures that the same average tare weight is used to determine the error for every package in the sample, not just the unopened packages.

Standard Packages. – Record the package error in the appropriate plus or minus column on the report form for each package opened for tare.

Random Packages. – Determine the package error for the tare sample using a nominal gross weight for each package so that all of the package errors are determined with the same tare weight value. Record the package error on the Random Package Report Form in the appropriate plus or minus column under Package Errors.

Note: Converting the package error to dimensionless units allows the inspector to record the package errors as whole numbers disregarding decimal points and zeroes in front and unit of measure after the number. This section does not prohibit the use of software or units of weight instead of dimensionless units.

Example:
If weighing in 0.001 lb increments, the unit of measure is 0.001 lb. If the package error for the first package opened for tare is + 0.008 lb, instead of recording 0.008 lb in the plus column, record the error as "8" in the plus column. If the second package error is + 0.060 lb, record the package error as "60" in the plus column, and so on.

Determine the errors for the rest of the sample by subtracting the nominal gross weight (Box 14) from the gross weight of each of the unopened sample packages. Record the package errors in the "Package Errors" section of the report form using either units of weight (lb or g) or dimensionless units.

(Amended 20XX)

2.3.7. Evaluate for Compliance

This inspection lot will pass or fail based on the sample test results. The following steps ~~lead~~ **guide** the inspector through the process to determine if a sample passes or fails. If the product is subject **to** a moisture allowance, follow the procedures under Section 2.3.8. "Moisture Allowances" to correct the MAV.

(Amended 20XX)

2.3.7.2. Average Requirement

1. Determine the average error by dividing the total error recorded in Box 15 by the sample size recorded in Box 6. Record the average error in Box 18 if using dimensionless units or in Box 19 if using units of weight.

2. Compute the average error in terms of weight (if working in dimensionless units up to this time) by multiplying the average error in dimensionless units by the unit of measure and record the value in Box 19. If the average error is positive, the sample passes the average requirement. If the average error is negative, the sample fails under a "Category B" test. Record in Box 20.

Note: If the total error recorded in Box 15 is a plus value, and Box 17 is "No" (the number of unreasonable errors is equal to or less than the number allowed, recorded in Box 8), the lot passes.

(Refer to Section 1.4.1. Net Quantity of Contents Requirements for Pesticides Labeled with Minimum Net Quantity of Contents Declarations.")

5. If the average error is a negative value when testing under the Sampling Plans for "Category A," compute the Sample Error Limit (SEL) as follows:

   - Compute the Sample Standard Deviation and record it in Box 21.

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

   - Obtain the Sample Correction Factor from Column 3 of Appendix A. Table 21. "Sampling Plans for Category A" test. Record this value in Box 22.

- Compute the Sample Error Limit using the formula:

Sample Error Limit (Box 23) =
Sample Standard Deviation (Box 21) × Sample Correction Factor (Box 22)

6. Compliance Evaluation of the Average Error:

- If the value of the Average Error (Box 18) is smaller than the Sample Error Limit (Box 23), the sample passes.

- If the value of the Average Error (disregarding the sign) (Box 18) is larger than the Sample Error Limit (Box 23), the sample fails. However, if the product is subject to moisture loss, the sample does not necessarily fail. Follow the procedures **in** ~~under~~ "**2.3.8.** Moisture Allowances" in this chapter.

(Amended 2018**,** ~~and~~ 2022 **& 20XX**)

2.3.8.1. Applying Moisture Loss before Determining Package Errors

1. Determine the percent value of the moisture allowance if the product is listed below. (see Table 2-3. "Moisture Allowances.")

Table 2-3.
Moisture Allowances

Verifying the labeled net weight of packages of:	Moisture Allowance is:	Notes
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Pasta products	3 %	Pasta products means all macaroni, noodle, and like products packaged in kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.
Borax	see Section 2.4. Borax	
Cannabis	3 %	*Cannabis* means plant material only, and not products containing *Cannabis*, whether containing more than 0.3 % Total Delta-9 THC (also known as cannabis, Marijuana, or Marihuana) or containing 0.3 % or less Total Delta-9 THC (also known as Hemp).
Wet Tare Only[1]		
Fresh poultry	3 %	Fresh poultry is defined as poultry above a temperature of − 3 °C (26 °F) that yields or gives when pushed with the thumb.
Franks or hot dogs	2.5 %	

Table 2-3. Moisture Allowances		
Bacon, fresh sausage, and luncheon meats	0 %	For packages of bacon, fresh sausage, and luncheon meats, there is no moisture allowance if there is no free-flowing liquid or absorbent material in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Used Dried Tare are equivalent.
[1] Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th edition of NIST Handbook 133 by reference in 2008 but not the "Wet Tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).		
Notes: (1) There is no moisture allowance when inspecting meat and poultry from a USDA inspected plant when Used Dry Tare and "Category A" sampling plans are used. (2) For the Wet Tare Only section of Table 2-3. "Moisture Allowances," free-flowing liquid and liquid absorbed by packaging materials in contact with the product are part of the wet tare. (Note Added 2010)		

(Amended 2010, 2013, and 2024)

2. To compute moisture allowance, multiply the labeled quantity by the decimal percent value of the allowance. Record this value in Box 13a.

Example:
Labeled net quantity of flour is 907 g (2 lb)
Moisture Allowance is 3 % (0.03)
Moisture Allowance = 907 g (2 lb) × 0.03 = 27 g (0.06 lb)

3. If the Moisture Allowance is known in advance (e.g., **Table 2-3. Moisture Allowances** ~~flour, pasta products, and dry pet food~~), it can be applied by adjusting the Nominal Gross Weight used to determine the sample package errors. The Moisture Allowance in Box 13a is subtracted from the Nominal Gross Weight to obtain an Adjusted Nominal Gross Weight which is entered in Box 14. The Nominal Gross Weight is defined in Section 2.3.6.1. ~~as the sum of the Labeled Weight and the Average Tare Weight from Box 13.~~

Adjusted Nominal Gross Weight =
= (Labeled Quantity + Average Tare Weight)
- Moisture Allowance

Example:
Use a Labeled Weight of 907 g (2 lb) and an
Average Tare Weight of 14 g (0.03 lb), ***and a 3% (0.03) Moisture Allowance of 27 g (0.06 lb)***

Adjusted Nominal Gross Weight = ([907 g (2 lb) + 14 g (0.03 lb) = 921 g (2.03 lb)]) – 27 g (0.06 lb) = 894 g (1.97 lb)

~~*The calculation is:*~~

~~*Labeled Net Quantity 907 g (2 lb) + Average Tare Weight 14 g (0.03 lb) = 921 g (2.03 lb) – Moisture Allowance 27 g (0.06 lb) = Adjusted Nominal Gross Weight of 894 g (1.97 lb)*~~

This result is entered in Box 14.

4. Determine package errors by subtracting the Adjusted Nominal Gross Weight from the Gross Weights of the Sample Packages.

Example:
~~The calculation is~~ **Compute the Package Error by using the formula**:
Package Error = *Gross Weight of the Sample Packages – Adjusted Nominal Gross Weight* ~~*= Package Error*~~

Note: When the Nominal Gross Weight is adjusted by subtracting the Moisture Allowance value(s) the Maximum Allowable Variation(s) is not changed. This is because the errors that will be found in the sample packages have been adjusted by subtracting the Moisture Allowance (e.g., 3 %) from the Nominal Gross Weight. That increases the individual package errors by the amount of the moisture allowance (e.g., 3 %). If the value(s) of the MAV(s) were also adjusted it would result in doubling the allowance. MAV is always based on the labeled net quantity.

(Added 2010)

2.3.8.2. Applying Moisture Allowance after Determining Package Errors

Adjustments can be made when the value of the Moisture Allowance is determined following the test (e.g., after the sample fails or if a packer provides reasonable moisture allowance based on data obtained using a scientific method) using the following approach:

If the sample fails the Average Requirement but has no unreasonable package errors, only Step 1 is used. If the sample passes the Average Requirement but fails because the sample included one or more Unreasonable Minus Errors, only Step 2 is used.

If the sample fails the Average and MAV Requirements, both of the following steps are applied.

1. Use the following approach to apply a Moisture Allowance to the Average Requirement after the test is completed:
   - the Moisture Allowance is computed;

Example :
3 % × 907 g (2 lb) = 27 g (0.06 lb)

   - added to the Sample Error Limit;

Example:
If the Sample Error Limit is 0.023, add 0.06 to obtain an Adjusted Sample Error Limit of 0.083)

   - the Adjusted Sample Error Limit is then compared to the Average Error of the Sample; and

- if the average error (disregarding sign) in Box 18 is smaller than the Adjusted Sample Error Limit, the sample passes.

HOWEVER,

- if the average error (disregarding sign) in Box 18 is larger than the Adjusted Sample Error Limit, the sample fails.

2. To apply Moisture Allowance to the MAV(s) after the test, the following method is recommended:
   - compute Moisture Allowance;

Example :
3 % × 907 g (2 lb) = 27 g (0.06 lb)

   - add to **the** MAV for labeled net quantity of the package to get **the** Adjusted ~~Maximum Allowable Variations~~**MAV(s)**;

Example:
MAV for 907 g (2 lb) is 31.7 g (0.07 lb) + 27 g (0.06 lb) =
*Adjusted ~~Maximum Allowable Variation~~**MAV**(s) of 58.7 g (0.13 lb)*

   - compare each minus package error to the Adjusted MAV;
   - mark package errors that exceed the Adjusted MAV and record the number of unreasonable minus errors found in the sample; and
   - if this number exceeds the number of unreasonable errors allowed, the sample fails.

(Added 2010 **& Amended 20XX)**

2.3.8.3. Moisture Allowance Gray Area

When the average error of a lot of fresh poultry, franks/hot dogs, or pasta products is minus but does not exceed the established "moisture allowance" or "gray area," contact the packer or plant management personnel to determine what information is available on the lot in question. Questions to the plant management representative may include:

- Is a quality control program in place?
- What information is available concerning the lot in question?
- If net weight checks were completed, what were the results of those checks?
- What adjustments, if any, were made to the target weight?

Note: If the plant management has data on the lot, such data may help to substantiate that the "lot" had met the net content requirements at the point of manufacture.

This handbook provides "moisture allowances" for some **products (Table 2.3. Moisture Allowances)**~~meat and poultry products, flour, pasta products, and dry pet food.~~ These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or further investigation can be conducted.

Reasonable variations from net quantity of contents caused by the loss or gain of moisture from the package are permitted when caused by ordinary and customary exposure to conditions that occur under good

distribution practices. If evidence is obtained and documented to prove that the lot was shipped from the packaging plant in a short-weight condition or was distributed under inappropriate or damaging distribution practices, appropriate enforcement action should be taken.

(Amended 2010, ~~and~~ 2013 **& 20XX)**

2.4.1. Test Equipment

- Dry measure with a capacity of 550.6 mL or (1 dry pt), 1 101 mL (dry quart), 1 000 mL (liter)
- Metal funnel with slide-gate and stand
- A scale that meets the requirements in Chapter 2, Section 2.2. "Measurement Standards and Test Equipment."
- Straightedge or Ruler
- Safety glasses
- Gloves
- Dust mask
- Level (at least 15 cm [6 in] in length)
- Pan or drop cloth/polyethylene sheeting for catching overflow of dry measure
- Borax Audit Worksheet **(see Appendix C. "Model Inspection Report Forms")**

(Amended 2016 **& 20XX**)

2.5.1 Test Equipment

Scales and ~~weights~~ **(mass standards)** recommended in Section 2.2. "Measurement Standards and Test Equipment" are suitable for the determination of drained weight.

Sieves

- For drained weight of 1.36 kg (3 lb) or less, one 203 mm (8 in) No. 8 mesh U.S. Standard Series sieve, receiving pan, and cover;
- For drained weight greater than 1.36 kg (3 lb), one 304 mm (12 in) sieve, with same specifications as above;
- For canned tomatoes, a U.S. Standard test sieve with 11.2 mm ($^{7}/_{16}$ in) openings must be used.

Note: The sieve is used, if it is necessary, to determine the percentage of solids in the container.

- Stopwatch. **See Section 2.2.5 "Other Test Equipment Requirements"**

(Amended 2010 **& 20XX**)

2.6.1.1. Test Equipment

- **Scale** ~~Balance~~ and ~~weights~~**mass standards** (used to verify accuracy) **per 2.2 "Measurement Standards and Test Equipment".**
- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a - 35 °C to + 50 °C (- 30 °F to + 120 °F) **range**, accurate to ± 1 °C (± 2 °F) **see Section 2.2.5 "Other Test Equipment Requirements".**

- Water source and hose with an approximate flow rate of 4 L to 15 L (1 gal to 4 gal) per minute for thawing blocks and other products

- Sink or other receptacle [i.e., bucket with a capacity of approximately 15 L (4 gal)] for thawing blocks and other products

- A wire mesh basket (e.g., used for testing large frozen blocks of shrimp) or a container that is large enough to hold the contents of one package (e.g., 2.27 kg or [5 lb] box of shrimp) and has openings small enough to retain all pieces of the product (e.g., an expanded metal test tube basket lined with standard 16-mesh screen)

- Number 8 mesh, 203 mm (8 in) or 304 mm (12 in) sieve

- Means to determine a 30° angle

- Pan for weighing the thawed and drained product

- Stopwatch**. (see Section 2.2.5 "Other Test Equipment Requirements")**

- Ice Glazed Package Worksheet (see Appendix C. "Model Inspection Report Forms"

- Ice Glazed Package Report (see Appendix C. "Model Inspection Report Forms")

(Amended 20XX)

2.6.1.2. Test Procedure for Encased-in-Ice Product Only

1. Follow Sections 2.3.1. through 2.3.4. to define the inspection lot, select a sampling plan and select a random sample.

2. Place the unwrapped frozen seafood, meat, poultry, or similar products in the wire mesh basket or an open container to thaw (e.g., it is not placed in a plastic bag) and immerse in a 15 L (4 gal) or larger container of fresh water at a temperature between 23 °C ~~to~~**and** 29 °C (75 °F ~~to~~**and** 85 °F). Submerge the basket so that the top of the basket extends above the water level.

3. Maintain a continuous flow of water into the bottom of the container to keep the temperature within the specified range. This is accomplished by maintaining a constant flow of warm water into the container holding the product (e.g., place a bucket in a sink to catch the overflow, and feed warm water into the bottom of the bucket through a hose).

Note: Direct immersion does not result in the product absorbing moisture because the freezing process causes the tissue to lose its ability to hold water.

4. As soon as the product thaws, determined by loss of rigidity, transfer all material to a sieve (203 mm [8 in] for packages 453 g [1 lb] or less). A sieve 304 mm [12 in] for packages weighing more than 453 g [1 lb]) and distribute it evenly over the sieve.

5. Without shifting the product, incline the sieve 30° from the horizontal position to facilitate drainage, and drain for two minutes **using a stopwatch.**

6. While the product is draining, place pan on scale and tare the scale reading to zero.

7. At the end of the drain time, immediately transfer the product to the tared pan for weighing to determine the net weight of the product.

(Amended 2010 **& 20XX**)

2.6.2.1. Test Equipment

- **Scale** ~~Balance~~ and ~~weights~~**mass standards** (used to verify accuracy), **see 2.2 "Measurement Standards and Test Equipment".**
- Continuous cold water source
- Number 8 sieve and receiving pan, 203 mm (8 in) for packages 453 g (1 lb) or less. A 304 mm (12 in) **sieve** for packages more than 453 g (1 lb).
- Means to determine a 17° to 20° angle
- Stopwatch. **(see Section 2.2.5 "Other Test Equipment Requirements")**

(Amended 20XX)

2.7.1 Test Equipment

- Scale ~~or balance~~ and mass standards (The standards are used to verify the accuracy and repeatability of the weighing device.) **See 2.2 "Measurement Standards and Test Equipment."**
- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a - 35 °C to + 50 °C (- 30 °F to + 120 °F) **range,** accurate to ± 1 °C (± 2 °F) **see Section 2.2.5 "Other Test Equipment Requirements".**
- Sink (e.g., water bath, ice chest) or other receptacle of suitable size to hold the packages for thawing, water source, and hose with fresh water that can be maintained at a temperature between 23 °C to 29 °C (75 °F to 85 °F). (Used for thawing plastic bags or buckets of chitterlings.)
- An alternative thawing procedure for packages requires access to a refrigerator that must be available for storing sample packages for several days to thaw.
- Stainless Steel Sieve(s) and Drain Pan(s) with number 8 mesh, 203 mm (8 in) or 304 mm (12 in) (The use is based on the labeled net weight of the package under inspection.)
- Chitterlings Worksheet for Category A and Category B (see Appendix C**.** "Model Inspection Report Forms.")
- Stopwatch (to measure drain periods), **see Section 2.2.5. "Other Test Equipment Requirements.**
- Knife or box cutter (to open packages).
- Waterproof marking pen (for numbering the packages).

- Disposable non-latex gloves.
- Paper towels (drying sieve drain pan, packages and work area).
- Large plastic bags (to hold product emptied from packages).
- Plastic rod (to insert into buckets of chitterlings to determine if the product is thawed and to ensure there are no chunks of ice remaining).

(Added 2015 **& Amended 20XX)**

The submitter requested that this be a Voting Item in 2027.

Previous Status:
2027: New Proposal

Original Justification:
NIST OWM is reviewing and making editorial changes to NIST Handbooks to ensure compliance with NIST Library Publication Standards and HTML Formatting requirements. This ongoing project is necessary and a required enhancement to the transition from the printed publication to an electronic/digital one. During this endeavor, OWM has identified several sections within NIST Handbook 133 that may encroach on the editorial boundary, including outdated language, references to test equipment, and other updates that we believe need to be presented to the NCWM for consideration.

Possible Opposing Arguments: Questions as to why these changes are necessary.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:

-

Advisory:

-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

One regulator asked for editorial review, i.e. the use of see vs. per, underlining, and capitalization in the added text.

The committee recommends a voting status.

WWMA 2026 Annual Meeting:

Mr. John McGuire (NIST OWM) stated that NET-27.3 and NET-27.4 are the results from NIST OWM reviewing NIST Handbook 130 and 133 to advance them into HTML electronic publication. These changes do not change the content in the model law; however, the review of the editorial changes should be brought to the body for consideration. Mr. McGuire recommended a VOTING status.

Mr. Matthew Douglas (L&R Committee Chair) asked if these edits will contradict; between the two handbooks and the additional documents that were submitted to WWMA.

Mr. John McGuire (NIST OWM) reaffirmed that the changes are to adapt the handbooks to the NIST library standard for HTML formatting and will include live links and structural changes. The structural change is in the labeling of titles to help users navigate the table of contents as well as SI incorporations. Mr. McGuire noted that the documents submitted are different but will not be contradictory because they address different items.

Mr. Kurt Floren (County of Los Angeles, California) agrees with the proposal and notes that if NET-25.1 moves forward, then the formatting will also need to be updated simultaneously to stay consistent.

Mr. John McGuire (NIST OWM) acknowledged Mr. Floren's concern and noted that NIST is aware that if the items move forward to voting, then those changes will have to be incorporated to reflect the new format as well.

Mr. Mahesh Albuquerque (Colorado Division of Oil and Public Safety) supported NET-27.3 and NET-27.4 with the editorial changes and recommended a VOTING status.

Mr. Kevin Schnepp (California Division of Measurement Standards) supported this item and recommended a VOTING status.

Based on the comments heard during open hearings the WWMA L&R Committee recommends a VOTING status for this item.

NEWMA 2026 Interim Meeting:

A Regulator from NJ concurs with NIST reformatting and recommends Voting status.

NIST OWM stated Chap 2 and 3 are additional that NIST found with changes to switch from HB133 to HTML and library standards. Can be found in the supporting docs of items that will occur in the 2027 HB. Happy to hear that NJ stands in support with the Voting item.

The committee recommends a voting status.

SWMA 2026 Annual Meeting:

Submitter recommends voting status.

Tory Brewer representing the state of West Virgina speaking on behalf of the Moisture Allowance Task group commented that pending the outcome of the items in Block 4 and NIST approach on accepting the editorial changes if BLOCK 4 is approved by the body. Until Mr. Brewer receives NISTs position on these changes he is recommending a developing status.

Alison Wilkinson representing the state of Maryland is neutral on this item and recommends developing status.

Whitney Corley representing the state of Louisiana commented the following:

We have concern with the proposal to replace the word "certified" with "traceable" because I believe that using "traceable" would unintentionally introduce a loophole that the mass standards used would not need to meet any sort of applicable maximum permissible error as traceability is an assigned value and uncertainty traceable to the SI only, and it does not ensure compliance with any sort of specification. I believe traceability is implied with a word such as "certified" or "verified" whereas certification or verification to any sort of specification or tolerance is not implied with "traceability." Recommends developing status.

Brain Terry representing the state of Arkansas supports this item and recommends voting status.

SWMA Laws and Regulations committee recommends this item to be given developing status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

NET-27.4 NIST Handbook 133, Chapter 3 Reformatting

Source:
NIST Office of Weights and Measures

Purpose:
Update Handbook 133 to NIST Library Standards and HTML Formatting requirements. These requirements are necessary to transition from the printed publication to an electronic/digital one.

Item under Consideration:
Amend NIST Handbook 133, Chapter 3 as follows:

Chapter 3. Test Procedures – For Packages Labeled by Volume

3.1. Scope

Use these procedures to determine the net contents of packaged goods labeled in fluid volume, such as milk, water, beer, oil, paint, distilled spirits, soft drinks, juices, liquid cleaning supplies, or chemicals. This chapter also includes procedures for testing the capacities of containers such as paper cups, bowls, glass tumblers, and stemware. **Also in this chapter are procedures for net content of package goods of peat moss, mulch, soil, ice cream, frozen novelties, oysters, compressed gas containers, firewood, and animal bedding labeled by volume.**

These procedures do not address all the safety issues users need to be aware of to carry out the tasks. Some specific test methods involve unique safety hazards. When performing these tests, always refer to OSHA or industry safety best practices guidance.

These procedures do not cover berry baskets and rigid-dry measures that are covered by specific code requirements in NIST Handbook 44 "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices."

If Multiunit or Variety Packages are to be inspected, refer to Chapter 5. "Specialized Test Procedures" for guidance in testing. If a total quantity declaration is being verified and the **Maximum Allowable Variation (**MAV**)** to be applied is not based on a percentage of the labeled quantity, refer to Section 1.2.4.1. "Total Quantity MAV for Multiunit and Variety Packages."

(Note Added 2022 & **Amended 20XX)**

3.1.1. Test Methods

The gravimetric procedure **in Section 3.2. "Gravimetric Test Procedure for Non-Viscous Liquids"** may be used to verify the net quantity of contents of packages labeled in volume when the density (density means the weight of a specific volume of liquid determined at a reference temperature) of the product being tested does not vary excessively from one package to another.

If the density varies from one package to another, test each package using the volumetric test procedures described in this chapter. Special test methods are required for a number of unique products so care should be taken to select the correct test procedure.

Reference Temperature:

In addition to possible package-to-package variations in product density, the temperature of the liquid will affect the volume. The product will expand or contract based on a rise or fall in product temperature.

Example:
The volume of a liquid cleaning product might be 5 L (1.32 gal) at 20 °C (68 °F) and 5.12 L (1.35 gal) at 25 °C (77 °F), which represents a 2.2 % change in volume.

Notes:

1. This extreme example is for illustrative purposes. A 2.2 % volume change will not occur in normal testing.

Use the reference temperature specified in Table 3-1. "Reference Temperatures for Liquids" to determine volume. When checking liquid products labeled by volume using the gravimetric procedure, maintain the packages used to determine product densities at reference temperatures. If testing the packages in a sample volumetrically, each package in the sample must be maintained at or corrected to the reference temperature when its volume is determined.

2. When checking liquid products using a volumetric ~~or gravimetric~~ procedure, **or when determining the density of samples using the gravimetric procedure,** the temperature of the samples must be maintained at the reference temperature ± 2 °C (± 5 °F).

Table 3-1. Reference Temperatures for Liquids		
If the liquid commodity is:	**Volume is determined at the reference temperature of:**	**Code of Federal Regulation (CFR) Reference***
Malt (Beer)	4 °C (39.1 °F)	27 CFR 7.10
Distilled Spirits	15.56 °C (60 °F)	27 CFR 5.11
Frozen food - sold and consumed in the frozen state	At the frozen temperature	21 CFR 101.7(b)(2)(i)
Petroleum	15.6 °C (60 °F)	16 CFR 500.8(b)
Refrigerated food (e.g., milk and other dairy products labeled "KEEP REFRIGERATED")	4 °C (40 °F)	21 CFR 101.7(b)(2)(ii)
Other liquids and wine (e.g., includes liquids sold in a refrigerated state for immediate customer consumption such as soft-drinks, bottled water and others that do not require refrigeration)	20 °C (68 °F)	Food: 21 CFR 101.7(b)(2)(iii) Non-Food: 16 CFR 500.8(b) Wine: 27 CFR 4.10 (b)
*The Code of Federal Regulations (CFR) can be accessed online at: **www.ecfr.gov or www.govinfo.gov/app/collection/cfr.**		

(Amended 2010 **& 20XX)**

3.2. Gravimetric Test Procedure for Non-Viscous Liquids

3.2.1. Test Equipment

- A scale that meets the requirements in Chapter 2, Section 2.2. "Measurement Standards and Test Equipment."
- **Other measurement standards and test equipment should meet the requirements in Chapter 2, Section 2.2.5. "Other Test Equipment Requirements".**

Note: To verify that the scale has adequate resolution for use, it is first necessary to determine the density of the liquid; next verify that the scale division is no larger than MAV/6 for the package size under test. The smallest graduation on the scale must not exceed the weight value for MAV/6 (see Example for Determining Scale Suitability).

Example:
Assume the inspector is using a scale with 1 g (0.002 lb) increments to test packages labeled 1 L (33.8 fl oz) that have an MAV of 29 mL (1 fl oz). Also, assume the inspector finds that the weight of 1 L of the liquid is 943 g (2.078 lb). This will result in an MAV/6 value in weight of 4.557 g (0.010 lb).

Example for Determining Scale Suitability (based on the example above)		
1. *Determine the MAV based on the labeled quantity.*	*MAV: 29 mL*	*MAV: 1 fl oz*
2. *Determine the density of the liquid.*	*Density: 1 Liter = 943 g ÷ 1000 mL = 0.943 g/mL*	*Density: 33.8 fl oz = 2.07 8 lb ÷ 33.8 fl oz = 0.061 4 lb/fl oz*
3. *Convert the MAV from volume to weight by multiplying the (volume) MAV by the density factor (step 2). Divide this result by 6 (MAV/6) and compare it to the scale division.*	*MAV in Volume Converted to Weight Divided by 6.* *29 mL × 0.943 g/mL ÷ 6 = 4.557 g**	*MAV in Volume Converted to Weight Divided by 6.* *1 fl oz × 0.061 4 lb/fl oz ÷ 6 = 0.010 lb*
**In this example, the 1 g (0.002 lb) scale division is smaller than the MAV/6 value of 4.557 g (0.010 lb) so the scale is suitable for making a density determination.*		

- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a − 35 °C to + 50 °C (− 30 °F to + 120 °F) **range**, accurate to ± 1 °C (± 2 °F) **see Chapter 2, Section 2.2.5 "Other Test Equipment Reguirements"**.
- Volumetric **standards** ~~measures~~ **(used to verify accuracy) per Chapter 2, Section 2.2.5 "Other Test Equipment Requirements".**

Note: When checking packages labeled in SI units, flask sizes of 100 mL, 200 mL, 500 mL, 1 L, 2 L, 4 L, and 5 L and a 50 mL cylindrical graduate with 1 mL divisions may be used. When checking packages labeled in U.S. customary units the use of measuring flasks and graduates with capacities of ~~gill, half-pint, pint, quart, half-gallon, gallon, and a 2 fl oz cylindrical graduate, graduated to $^1/_2$ fl dr~~ **1 gi, 0.5 pt, 1 pt, 1 qt, 0.5 gal, 1 gal, and a 2 fl oz cylindrical graduate, graduated to 0.5 fl dr** is recommended.

- Defoaming agents may be necessary for testing liquids such as beer and soft drinks that effervesce or are carbonated. Two such products are Hexanol or Octanol (Capryl Alcohol).
- ~~Bubble~~ **L**~~l~~evel at least 152 mm (6 in) in length
- Stopwatch **per Chapter 2, Section 2.2.5. "Other Test Equipment Requirements."**

(Amended 20XX)

3.2.2. Test Procedure

1. Follow Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection. Select a random sample.

2. Bring the sample packages and their contents to the reference temperature as specified in Table 3-1. "Reference Temperatures for Liquids." To determine if the liquid is at its reference temperature, immerse the thermometer in the liquid before starting the test. Verify the temperature again immediately after the flask and liquid is weighed. If the product requires mixing for uniformity, mix it before opening in accordance with any instructions specified on the package label. **Often, less air is entrapped if the package is gently rolled to mix the contents.** Shaking liquids, such as flavored milk, often entraps air that will affect volume measurements, so use caution when testing these products. ~~Often, less air is entrapped if the package is gently rolled to mix the contents.~~

3. For milk, select a volumetric measure equal to or one size smaller than the label declaration. For all other products, select a volumetric measure that is one size smaller than the label declaration.

(Amended 2004)

Example:
If testing a 1 L bottle of juice or a soft drink, select a 500 mL volumetric measure.

Note: When determining the density of milk, if the product from the first container does not fill the volumetric measure to the nominal capacity graduation, product may be added from another container as long as product integrity is maintained (i.e., brand, identity, lot code, and temperature).

4. Prepare a clean volumetric measure to use according to the following procedure:

- Because flasks are ordinarily calibrated on a "to deliver" basis, they must be "wet down" before using. Immediately before use, fill the volumetric flask(s) or graduate with water. The water should be at the reference temperature of the product being tested. Fill the flask(s) with water to a point slightly below the top graduation on the neck. The flask should be emptied in 30 seconds (± 5 seconds). Tilt the flask gradually so the flask walls are splashed as little as possible as the flask is emptied. When the main flow stops, the flask should be nearly inverted **(held at a 10 ° to 15 ° angle from vertical)**. Hold the flask in this position for 10 seconds more and touch off the drop of water that adheres to the tip. If necessary, dry the outside of the flask. This is called the "wet down" condition. The flask or graduate is then ready to fill with liquid from a package.

Note: When using a volumetric measure that is calibrated "to contain," the measure must be dry before each measurement. **See NIST Handbook 105-2 section 3 "Terminology" for markings placed by the manufacturer to identify the type of volumetric measure.**

- If the liquid effervesces or foams when opened or poured (such as carbonated beverages), add two drops of a defoaming agent to the bottom of the flask before filling with the liquid. If working with a carbonated beverage, make all density determinations immediately upon placing the product into the standard. This reduces the chance of volume changes occurring from the loss of carbonization.

5. If the flask capacity is equal to the labeled volume, pour the liquid into the volumetric measure tilting the package to a nearly vertical position. If the flask capacity is smaller than the package's labeled volume, fill the flask to its nominal capacity graduation.

6. **Read the flask meniscus according to the following procedure:** Position the flask on a level surface at eye level. For clear liquids, place a material of some dark color outside the flask immediately below the level of the meniscus. Read the volume from the lowest point of the meniscus. For opaque liquids, read volume from the center top rim of the liquid surface.

7. Evaluate the density variation.

- Select a volumetric measure equal to or one size smaller than the labeled volume (depending on the product) and prepare it as described in Step 4 of this section. Then determine and record its empty weight.

- Determine acceptability of the liquid density variation, using two packages as follows:
  - Determine the gross weight of the first package.
  - Pour the liquid from the first package into a flask. Measure exactly to the nominal capacity marked on the neck of the measure.
  - Weigh the filled flask and subtract its empty weight to obtain the weight of the liquid.
  - Determine density by dividing the weight of the liquid by the capacity of the flask.
  - Determine the weight of the liquid from a second package using the same procedure.
  - If the difference between the densities of the two packages exceeds one division, use the volumetric procedure in Section 3.3. "Volumetric Test Procedure for Non-Viscous Liquids."

8. Determine the Average Used Dry Tare Weight of the sample according to provisions of Section 2.3.5. "Procedures for Determining Tare."

9. Calculate the Average Product Density by adding the densities of the liquid from the two packages and dividing the sum by two.

10. Calculate the "nominal gross weight" using the following formula if the flask capacity is equal to the labeled volume:

Nominal Gross Weight = (Average Product Density [in weight units]) + (Average Used Dry Tare Weight)

Note: If the flask size is smaller than the labeled volume, the following formula is used:

Nominal Gross Weight = (Average Product Density × [Labeled Volume/Flask Capacity]) + (Average Used Dry Tare Weight)

11. Weigh the remaining packages in the sample.

12. Subtract the nominal gross weight from the gross weight of each package to obtain package errors in terms of weight. All sample packages are compared to the nominal gross weight.

13. To convert the average error or package error from weight to volume, use the following formula:

Package Error in Volume = Package Error in Weight ÷ Average Product Density Per Volume Unit of Measure.

(Amended 20XX)

3.3.1. Test Equipment

- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a − 35 °C to + 50 °C (− 30 °F to + 120 °F) **range**, accurate to ± 1 °C (± 2 °F) **see Chapter 2, Section 2.2.5. "Other Test Equipment Requirement".**
- Volumetric ~~measures~~ **standards (used to verify accuracy) per Chapter 2, Section 2.2.5 "Other Test Equipment Requirements".**

Note: When checking packages labeled in SI units, flask sizes of 100 mL, 200 mL, 500 mL, 1 L, 2 L, 4 L, and 5 L and a 50 mL cylindrical graduate with 1 mL divisions may be used. When checking packages labeled in U.S. customary units the use of measuring flasks and graduates with capacities of ~~gill, half-pint, pint, quart, half-gallon, gallon, and a 2-fl oz cylindrical graduate, graduated to $\frac{1}{2}$-fl dr~~ **1 gi, 0.5 pt, 1 pt, 1 qt, 0.5 gal, 1 gal, and a 2 fl oz cylindrical graduate, graduated to 0.5 fl dr is**is recommended.

- Defoaming agents may be necessary for testing liquids such as beer and soft drinks that effervesce or are carbonated. Two such products are Hexanol or Octanol (Capryl Alcohol).
- ~~Bubble~~ level at least 152 mm (6 in) in length
- Stopwatch **per Chapter 2, Section 2.2.5. "Other Test Equipment Requirements."**

(Amended 20XX)

3.3.2. Test Procedure

5. Follow Steps 1 through 6 in Section 3.2. "Gravimetric Test Procedure for Non-Viscous Liquids" for each package in the sample.

6. In Step 5, drain the container into the flask for one minute after the stream of liquid breaks into drops **of liquid**.

7. Read the package errors directly from the graduations on the measure. The reference temperature must be maintained within ± 2 °C (± 5 °F) for the entire sample.

(Amended 20XX)

3.4. Volumetric Test Procedures for Viscous Fluids – Headspace

Depending on how level the surface of the commodity is, use one of the two headspace test procedures. Use Section 3.4.2.a. "Test Procedure for Testing Oils, Syrups, and other Viscous Liquids with a Smooth and Level Surface" to determine volume where the liquid has a level surface ~~(e.g., oils, syrups, and other viscous liquids)~~. Use Section 3.4.2.b. "Test Procedure for Testing Mayonnaise, Salad Dressing, and Water Immiscible Products with no Smooth and Level Surface" to determine volume where the commodity does not have a level surface (e.g., mayonnaise and salad dressing).

Before conducting either of the following volumetric test procedures, follow Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample.

(Amended 2019 **& 20XX)**

3.4.1. Test Equipment

- Micrometer depth gage (ends of rods may be flat or fully rounded) 0 mm to 225 mm (0 in to 9 in) or longer.

- Level (at least 152 mm [6 in] in length)
- Laboratory pipets and/or buret
  - Class A 100 mL buret as defined by the latest version of ASTM E287, "Standard Specification for Laboratory Glass Graduated Burets."
  - Class A pipets, calibrated "to deliver "as defined by the latest version of ASTM E969, "Standard Specification for Glass Volumetric (Transfer) Pipets."

- Volumetric ~~measures~~ **standards (used to verify accuracy) per Chapter 2, Section 2.2.5 "Other Test Equipment Requirements".**
- Distilled Water or Reverse Osmosis Water (for use with laboratory pipets and/or burets)
- Water
- Rubber bulb syringe
- Plastic disks that are 3 mm (1/8 in) thick with diameters equal to the seat diameter or larger than the brim diameter of each container to be tested. The diameter tolerance for the disks is 50 µm (± 0.05 mm [± 0.002 in]). The outer edge should be smooth and beveled at a 30° angle with the horizontal to 800 µm (0.8 mm [1/32 in]) thick at the edge. Each disk must have a 20 mm (3/4 in) diameter hole through its center and a series of 1.5 mm (1/16 in) diameter holes 25 mm (1 in) apart around the periphery of the disk and 3 mm (1/8 in) from the outer edge. All edges must be smooth.

- Stopwatch **per Chapter 2, Section 2.2.5. "Other Test Equipment Requirements."**
- Partial immersion thermometer (or equivalent) with 1 °C (2 °F) graduations and a range of − 35 °C to + 50 °C (− 30 °F to + 120 °F) **range,** accurate to ± 1 °C (± 2 °F) **see Chapter 2, Section 2.2.5 "Other Test Equipment Requirements".**

(Amended 2019 **& 20XX)**

3.4.3. Evaluation of Results

For either of the above procedures **(3.4.2.a., 3.4.2.b.)**, follow the procedures in Section 2.3.7. "Evaluate for Compliance" to determine lot conformance.

3.5.2. Test Procedure

Note: Make all measurements on a level surface.

1. Before conducting any of the following volumetric test procedures, refer to Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample.

2. When testing goods labeled by capacity, use water at a reference temperature of 20 °C ± 2 °C (68 °F ± 5 °F).

3. Select a sample container and place a disk larger than the container opening over the opening.

4. Measurement Procedure:

   - Add water to the container using flask (or flasks), graduate, or buret corresponding to labeled capacity of the container. If it appears that the contents of the flask may overfill the container, do not empty the flask. Add water until all of the air in the container has been displaced and the water begins to rise in the center hole of the disk. Stop filling the container when the water fills the center disk hole and domes up slightly due to the surface tension.

- If the water dome breaks on the surface of the disk, the container has been overfilled and the test is void; dry the container and start over.
- Record the amount of water used to fill the container and subtract 1 mL (0.03 fl oz) ~~this~~ **(which** is the amount of water held in the hole in the disk specified) to obtain the total container volume.

5. Test the other containers in the sample according to Steps 3 and 4 of this procedure.

6. To determine package errors, subtract the total container volume obtained in Step 4 of this procedure from the labeled capacity of the container.
(Amended 20XX)

3.7.1. Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment"
- Volumetric ~~measures~~**standards (used to verify accuracy) per Chapter 2, Section 2.2.5 "Other Test Equipment Requirements"**
- Partial immersion thermometer (or equivalent with 1 °C (2 °F) graduations and a range of – 35 °C to + 50 °C (– 30 °F to + 120 °F) **range,** accurate to ± 1 °C (± 2 °F) **see Chapter 2, Section 2.2.5 "Other Test Equipment Requirements".**
- Micrometer depth gage (ends of rods may be flat or fully rounded), **with an operating range of** 0 mm to 225 mm (0 in to 9 in)
- Spanning bar, 25.4 mm × 25.4 mm × 304 mm or (1 in × 1 in × 12 in)
- Ruler, 304 mm (12 in)
- Paint solvent or other solvent suitable for the product being tested
- Cloth, 304 mm (12 in) square
- Wood, 50 mm (2 in) thick × 150 mm (6 in) wide × 300 mm (12 in) long
- Rubber mallet
- Metal disk or other appropriate shape, 6.4 mm (¼ in) thick and slightly smaller than the diameter of package container bottom
- ~~Rubber s~~Spatula **(rubber or silicon)**
- Level at least 152 mm (6 in) in length
- Distilled water or reverse osmosis water
- Micrometer (optional)
- Stopwatch **per Chapter 2, Section 2.2.5. "Other Test Equipment Requirements."**

(Amended 2019 **& 20XX**)

3.7.2. Test Procedures

a. Plant Audit Test Procedure

Use the following procedure to conduct an audit inspection in a production facility. This method applies to containers in a sample that are the lightest in weight and likely to contain the smallest volume of product. Duplicate the level of fill with water in an empty unused container of the same dimensions and capacity as the one under test. Use this method to check any size rigid container, if the liquid level is within the measuring range of the depth gage. If any paint is clinging to the sidewall or lid, carefully scrape the paint into the container using ~~a rubber~~ **the** spatula to ensure the full content volume is measured.

Note: Do not shake or invert the containers selected as the sample**.**

1. Follow Section 2.3.1. "Define the Inspection Lot" to determine which "Category A" sampling plan to use; select a random sample.

Note: The sample containers shall be identically labeled as to volume, brand, commodity, color, and lot.

2. Determine the gross weight of the sample container. Record the gross weight of the lightest and heaviest container.

3. Select the lightest container and place it on a level work surface and open it. Place a spanning bar and depth gage across the top center of the container. Lower the depth gage rod until its point touches the surface of the paint and lock the rod adjustment.

4. Obtain an empty, unused – undamaged container of the same type and capacity as the container under test from the packer. Place the container on a rigid level work surface and place a disk or other appropriate support under the bottom to prevent deflection.

5. Use a volumetric flask or cylinder to fill the container with water [water reference temperature 20 °C ± 2 °C (68 °F ± 5 °F)] to the largest labeled quantity declared on the container.

6. Place the spanning bar and depth gage (locked at the surface depth of the paint in the container measured in Step 3.) across the top center of the container. If the point of the depth gage is at or below the surface of the water added in Step 4. assume the container is not short measure. When the audit test indicates that a short measure may exist in the sample container, then use Section 3.7.2.b. "Compliance Test Procedure".

(Added 2019)

b. Compliance Test Procedure

Use the following procedure when testing rigid containers of paint when they have failed the plant audit test. This procedure is used to test paint or other liquid whether testing is performed inside the plant or at retail.

Note: Do not shake or invert the containers selected as the sample.

1. Follow Section 2.3.1. "Define the Inspection Lot" to determine which "Category A" sampling plan to use; select a random sample.

Note: The sample containers shall be identically labeled as to the volume, brand, commodity, color, and lot. The steps noted with an (*) are required if there is paint adhering to the lid and it cannot be removed by scraping into the container.

2. Determine the gross weight of these containers and record in Column 2 of the "Example Worksheet for Determining Possible Violation in Checking Paint" (in this section). Select and test the containers in order of the lightest to the heaviest.

3. Record the labeled volume of the first tare sample package in Column 1 of the worksheet. Place the container on a level surface and use a circular (or appropriately shaped) metal or other solid disk to eliminate deflection in the bottom of the container and remove the lid. If paint clings to the lid of the container, scrape it off with ~~a~~ **the** spatula and place back into the container.

4. *If paint that adheres to the lid cannot be completely removed then by scraping the paint into the container, determine the weight of the lid plus any adhering paint. Clean (dry) the paint lid with solvent and weigh again. Subtract the clean (dry) lid weight from the lid weight with paint (wet) to determine the weight of the paint adhering to the lid. Record this weight in Column 3.

5. Place the spanning bar and depth gage across the top center of the container. Mark the location of the spanning bar on the rim of the container. Lower the depth gage rod until the point touches the paint surface and lock the rod adjustment.

6. Empty and clean the sample container and lid with solvent; dry and weigh the container and lid. Record the tare weight in Column 5.

7. Set up the container in the same manner as in Step 3.

8. Place the spanning bar at the same location on the rim of the paint container as marked in Step 5. With the depth gage set as described in Step 5, deliver water into the container in known amounts until the water reaches the same level occupied by the paint as indicated by the depth gage. Record this volume of water (in mL or fl oz) in Column 6 of the worksheet. This is the volume occupied by the paint in the container. Follow Steps 9a, 10a, and 11a if scraping does not remove the paint from the lid. To determine if gravimetric testing can be used to test the other containers in the sample, follow only Steps 9, 10, and 11 when no paint adheres to the lid.

9. Subtract the **tare** weight of the container (Column 5) from the gross weight (Column 2) to arrive at the net weight of paint in the selected container. Record the net weight in Column 7 of the worksheet.

   9a.* Subtract the **tare** weight of the container (Column 5) and the weight of product on the lid (Column 3) from the gross weight (Column 2) to arrive at the net weight of paint in the container. Record in Column 7 (excluding the weight of the paint on the lid).

10. Calculate the weight of the labeled volume of paint (for the first container opened for tare).

    Net Weight (Column 7) × Labeled Volume (Column 1) ÷ Volume of paint in can (Column 6)

    Record this value in Column 8.

    10a.* Calculate the package volume =

    Volume in container (Column 6) + (lid weight [Column 3] ×
    Volume in container [Column 6] ÷ net weight [Column 7])

    Record it in Column 9 of the worksheet.

11. Calculate the package error. Use the following formula if paint does not adhere to the lid.

    Package error = (Column 6 value) − (labeled volume)

    11a.* Use the following formula if paint does adhere to the lid and will not come off by scraping.
    Package error = (Column 9 value) − (labeled volume)

12. Repeat Steps 2 through 11 for the second package chosen or tare

(Amended 2010 and 2019)

Example Worksheet for Determining Possible Violation in Checking Paint (add additional rows as needed)								
1. Labeled Volume	**2. Gross Weight**	**3. Lid Weight (Wet − Dry)**	**4. Liquid Level**	**5. Tare <u>Weight</u>**	**6. Water Volume**	**7. Net Wt. = 2 − 5**	**8. Weight of Labeled Volume = 7 × 1 ÷ 6**	**9. Package Volume = 6 + [(3 ÷ 7) × 6)]**

Note: A gravimetric procedure can be used if the weights of the labeled volume for the first two containers do not differ from each other by more than one division on the scale (if they meet this criterion, check the rest of the sample gravimetrically and record in Column 8). The weight of a given volume of paint often varies considerably from container to container; therefore, volumetric measurement may prove necessary for the entire sample using the headspace procedure in Step 8. To determine the volume and enter the Package Volume in Column 9. Proceed to procedures in Section 2.3.7. "Evaluate for Compliance".

Note: To conserve inspection time and reduce destructive testing the inspector may stop testing and consider this test as an audit if the first few containers ~~contain the correct~~**<u>meet or exceed the labeled quantity</u>**. However, the inspector may continue to test the complete sample to determine the average fill level of the entire sample.

13. Use Section 2.3.6. "Determine Nominal Gross Weight and Package Error" to determine the "Nominal Gross Weight" as follows:

The nominal gross weight equals the sum of the average weight of the labeled volume (average of values recorded in Column 8) plus the average tare (average of values recorded in Column 3) for the containers selected for tare.

<u>(Amended 20XX)</u>

3.8.1. Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment."

- Pycnometer (pik·näm´ ət ər), a vessel of known volume used for weighing semifluids. The pycnometer can be bought or made. If it is made, refer to it as a "density cup." To make a 150 mL or 5 fl oz density cup, cut off the lip of a 150 mL beaker with an abrasive saw and grind the lip flat on a lap wheel. The slicker plate is available commercially. The metrology laboratory should calibrate the density cup gravimetrically with respect to the contained volume using the procedure as defined by the latest version of ASTM E542, "Standard Practice for Calibration of Laboratory Volumetric Apparatus."

Note: If applicable, comply with any special instructions furnished by the manufacturer to calibrate a pycnometer that has not been calibrated. It is not necessary to reweigh or recalibrate for each test; however, mark the pieces of each unit **<u>with unique identification</u>** to prevent interchange of cups and slicker plates.

- Appropriate solvents (water, Stoddard solvent, kerosene, alcohol, etc.)

- Caulking gun (for cartridge packed products)

(Amended 20XX)

3.8.2. Test Procedure

1. Follow the procedures in Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; and select a random sample.

2. Weigh a calibrated pycnometer and **its associated** slicker plate, and record as "pycnometer weight" and record the volume of the pycnometer.

3. Determine the gross weight of the first package and record the weight value. Open the package and transfer the product to the pycnometer by filling it to excess. Use a caulking gun to transfer product from the caulking cartridges. If using a pycnometer, cover it with a lid and screw the cap down tightly. Excess material will be forced out through the hole in the lid, so the lid must be clean. If using a density cup, place the slicker plate over ¾ of the cup mouth, press down and slowly move the plate across the remainder of the opening. With the slicker plate in place, clean all the exterior surfaces with solvent and dry.

4. Completely remove **any remaining** ~~the~~ product from the package container; clean the package container with solvent; dry and weigh it to determine the tare weight.

5. Weigh the filled pycnometer or filled density cup with slicker plate and record this weight. Subtract the weight of the empty pycnometer from the filled weight to determine the net weight of the product contained in the pycnometer and record this weight.

6. Clean the pycnometer and repeat Steps 3, 4, and 5 for the second package in the tare sample.

7. Determine acceptability of the density variation on the two packages selected for tare. If the difference between the densities of the two packages exceeds one division of the scale, do not use the gravimetric procedure to determine the net quantity of contents. Instead, use the procedure in steps 9, 10, and 11.

Product Density = *Weight of Product in Pycnometer ÷ Pycnometer Volume* ~~*= Product Density*~~

Note: If the gravimetric procedure can be used, perform Steps 8, 10, and 11 for each package in the sample.

8. Calculate the weight of product corresponding to the labeled volume of product according to the following formula:

Labeled Weight = *Product Density × Labeled Volume* ~~*= Labeled Weight*~~

9. Test each package individually by determining the product density in each package using the pycnometer and record the gross, tare, and net weight of each package. Subtract the weight of the labeled volume (determined for each package) from the net weight of product to arrive at each individual package error in units of weight.

10. Convert the package errors to units of volume using the following formula:

Package Error (volume) =
(Package Error [weight] × Pycnometer Volume) ÷ (Weight of Product in Pycnometer)

11. Record the package errors on the report form, using an appropriate unit of measure.

(Amended 20XX)

3.9.1.1. Test Equipment

- Calculator or spreadsheet Software (programmed to make volume calculations
- ~~Worksheet for~~ Peat Moss Labeled by Volume **Package Worksheet** – Dimensional Procedure (see Appendix C. "Model Inspection Report Forms.")
- ~~Non-permanent marking pen.~~
- Knife or razor cutter (for use in opening packages and unwrapping shrink-wrapped pallets in warehouses)
- Cellophane or duct tape (for use in securing packaging tails)
- Dimensional Measuring Frame (see Figure 3-1. "Dimensional Measuring Frame").



Figure 3-1. Dimensional Measuring Frame

- Rigid Rulers with 1.0 mm graduations. The edges of a ruler used with a measuring frame must be straight and the edges must be the zero point (see Figure 3-1. "Dimensional Measuring Frame").
  - 304 mm (12 in)
  - 500 mm (19.5 in)
  - 1 m (39 in)
- Carpenter square
  - 304 mm (12 in)
  - 600 mm (24 in)

(Amended 2015 **&** **20XX**)

3.9.1.2. Test Procedure

Test Notes:

Rounding: When a package measurement falls between graduations on a ruler, round the value up. This practice eliminates the issue of rounding from the volume determination and provides the packager the benefit of the doubt. If a ruler with a graduation of 1.0 mm is used, the rounding error will be limited to 0.5 mm or less. It is good practice to circle a measurement that has been rounded up or make a statement to such effect so that it becomes a part of the record.

Dimension Identification: The following package nomenclature is used to identify the dimensions measured in this test procedure (see Figure 3-2. "Dimensional Identification").

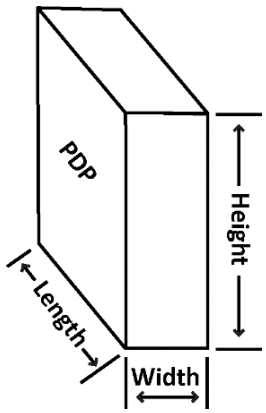


Figure 3-2. Dimensional Identification

Note: Packages of compressed peat moss do not have declaration of expanded volume.

Safety Precautions:

This procedure does not address all of the safety issues that users need to be aware of in order to carry out the following tasks. Users are sometimes required to conduct tests in warehouse spaces or retail stores where forklift trucks are in motion**.** ~~–~~ ~~e~~**C**are must be taken to warn others to avoid or exercise care around the test site. The procedure requires users to lift heavy objects including large bulky packages and test measures and includes the use of sharp instruments to obtain packages from shrink-wrapped pallets. Users may be required to climb ladders or work platforms to obtain sample packages. When opening and emptying packages, dust, or other particles may be present or escape from the packages, which may cause eye injuries and respiratory or other health problems. Users must utilize appropriate safety equipment and exercise good safety practices. If safe working conditions cannot be ensured, suspend testing until the situation is corrected **or abated**.

1. Follow Section 2.3.1. "Define the Inspection Lot." Use a "Category A" Sampling Plan for the inspection. Collect the sample packages from the Inspection Lot using random sampling. If the packages are not randomly selected, the sample will not be representative of the lot and the test results will not be valid for use in enforcement action. Place the sample packages in a location where there is adequate lighting and ample space for the packages and test equipment.

2. Examine the package for excess packaging material (i.e., packaging tails). Fold the packaging material consistent with design of the packaging and tape the material securely to the package so that its effect on the dimensional measurement is minimized. If the thickness of packaging tail appears excessive, it is appropriate to determine its average thickness by making at least three measurements along its length using a dead weight dial micrometer specified in Section 4.5. "Polyethylene Sheeting" and subtract the thickness from the measurement of length, width or height. Any deduction from a measurement should be noted on the inspection report.

3. If a Dimensional Measuring Frame is used, place it on a solid support. If a table is used, select one of sufficient load capacity to hold the weight of the frame, **tools,** and the heaviest package to be tested.
4. Position the frame so that the zero end of the ruler can be placed squarely and firmly against a surface of the frame and so that the ruler graduations can be read. Position yourself so that you can read both the ruler and the edge of the carpenter square in Figure 3-3. "Rigid Frame."



Figure 3-3. Rigid Frame

The rigid frame allows the observer to hold the zero reference point firmly in place.

5. Place the package against two sides of the frame without compressing the package. Place a carpenter square against the package at the point of measurement and align the ruler perpendicular to the edge of the carpenter square as shown in Figure 3-4. "Length Measurement" where the package length, Figure 3-5. "Height Measurement" where the package height are being determined, and Figure 3-6. "Width Measurement" where the package width are being determined.



Figure 3-4. Length Measurement

Using a measuring frame for dimensional testing ruler and carpenter square define zero reference and measurement point.



Figure 3-5. Height Measurement

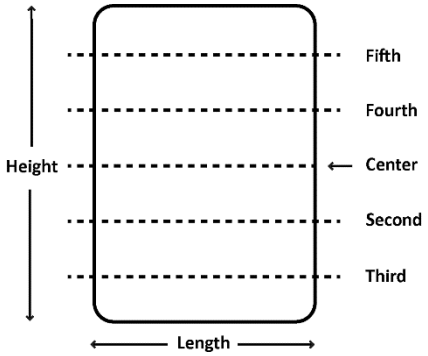
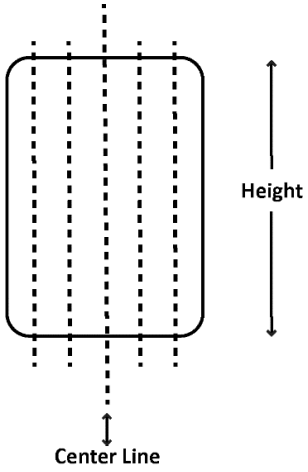
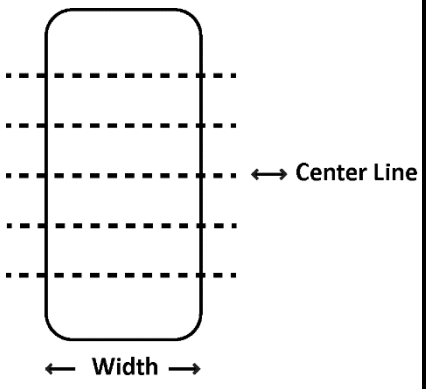
The packaging tail on the end of the package can affect this measurement so it has been folded over and taped against the end of the package.



Figure 3-6. Width Measurement

The frame is rotated on its end to vertical so that the carpenter square does not compress the product

1

Inspect the package for shape and place the flattest surfaces against the measuring frame.	
Length (see Figure 3-4. "Length Measurement") (a) Take the first measurement across the center line of the length axis of package. (b) Take the second measurement at half the distance between the center line and either of the package edges. (c) Take the third measurement half the distance between the second measurement and the package edge. (d) Take the fourth measurement on the opposite end of the package at half of the distance between the center line and the package edge. (e) Take the fifth measurement at half of the distance between the fourth measurement and the package edge.	
Height (see Figure 3-5. "Height Measurement") (a) Take the first measurement across the center line of the height axis of the package. (b) Take the second measurement at half the distance between the center line and the package edge. (c) Take the third measurement half the distance between the second measurement and the package edge. (d) Take the fourth measurement on the opposite end of the package at half of the distance between the center line and the package edge. (e) Take the fifth measurement at half of the distance between the fourth measurement and the package edge.	
Width (see Figure 3-6. "Width Measurement") If using one, turn the measuring frame on end and place the package on its bottom and against the frame as shown in the picture and on the right where the package width is being measured. (a) Take the first measurement across the center line of width axis of the package. (b) Take the second measurement at half the distance between the center line and the package edge. (c) Take the third measurement half the distance between the second measurement and the package edge. (d) Take the fourth measurement on the opposite end of the package at half the distance between the center line and the package edge. (e) Take the fifth measurement half of the distance between the forth measurement and the package edge.	

1

2



~~**Figure 3-5. Height Measurement**~~

~~**The packaging tail on the end of the package can affect this measurement so it has been folded over and taped against the end of the package**~~.

6. Measurements – take at least five measurements* of each of the dimensions as follows:

   *On small packages (height or length dimensions of 152 mm [6 in] or less), at least three measurements are taken using the following instructions.

7. Record the dimensions of each package in millimeters in a software program or inspection form that includes the information shown in the sample worksheet "Calculate the Compressed Volume of the Package in Liters" (below). Enter the measurements in the appropriate spaces and calculate the volume in liters. Calculate the package error by following the steps listed in the table and then calculate the average error for the sample.

Note: The following table is an example of the information from an actual test that is included in a worksheet for verifying the compressed volume on packages of peat moss. The Peat Moss Labeled by Volume Package Worksheet – Dimensional Procedure (see Appendix C. "Model Inspection Forms") has space for a sample of 12 packages and includes the steps for calculating the Average Package Error. Here, the package error in the dimensional volume was + 6.8 L (+ 0.24 ft^3). To determine the value of the MAV, look up the labeled quantity in Appendix A., Table 2-6. "Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume."

Sample Worksheet Calculate the Compressed Volume of the Package in Liters				
Unit of Measure = 1.0 mm		**Length (L)**	**Width (W)**	**Height (H)**
	1.	*482*	*282*	*690*
	2.	*490*	*278*	*690*
	3. (Center Line)	*493*	*276*	*681*
	4.	*499*	*272*	*677*
	5.	*493*	*269*	*657*
a.	**Average:**	*491*	*275.4*	*679*
b.	**Actual Calculated Volume L × W × H = Volume/1 000 000**	*91.8 L/3.24 cu ft*		
c.	**Labeled Compressed Quantities**	*85.0 L/3.0 cu ft*		
d.	**Conversion Factors**	*NA*	*(b) × 61.023 74*	*(b) × 0.035 314 67*
e.	**Converted Volume**	*91.8 L*	*NA cu in*	*3.24 cu ft*
f.	**Package Error = (b – c)**	*6.8 L*	*NA cu in*	*0.24 cu ft*

(Amended 2010**,** ~~and~~ 2015 **& 20XX**)

3.9.2.1. Test Equipment

- ~~12.7~~ **12.5** mm (or 1/2 in) sieve**, (per ASTM D2978)**
- Use a measure appropriate for the package size. (Refer to Table 3-4. "Specifications for Test Measures for Mulch and Soils" for additional information on test measure size and construction.)
- Straight edge, 508 mm (20 in) in length
- Sheet for catching overflow of material
- Level (at least 152 mm [6 in] in length)

(Amended 2015 **& 20XX**)

3.10.2. Test Procedure

1. Follow Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection, and select a random sample.

2. Some types of mulch are susceptible to clumping and compacting. To ensure that the material is loose and free flowing when placed into the test measure, gently massage the package while rolling the bag on the ground (or flat surface) at least four full rotations (but not more than eight full rotations), without lifting or dropping the package, before opening to reduce the clumping and compaction of the material.

Note: Mulch products stored exposed to the elements may become saturated with moisture. Excessive moisture adds weight to mulch particles and distorts the volume test results. Test samples with flowing or excessive collected moisture in the package shall be excluded from the test procedure.

3. Placing contents into the test measure.
   - Open the bag, gather the bag opening to ensure that no product is lost. Place the gathered bag opening as far into the top of the measure as possible without disturbing or leaning against the measure.

   - Release the bag opening and quickly dump the contents of the package into a test measure in a continuous flow.

Note: Do not touch the product or disturb the test measure by rocking, shaking, dropping or tamping it during the test procedure.

   - Massage the outside of the bag to maintain a continuous flow of the product but not for the purpose of de-clumping the product.

   - Using your hand, gently level the contents, being careful not to affect the compaction of the product.

4. Read the horizontal marks at a position level with the product and round the readings between two marked intervals up to the nearest ~~38.1~~ **12.7** mm (1/2 in) increment to determine the package net volume.

5. Determine package errors by subtracting the labeled volume from the package net volume in the measure. Record each package error.

$$Package\ Error = Package\ Net\ Volume - Labeled\ Volume$$

(Amended 2017 **& 20XX**)

3.11.1. Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment"

- Volumetric ~~measures~~**standards (used to verify accuracy) per Chapter 2, Section 2.2.5 "Other Test Equipment Requirements".**

- Displacement vessel with dimensions appropriate for the size of novelties being tested (see Figure 3-7(a), "Example of a Displacement Vessel"). It should include an interior baffle that reduces wave action when the novelty is inserted and a downward angled overflow spout to reduce dripping. Other designs may be used.



Figure 3-7(a). Example of a Displacement Vessel

- Insulation shield

  - Styrofoam Board – minimum one-inch-thick

  - Styrofoam glue

Figure 3-7(b)(c)(d). Example of an Insulation Shield with Acrylic Displacement Vessel



(b)



(c)



(d)

Figure 3-7(e)(f)(g). Example of an Insulation Shield with Metal Displacement Vessel



(e)



(f)



(g)

- Thin wire, clamp, or tongs
- Freezer or ice chest
- Single-edged razor or sharp knife (for sandwiches only)
- Prepared, chilled water maintained at 1 °C (33 °F) or below
- Ice Cubes and Dry Ice (Safe Handling and Storage of Dry Ice | OSHA Safety Manuals Safe Handling and Storage of Dry Ice OSHA Safety Manual: **(www.safetymanualosha.com/safe-handling-and-storage-of-dry-ice/)**
- Cryogenic gloves (for handling dry ice)

- Preparation container for prepared, chilled water with insulation (for protection from thermal transfer from ambient environment)

- Straining device to catch ice cubes and dry ice chunks from flowing into displacement vessel

- Indelible marker (for ice pops only)
- Level, at least 152 mm (6 in) in length
- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a − 35 °C to + 50 °C (− 30 °F to + 120 °F) **range,** accurate to ± 1 °C (± 2 °F) **see Chapter 2, Section 2.2.5 "Other Test Equipment Requirements".**

- A table top, laboratory-type jack of sufficient size to hold the displacement vessel
- Stopwatch **per Chapter 2, Section 2.2.5. "Other Test Equipment Requirements."**

(Amended 2024 **&** **20XX**)

3.11.2. Test Procedure

8. Follow the procedures in Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; and select a random sample.

2. Place the assembled displacement vessel and insulation shield in a freezer or an ice chest filled with dry ice for at least 30 minutes prior to testing. It is advisable to pre-chill water for use as immersion fluid in a sufficient volume to fill the displacement vessel and to replenish as needed throughout the testing procedures by placing a container of water in a refrigerator or ice chest during the same period.

Note: The insulation shield should be assembled with dimensions that will cover as much surface area of the displacement vessel and minimal gaps between the seams (see Figure 3-7(b)(c)(d), "Example of an insulation shield with displacement vessel "). The purpose of the insulation shield is to reduce thermal transfer from the ambient environment to the displacement vessel to maintain the immersion fluid at 1 °C (33 °F) or below, as consistently as possible during testing.

Maintain the ice cream, ice pop or similar frozen novelty samples at the reference temperature for frozen products that is specified in Table 3-1. "Reference Temperatures for Liquids." Place the samples in the freezer or ice chest until they are ready to be tested, ~~and~~ then remove packages from the freezer one at a time.

3. According to the type of novelty, prepare the sample products as follows:

- ***Ice-pop**. Mark on the stick(s) with the indelible marker **at** the point to which the ice-pop will be submerged in the prepared, chilled water. (After the ice-pop contents have been submerged, remove the novelty to determine the volume of the stick.)

- ***Cone**. Make a small hole in the cone below the ice cream portion to allow air to escape.

- **Sandwich**. Determine whether the declared volume is (a) the total volume of the novelty (that is, including the cookie portion) or (b) the volume of the ice-cream-like portion only. If the declared volume is the volume of only the ice-cream-like portion, shave off the cookie with a **single-edged** razor or **sharp** knife, leaving some remnants of cookie to ensure that no ice cream

is accidentally shaved off. Work quickly, and return the novelty to the freezer before the sandwich softens.

- **Cup**. Remove the cap from the cup.

4. Prepare immersion fluid to a temperature of 1 °C (33 °F) or below by adding dry ice and ice cubes to water in a preparation container.

For best results, use an insulated preparation container to prevent thermal transfer from ambient air. Monitor the water temperature throughout this procedure by placing the thermometer in the center position of the pitcher.

Note: Be cautious while handling dry ice due to its very low temperature (− 109 °F); handle it with cryogenic gloves to prevent frostbite or freezer burns to skin.

Note: Dry ice (− 109 °F) is the key ingredient for the chilled water immersion fluid preparation because of its very low temperature. However, while the dry ice lowers the water mixture temperature, the water surface that is in contact with the ambient air in the testing environment is also constantly gaining heat due to heat transfer. To resolve this problem, add ice cubes to the water; the ice cubes will float and form an insulation barrier, thereby, allowing water temperature to be maintained at the required temperature. The approximate ratio to make the prepared, chilled water (can reach as low as 31.6 °F) are as follows:

Water : Dry ice : Ice cubes = 6 parts : 1 part : 2 parts

Note: ~~Monitoring of~~ **T**~~t~~he temperature of the chilled water immersion fluid should be ~~conducted~~ **monitored** throughout the testing. At any time that the chilled water temperature exceeds 1 °C (33 °F), a new batch of chilled water at the required temperature will need to be prepared to ~~validate~~ **ensure the proper** ~~the~~ testing procedure **is followed.**

5. When the displacement vessel and the insulation shield are both chilled and ready to be used, remove from freezer and set up on testing surface.

6. Fill the displacement vessel with prepared, chilled water until it overflows **through** the spout. Use a strainer to prevent ice cubes or dry ice chunks from flowing into the displacement vessel. Allow it to sit until dripping stops. Raise the displacement vessel with a tabletop laboratory-type jack as necessary and place the ~~graduate~~ **volumetric standard** of appropriate capacity beneath the spout.

7. Remove a package from the freezer, determine its gross weight, and record it.

8. Submerge the novelty as suggested until it is below the surface level of the water.

- **Ice-pop**. Use a clamp, tongs, or your fingers to hold the stick(s) and submerge the ice-pop to the level marked in Step 3 of the Test Procedure.

- **Cone**. Shape the wire into a loop, and use it to push the cone, headfirst (ice cream portion first) into the prepared, chilled water. Do not completely submerge the cone immediately: let water fill the cone through the hole made in Step 3 of the Test Procedure before completely submerging the novelty.

- **Sandwich or cup**. Skewer the novelty with the thin wire or form a loop on the end of the wire to push the sandwich or ice cream portion or cup completely below the liquid level.

9. Record the total water volume in the graduate.

   - For a cone or sandwich, record the water volume as the net volume and go to Step 11.

   - For ice-pops or cups, record the water volume in the graduate as the gross volume and go to Step 10.

10. Refill the displacement vessel with prepared, chilled water to overflowing and reposition the empty graduate under the spout. After the cup and novelty contents have been submerged, remove the novelty from the cup to determine the volume of the cup.

    - **Ice-pop**. Melt the ice-pop off the stick or sticks. Submerge the stick or sticks to the line marked in Step 3. Record the volume of tare material (i.e., stick) by measuring the water displaced into the graduate. The net volume for the ice-pop is the gross volume recorded in Step 9 minus the volume of the tare materials in this step. Record this volume as the "volume of novelty." To determine the error in the package, subtract the labeled quantity from the volume of novelty.

    - **Cup**. Remove the novelty from the cup. Rinse the cup, and then submerge it in the displacement vessel. Small pinholes in the base of the cup can be made to make submersion easier. Record the volume of water displaced into the graduate by the cup as the volume of tare material. The net volume for the novelty is the gross volume determined in Step 9 minus the volume of the tare materials determined in this step. Record this as the net volume of the novelty. To determine the error in the package, subtract the labeled quantity from the volume of novelty.

11. Clean and air-dry the tare materials (sticks, wrappers, cup, lid, etc.). Weigh and record the weight of these materials for the package.

12. Subtract the tare weight from the gross weight to obtain the net weight and record this value.

13. Compute the weight of the labeled volume for the package using the following formula and then record the weight:

    Product Density = (product net weight in Step 12) ÷ (the total water volume in Step 9 – volume of tare material in Step 10)

    Weight of labeled volume = (labeled volume) × (Product Density)

14. Repeat Steps 3 through 13 for a second package.

Note: ~~Monitoring of~~ ~~t~~**T**he temperature of the prepared, chilled water should be ~~conducted~~ **monitored** throughout the testing. At any time that the chilled water temperature exceeds 1 °C (33 °F), a new batch of chilled water at the required temperature will need to be prepared to ~~validate the~~ **ensure the proper** testing procedure **is followed**.

15. Repeat prepared, chilled water preparation and freezing of insulation shield and displacement vessel as needed throughout the inspection time period. If the weight of the labeled volumes in Step 13 for the two packages differs from each other by more than one division on the scale, the gravimetric test procedure cannot be used to test the sample for compliance. If this is the case, use Steps 3 through 10 for each of the remaining packages in the sample to determine their net volumes and package errors. Then go to evaluation of results. If the weights of the labeled volumes agree within one division, continue to Step 16 to test the rest of the sample using the gravimetric test procedure.*

16. Use Section 2.3.5.1. "Determination of Tare Sample and Average Tare Weight" to determine the Average Used Dry tare Weight of the sample.

17. Find the Average Product Density by adding the densities of the product from the two packages and dividing the sum by two.

18. Using the weight of labeled volume determined in Step 13, calculate the Average Product Weight by multiplying the weight of the labeled volume by the average product density.

**Average Product Weight = Labeled Volume × Average Product Density*

19. Calculate the "nominal gross weight" using the formula:

Nominal Gross Weight = Average Product Weight + Average Used Dry Tare Weight

20. Weigh the remaining packages in the sample.

21. Subtract the nominal gross weight from the gross weight of each package to obtain package errors in terms of weight.

Note: Compare the sample packages to the nominal gross weight.

22. Determine the average package error by totaling all package errors and dividing by the number of packages in the sample.

To convert the average error or package error from weight to volume, use the following formula:

Package Error in Volume = (Package Error in Weight) ÷ (Average Product Density)

(Amended 2024 **& 20XX**)

3.12.1. Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment"

- Volumetric ~~measures~~ **standards (used to verify accuracy) per Chapter 2, Section 2.2.5 "Other Test Equipment Requirements".**

- Micrometer depth gage (ends of rods fully rounded), 0 mm to 228 mm (0 in to 9 in)

- Strainer for determining the amount of drained liquid from shucked oysters. Use a strainer and a slightly smaller bottom receiving pan or tray constructed to the following specifications:

- Sides: 50 mm (2 in)
- Area: 1 935 cm^2 (300 in^2) or more for each 3.78 L (1 gal) of oysters

Note: Strainers of smaller area dimensions are permitted to facilitate testing smaller containers.

- Perforations:
  Diameter: 6.35 mm ($^1/_4$ in)
  Location: 3.17 cm ($1^1/_4$ in) apart in a square pattern, or perforations of equivalent area and distribution.

- Spanning bar, 25.4 mm × 25.4 mm × 304 mm (1 in × 1 in × 12 in)

- ~~Rubber s~~**S**patula **(rubber or silicon)**

- Partial immersion thermometer, 1 °C (2 °F) graduations and a range of – 35 °C to + 50 °C (− 30 °F to + 120 °F) accurate to ± 1 °C (± 2 °F)

- Level, at least 152 mm (6 in) in length

- Stopwatch **per Chapter 2, Section 2.2.5. "Other Test Equipment Requirements."**

(Amended 2014 & **20XX**)

3.14.1. Test Equipment

Linear Measurement The maximum value of graduations on a ruler or tape shall be equal to or less than:		
For Testing	**SI Units**	**U.S. Customary Units**
Packaged Firewood	1 mm	$^1/_{16}$ in (0.062 5 in)
Stacked Firewood	0.5 cm	$^1/_8$ in (0.125 in)

Other Equipment:

Except where a long tape measure is needed for measuring stacks of wood and unless otherwise noted below, a precision tempered steel ruler should be used for linear measurements. Current calibration certificates issued by a NIST recognized or accredited laboratory should be available for all measuring devices.

- To test boxes of firewood, use a straightedge and a 150 mm (6 in) tempered steel pocket ruler to measure the box headspace. A rigid 610 mm (24 in) tempered steel ruler is required to measure piece length and the dimensions of the box.

- To test bundles of firewood, use a rigid 610 mm (24 in) tempered steel ruler to measure typical piece length. If the circumference based auditing method is to be conducted, a precision 610 mm (24 in) diameter (pi) tape or flexible steel tape with 1 mm ($^1/_{16}$ in) graduations may be used to approximate the package volume for screening and audit purposes.

For testing stacks of firewood, a precision tape or long tape measure is used. For testing bundles and bags of firewood, the following equipment and materials are used in addition to the linear measures listed above:

- Binding Straps: Straps with ratchet type closures are easily tightened to secure the wood tightly. The binding straps are used to hold wood bundles together if the bundles need to be removed from the package/wrapping material.

- Graph Paper: 279.4 mm × 431.8 mm (11 in × 17 in) with 0.5 centimeter or ¼ inch squares. This paper is used for tracing and calculating the areas of the ends of a bundle of firewood. Prior to using any graph paper use a calibrated ruler to verify the dimensions of squares at several random points across the page.

- Ruler: 300 mm (12 in) with 0.5 cm ($^1/_4$ in) graduations. This ruler is used with the graph paper to calculate the area of the bundle ends.

- **Sharp point marking pen (This is used in conjunction with the graph paper)**

(Amended 2016 & **20XX**)

The submitter requested that this be a Voting Item in 2027.

Previous Status:

2027: New Proposal

Original Justification:

NIST OWM is reviewing and making editorial changes to NIST Handbooks to ensure compliance with NIST Library Publication Standards and HTML Formatting requirements. This ongoing project is necessary and a required enhancement to the transition from the printed publication to an electronic/digital one. During this endeavor, OWM has identified several sections within NIST Handbook 133 that may encroach on the editorial boundary, including outdated language, references to test equipment, and other updates that we believe need to be presented to the NCWM for consideration.

Possible Opposing Arguments: Questions as to why these changes are necessary.

Comments in Favor:

Regulatory:

-

Industry:

-

Advisory:

-

Comments Against:

Regulatory:

-

Industry:

-

Advisory:

-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

A representative questioned if the print version would be identical to the online version.

The committee recommends a voting status.

WWMA 2026 Annual Meeting:

Mr. John McGuire (NIST OWM) stated that NET-27.3 and NET-27.4 are the results from NIST OWM reviewing NIST Handbook 130 and 133 to advance them into HTML electronic publication. Additionally, regarding the additional documents available online, each include a cover letter outlining the editorial changes to their respective chapters. Mr. McGuire recommended that this item and NET-27.3 be grouped together as a block and supported a VOTING status.

Based on the comments heard during open hearings the WWMA L&R Committee recommends a VOTING status for this item. The committee further recommends that the NCWM L&R Committee consider blocking NET-27.3 and NET-27.4.

NEWMA 2026 Interim Meeting:

A Regulator from NJ concurs with the NIST reformatting and recommends a Voting status.

The committee recommends a voting status.

SWMA 2026 Annual Meeting:

Submitter recommends voting status.

Alison Wilkinson representing the state of Maryland is neutral on this item and recommends developing status.

Brain Terry representing the state of Arkansas supports this item and recommends voting status.

SWMA Laws and Regulations committee recommends this item to be given voting status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH – OTHER ITEMS

OTH-24.1 A X. Uniform Shipment Law

Source:
New Hampshire Department of Agriculture, Markets & Food

Purpose:
Provide model law language to address the shipment of goods.

Item under Consideration:
Adopt a new Handbook 130 Uniform Shipment Law as follows:

X. Uniform Shipment Law

Section 1. Purpose

The purpose of this Act is to ensure transparent, equitable, and accountable shipment practices concerning the weight, measure, quantity, dimensions, volume, density, classification, and documentation of shipped freight, commodities, and goods.

Section 2. Scope

This Act:

(a) establishes an enforcement program for shipment-related representations of weight, measure, quantity, dimensions, volume, density, classification, and related documentation;

(b) empowers the state to promulgate regulations as needed to carry out the provisions of the Act;

(c) authorizes requirements for records and documentation necessary to determine compliance;

(d) provides for civil and criminal penalties; and

(e) does not establish, regulate, or require freight rates, tariff policies, flat rates, minimum charges, zone-based pricing, or general freight classification determinations; however, shipment information, measurement values, correction documentation, and related records used to determine shipment charges or shipment representations are subject to this Act and any regulation promulgated under this Act.

Section 3. Definitions

As used in this Act:

3.1. Bill of Lading (BOL) / Waybill. - A legal instrument or shipping document used in the transportation and shipment industries that lists the freight being shipped and the terms under which it will be delivered.

3.2. Carrier. - A person engaged in handling, transporting, or delivering freight as part of a commercial transaction.

3.3. Classification. - A shipment-related class, category, code, or designation assigned to freight when based on or affected by measurable shipment information or related shipment documentation. Classification includes a determination or change that relies on weight, measure, quantity, dimensions, volume, density, commodity description, packaging, handling unit, or other shipment information used to determine a shipment representation or shipment charge. Classification does not include the establishment of freight rates, tariffs, or general freight classification systems.

3.4. Commodity. - An article of commerce, especially when delivered for shipment, including any good, product, material, cargo, raw material, agricultural product, livestock or livestock product, metal, energy product, or other article of trade.

3.5. Director. - The of the Department of .

3.6. Freight. - Goods, commodities, or cargo transported by motor vehicle, train, ship, or aircraft for commercial purposes.

3.7. Freight Quote. - Documentation provided by a carrier, logistics service provider, or other responsible party that states the cost of transporting freight based on shipment information, including weight, measure, quantity, dimensions, volume, density, classification, distance, service level, or shipping method.

3.8. Goods. - Physical, movable, tangible items, such as raw materials, parts, and finished products transported by motor vehicle, train, ship, or aircraft.

3.9. Handling Unit. - A single item or group of items that are packaged together and handled as a single unit throughout the shipping process.

3.10. Inspection Certificate. - A document used to signify that shipped freight has been inspected concerning weight, measure, quantity, dimensions, volume, density, classification, or related shipment information.

3.11. Logistics Service Provider. - A person that offers logistics-related services such as transportation, warehousing, freight forwarding, or supply chain coordination on behalf of another party. This includes, but is not limited to, a carrier, third-party logistics provider, freight forwarder, broker, shipper, or broker agent.

3.12. Person. - Any natural individual, corporation, partnership, association, organization, or other legal entity.

3.13. Shipment. - A quantity of goods, freight, or commodities shipped with a logistics service provider.

3.14. Shipper. - A person that sends or requests goods, freight, or commodities using a logistics service provider.

3.15. Unique Identifier. - A distinct code or number assigned by a logistics service provider to identify an individual, entity, document, item, or shipment within a specific operational or shipment tracking system.

3.16. Weighing or Measuring System. - A device or combination of devices, including equipment and software, used to determine or record the weight, measure, quantity, dimensions, volume, density, or other measurable attribute of freight, as approved by the jurisdiction where the system is used.

Section 4. Enforcing Official: Rules and Regulations

The Director is authorized to:

(a) enforce the provisions of this Act;

(b) issue reasonable regulations for the enforcement of this Act that shall have the force and effect of law; and

(c) adopt rules that include, but are not limited to, requirements for:

(1) freight quote documentation and related shipment information used to determine shipment charges, including requirements for accurate information provided by a shipper, logistics service provider, or other responsible party;

(2) shipment weighing, measuring, quantity, dimensions, volume, density, and classification practices related to shipment representations, documentation, or charges;

(3) inspection certificates and related shipment documentation;

(4) recordkeeping and record retention;

(5) access to records by the Director or authorized agents;

(6) correction disclosures when shipment charges or shipment documentation are affected by corrected weight, measure, quantity, dimensions, volume, density, classification, rounding method, or related shipment information;

(7) use of approved weighing, measuring, or automated measuring systems; and

(8) information required on bills of lading, waybills, freight quotes, or other shipping documents.

Section 5. Required Compliance

(a) Any person or entity subject to this Act shall comply with this Act and any regulation promulgated under this Act.

(b) Transportation Contracts and Commercial Terms. - Nothing in this Act establishes, regulates, or requires a transportation rate, discount, tariff, freight classification, accessorial charge, or other commercial term of a transportation contract. No transportation contract, tariff, bill of lading, arbitration agreement, or other private agreement shall limit, waive, conflict with, or excuse compliance with this Act or any regulation promulgated under this Act, including requirements concerning accurate shipment representations, required records, correction documentation, access to records, or enforcement by the Director or an authorized agent.

Section 6. Records and Documentation

Any person or entity subject to this Act shall make, keep, and preserve records and documentation as required by the Director by regulation. Required records and documentation shall be made available for inspection by the Director or authorized agent in the manner prescribed by regulation.

Section 7. Prohibited Acts

The following acts are prohibited, subject to the clarification in subsection (i):

(a) violating any provision of this Act or any regulation promulgated under this Act;

(b) knowingly or with intent to defraud providing false or misleading shipment information, whether oral, written, electronic, or otherwise recorded;

(c) knowingly or with intent to defraud providing a false commodity description, weight, measure, quantity, dimensions, volume, density, classification, shipment identifier, or related shipment representation;

(d) providing incomplete, false, or misleading information for a freight quote, bill of lading, waybill, estimate, or other shipping document when the information affects the shipment charge, classification, weight, measure, quantity, dimensions, volume, density, or related shipment representation;

(e) failing to make, keep, preserve, or provide records or documentation required under this Act or any regulation promulgated under this Act;

(f) hindering or obstructing in any way the Director or an authorized agent in the performance of official duties under this Act;

(g) using or having in possession a weighing or measuring system, or any component of such system, that has been designed, modified, or used to facilitate fraud, or that has not been approved for commercial use by a weights and measures agency or official, or other authorized regulatory authority having jurisdiction;

(h) using a reweigh, remeasure, reclassification, density determination, or other correction process in a manner that selectively applies, suppresses, disregards, or withholds corrected shipment information based on whether the result increases or decreases a shipment charge; and

(i) for household goods shipments subject to 49 CFR Part 375, nothing in this section shall be construed to prohibit a non-binding estimate permitted under federal law. Any such estimate, freight quote, or related shipment documentation remains subject to applicable federal requirements and shall not contain false, misleading, incomplete, or inaccurate information required to be disclosed.

Section 8. Civil Penalties

8.1. Assessment of Penalties. - Any person or entity who by themselves, by their servant or agent, or as the servant or agent of another person or entity commits any of the acts enumerated in Section 7. Prohibited Acts may be punished for the violation with a written warning and/or assessed by the _____ a civil penalty, as deemed appropriate upon consideration of the nature, circumstances, extent, gravity of the violation, and history of prior offenses.

(a) a warning or fine of not less than $_____ nor more than $_____ for a first violation;

(b) a warning or fine of not less than $_____ nor more than $_____ for a second violation within _____ from the date of the first violation; and

(c) a fine of not less than $_____ nor more than $_____ for a third violation within _____ from the date of the first violation.

8.2. Administrative Hearing. - Any person or entity subject to a civil penalty shall have a right to request an administrative hearing within _____ days of receipt of the notice of the penalty. The Director or their designee shall be authorized to conduct the hearing after giving appropriate notice to the respondent. The decision of the Director shall be subject to appropriate judicial review.

8.3. Collection of Penalties. - If the respondent has exhausted their administrative appeals and the civil penalty has been upheld, the respondent shall pay the civil penalty within _____ days after the effective date of the final decision. If the respondent fails to pay the penalty, a civil action may be brought by the Director in any court of competent jurisdiction to recover the penalty. Any civil penalty collected under this Act shall be transmitted to _____.

Section 9. Criminal Penalties

9.1. Misdemeanor. - Any person or entity who by themselves, by their servant or agent, or as the servant or agent of another person or entity commits any of the acts enumerated in Section 7. Prohibited Acts or violates any other provision of this Act shall be guilty of a Class _____ misdemeanor and upon conviction shall be punished by a fine not less than $_____ nor more than $_____, or by imprisonment for not less than _____ nor more than _____, or both fine and imprisonment.

9.2. Felony. - Any person or entity who by themselves, by their servant or agent, or as the servant or agent of another person or entity intentionally commits any of the acts enumerated in Section 7. Prohibited Acts or repeatedly violates any other provision of this Act shall be guilty of a Class _____ felony and upon conviction shall be punished by a fine not less than $_____ and/or by imprisonment for not less than _____ nor more than _____.

Section 10. Restraining Order and Injunction

The Director is authorized to apply to any court of competent jurisdiction for a restraining order, or a temporary or permanent injunction, restraining any person from violating any provision of this Act.

Section 11. Validity of Prosecutions

Prosecutions for violation of any provision of this Act are declared to be valid and proper notwithstanding the existence of any other valid general or specific Act of this state dealing with matters that may be the same as or similar to those covered by this Act.

Section 12. Severability Provision

If any provision of this Act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, the constitutionality of the remainder of the Act and the applicability thereof to other persons and circumstances shall not be affected.

Section 13. Repeal of Conflicting Laws

All laws and parts of laws contrary to or inconsistent with the provisions of this Act, and specifically _____, are repealed insofar as they might operate in the future; but as to offenses committed, liabilities incurred, and claims now existing thereunder, the existing law shall remain in full force and effect.

Section 14. Citation

This Act may be cited as the "Shipment Act of _____."

Section 15. Effective Date

This Act shall become effective on _____.

Previous Status:

2026: Assigned to the Uniform Shipping Law Task Group – Language Changes
2025: Assigned to the Uniform Shipping Law Task Group
2024: Assigned to the Uniform Shipping Law Task Group

Original Justification:

Current shipping practices may result in incorrect overcharges and misleading pricing. It has been documented through investigations that carriers or freight brokers have incorrectly billed shippers on goods shipped. Documentation

provided by carriers to both shippers and weights and measures officials lack relevant information needed to fully investigate complaints within the shipping industry.

Carriers may have language in their contracts that inform the shipper of possible audits of their shipped goods and subsequent correction and audit fees.

The submitter requested Voting status in 2024.

Comments in Favor:

Regulatory:

- NCWM Interim 2026: Seven weights and measures officials supported the item and recommended that it remain Assigned.

Industry:

- None

Advisory:

- NCWM Interim 2026: The representative from NIST OWM supported keeping the item assigned to the Work Group.

Comments Against:

Regulatory:

- None

Industry:

- One representative from Industry voiced that the item is not finished and needs clarity.

Advisory:

- None

Neutral Comments:

Regulatory:

- NCWM Interim 2026: Multiple weights and measures officials recommended maintaining this item as Assigned.

Industry:

- None

Advisory:

- NCWM Interim 2026: The Work Group Chair recommended maintaining this item as Assigned.

Item Development:

NCWM 2026 Annual: This item remains assigned to the Uniform Shipment Law Task Group, as it is not yet fully developed. The Task Group Chair, Mr. Miland Kofford informed the Committee after the Annual Meeting that they have an updated language of the proposal and requested the Committee to include it in the Annual Report for membership consideration. The latest language is shown above under "Item Under Consideration".

Contact: Miland Kofford
Uniform Shipment Law Task Group Chair
mkofford@utah.gov

NCWM 2026 Interim: This item continues to be assigned to the Task Group as it is not yet fully developed. The Item under consideration reflects new language provided by the Task Group.
NCWM 2025 Annual: The Item is Assigned so the Committee heard comments only from the Task Group Chair Mr. Miland Kofford. Mr. Kofford told the Committee that the task group continues working on and developing this item.

The task group has submitted new language for this item and is available on the NCWM website under supporting documents dated July 9, 2025. The Committee has not reviewed or considered this language.

NCWM 2025 Interim: The Committee received a revision of the proposal during the NCWM 2025 Interim meeting. It appears above in this report and is the version being considered. The previous version can be found in NCWM 2025 Publication 15.

During the 2025 Interim open , the Committee heard from representatives of the shipping industry that they were in general support of this item but had some suggestions for the task group to consider.

For this reason, and because changes were made to the item during the 2025 Interim, the Committee has maintained the Assigned status for this item. This will allow interested parties to review the most recent version of the item and for the Task Group to solicit input from industry stakeholders and other interested parties.

NCWM 2024 Annual: The Committee took no action and did not make any changes to this item.

NCWM 2024 Interim: The submitter made a presentation on this item and the Committee heard support for the item, but recognizing it is not fully developed will request to assign it to the newly formed Uniform Shipment Law Task Group.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

One regulator voiced in favor of this proposal. A member of the task group provided a summary of the committee's actions.

The committee recommends this item remain assigned.

WWMA 2026 Annual Meeting:

Mr. Miland Kofford (Chair of the Uniform Shipment Law Task Group) stated during open hearings that the work group had made great progress in developing this law and that he believed it was ready to move forward to a vote. He was pleased with what the committee had done and recommended VOTING status.

Based on the comments heard during open hearings the WWMA L&R Committee recommends VOTING status for this item.

NEWMA 2026 Interim Meeting:

A Regulator from NH stated with the support of the NCWM chair, the Uniform Shipment Law Task Group was allowed to review, discuss, and propose a Uniform Shipment Regulation. With that support, the Task Group removed some of the regulatory language from the original OTH-24.1 Uniform Shipment Law proposal and the task group created OTH-27.1. The regulator from NH believes that the Uniform Shipment Law proposal is ready and should be assigned a Voting status

A Regulator from NJ stated this item is fully developed, has merit and recommends Voting status.

A Regulator from NY concurs with Voting and thanks the TG.

A Regulator from PA supports a Voting statues

Another regulator from NY requested that for the following sections, could we align the proposal terminology with existing HB130 language?

Section 4.(c).**(5) access to records by the Director or authorized agents;**
End of Sec.5.(b) - … **access to records, or enforcement by the Director or an authorized agent.**
Last sentence of Sec.6.- … **Required records and documentation shall be made available for inspection by the Director or authorized agent in the manner prescribed by regulation**
Sec.7 Prohibited acts, part (f) - **hindering or obstructing in any way the Director or an authorized agent in the performance of official duties under this Act;**
Last sentence of Sec. 7 prohibited acts, part (g) - … **or that has not been approved for commercial use by a weights and measures agency or official, or other authorized regulatory authority having jurisdiction.**
Sec.8.2 – "**The Director or their designee shall be authorized…"**
Sec.10 – "**The Director is authorized…"**

Throughout Handbook 130, the phrase "Director, or his/her authorized agent" is used for other model laws and regulations. As the proposal is currently worded, the "authorized agent" is not explicitly designated or appointed by the Director. In the W&M Law proposal, specific authority across sections is unclear. Additionally, the definition of "Director" in Section 3.5 could encompass other officials (e.g., Director of Consumer Affairs) rather than strictly the Weights and Measures Director. The OTH-27.1 proposal vests sole authority for everything with the Director, but current phrasing in that proposal also fails to properly tie the "authorized agent" back to that role.

NY suggests we use the existing phrase "Director, or his/her authorized agent", as used throughout HB130. This recommendation is for both proposals OTH-24.1 and OTH-27.1.

The regulator from NH, whom is also part of the task group likes the change and will provide the information to the task group and reintroduce at the NCWM Interim meeting.

The committee recommends an assigned status.

SWMA 2026 Annual Meeting:

No comments.

SWMA Laws and Regulations committee recommends this item to be given assigned status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH-27.1 X. Uniform Shipment Regulation

Source:
Uniform Shipment Law Task Group

Purpose:
Add a new Uniform Shipment Regulation to NIST Handbook 130, Chapter IV, Uniform Regulations, to establish uniform operating requirements for shipment-related weighing, measuring, remeasurement, reclassification, correction documentation, record retention, access to records, and related enforcement procedures for freight shipments in commercial trade.

Item under Consideration:
Adopt a new Uniform Shipment Regulation in NIST Handbook 130, Chapter IV - Uniform Regulations, as follows:

Uniform Shipment Regulation

Section 1. Definitions

As used in this regulation:

1.1. Bill of Lading (BOL) / Waybill. - A legal instrument or shipping document used in the transportation and shipment industries that lists the freight being shipped and the terms under which it will be delivered.

1.2. Carrier. - A person engaged in handling, transporting, or delivering freight as part of a commercial transaction.

1.3. Classification. - A shipment-related class, category, code, or designation assigned to freight when based on or affected by measurable shipment information or related shipment documentation. Classification includes a determination or change that relies on weight, measure, quantity, dimensions, volume, density, commodity description, packaging, handling unit, or other shipment information used to determine a shipment representation or shipment charge. Classification does not include the establishment of freight rates, tariffs, or general freight classification systems.

1.4. Commodity. - An article of commerce, especially when delivered for shipment, including any good, product, material, cargo, raw material, agricultural product, livestock or livestock product, metal, energy product, or other article of trade.

1.5. Director. - The of the Department of .

1.6. Freight. - Goods, commodities, or cargo transported by truck, train, ship, or aircraft for commercial purposes.

1.7. Freight Quote. - Documentation provided by a carrier, logistics service provider, or other responsible party that states the cost of transporting freight based on shipment information, including weight, measure, quantity, dimensions, volume, density, classification, distance, service level, or shipping method.

1.8. Goods. - Physical, movable, tangible items, such as raw materials, parts, and finished products, transported by truck, train, ship, or aircraft.

1.9. Handling Unit. - A single item or group of items that are packaged together and handled as a single unit throughout the shipping process.

1.10. Inspection Certificate. - A document used to signify that shipped freight has been inspected concerning weight, measure, quantity, dimensions, volume, density, classification, or related shipment information.

1.11. Logistics Service Provider. - A person that offers logistics-related services such as transportation, warehousing, freight forwarding, or supply chain coordination on behalf of another party. This includes, but is not limited to, a carrier, third-party logistics provider, freight forwarder, broker, shipper, or broker agent.

1.12. Person. - Any natural individual, corporation, partnership, association, organization, or other legal entity.

1.13. Shipment. - A quantity of goods, freight, or commodities shipped with a logistics service provider.

1.14. Shipper. - A person that sends or requests goods, freight, or commodities using a logistics service provider.

1.15. Unique Identifier. - A distinct code or number assigned by a logistics service provider to identify an individual, entity, document, item, or shipment within a specific operational or shipment tracking system.

1.16. Weighing or Measuring System. - A device, equipment, software, or combination thereof used to determine, calculate, record, or represent the weight, measure, quantity, dimensions, volume, density, or other measurable attribute of freight, as approved or authorized by the jurisdiction where the system is used.

Section 2. Application

(a) This regulation applies to all logistics service providers and shippers engaged in the shipment, handling, measurement, or documentation of freight for commercial purposes.

(b) This regulation establishes minimum standards for weighing and measuring practices, provides requirements for recordkeeping and documentation, and supports enforcement by the appropriate regulatory authority under applicable law.

Section 3. Regulatory Authority and Rulemaking

The Director is authorized to enforce this regulation and adopt rules consistent with this regulation, including requirements for:

(a) freight quote documentation and related shipment information used to determine shipment charges, including accurate information provided by the shipper, carrier, logistics service provider, or other responsible party;

(b) procedures for weighing, measuring, determining quantity, dimensions, volume, density, and documenting classification changes when the classification is based on or affected by measurable shipment information or related shipment documentation;

(c) correction notice disclosures when shipment charges or shipment documentation are affected by corrected weight, measure, quantity, dimensions, volume, density, classification, or other shipment information used to determine the charge;

(d) required recordkeeping and record retention for freight quotes, bills of lading, waybills, inspection certificates, correction notices, reweigh or remeasure records, zero-load or ready indication records, when applicable, and related shipment records, including records required under 49 CFR Part 379 where applicable; and

(e) access to records needed to determine compliance.

Section 4. Weighing and Measuring Practices and Equipment Used

(a) All regulated parties shall comply with applicable requirements of NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices," for commercial weighing and measuring devices.

(b) Weighing and measuring devices, measuring systems, and related software used to determine, calculate, record, or represent shipment attributes shall be approved or authorized by the Director, a weights and measures official, NTEP where applicable, or other authorized regulatory authority. Installation, service, repair, or placement into service may be performed by an authorized service agent where permitted by the Director. Where no applicable NTEP approval exists, the device, system, or software shall be used in accordance with requirements established by the Director.

(c) Each reweigh or automated remeasure, when applicable, shall be recorded in the system, including the as-found zero-load or ready indication of the weighing or measuring device, even if an inspection certificate is not issued.

(d) When shipment weight, measure, quantity, dimensions, volume, or density is used to determine shipment charges, the shipment shall be weighed or measured in its final packaged state, including packaging, pallets, containers, or other components included in the shipment as presented for transportation.

(e) The Director may issue technical requirements for weighing, measuring, determining quantity, dimensions, volume, or density involving perishable commodities, including dairy products, where industry practices or equipment differ from general freight. Any classification change based on or affected by measurable shipment attributes shall be documented.

Section 5. Inspection Certificate - Required Entries

(a) The documentation, when properly completed and signed, including digital signatures, shall be prima facie evidence of the accuracy of the recorded results and procedures followed.

(b) The recorded information to be provided on the documentation shall be prescribed by the Director and will include, but not be limited to, the following:

(1) employee identifier of the individual or individuals who conducted the inspection;

(2) date and time of the inspection;

(3) identifying information for the issuing terminal or service center, including physical address and contact information;

(4) unique identifier of the weighing or measuring device used to conduct the inspection;

(5) recorded reweigh or remeasure value displayed or generated by the weighing or measuring device or system, including the as-found zero-load or ready indication when applicable, for each handling unit;

(6) indicated classification code and commodity description related to freight class for each handling unit or shipment when associated with a change in weight, measure, quantity, dimensions, volume, or density;

(7) unique shipment identifier and bill of lading, where applicable; and

(8) name and address of the shipper from the point of origin.

Section 6. Record Retention and Access

(a) All inspection certificates shall be retained for two (2) years.

(b) Required records shall be made available within 48 hours of request during normal business hours.

(c) Records may include inspection certificates, bills of lading, waybills, freight quotes, correction notices, reweigh or remeasure records, and related shipment documentation required by this regulation.

Section 7. Correction Notices and Reweigh or Remeasure Documentation

(a) When a shipment is reweighed, remeasured, reclassified, or otherwise corrected in a manner that affects shipment documentation, classification, or charges, the correction shall be documented.

(b) Correction documentation shall identify the shipment, the corrected weight, measure, quantity, dimensions, volume, density, classification, rounding method, or other shipment information used to determine the charge, the basis for the correction, and the party making the correction.

(c) Required correction notice disclosures shall be provided by the carrier, logistics service provider, or other responsible party as required by the Director.

(d) When a shipment charge is based on dimensional weight, volumetric weight, rounding, a conversion factor, or a similar charge-related method, the method used shall be identified in the freight quote, shipment documentation, correction documentation, or other related record as required by the Director.

(e) Nothing in this section requires a charge adjustment where the applicable charge is fixed and is not determined, calculated, validated, or adjusted using the corrected shipment attribute. A person asserting that a charge is fixed and independent of the corrected shipment attribute shall maintain records sufficient to demonstrate that the attribute was not used to determine, validate, or adjust the charge.

Section 8. Commercial Terms and Classification Limitation

(a) Nothing in this regulation establishes, regulates, or requires freight rates, tariff policies, flat rates, minimum charges, zone-based pricing, or general freight classification determinations.

(b) Shipment information, measurement values, correction documentation, and related records used to determine shipment charges or shipment representations remain subject to this regulation.

Section 9. Prohibited Acts

The following acts are prohibited, subject to the clarification in subsection (i):

(a) knowingly submitting false or misleading shipment data;

(b) providing false, misleading, incomplete, or inaccurate information affecting a freight quote, shipment charge, classification change, bill of lading, waybill, correction notice, invoice, or other shipping document;

(c) failing to make, keep, preserve, or provide records required by this regulation;

(d) obstructing regulatory enforcement;

(e) using any unapproved, altered, or fraudulent weighing device, measuring device, measuring system, or related software, or using any such device, system, or software in a manner that facilitates fraud or inaccurate shipment representations;

(f) violating any provision of this regulation or any rule adopted under this regulation;

(g) using a reweigh, remeasure, reclassification, density determination, or other correction process in a manner that selectively applies, suppresses, disregards, or withholds corrected shipment information based on whether the result increases or decreases a shipment charge;

(h) applying a correction threshold, rounding method, documentation requirement, or other condition to an upward charge adjustment that is not applied on substantially equivalent terms to a downward charge adjustment involving the same shipment attribute and applicable rate basis; and

(i) for household goods shipments subject to 49 CFR Part 375, nothing in this section shall be construed to prohibit a non-binding estimate permitted under federal law. Any such estimate or related shipment documentation remains subject to applicable federal requirements and shall not contain false, misleading, incomplete, or inaccurate information required to be disclosed.

Section 10. Enforcement

(a) Violations of this regulation may be subject to civil penalties, criminal penalties, injunctive relief, or other enforcement action as authorized by the Uniform Shipment Law and applicable state law.

(b) Administrative hearing and judicial review procedures shall be available as provided by applicable law.

Section 11. Severability

If any part of this regulation is deemed invalid, the remainder shall remain in effect.

Section 12. Effective Date

This regulation shall take effect on following adoption by the appropriate authority.

Previous Status:
2027: New Proposal

Original Justification:
Background and Need: This proposal is submitted for national consideration as a model regulation to establish uniform shipment-related weights and measures requirements for freight shipments in commercial trade. The proposal is intended to coordinate with the proposed Uniform Shipment Law and provide the operating requirements needed for consistent administration and enforcement.

Shipment charges and shipment representations may be affected by weight, measure, quantity, dimensions, volume, density, classification, reweighs, remeasurements, correction notices, and related shipment documentation. A uniform regulation would assist jurisdictions, carriers, logistics service providers, shippers, and other responsible parties by establishing consistent requirements for shipment documentation, correction records, inspection certificates, record retention, and access to records.

National Importance: A uniform approach is nationally important because freight shipments commonly move across jurisdictional boundaries, and shipment charges or shipment representations may rely on measurement values, documentation, or correction processes generated at different points in the transportation chain. Consistent model requirements would support transparency, accountability, and regulatory consistency for jurisdictions and regulated parties while allowing continued Task Group, regional, stakeholder, and legal review.

Boundary of the Proposal: The proposal is intended to promote transparency, fairness, and accountability in the weighing, measuring, remeasurement, correction, and documentation of freight shipments in commercial trade. The draft regulation is not intended to establish, regulate, or require freight rates, tariff policies, flat rates, minimum charges, zone-based pricing, or general freight classification determinations. Instead, it focuses on shipment information, measurement values, correction documentation, and related records when those items are used to determine shipment charges or shipment representations. The proposed regulation recognizes that freight transportation may involve private contracts, tariffs, bills of lading, and federal transportation requirements. The regulation is drafted to preserve the distinction between commercial pricing terms and weights and measures enforcement. It does not establish or regulate rates, discounts, tariffs, classifications, accessorial charges, or other commercial terms. It addresses the accuracy,

documentation, correction, retention, and availability of shipment information and measurement values when used in shipment-related representations or charges.

Summary of Proposed Requirements:

- freight quote documentation and related shipment information;
- weighing, measuring, quantity, dimensions, volume, and density procedures;
- classification changes when based on or affected by measurable shipment information or related shipment documentation;
- correction notice disclosures;
- inspection certificate entries;
- record retention and access;
- final packaged state;
- dimensional weight, volumetric weight, rounding methods, conversion factors, and related records; Uniform Shipment Regulation Form 15 Submission Language — August 14, 2026 • commercial terms and classification limitation;
- fixed-charge clarification where a corrected shipment attribute is not used to determine, validate, or adjust the charge;
- prohibited acts involving false information, incomplete information, selective corrections, and unequal treatment of upward and downward charge adjustments; and
- clarification that non-binding household goods estimates permitted under federal law are not prohibited, while required shipment documentation remains subject to applicable federal requirements.

Legal Review Request Legal review is requested regarding the interaction of this proposal with applicable federal transportation law, private transportation contracts, tariffs, bills of lading, arbitration agreements, and federal recordkeeping requirements, including 49 CFR Part 379 and 49 CFR Part 375 where applicable. Legal review is also requested regarding the proposed language on classification, non-binding household goods estimates, selective corrections, substantially equivalent treatment of upward and downward charge adjustments, fixed-charge clarification, record access, and enforcement authority.

Possible Opposing Arguments:

- There may be concern that the proposed regulation could be viewed as regulating transportation rates, tariffs, freight classifications, or private contract terms. The proposal addresses this concern by clarifying that the regulation does not establish, regulate, or require freight rates, tariff policies, flat rates, minimum charges, zone-based pricing, or general freight classification determinations. Shipment information, measurement values, correction documentation, and related records used to determine shipment charges or shipment representations remain subject to the regulation.

- There may be concern that the regulation could impose additional recordkeeping or operational burdens on carriers, logistics service providers, shippers, or other responsible parties. The Task Group recognizes that this issue should be considered during regional, national, stakeholder, and legal review.

- There may be concern that fixed-charge transportation arrangements may not require adjustment when a corrected shipment attribute does not affect the charge. The proposal addresses this by including a fixed-charge clarification, while requiring records sufficient to demonstrate that the corrected attribute was not used to determine, validate, or adjust the charge.

- There may be concern that non-binding household goods estimates permitted under federal law could be affected by the prohibited acts language. The proposal addresses this concern by clarifying that household goods shipments subject to 49 CFR Part 375 may use non-binding estimates permitted under federal law, while still requiring that such estimates and related shipment documentation comply with applicable federal requirements and not contain false, misleading, incomplete, or inaccurate information required to be disclosed.

- There may be concern that the language addressing upward and downward charge adjustments may be viewed as affecting private commercial billing practices. The proposal limits this provision to correction thresholds, rounding methods, documentation requirements, or other conditions involving the same shipment attribute and applicable rate basis, and should be reviewed to ensure it remains within weights and measures authority.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal 2027

Regional Associations' Comments:
New Proposal 2027

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends a developing status.

WWMA 2026 Annual Meeting:

Mr. Miland Kofford (Chair of the Uniform Shipment Law Task Group) stated during open hearings that the work group determined too much was being put into a single "law" OTH-24.1 and requested NCWM broaden their scope to also develop a "regulation" OTH-27.1. The work group believed that the addition of the regulation will make it more useful

for some regulators. Mr. Kofford noted that the work group had put a lot of effort into this and welcomed comments on the item during the open hearings.

Mr. Kevin Schnepp (California Division of Measurement Standards) inquired if it would be practical to block OTH-24.1 and OTH-27.1.

Mr. Kofford agreed that blocking OTH-24.1 and OTH-27.1 would be practical.

Based on the comments heard during open hearings the WWMA L&R Committee recommends a VOTING status for this item. The committee further recommends that the NCWM L&R Committee consider blocking OTH-24.1 and OTH-27.1.

NEWMA 2026 Interim Meeting:

A Regulator from NJ stated this item is fully developed and has merit. NJ appreciates the TG taking the comments received that the law was too specific, modifying it, and creating this regulation as a companion, and recommends a Voting status

A Regulator from NH stated the task group took some of the previous language that we had in the Uniform Shipment Law proposal and created a separate Uniform Shipment Regulation. The task group has both regulators and industry on the task group and we have vetted the proposed language with everyone on the task group. NH believes that as a regulation will help regulators better follow-up on shipment complaints.

The comments heard from the NY regulator for OTH-24.1, were also applicable to the following sections of OTH-27.1.

- For Sec. 4.(b). NY suggests the following language:

Sec.4.(b) - …**shall be approved or authorized by the ~~Director,~~ Director, or his/her authorized agent, a weights and measures official, or NTEP where applicable.~~, or other authorized regulatory authority.~~ Installation, service, repair, or placement into service may be performed by an authorized service agent where permitted by the Director**

- Note: NY believes it is not an appropriate change for Sec. 5.(b).

The regulator from NH, whom is also part of the task group likes the suggested language change and will provide the information to the task group, and are a welcomed update to the proposal.

A Regulator from PA supports Voting status

SWMA 2026 Annual Meeting:

No comments.

SWMA Laws and Regulations committee has no recommendation to give for this item. No recommendations made in the proposal nor on the floor.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH-07.1 D Fuels and Lubricants Subcommittee

Source:
NCWM Fuels and Lubricants Subcommittee (FALS)

Purpose:
Provide an update of the activities of this Subcommittee which works on direction from and reports to the L&R Committee. The mission of FALS is to assist the L&R Committee in the development of agenda items that affect Handbook 130, Uniform Fuels and Automotive Lubricants Inspection Law and Uniform Fuels and Automotive

Lubricants Regulation. The Subcommittee consists of regulators and associate members who have subject matter expertise in fuels and lubricants. The Subcommittee will be called upon to aid in the development, provide guidance, and help establish NCWM position on items concerning fuels and lubricants.

Item Development:
NCWM 2026 Annual: Vanessa Benchea, FALS Chair, reported on the FALS activities during the open hearings and provide a written report for the Committee. The report is included below.

Contact: Vanessa Benchea
Fuels and Lubricants Subcommittee Chair
Vanessa.Benchea@fdacs.gov

This report outlines the activities of the Fuels and Lubricants Subcommittee (FALS), which reports to and provides recommendations for the Laws and Regulations Committee.

FALS convened on Sunday, July 26, 2026, at the 2026 NCWM Annual Meeting in Philadelphia, Pennsylvania, with approximately 32 members and guests in attendance. The purpose of this meeting is to review items related to fuel and automotive fluid standards that appear on the L&R agenda, along with items of old and new business.

- Dr. Jenny Tabbert presented the latest language for FLR-26.1 7.2 that was developed from the focus group's previous meeting. After discussion amongst the membership, it was decided that some minor development and clarification was still needed. The latest language from this meeting will be distributed amongst FALS membership for any additional commentary with the hopes that the item can be presented as fully developed by the interim.

Original Submission:

7.2. Reproducibility Limits.

7.2.1. AKI Limits. – When determining the antiknock index (AKI) acceptance or rejection of a gasoline sample, the AKI reproducibility limits as outlined in the latest version of ASTM D4814, "Standard Specification for Automotive Spark-Ignition Engine Fuel," Appendix X1 shall be acknowledged for enforcement purposes.

7.2.2. Reproducibility. – The reproducibility limits of the standard test method used for each test performed shall be acknowledged for enforcement purposes, except as indicated in Section 2.2.1. Premium Diesel Fuel and Section 7.2.1. AKI Limits. No allowance shall be made for the precision of the test methods for aviation gasoline or aviation turbine fuels.
(Amended 2008)

7.2.2.1 Enforcement Action. - To avoid the exploitation of a test method's reproducibility limits by any regulated party, the Director may initiate enforcement action when several independent test results, of the same product sampled from the same source location at different times, are exceeding legal limits (such as specification values, posted values, certified values, or registered values). (Added 202X).

7.2.3. SAE Viscosity Grades for Engine Oils. – With the exception of the low-temperature cranking viscosity, all values required to define SAE Viscosity Grades, as defined in the latest version of SAE J300, "Engine Oil Viscosity Classification", are critical specifications as defined by the latest version of ASTM D3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications".
(Added 2008) (Amended 2021)

7.2.4. Dispute Resolution. – In the event of a dispute over a reported test value, the guidelines presented in the latest version of ASTM D3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications," shall be used to determine the acceptance or rejection of the sample.

~~7.2.5. — Additional Enforcement Action. — The Director may initiate enforcement action in the event that, based upon a statistically significant number of samples, the average test result for products sampled from the same source location is greater than the legal maximum or less than the legal minimum limits (specification value), posted values, certified values, or registered values.~~
~~(Added 2008) (Amended 2018)~~

Latest proposal:

7.2. Reproducibility Limits.

7.2.3. AKI Limits. – When determining the antiknock index (AKI) acceptance or rejection of a gasoline sample, the AKI reproducibility limits as outlined in the latest version of ASTM D4814, "Standard Specification for Automotive Spark-Ignition Engine Fuel," Appendix X1 shall be acknowledged for enforcement purposes.

7.2.4. Reproducibility. **~~— The reproducibility limits of the standard test method used for each test performed shall be acknowledged for enforcement purposes, except as indicated in Section 2.2.1. Premium Diesel Fuel and Section 7.2.1. AKI Limits. No allowance shall be made for the precision of the test methods for aviation gasoline or aviation turbine fuels.~~**

(a) The reproducibility limits of the standard test method used for each test performed shall be acknowledged for enforcement purposes, except as indicated in Section 7.2.1. AKI Limits. No allowance shall be made for the precision of the test methods for aviation gasoline or aviation turbine fuels. (Amended 20xx)

(b) Notwithstanding the provisions in 7.2.2. (a), the Director may initiate enforcement action when several independent test results of the same product, sampled from the same source location on separate occasions following new product deliveries, are greater than the maximum or less than the minimum specification limits, posted values, certified values, or registered values.

8.2.1 SAE Viscosity Grades for Engine Oils. – With the exception of the low-temperature cranking viscosity, all values required to define SAE Viscosity Grades, as defined in the latest version of SAE J300, "Engine Oil Viscosity Classification", are critical specifications as defined by the latest version of ASTM D3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications". (Added 2008) (Amended 2021)

8.2.2 Dispute Resolution. – In the event of a dispute over a reported test value, the guidelines presented in the latest version of ASTM D3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications," shall be used to determine the acceptance or rejection of the sample.

~~8.2.3 — Additional Enforcement Action. — The Director may initiate enforcement action in the event that, based upon a statistically significant number of samples, the average test result for products sampled from the same source location is greater than the legal maximum or less than the legal minimum limits (specification value), posted values, certified values, or registered values.~~
~~(Added 2008) (Amended 2018)~~

- Highlights and updates from ASTM D02 were provided, specifically by Marilyn Herman for Subcommittee A (Gasoline and Oxygenated Fuels) and by Randy Jennings for Subcommittee E (Burner, Diesel, and Non-Aviation Gas Turbine Fuels), and J (Aviation Fuels). Highlights of note included the newest version of ASTM D4814 was approved July 1, 2026, continued efforts in streamlining one manageable diesel fuel standard, the ongoing investigation into the root cause of the premature plugging of filters that retail facilities are continuing to deal with and that ASTM D02 will be hosting their meeting in Europe in 2029.

- There was some follow up commentary to Henry Walczak's request for a template that could manage and align fuel specifications across the States. Dr. Jenny Tabbert mentioned that Colorado had provided this information and encouraged others to follow suite.

- There was discussion concerning the proper labeling of fuel at retail dispensers, specifically E15, and how some states are approaching this effort.

Detailed minutes of this meeting will be distributed to FALS membership, including attachments with all presentations from the meeting.

NCWM 2026 Interim: Ms. Vanessa Benchea, FALS Chair, reported on the FALS activities during the open hearings and provide a written report for the Committee.

Regional Associations Comments:

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends a developing status.

WWMA 2026 Annual Meeting:

No comments were heard during open hearings.

The WWMA L&R Committee appreciates the work of the Fuels and Lubricants Subcommittee and recommends this item remain DEVELOPING.

NEWMA 2026 Interim Meeting:

No comments were heard from the floor.

The committee recommends a developing status.

SWMA 2026 Annual Meeting:

No comments.

SWMA Laws and Regulations committee recommends this item remain developing status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH-11.1 D Packaging and Labeling Subcommittee

Source:
NCWM Packaging and Labeling Subcommittee (PALS)

Purpose:
Provide an update of the activities of this Subcommittee which reports to the L&R Committee. The mission of PALS is to assist the L&R Committee in the development of agenda item, NCWM positions and new standards related to packaging and labeling. The Subcommittee will also be called upon to provide important and much needed guidance to the regulatory and consumer packaging communities on difficult questions.

PALS will report to NCWM L&R Committee. The Subcommittee is comprised of a Chair, eight voting members, and anyone interested in packaging and labeling standards.

Original Justification:
This item is to provide a report on the activities of the Packaging and Labeling Subcommittee which reports and provides recommendations to the Laws and Regulations Committee.

For more information or to provide comments, please contact the PALS Chair:

Mr. Chris Guay
CGGT
513-652-6597, guay.cb@gmail.com

Item Development:
NCWM Annual 2026: Mr. Chris Guay representing PALS updated the Committee on PALS activities and provided a presentation on the best practice document Quantity-Related Expressions on a Principal Display Panel that PALS has developed and submitted to the Board of Directors for review and which can be found at the end of this report.

NCWM 2026 Interim: Mr. Mike Smith, New York representing PALS updated the Committee on PALS activities and provided the following:

The Packaging and Labeling Subcommittee met on Sunday January 11, 2026. We shared and discussed the Draft Best Practice Document called, "Quantity related expressions on a principal display panel". This document will provide guidance to manufacturers and regulators alike regarding the statements which appear in addition to a proper and correct Declaration of Net Quantity. We hope to have this document completed by March and plan to submit this to the NCWM Board shortly thereafter so that an expert panel can be established to review and publish as an NCWM best practice publication. PALS is optimistic that this document will be completed for the NCWM body, by the annual meeting in Philadelphia.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends a developing status.

WWMA 2026 Annual Meeting:

No comments were heard during open hearings.

The WWMA L&R Committee appreciates the work of the Packaging and Labeling Subcommittee and recommends this item remain DEVELOPING.

NEWMA 2026 Interim Meeting:

A regulator from NY that is part of the PALS committee stated that the NCWM committee that oversees this PALS document, has asked our subcommittee whether it should be considered a "Guidance" document, "Recommended Practice" document or "Recommended Best Practice" document? It was pointed out that:

- Two of the links (from the resources page) take the user to FDA guidance documents – "Guidance document for Industry: Food Labeling Guide" and "FDA- Cosmetic Labeling Guide".

Therefore, the PALS committee considers it a "guidance document" as well.

A Regulator from NH stated they have been on committee meeting and 100% supports the work and supports the term "guidance document".

The committee recommends a developing status.

SWMA 2026 Annual Meeting:

Loren Minnich speaking on his behalf encouraged everyone in the body to review the Appendix A draft guideline for label declaration and commented that he is concerned this document may conflict with NIST Handbook 130 and federal law and a thorough review by regulators is highly advised.

SWMA Laws and Regulations committee recommends this item remain developing status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ITEM BLOCK 1 (B1) PREMIUM DIESEL FUEL

Source:
Colorado Division of Oil and Public Safety

Purpose:
Add an alternative method to determine the cetane number of premium diesel fuels.

Original Justification:
ASTM D8183, "Test Method for Determination of Indicated Cetane Number (ICN) of Diesel Fuel Oils using a Constant Volume Combustion Chamber - Reference Fuels Calibration Method," is a proven, standardized approach that was officially incorporated as an alternative method for determining cetane number within ASTM D975, "Standard Specification for Diesel Fuel," in 2018. The National Conference on Weights and Measures (NCWM) should adopt ASTM D8183 as an alternative method for determining cetane number because it provides a faster, highly precise, and cost-effective measurement of fuel ignition quality that correlates directly—and without bias—to traditional engine tests.

Adopting this method offers significant operational and economic advantages. It drastically improves testing efficiency, completing analyses in roughly 10 minutes compared to the hours required by traditional engine tests, while also minimizing waste by requiring only 40 mL of fuel. Furthermore, this method eliminates the high maintenance costs and operational requirements associated with the traditional single-cylinder variable compression cetane engine (ASTM D613).

Technically, ASTM D8183 represents a modernization of fuel testing. It utilizes the same Primary Reference Fuels that define the historical cetane number scale, ensuring continuity with industry standards. Extensive inter-laboratory studies have confirmed that the method maintains accuracy with no statistical bias compared to standard engine testing. Additionally, it is well-equipped to handle modern fuel compositions, including conventional diesel, biodiesel blends, and premium diesel fuels enhanced with cetane improver additives.

Note: Appendix A. Index should be updated as the current reference to "cetane number" on page 191 is incorrect; it currently appears on pages 147, 186, and 190 of the NIST Handbook 130.

The submitter requests that this be an Assigned Item in 2027, referred to the Fuels and Lubricants Subcommittee.

B1: MOS-27.1 2.39.2. Premium Diesel Fuel.

Item under Consideration:
Amend the NIST Handbook 130 Uniform Regulation for the Method of Sale of Commodities as follows:

2.39.2. Premium Diesel Fuel. - All diesel fuels identified on retail dispensers as premium, super, supreme, or premier must conform to the following minimum requirements:

(a) Cetane Number. - A minimum cetane number of 47.0 as determined by the latest version of ASTM D613, "Standard Test Method for Cetane Number of Diesel Fuel Oil."

Note: ASTM D613, "Standard Test Method for Cetane Number of Diesel Fuel Oil" is the referee method; however, the following methods can be used to determine cetane number: the latest version of ASTM D6890, "Standard Test Method for Determination of Ignition Delay and Derived Cetane Number**"** (DCN) of Diesel Fuel Oils by Combustion in a Constant Volume Chamber"~~**; and,**~~ ASTM D7668, "Standard Test

Method for Determination of Derived Cetane Number (DCN) of Diesel Fuel Oils - Ignition Delay and Combustion Delay Using a Constant Volume Combustion Chamber Method~~.~~" **and ASTM D8183, "Test Method for Determination of Indicated Cetane Number (ICN) of Diesel Fuel Oils using a Constant Volume Combustion Chamber - Reference Fuels Calibration Method."**

Previous Status:
2027: New Proposal

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

No comments were received.

Editorial change would be to change the spelling of DIESELL in the header.

The committee recommends a voting status.

WWMA 2026 Annual Meeting:

WWMA L&R Committee member Mr. Scott Wagner recused himself from the open hearings and working sessions for this item.

Mr. Steve Harrington (Oregon Weights & Measures) supports the efforts and agrees that the test methods used to determine cetane number for premium diesel fuel should be allowable. He expressed that he does not support keeping a list of these methods within NIST Handbook 130; ASTM already publishes and maintains the appropriate test methods (such as those referenced in section 5.1.10). His recommendation is to re-write or develop the item so that the Handbook simply references the applicable ASTM standards rather than enumerating the methods. Mr. Harrington recommended a DEVELOPING status.

Based on the comments heard during open hearings and the submitter's request that this item be assigned to the Fuels and Lubricants Subcommittee in their original justification, the WWMA L&R Committee recommends this item remain blocked with FLR-27.1 and that both items be ASSIGNED to the Fuels and Lubricants Subcommittee.

NEWMA 2026 Interim Meeting:

No comments were heard from the floor.

The committee gave no recommendation for this item.

SWMA 2026 Annual Meeting:

Submitter recommends this item be assigned.

Vanessa Benchea representing the state of Florida supports this item and recommends assigned status.

SWMA Laws and Regulations committee recommends this item to be given assigned status.

B1: FLR-27.1 2.2.1. Premium Diesel Fuel.

Item under Consideration:
Amend the NIST Handbook 130 Uniform Fuels and Automotive Lubricants Regulation as follows:

2.2.1. Premium Diesel Fuel. - All diesel fuels identified on retail dispensers as premium, super, supreme, or premier must conform to the following minimum requirements:

(a) **Cetane Number.** - A minimum cetane number of 47.0 as determined by the latest version of ASTM D613, "Standard Test Method for Cetane Number of Diesel Fuel Oil."

Note: ASTM D613, "Standard Test Method for Cetane Number of Diesel Fuel Oil" is the referee method; however, the following methods can be used to determine cetane number: the latest version of ASTM D6890, "Standard Test Method for Determination of Ignition Delay and Derived Cetane Number~~2~~ (DCN) of Diesel Fuel Oils by Combustion in a Constant Volume Chamber"**~~; and~~,** ASTM D7668, "Standard Test Method for Determination of Derived Cetane Number (DCN) of Diesel Fuel Oils - Ignition Delay and Combustion Delay Using a Constant Volume Combustion Chamber Method~~.~~" **and ASTM D8183, "Test Method for Determination of Indicated Cetane Number (ICN) of Diesel Fuel Oils using a Constant Volume Combustion Chamber - Reference Fuels Calibration Method."**

Previous Status:
2027: New Proposal

Comments in Favor:

Regulatory:
•

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

The agenda should have listed this item number as B1: FLR 27.1 which is currently listed as FLR 27.2.

(NCWM has since corrected this error in the current version of Publication 15.)

The committee recommends a voting status.

WWMA 2026 Annual Meeting:

WWMA L&R Committee member Mr. Scott Wagner recused himself from the open hearings and working sessions for this item.

Mr. Steve Harrington (Oregon Weights & Measures) supports the efforts and agrees that the test methods used to determine cetane number for premium diesel fuel should be allowable. He expressed that he does not support keeping a list of these methods within NIST Handbook 130; ASTM already publishes and maintains the appropriate test methods (such as those referenced in section 5.1.10). His recommendation is to re-write or develop the item so that the Handbook simply references the applicable ASTM standards rather than enumerating the methods. Mr. Harrington recommended a DEVELOPING status.

Based on the comments heard during open hearings and the submitter's request that this item be assigned to the Fuels and Lubricants Subcommittee in their original justification, the WWMA L&R Committee recommends this item remain blocked with MOS-27.1 and that both items be ASSIGNED to the Fuels and Lubricants Subcommittee.

NEWMA 2026 Interim Meeting:

No comments were heard from the floor.

The committee gave no recommendation for this item.

SWMA 2026 Annual Meeting:

Submitter recommends this item be assigned.

Vanessa Benchea representing the state of Florida supports this item and recommends assigned status.

SWMA Laws and Regulations committee recommends this item to be given assigned status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ITEM BLOCK 2 (B2) ~~MTBE~~ETBE

Source:
Colorado Division of Oil and Public Safety

Purpose:
MTBE (methyl tertiary butyl ether) is a historical petroleum-based oxygenate that was phased out in the mid-2000s due to extensive groundwater contamination. This proposal aims to remove MTBE from NIST Handbook 130 and, where applicable, replace it with ETBE (ethyl tert-butyl ether), a currently used oxygenate.

Previous Status:
2027: New Proposal

Original Justification:
MTBE is a synthetic liquid compound that was used from 1979 to the mid-2000s as an octane booster and to help gasoline burn more cleanly. However, it was phased out nationwide because it is water-soluble, resists natural degradation, and contaminated groundwater and drinking water supplies, creating significant environmental and health concerns.

The phase-out of MTBE occurred in May 2006, driven by the Energy Policy Act of 2005. This legislation forced the change through two mechanisms: It eliminated the federal requirement for gasoline to contain oxygenates, removing the primary legal obligation to use MTBE, and Congress refused to grant oil companies immunity from groundwater contamination lawsuits, making the financial risk of using MTBE unsustainable.

Refiners made a massive, voluntary market shift to completely strip MTBE out of their production lines by the May 2006 deadline, replacing it universally with corn-based ethanol. Hence, MTBE is virtually absent from automotive gasoline nationwide. Keeping "MTBE" as the primary poster-child example for ether labeling on active consumer gas pumps is legally out of touch. ETBE is legally permitted by the EPA and serves as a highly popular alternative globally. While rare domestically due to corn ethanol's dominance, ETBE remains the most viable high-octane ether compound a modern specialized or imported fuel supply might actually contain.

MTBE is a massive groundwater contaminant because it dissolves easily in water and travels quickly. ETBE features a longer carbon-hydrogen chain, making it significantly less water-soluble and easier to biodegrade. Because NIST Handbook 130 serves as a "model law" adopted by state and local weights-and-measures authorities, updating the template wording implicitly encourages the adoption of safer chemical standards across state jurisdictions.

Replacing MTBE with ETBE aligns the model rules with modern engine requirements. ETBE provides an even higher octane boost than MTBE and features a lower vapor pressure, meaning refiners do not suffer a vapor pressure penalty when integrating it into specific premium or high-performance blends. If a state inspector comes across a specialized fuel blend utilizing ethers today, it is highly likely to be ETBE or TAME (tertiary-amyl methyl ether), not the phased-out MTBE. Updating the specific text provides field inspectors with clear, modern labeling templates that match actual laboratory findings.

The submitter acknowledges that, although phased out for standard road vehicles, MTBE is not universally prohibited across all specialized fuel blends, remaining technically permissible in specific off-road or aviation niche formulations.

Nevertheless, NIST Handbook 130 serves as a national rather than global standard, and the affected sections focus strictly on automotive gasoline-oxygenate blends rather than these off-road or aviation applications.

The submitter requests that this be an Assigned Item in 2027, referred to the Fuels and Lubricants Subcommittee.

B2: MOS-27.2 2.20.1. Method of Retail Sale, 2.20.2. Product Transfer Document (PTD) Requirements.

Item under Consideration:
Amend the NIST Handbook 130 Uniform Regulation for the Method of Sale of Commodities as follows:

2.20.1. Method of Retail Sale. – Type of Oxygenate must be Disclosed. – All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold at retail containing at least 1.5 mass percent oxygen shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read "contains ethanol" or "with ~~**MTBE**~~**ETBE**." The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains ~~**MTBE**~~**ETBE** or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.3 % by volume methanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (1/2 in) in height, 1.5 mm (1/16 in) stroke (width of type). (Amended 1996**, and 202X**)

2.20.2. Product Transfer Document (PTD) Requirements. – The retailer shall be provided information that complies with PTD requirements for gasoline, gasoline additives, and gasoline regulated blendstocks 40 C.F.R. § 1090.1110, at the time of delivery of the fuel, on product transfer documents such as an invoice, bill of lading, shipping paper, or other documentation. Additional declarations may be required for specific fuels:

(a) For fuels containing multiple oxygenates or oxygenates other than ethanol a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase "contains ~~**MTBE**~~**ETBE** or other ethers."

(b) For fuels containing more than 0.3 % by volume methanol a declaration shall be identified as "with" or "containing" methanol.

(Added 1984) (Amended 1985, 1986, 1991, 1996, 2014, 2022, ~~**and**~~ 2023**, and 202X**)

Comments in Favor:

Regulatory:
•

Industry:

-

Advisory:

-

Comments Against:

Regulatory:

-

Industry:

-

Advisory:

-

Neutral Comments:

Regulatory:

-

Industry:

-

Advisory:

-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends a voting status.

WWMA 2026 Annual Meeting:
WWMA L&R Committee member Mr. Scott Wagner recused himself from the open hearings and working sessions for this item.

Mr. Steve Harrington (Oregon Weights & Measures) expressed general support for this item but questioned whether MTBE gasoline blending is permissible anywhere. He also wondered if there should be separate definitions and striking MTBE then adding ETBE rather than modifying the language. He recommended a DEVELOPING status to allow incorporation of the proposed changes.

Mr. Matthew Sheehan (Chevron) supported assigning this item to the Fuels and Lubricants Subcommittee and recommended using broader language to classify these products as Ether blends, helping to avoid similar issues in the future. He recommended a DEVELOPING status.

Mr. Steve Harrington (Oregon Weights & Measures) expressed his support for designating this item an ASSIGNED status.

Mr. Kevin Schnepp (California Division of Measurement Standards) also supported the recommendation to broaden the language to include Ether blends and an ASSIGNED status.

Based on the comments heard during open hearings and the submitter's request that this item be assigned to the Fuels and Lubricants Subcommittee in their original justification, the WWMA L&R Committee recommends this item remain blocked with FLR-27.2 and that both items be ASSIGNED to the Fuels and Lubricants Subcommittee.

NEWMA 2026 Interim Meeting:

No comments were heard from the floor.

The committee had no recommendation for this item.

SWMA 2026 Annual Meeting:

Submitter recommends this item be assigned.

Vanessa Benchea representing the state of Florida supports this item and recommends assigned status.

SWMA Laws and Regulations committee recommends this item to be given assigned status.

B2: FLR-27.2 **~~1.46. MTBE. Methyl tertiary-butyl ether, the chemical compound (CH3)3COCH3 [C5H12O].~~, 1.X. ETBE. – Ethyl tertiary-butyl ether, the chemical compound (CH3CH2OC(CH3)3 [C6H14O]., 3.2.4. Method of Retail Sale., 3.2.5. Product Transfer Document (PTD) Requirements., Appendix A. ~~MTBE, Methyl tertiaryubutyl ether~~, ETBE, Ethyl tertiary-butyl ether**

Item under Consideration:
Amend the NIST Handbook 130 Uniform Fuels and Automotive Lubricants Regulation as follows:

~~1.46. MTBE. Methyl tertiary-butyl ether, the chemical compound (CH_3)$_3$COCH$_3$ [$C_5H_{12}O$]. (Added 2008) (Amended 2018)~~

1.X. ETBE. – Ethyl tertiary-butyl ether, the chemical compound ($CH_3CH_2OC(CH_3)_3$ [$C_6H_{14}O$]. (Added 202X)

…

3.2.4. Method of Retail Sale. – Type of Oxygenate must be disclosed. All automotive gasoline or automotive gasoline-oxygenate blends, or racing gasoline kept, offered, or exposed for sale, or sold at retail containing more than one volume percent oxygenate shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read "contains ethanol" or "with ~~**methyl tertiary-butyl ether (MTBE)**~~**ethyl tertiary-butyl ether (ETBE)**." The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains ~~**MTBE**~~**ETBE** or other ethers." In addition, gasoline-methanol blends containing more than 0.3 % by volume methanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (1/2 in) in height, 1.5 mm (1/16 in) stroke (width of type).
(Amended 1996~~**, and**~~ 2018**, and 202X**)

3.2.5. Product Transfer Document (PTD) Requirements. – The retailer shall be provided information that complies with requirements for gasoline, gasoline additives, and gasoline regulated blendstocks, 40 C.F.R. § 1090.1110 when the fuel contains ethanol. Additional declarations may be required for specific fuels

(a) For fuels containing multiple oxygenates or oxygenates other than ethanol, information a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase "contains ~~**MTBE**~~**ETBE** or other ethers."
(Added 2014) (Amended 2022~~**,** **and**~~2023 **and 202X**)

(b) For fuels containing more than 0.3 % by volume methanol a declaration shall be identified as "with" or "containing" methanol.
(Added 2014) (Amended 2018 and 2023)

…

Appendix A. Index

~~**MTBE, Methyl tertiary-butyl ether 149**~~

ETBE, Ethyl tertiary-butyl ether XXX

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends a voting status.

WWMA 2026 Annual Meeting:

WWMA L&R Committee member Mr. Scott Wagner recused himself from the open hearings and working sessions for this item.

Mr. Steve Harrington (Oregon Weights & Measures) expressed general support for this item but questioned whether MTBE gasoline blending is permissible anywhere. He also wondered if there should be separate definitions and striking MTBE then adding ETBE rather than modifying the language. He recommended a DEVELOPING status to allow incorporation of the proposed changes.

Mr. Matthew Sheehan (Chevron) supported assigning this item to the Fuels and Lubricants Subcommittee and recommended using broader language to classify these products as Ether blends, helping to avoid similar issues in the future. He recommended a DEVELOPING status.

Mr. Steve Harrington (Oregon Weights & Measures) expressed his support for designating this item an ASSIGNED status.

Mr. Kevin Schnepp (California Division of Measurement Standards) also supported the recommendation to broaden the language to include Ether blends and an ASSIGNED status.

Based on the comments heard during open hearings and the submitter's request that this item be assigned to the Fuels and Lubricants Subcommittee in their original justification, the WWMA L&R Committee recommends this item remain blocked with MOS-27.2 and that both items be ASSIGNED to the Fuels and Lubricants Subcommittee.

NEWMA 2026 Interim Meeting:

No comments were heard from the floor.

The committee had no recommendation for this item.

SWMA 2026 Annual Meeting:

Submitter recommends this item be assigned.

Vanessa Benchea representing the state of Florida supports this item and recommends assigned status.

SWMA Laws and Regulations committee recommends this item to be given assigned status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ITEM BLOCK 4 (B4) MOISTURE ALLOWANCE CONSIDERATION

Source:
Michigan Department of Agriculture & Rural Development

Purpose:
Change the language for the moisture gray area from "moisture allowance" to "moisture consideration."

Original Justification:
This is a companion item to those changes requested for HB133.

In speaking with both weights and measures officials and industry, quite often both interpret the language "moisture allowance" to mean "tolerance" which should automatically be given to inspection results when a lot is found short. Changing the wording to "moisture consideration" should be more clear that "Further information is required to determine lot compliance or noncompliance", as stated in the glossary.

Some industries may believe "moisture allowance" should be used as a tolerance and have always used it as same. There may also be enforcement jurisdictions that want to continue to use it as a tolerance rather than conducting additional investigations into the root cause of shortages found in those packages that allow moisture consideration.

B4: POL-25.1 A 2.6.12. Point-of-Pack Inspection Guidelines.

Previous Status:
2026: Assigned to the Moisture Allowance Task Group – Language Changes
2025: Assigned to the Moisture Allowance Task Group

Item under Consideration:
Amend Handbook 130 NCWM Policy, Interpretations, and Guidelines as follows:

2.6.12. Point-of-Pack Inspection Guidelines.

A. Weights and Measures Officials' Responsibilities.

…

8. Sample questions and tasks for Inspectors:

(c) Warehouse Inspection.

If an inspection is conducted:

vi. Apply ~~moisture allowances~~ **a reasonable variation due to loss of moisture**, if applicable.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends an assigned status.

WWMA 2026 Annual Meeting:

Mr. Kurt Floren (County of Los Angeles, California) explained that this block of items was originally submitted by the Michigan Department of Agriculture & Rural Development, however the title of the block is no longer reflective of the items under consideration and should be updated to prevent confusion. This item, POL-25.1, is an edit to NIST Handbook 130; striking "moisture allowances" and replacing it with "a reasonable variation due to loss of moisture" and he is supportive of this edit.

Mr. Kevin Schnepp (California Division of Measurement Standards) applauded the work of the Moisture Allowance Task Group which he felt was comprehensive. Mr. Schnepp stated that he was in full agreement with Kurt Floren on this item.

Mr. John McGuire (NIST OWM) stated that he was on the Moisture Allowance Task Group and that he met with Mr. Floren for a cursory review of the proposed edits. However, NIST OWM has not reviewed the edits and does not have

a formal position, although Mr. McGuire stated that he was generally in agreement with them and would like to see them included moving forward.

Based on the comments heard during open hearings, the WWMA L&R Committee has changed the title of Block 4 to "REASONABLE VARIATION DUE TO LOSS OF MOISTURE" and inserted this title into the agenda report. The WWMA L&R Committee recommends that this item remain blocked with NET-25.1, and that the items move forward together with a VOTING status.

NEWMA 2026 Interim Meeting:

A Regulator from NJ stated this item has merit and is needed. NJ understands that the submitter offered further updates during the Western Annual meeting. Based on those updates, NJ believes the item will be fully developed, recommends Voting status with developer updates.

A regulator from NY stated that the TG feels that it is done with what it was charged to do. Except for the flow chart that was going to be added to the guidance document, he feels that the proposal is fully developed.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

Tory Brewer representing the state of West Virigina and acting chair on the Moisture Allowance Task group commented that he is not advocating for the item but informing the body that there is a new version item and it will be presented to the body at NCWM interim in January.

SWMA Laws and Regulations committee recommends this item to be given assigned status.

B4: NET-25.1 A 1.2.6.1. Applying a Moisture Allowance Consideration, 2.3.8. Moisture Allowances Considerations, 4.10.2.2. Moisture Shrinkage Allowance Consideration for Structural Plywood and Wood-based Structural Panels, 4.11.2.1. Shrinking Allowance Consideration

Previous Status:

2026: Assigned to the Moisture Allowance Task Group – Language Changes
2025: Assigned to the Moisture Allowance Task Group

Item under Consideration:

Amend Handbook 133 Checking the Net Contents of Packaged Goods as follows:

Chapter 1. General Information

1.2.6. ~~Deviations~~Variations Caused by ~~Moisture~~ Loss or Gain of Moisture in Packaged Goods

~~Deviations~~**Variations** from the net quantity of contents caused by the loss or gain of moisture from the package are permitted when they **are reasonable and** are caused by ordinary and customary exposure to conditions that normally occur in good distribution practice and that unavoidably result in change of weight or measure. According to regulations adopted by the U.S. Environmental Protection Agency, no ~~moisture loss~~ **permissible variation** is recognized on pesticides. (see Code of Federal Regulations 40 CFR 156.10.)

Test procedures for flour, dry pet food, pasta products, *Cannabis*, some meat products, and fresh poultry are based on the concept of a potentially permissible "reasonable variation due to moisture loss or gain" also known as a "gray area" or "no decision" area (see Section 2.3.8. "Adjustments for Reasonable Variations Due To Loss of Moisture"). When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the "gray area," the lot is said to be in the "gray" or "no decision" area. The gray area is not a tolerance. More information must be collected (see below) before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the determined "reasonable variation due to moisture loss" or "gray area."

Federal laws, namely the Fair Packaging and Labeling Act (see 16 CFR Chapter 1 Subchapter E Part 500 § 500.25), the Food, Drug and Cosmetic Act (see 21 USC Chapter 9 Subchapter IV § 343), the Federal Meat Inspection Act (see 21 USC Chapter 12 Subchapter 1 § 601(n)(5)), and the Poultry Products Inspection Act (see 21 USC Chapter 10 § 453(h)(5)) each address requirements to consider "reasonable variations" from stated, labeled net content statements. Federal regulations promulgated under the Acts (see Title 21 Code of Federal Regulations (CFR) Chapter 1 § 101.105(q) re: FPLA; Title 9 CFR § 317.2(h)(2) re: Meat and Poultry Products); Title 9 CFR § 381.121(c)(6) re: Poultry Products) each state that such "reasonable variations" are applicable to packaged products "during the course of good distribution practices." Similarly, "reasonable variations" may be permitted when resulting from "unavoidable deviations in good manufacturing practices."

In determining whether or not "good distribution practices" and "good manufacturing practices" have been followed regarding products subject to reasonable variations due to loss of moisture, see considerations set forth in Section 2.3.8.3.

1.2.6.1. Applying an ~~Moisture Allowance~~Adjustment for Reasonable Variation Due To Moisture Loss

Some packaged products may lose or gain moisture and, therefore, lose or gain weight or volume after packaging. The amount of ~~moisture loss~~ **reasonable variation in quantity** depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. ~~Moisture loss~~ **Variations due to loss or gain of moisture** may occur even when manufacturers follow good distribution practices. Loss of weight "due to exposure" may include solvent evaporation, not just loss of water. For loss or gain of moisture, the ~~moisture allowances~~ **application of adjustments recognizing reasonable variations** may be applied before or after the package errors are determined.

To apply an ~~allowance~~ **adjustment for reasonable variation** before determining package errors, adjust the Nominal Gross Weight (see Section 2.3.6. "Determine Nominal Gross Weight and Package Errors"), so the package errors are increased by an amount equal to the ~~moisture allowance~~ **permissible reasonable variation**. This approach is used to account for **reasonable variations due to loss of** moisture ~~loss~~ in both the average and individual package errors.

It is also permissible to apply the ~~moisture allowances~~ **adjustments for reasonable variations** after individual package errors and average errors are determined.

Example:
*A sample of a product that could be subject to ~~moisture loss~~ **reasonable variation** might fail because the average error is minus or the error in several of the sample packages are found to be unreasonable **minus** errors (i.e., the package error is greater than the Maximum Allowable Variation (MAV) permitted for the package's labeled quantity).*

NOTE: "Maximum Allowable Variation" is different from "Reasonable Variation Due To Loss or Gain of Moisture." (See Section 1.2.4.)

You may apply a**n adjustment for reasonable variation due to loss of** moisture ~~allowance~~ after determining the package errors by adding the ~~allowance~~ **reasonable variation** to the Sample Error Limit (SEL) and then, comparing the average error to the SEL to determine compliance. The ~~moisture allowance~~ **reasonable variation due to loss of moisture** must be added to the MAV before evaluating sample errors to identify unreasonable minus errors.

(Amended ~~2010~~**XXXX**)

~~This handbook provides "moisture allowances" for some meat and poultry products, flour, pasta, *Cannabis* (this only includes plant material but does not include products containing *Cannabis*) and dry pet food. (see Chapter 2, Table 2-3. "Moisture Allowances") These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or more information must be collected before deciding lot compliance or noncompliance.~~

~~(Amended 2024)~~

~~Test procedures for flour, some meat, and poultry are based on the concept of a "moisture allowance" also known as a "gray area" or "no decision" area (see Section 2.3.8. "Moisture Allowances"). When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the "gray area," the lot is said to be in the "gray" or "no decision" area. The gray area is not a tolerance. More information must be collected before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the "moisture allowance" or "gray area."~~
~~(Amended 2002)~~

Chapter 2. Test Procedures for Packages Labeled by Weight – Gravimetric Testing

2.3. Basic Test Procedure for Gravimetric Testing of Net Weight

2.3.5. Procedures for Determining Tare

c. Wet Tare

Wet Tare is used tare material where no effort is made to dry the tare material. Free-flowing liquids are considered part of the tare weight.

Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The USDA Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST Handbook 133 by reference in 2008 but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).

If the jurisdiction uses wet tare to determine net weight, follow the procedures described below that reference Used Dry Tare, except make no effort to dry the tare material. If Wet Tare is used to verify the net weight of the packages, the inspector must ~~allow for moisture loss~~ **consider, and apply processes for determining, potential application of adjustments for reasonable variations due to loss or gain of moisture**.
(Amended ~~2010~~**XXXX**)

2.3.7. Evaluate for Compliance

This inspection lot will pass or fail based on the sample test results. The following steps lead the inspector through the process to determine if a sample passes or fails. If the product is subject **to** ~~a~~**adjustments for reasonable variations due to loss or gain of** moisture ~~allowance~~, follow the procedures under Section 2.3.8. "~~Moisture Allowances~~**Adjustments for Reasonable Variations Due To Loss of Moisture**" to correct the MAV.

2.3.7.2. Average Requirement

1. Determine the average error by dividing the total error recorded in Box 15 by the sample size recorded in Box 6. Record the average error in Box 18 if using dimensionless units or in Box 19 if using units of weight.

2. Compute the average error in terms of weight (if working in dimensionless units up to this time) by multiplying the average error in dimensionless units by the unit of measure and record the value in Box 19. If the average error is positive, the sample passes the average requirement. If the average error is negative, the sample fails under a "Category B" test. Record in Box 20.

Note: If the total error recorded in Box 15 is a plus value, and Box 17 is "No," (the number of unreasonable errors is equal to or less than the number allowed, recorded in Box 8), the lot passes.

(Refer to Section 1.4.1. Net Quantity of Contents Requirements for Pesticides Labeled with Minimum Net Quantity of Contents Declarations.")

3. If the average error is a negative value when testing under the Sampling Plans for "Category A," compute the Sample Error Limit (SEL) as follows:

Compute the Sample Standard Deviation and record it in Box 21.

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X})^2}$$

Obtain the Sample Correction Factor from Column 3 of Appendix A. Table 2-1. "Sampling Plans for Category A" test. Record this value in Box 22.

Compute the Sample Error Limit using the formula:

Sample Error Limit (Box 23) =
Sample Standard Deviation (Box 21) × Sample Correction Factor (Box 22)

4. Compliance Evaluation of the Average Error:

If the value of the Average Error (Box 18) is smaller than the Sample Error Limit (Box 23), the sample passes.

If the value of the Average Error (disregarding the sign) (Box 18) is larger than the Sample Error Limit (Box 23), the sample fails. However, if the product is subject to **potential loss of** moisture ~~loss~~, the sample does not necessarily fail. Follow the procedures under "~~Moisture Allowances~~**Adjustments for Reasonable Variations Due To Loss of Moisture**" in this chapter.

~~(Amended 2018)~~

(Amended ~~2022~~XXXX)

2.3.8. ~~Moisture Allowances~~Adjustments for Reasonable Variations Due To Loss of Moisture

When no predetermined ~~allowance~~**gray area** is found in NIST Handbook 133, the potential for **reasonable variation due to loss of** moisture ~~loss~~ must be considered. Inspectors should follow their jurisdiction's guidance for making their determination on ~~an acceptable moisture allowance~~**an adjustment for reasonable variation to be permitted. Such jurisdictional guidance should include considerations set forth in Section 2.3.8.3.**

(~~Added 2010~~**Amended XXXX**)

If the product tested is subject to ~~moisture loss~~**variations due to loss of moisture**, provide for the ~~moisture allowance~~**reasonable variation** by following one of the two procedures listed below.

2.3.8.1. Applying ~~Moisture Loss~~ Reasonable Variation Due to Loss of Moisture before Determining Package Errors

Determine the percent value of the ~~moisture allowance~~**reasonable variation** if the product is listed below. (see Table 2-3. "~~Moisture Allowances~~**'Gray Area' or Predetermined Reasonable Variation Due To Loss of Moisture**.")

Table 2-3.
~~Moisture Allowances~~"Gray Area" or Predetermined Reasonable Variation Due To Loss of Moisture

Percentage values represent the maximum variation to be considered.
Listed values are not tolerances, but limits to what is deemed "reasonable."

Verifying the labeled net weight of packages of:	~~Moisture Allowance~~Gray Area is:	Notes
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Pasta products	3 %	Pasta products means all macaroni, noodle, and like products packaged in kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.
Borax	see Section 2.4. Borax	
Cannabis	3 %	*Cannabis* means plant material only, and not products containing *Cannabis*, whether containing more than 0.3 % Total Delta-9 THC (also known as cannabis, Marijuana, or Marihuana) or containing 0.3 % or less Total Delta-9 THC (also known as Hemp).
Wet Tare Only[1]		
Fresh poultry	3 %	Fresh poultry is defined as poultry above a temperature of − 3 °C (26 °F) that yields or gives when pushed with the thumb.
Franks or hot dogs	2.5 %	

Table 2-3. **~~Moisture Allowances~~"Gray Area" or Predetermined Reasonable Variation Due To Loss of Moisture**		
Percentage values represent the maximum variation to be considered. **Listed values are not tolerances, but limits to what is deemed "reasonable."**		
Bacon, fresh sausage, and luncheon meats	0 %	For packages of bacon, fresh sausage, and luncheon meats, there is no ~~moisture allowance~~**adjustment for loss of moisture** if there is no free-flowing liquid or absorbent material in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Used Dried Tare are equivalent.

[1] Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th edition of NIST Handbook 133 by reference in 2008 but not the "Wet Tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).

Notes:

(1) There is no ~~moisture allowance~~**adjustment for loss of moisture** when inspecting meat and poultry from a USDA inspected plant when Used Dry Tare and "Category A" sampling plans are used.

(2) For the Wet Tare Only section of Table 2-3. "~~Moisture Allowances~~**'Gray Area' or Predetermined Reasonable Variation Due To Loss of Moisture**," free-flowing liquid and liquid absorbed by packaging materials in contact with the product are part of the wet tare. (Note Added 2010)

(Amended 2010, 2013, ~~and~~ 2024**, and XXXX**)

2. To compute ~~moisture allowance~~**a reasonable variation due to loss of moisture**, multiply the labeled quantity by the decimal percent value of the ~~allowance~~**reasonable variation to be applied.** Record this value in Box 13a.

Example:
Labeled net quantity of flour is 907 g (2 lb)
*~~Moisture Allowance~~**"Gray Area"** is 3 % (0.03)*
*~~Moisture Allowance~~**"Gray Area"** = 907 g (2 lb) × 0.03 = 27 g (0.06 lb)*

3. If the ~~Moisture Allowance~~ **Gray Area/Predetermined Reasonable Variation** is known in advance (e.g., flour, pasta products, ***Cannabis,*** ~~and~~ dry pet food**, fresh poultry, and franks or hot dogs**), it can be applied by adjusting the Nominal Gross Weight used to determine the sample package errors. The ~~Moisture Allowance~~**Gray Area/Reasonable Variation** in Box 13a is subtracted from the Nominal Gross Weight to obtain an Adjusted Nominal Gross Weight which is entered in Box 14. The Nominal Gross Weight is defined in Section 2.3.6.1. as the sum of the Labeled Weight and the Average Tare Weight from Box 13.

Example:

Use a Labeled Weight of 907 g (2 lb) and an Average Tare Weight of 14 g (0.03 lb)

The calculation is:

*Labeled Net Quantity 907 g (2 lb) + Average Tare Weight 14 g (0.03 lb) = 921 g (2.03 lb) – ~~Moisture Allowance~~ **"Gray Area"** 27 g (0.06 lb) = Adjusted Nominal Gross Weight of 894 g (1.97 lb)*

This result is entered in Box 14.

4. Determine package errors by subtracting the Adjusted Nominal Gross Weight from the Gross Weights of the Sample Packages.

Example:
The calculation is:

Gross Weight of the Sample Packages – Adjusted Nominal Gross Weight = Package Error

Note: When the Nominal Gross Weight is adjusted by subtracting the ~~Moisture Allowance~~**Gray Area/Reasonable Variation** value(s)**,** the Maximum Allowable Variation(s) is not changed. This is because the errors that will be found in the sample packages have been adjusted by subtracting the ~~Moisture Allowance~~**Gray Area/Reasonable Variation** (e.g., 3 %) from the Nominal Gross Weight. That increases the individual package errors by the amount of the ~~moisture allowance~~**Gray Area/Reasonable Variation** (e.g., 3 %). If the value(s) of the MAV(s) were also adjusted, it would result in doubling the ~~allowance~~**adjustment for the Gray Area/Reasonable Variation**. MAV is always based **solely** on the labeled net quantity.

(~~Added 2010~~**Amended XXXX**)

2.3.8.2 Applying ~~Moisture Allowance~~Reasonable Variation Due To Loss of Moisture after Determining Package Errors

Adjustments can be made when the value of the ~~Moisture Allowance~~**Reasonable Variation** is determined following the test (e.g., after the sample fails or if a packer provides **justification for a** reasonable **variation due to** moisture ~~allowance~~**loss** based on data obtained using a scientific method) using the following approach:

If the sample fails the Average Requirement but has no unreasonable package errors **(based upon minus errors exceeding the applicable MAV),** only Step 1 is used. If the sample passes the Average Requirement but fails because the sample included one or more Unreasonable Minus Errors, only Step 2 is used.

If the sample fails the Average and MAV Requirements, both of the following steps are applied.

Use the following approach to apply ~~a Moisture Allowance~~**an adjustment for Reasonable Variation Due to Loss of Moisture** to the Average Requirement after the test is completed:

- the ~~Moisture Allowance~~**Reasonable Variation** is computed;

  Example:
  3 % × 907 g (2 lb) = 27 g (0.06 lb)

- added to the Sample Error Limit;

  Example:
  If the Sample Error Limit is 0.023, add 0.06 to obtain an Adjusted Sample Error Limit of 0.083)

- the Adjusted Sample Error Limit is then compared to the Average Error of the Sample; and

- if the average error (disregarding sign) in Box 18 is smaller than the Adjusted Sample Error Limit, the sample passes.

HOWEVER,

- if the average error (disregarding sign) in Box 18 is larger than the Adjusted Sample Error Limit, the sample fails.

To apply ~~Moisture Allowance~~**Reasonable Variation Due to Loss of Moisture** to the MAV(s) after the test, the following method is recommended:

- compute ~~Moisture Allowance~~**Reasonable Variation Due to Loss of Moisture**;

Example:
3 % × 907 g (2 lb) = 27 g (0.06 lb)

- add to MAV for labeled net quantity of the package to get Adjusted Maximum Allowable Variations **(MAV);**

Example:
MAV for 907 g (2 lb) is 31.7 g (0.07 lb) + 27 g (0.06 lb) =
Adjusted Maximum Allowable Variation(s) of 58.7 g (0.13 lb)

- compare each minus package error to the Adjusted MAV;

- mark package errors that exceed the Adjusted MAV and record the number of unreasonable minus errors found in the sample; and
- if this number exceeds the number of unreasonable errors allowed, the sample fails.

(~~Added 2010~~**Amended XXXX**)

2.3.8.3. ~~Moisture Allowance~~Reasonable Variation Due To Loss of Moisture or "Gray Area"

When the average error of a lot of fresh poultry, franks/hot dogs, ~~or~~ pasta products**, *Cannabis*, flour, or dry dog food** is minus but does not exceed the established "~~moisture allowance~~**Predetermined Reasonable Variation Due To Loss Of Moisture"** or "gray area," contact the packer or plant management personnel to determine what information is available on the lot in question. **Similarly, when no "Predetermined Reasonable Variation" or "gray area" has been adopted regarding a commodity under inspection, additional research, inquiry, investigation, and information gathering should be undertaken before a compliance decision is rendered.** Questions to the plant management representative may include:

- Is a quality control program in place?
- What information is available concerning the lot in question?
- If net weight checks were completed, what were the results of those checks?
- What adjustments, if any, were made to the target weight?

Note: If the plant management has data on the lot, such data may help to substantiate that the "lot" had met the net content requirements at the point of manufacture.

Additional steps to take in determining whether or not to apply an Adjustment for Reasonable Variations Due To Loss of Moisture:

It is critical to note that Adjustments for Reasonable Variations, consideration of which are based upon "good manufacturing practices" and "good distribution practices," and related determinations of compliance with net content requirements are dependent upon demonstrable adherence by product packers and distributors to those "good" practices. Consideration must be given to, and information should be sought regarding, the following:

- **What is the nature of the product? Is it subject to loss of moisture during distribution?**
- **Have data records been requested from the manufacturer regarding production-run quantity and quality control checks for the lot under inspection? Have they been reviewed for anomalies in filling/packaging processes?**
- **What is the packaging material? Is it porous (subject to product evaporation) or hermetically sealed?**
- **Is the commodity one which should be constantly refrigerated? Was that followed?**
- **How long has the product been in distribution?**
- **Is there evidence that the product was maintained in an inappropriately warm environment for a length of time that would encourage loss of moisture? (i.e., not good distribution practice)**
- **Do industry "best practices" exist for the commodity regarding storage and distribution methods and practices?**
- **Are studies available on equivalent or similar commodities exist regarding quantity variations due to gains or losses of moisture over time?**

The above is not an exhaustive list of considerations that may be applicable. Commodity types and characteristics vary widely, influencing their respective vulnerability to environmental conditions and other factors that may affect loss of moisture resulting in variations from stated net content. In making compliance decisions, the official should be prepared with such collected information and demonstration of appropriate investigation and due process considerations to justify either passage or failure of the packaged commodity test.

~~This handbook provides "moisture allowances" for some meat and poultry products, flour, pasta products, and dry pet food. These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or further investigation can be conducted.~~

~~Reasonable variations from net quantity of contents caused by the loss or gain of moisture from the package are permitted when caused by ordinary and customary exposure to conditions that occur under good distribution practices.~~ If evidence is obtained and documented to prove that the lot was shipped from the packaging plant in a short-weight condition or was distributed under inappropriate or damaging distribution practices **(i.e., not restricted to "ordinary and customary exposure to conditions that normally occur under good distribution practices," as stated in Section 1.2.6.),** appropriate enforcement action should be taken.
(Amended 2010 and 2013 **and XXXX**)

Original Justification:
This is a companion item to those changes requested for HB130.

In speaking with both weights and measures officials and industry, quite often both interpret the language "moisture allowance" to mean "tolerance" which should automatically be given to inspection results when a lot is found short. Changing the wording to "moisture consideration" should be more clear that "Further information is required to determine lot compliance or noncompliance", as stated in the glossary.

Possible Opposing Arguments:
Some industries may believe "moisture allowance" should be used as a tolerance and have always used it as same. There may also be enforcement jurisdictions that want to continue to use it as a tolerance rather than conduct ing additional investigations into the root cause of shortages found in those packages that allow moisture consideration.

Comments in Favor:

Regulatory:
- None

Industry:
- None

Advisory:
- None

Comments Against:

Regulatory:
- None

Industry:
- None

Advisory:
- None

Neutral Comments:

Regulatory:
- NCWM Interim 2026: Multiple Weights and Measures officials rose to support the work of the Work Group and recommended that it continue to develop this item.

Industry:
- None

Advisory:
- None

Item Development:
NCWM 2026 Annual: The Committee received an update from Mr. Tory Brewer, Chair of the Moisture Loss Task Group. They presented for membership consideration the updated language shown under Item Under Consideration above. He reported the charge of his task group was amending and updating language in L&R Block 4 items POL 25.1 and NET 25.1 to provide clarity and consistency in terminology and application pertaining to "Moisture Allowance" in Handbooks 130 and 133 to guide manufacturers and regulators, regarding when and if moisture allowances should be considered in determined net content compliance for packaged commodities.

As presented in January at the interim, the task group reviewed other federal regulations and decided to mirror the terminology found therein. The task group also believes that it was critical to better organize the intent and procedures in Handbook 133 to provide clarity to regulators that these "allowances" are NOT a tolerance.

As such, the task group replaced all applicable mentions within these items with the term from the other federal regulations which is "Reasonable Variation due to Loss or Gain of Moisture."

The group then reorganized the language and made a few edits to make it easier for inspectors, in our opinions.

It was also the original intent to include a flow chart within the item. However, after many hours of consideration, discussion, and editing, the task group has decided to remove the flow chart all together recommending inclusion of it in the EPO or guidance document once it is published.

NCWM 2026 Interim:
This item remains assigned to the Work Group. The Committee deleted 4.10.2.2. Moisture Shrinkage Allowance Consideration for Structural Plywood and Wood-based Structural Panels and 4.11.2.1. Shrinking Allowance Consideration from the title because it was previously agreed that plywood would not be part of the proposed changes to this item.

Mr. Kurt Floren (County of Los Angeles, California), a member of the Moisture Allowance Task Group, provided a presentation on the task group efforts.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were received.

The committee recommends an assigned status.

WWMA 2026 Annual Meeting:

During open hearings, proposed edits which were provided by Mr. Kurt Floren (County of Los Angeles, California) were presented and reviewed.

Mr. Floren explained that this block of items was originally submitted by the Michigan Department of Agriculture & Rural Development, however the title of the block is no longer reflective of the items under consideration and should be updated to prevent confusion. This item, NET-25.1, has a tremendous amount of work which was done by the Moisture Allowance Task Group. Mr. Floren emphasized that the language in black print (on the document he shared with his proposed edits; which is available on the WWMA website) contained the proposed edits from the Work Group, the language in red print is Mr. Floren's recommendations, which have not gone through the Work Group. Mr. Floren also expressed that moisture loss is a consideration, not an allowance, it is a gray area; moisture loss is considered based on factors such as good manufacturing and distribution practices where moisture loss is naturally occurring and unavoidable. Mr. Floren explained that this item would change the language "Moisture Allowance" to "Reasonable Variations Due to Loss of Moisture" which is consistent with Federal Law unlike "Moisture Allowance" which is not. He further explained that there are many questions to be answered when considering whether you will allow the variation and that the intention of this item is to provide guidance to inspectors and to empower them to make a decision. Mr. Floren recommended a VOTING status for this item with his edits.

Mr. Kevin Schnepp (California Division of Measurement Standards) applauded the work of the Moisture Allowance Task Group which he felt was comprehensive. Mr. Schnepp stated that he was in full agreement with Kurt Floren on this item.

Mr. John McGuire (NIST OWM) stated that he was on the Moisture Allowance Task Group and that he met with Mr. Floren for a cursory review of the proposed edits. However, NIST OWM has not reviewed the edits and does not have a formal position, although Mr. McGuire stated that he was generally in agreement with them and would like to see them included moving forward.

The WWMA L&R Committee recommends that this item remain blocked with POL-25.1, and that the items move forward together with a VOTING status, including the edits provided on NET-25.1 at open hearings as shown below in red and double underlined:

B4: NET-25.1 **1.2.6.1. Applying ~~a Moisture Allowance Consideration~~Adjustment for Reasonable Variation for Loss or Gain of Moisture, 2.3.8. Adjustment for Reasonable Variation for Loss or Gain of Moisture~~Moisture Allowances Considerations~~, ~~4.10.2.2. Moisture Shrinkage Allowance Consideration for Structural Plywood and Wood-based Structural Panels, 4.11.2.1. Shrinking Allowance Consideration~~**

Item under Consideration:
Amend Handbook 133 Checking the Net Contents of Packaged Goods as follows:

Chapter 1. General Information

1.2.6. ~~Deviations~~Variations Caused by ~~Moisture~~ Loss or Gain of Moisture in Packaged Goods

~~Deviations~~**Variations** from the net quantity of contents caused by the loss or gain of moisture from the package are permitted when they **are reasonable and** are caused by ordinary and customary exposure to conditions that normally occur in good distribution practice and that unavoidably result in change of weight or measure. According to regulations adopted by the U.S. Environmental Protection Agency, no ~~moisture loss~~ **permissible variation** is recognized on pesticides. (see Code of Federal Regulations 40 CFR 156.10.)

Test procedures for packaged products subject to loss or gain of moisture are based on the concept of a potentially permissible "reasonable variation due to moisture loss or gain." Product lots found to vary in content beyond such determined reasonable variation are subject to enforcement action, such as ordering off-sale, correcting the labeled net content, or repacking to meet the labeled content. For specific products, including flour, dry pet food, pasta products, *Cannabis*, some meat products, and fresh poultry, ~~are based on the concept of a~~ the potentially permissible "reasonable variation due to moisture loss or gain" ~~also~~is known as a "gray area" or "no decision" area (see Section 2.3.8. "Adjustments for Reasonable Variations Due To Loss of Moisture"). When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the "gray area," the lot is said to be in the "gray" or "no decision" area. The gray area is not a tolerance. More information must be collected (see below) before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the determined "reasonable variation due to moisture loss" or "gray area."

Federal laws, namely the Fair Packaging and Labeling Act (see 16 CFR Chapter 1 Subchapter E Part 500 § 500.25), the Food, Drug and Cosmetic Act (see 21 USC Chapter 9 Subchapter IV § 343), the Federal Meat Inspection Act (see 21 USC Chapter 12 Subchapter 1 § 601(n)(5)), and the Poultry Products Inspection Act (see 21 USC Chapter 10 § 453(h)(5)) each address requirements to consider "reasonable variations" from stated, labeled net content statements. Federal regulations promulgated under the Acts (see Title 21 Code of Federal Regulations (CFR) Chapter 1 § 101.105(q) re: FPLA; Title 9 CFR § 317.2(h)(2) re: Meat and Poultry Products); Title 9 CFR § 381.121(c)(6) re: Poultry Products) each state that such "reasonable variations" are applicable to packaged products "during the course of good distribution practices." Similarly, "reasonable variations" may be permitted when resulting from "unavoidable deviations in good manufacturing practices."

In determining whether or not "good distribution practices" and "good manufacturing practices" have been followed regarding products subject to reasonable variations due to loss of moisture, see considerations set forth in Section 2.3.8.3. Reasonable Variation Due To Loss of Moisture or "Gray Area"

1.2.6.1. Applying an ~~Moisture Allowance~~Adjustment for Reasonable Variation Due To Moisture Loss
Some packaged products may lose or gain moisture and, therefore, lose or gain weight or volume after packaging. The amount of ~~moisture loss~~ **reasonable variation in quantity** depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. ~~Moisture loss~~ **Variations due to loss or gain of moisture** may occur even when manufacturers follow good distribution practices. Loss of weight "due to exposure" may include solvent evaporation, not just loss of water. For loss or gain of moisture, the ~~moisture allowances~~ **application of adjustments recognizing reasonable variations** may be applied before or after the package errors are determined.

To apply an ~~allowance~~ **adjustment for reasonable variation** before determining package errors, adjust the Nominal Gross Weight (see Section 2.3.6. "Determine Nominal Gross Weight and Package Errors"), so the package errors are increased by an amount equal to the ~~moisture allowance~~ **permissible reasonable variation**. This approach is used to account for **reasonable variations due to loss of** moisture ~~loss~~ in both the average and individual package errors.

It is also permissible to apply the ~~moisture allowances~~ **adjustments for reasonable variations** after individual package errors and average errors are determined.

Example:
*A sample of a product that could be subject to ~~moisture loss~~ **reasonable variation** might fail because the average error is minus or the error in several of the sample packages are found to be unreasonable **minus** errors (i.e., the package error is greater than the Maximum Allowable Variation (MAV) permitted for the package's labeled quantity).*

NOTE: "Maximum Allowable Variation" is different from "Reasonable Variation Due To Loss or Gain of Moisture." (See Section 1.2.4.)

You may apply a**n adjustment for reasonable variation due to loss of** moisture ~~allowance~~ after determining the package errors by adding the ~~allowance~~ **reasonable variation** to the Sample Error Limit (SEL) and then, comparing the average error to the SEL to determine compliance. The ~~moisture allowance~~ **reasonable variation due to loss of moisture** must be added to the MAV before evaluating sample errors to identify unreasonable minus errors.

(Amended ~~2010~~**XXXX**)

~~This handbook provides "moisture allowances" for some meat and poultry products, flour, pasta, *Cannabis* (this only includes plant material but does not include products containing *Cannabis*) and dry pet food. (see Chapter 2, Table 2-3. "Moisture Allowances") These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or more information must be collected before deciding lot compliance or noncompliance.~~

~~(Amended 2024)~~

~~Test procedures for flour, some meat, and poultry are based on the concept of a "moisture allowance" also known as a "gray area" or "no decision" area (see Section 2.3.8. "Moisture Allowances"). When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the "gray area," the lot is said to be in the "gray" or "no decision" area. The gray area is not a tolerance. More information must be collected before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the "moisture allowance" or "gray area."~~

~~(Amended 2002)~~

Chapter 2. Test Procedures for Packages Labeled by Weight – Gravimetric Testing

2.3. Basic Test Procedure for Gravimetric Testing of Net Weight

2.3.5. Procedures for Determining Tare

c. Wet Tare

Wet Tare is used tare material where no effort is made to dry the tare material. Free-flowing liquids are considered part of the tare weight.

Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The USDA Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST Handbook 133 by reference in 2008 but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).

If the jurisdiction uses wet tare to determine net weight, follow the procedures described below that reference Used Dry Tare, except make no effort to dry the tare material. If Wet Tare is used to verify the net weight of the packages, the inspector must ~~allow for moisture loss~~ **consider, and apply processes for determining, potential application of adjustments for reasonable variations due to loss or gain of moisture**.
(Amended ~~2010~~**XXXX**)

2.3.7. Evaluate for Compliance

This inspection lot will pass or fail based on the sample test results. The following steps lead the inspector through the process to determine if a sample passes or fails. If the product is subject **to** ~~a~~**adjustments for reasonable variations due to loss or gain of** moisture ~~allowance~~, follow the procedures under Section 2.3.8. "~~Moisture Allowances~~**Adjustments for Reasonable Variations Due To Loss of Moisture**" to correct the MAV.

2.3.7.2. Average Requirement

1. Determine the average error by dividing the total error recorded in Box 15 by the sample size recorded in Box 6. Record the average error in Box 18 if using dimensionless units or in Box 19 if using units of weight.

2. Compute the average error in terms of weight (if working in dimensionless units up to this time) by multiplying the average error in dimensionless units by the unit of measure and record the value in Box 19. If the average error is positive, the sample passes the average requirement. If the average error is negative, the sample fails under a "Category B" test. Record in Box 20.

Note: If the total error recorded in Box 15 is a plus value, and Box 17 is "No," (the number of unreasonable errors is equal to or less than the number allowed, recorded in Box 8), the lot passes.

(Refer to Section 1.4.1. Net Quantity of Contents Requirements for Pesticides Labeled with Minimum Net Quantity of Contents Declarations.")

3. If the average error is a negative value when testing under the Sampling Plans for "Category A," compute the Sample Error Limit (SEL) as follows:

   Compute the Sample Standard Deviation and record it in Box 21.

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X})^2}$$

Obtain the Sample Correction Factor from Column 3 of Appendix A. Table 2-1. "Sampling Plans for Category A" test. Record this value in Box 22.

Compute the Sample Error Limit using the formula:

Sample Error Limit (Box 23) =
Sample Standard Deviation (Box 21) × Sample Correction Factor (Box 22)

4. Compliance Evaluation of the Average Error:

If the value of the Average Error (Box 18) is smaller than the Sample Error Limit (Box 23), the sample passes.

If the value of the Average Error (disregarding the sign) (Box 18) is larger than the Sample Error Limit (Box 23), the sample fails. However, if the product is subject to **potential loss of** moisture ~~loss~~, the sample does not necessarily fail. Follow the procedures under "~~Moisture Allowances~~**Adjustments for Reasonable Variations Due To Loss of Moisture**" in this chapter.

~~(Amended 2018)~~

(Amended ~~2022~~XXXX)

2.3.8. ~~Moisture Allowances~~Adjustments for Reasonable Variations Due To Loss of Moisture

When no predetermined ~~allowance~~**gray area** is found in NIST Handbook 133, the potential for **reasonable variation due to loss of** moisture ~~loss~~ must be considered. Inspectors should follow their jurisdiction's guidance for making their determination on ~~an acceptable moisture allowance~~**an adjustment for reasonable variation to be permitted. Such jurisdictional guidance should include considerations set forth in Section 2.3.8.3. Reasonable Variation Due To Loss of Moisture or "Gray Area"**

(~~Added 2010~~**Amended XXXX**)

If the product tested is subject to ~~moisture loss~~**variations due to loss of moisture**, provide for the ~~moisture allowance~~**reasonable variation** by following one of the two procedures listed below.

2.3.8.1. Applying ~~Moisture Loss~~ Reasonable Variation Due to Loss of Moisture before Determining Package Errors

1. Determine the percent value of the ~~moisture allowance~~**reasonable variation** if the product is listed below. (see Table 2-3. "~~Moisture Allowances~~**'Gray Area' or Predetermined Reasonable Variation Due To Loss of Moisture**.")

Table 2-3.
~~Moisture Allowances~~"Gray Area" or Predetermined Reasonable Variation Due To Loss of Moisture

Percentage values represent the maximum variation to be considered for application.
Listed values are not tolerances, but limits to what is deemed "reasonable."
Reasonable variation to be applied may be less than value listed based upon findings under Section 2.3.8.3.

Verifying the labeled net weight of packages of:	~~Moisture Allowance~~ Maximum Predetermined Reasonable	Notes

Table 2-3. ~~Moisture Allowances~~"Gray Area" or Predetermined Reasonable Variation Due To Loss of Moisture		
Percentage values represent the maximum variation to be considered for application. Listed values are not tolerances, but limits to what is deemed "reasonable." Reasonable variation to be applied may be less than value listed based upon findings under Section 2.3.8.3.		
	Variation or Gray Area is:	
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Pasta products	3 %	Pasta products means all macaroni, noodle, and like products packaged in kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.
Borax	see Section 2.4. Borax	
Cannabis	3 %	*Cannabis* means plant material only, and not products containing *Cannabis*, whether containing more than 0.3 % Total Delta-9 THC (also known as cannabis, Marijuana, or Marihuana) or containing 0.3 % or less Total Delta-9 THC (also known as Hemp).
Wet Tare Only[1]		
Fresh poultry	3 %	Fresh poultry is defined as poultry above a temperature of − 3 °C (26 °F) that yields or gives when pushed with the thumb.
Franks or hot dogs	2.5 %	
Bacon, fresh sausage, and luncheon meats	0 %	For packages of bacon, fresh sausage, and luncheon meats, there is no ~~moisture allowance~~**adjustment for loss of moisture** if there is no free-flowing liquid or absorbent material in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Used Dried Tare are equivalent.

1

[1] Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th edition of NIST Handbook 133 by reference in 2008 but not the "Wet Tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).

Notes:

(1) There is no ~~moisture allowance~~**adjustment for loss of moisture** when inspecting meat and poultry from a USDA inspected plant when Used Dry Tare and "Category A" sampling plans are used.

(2) For the Wet Tare Only section of Table 2-3. "~~Moisture Allowances~~**'Gray Area' or Predetermined Reasonable Variation Due To Loss of Moisture**," free-flowing liquid and liquid absorbed by packaging materials in contact with the product are part of the wet tare. (Note Added 2010)

(Amended 2010, 2013, ~~and~~ 2024**, and XXXX**)

2. To compute ~~moisture allowance~~**a reasonable variation due to loss of moisture**, multiply the labeled quantity by the decimal percent value of the ~~allowance~~**reasonable variation to be applied.** Record this value in Box 13a.

Example:
Labeled net quantity of flour is 907 g (2 lb)
*~~Moisture Allowance~~**Reasonable Variation or "Gray Area"** is 3 % (0.03)*
*~~Moisture Allowance~~**Reasonable Variation or "Gray Area"** = 907 g (2 lb) × 0.03 = 27 g (0.06 lb)*

3. If the ~~Moisture Allowance~~ **Gray Area/Predetermined Reasonable Variation** is known in advance (e.g., flour, pasta products, ***Cannabis,*** ~~and~~ dry pet food**, fresh poultry, and franks or hot dogs**), it can be applied by adjusting the Nominal Gross Weight used to determine the sample package errors. The ~~Moisture Allowance~~**Gray Area/Reasonable Variation** in Box 13a is subtracted from the Nominal Gross Weight to obtain an Adjusted Nominal Gross Weight which is entered in Box 14. The Nominal Gross Weight is defined in Section 2.3.6.1. as the sum of the Labeled Weight and the Average Tare Weight from Box 13.

Example:
Use a Labeled Weight of 907 g (2 lb) and an Average Tare Weight of 14 g (0.03 lb)

The calculation is:

*Labeled Net Quantity 907 g (2 lb) + Average Tare Weight 14 g (0.03 lb) = 921 g (2.03 lb) – ~~Moisture Allowance~~ **Reasonable Variation ("Gray Area")** 27 g (0.06 lb) = Adjusted Nominal Gross Weight of 894 g (1.97 lb)*

This result is entered in Box 14.

4. Determine package errors by subtracting the Adjusted Nominal Gross Weight from the Gross Weights of the Sample Packages.

Example:
The calculation is:

Gross Weight of the Sample Packages – Adjusted Nominal Gross Weight = Package Error

Note: When the Nominal Gross Weight is adjusted by subtracting the ~~Moisture Allowance~~**Gray Area/Reasonable Variation** value(s)**,** the Maximum Allowable Variation(s) is not changed. This is because the errors that will be found in the sample packages have been adjusted by subtracting the ~~Moisture Allowance~~**Gray Area/Reasonable Variation** (e.g., 3 %) from the Nominal Gross Weight. That increases the individual package errors by the amount of the ~~moisture allowance~~**Gray Area/Reasonable Variation** (e.g., 3 %). If the value(s) of the MAV(s) were also adjusted**,** it would result in doubling the ~~allowance~~**adjustment for the Gray Area/Reasonable Variation**. MAV is always based **solely** on the labeled net quantity.
(~~Added 2010~~**Amended XXXX**)

2.3.8.2 Applying ~~Moisture Allowance~~Reasonable Variation Due To Loss of Moisture after Determining Package Errors

Adjustments can be made when the value of the ~~Moisture Allowance~~**Reasonable Variation** is determined following the test (e.g., after the sample fails or if a packer provides **justification for a** reasonable **variation due to** moisture ~~allowance~~**loss** based on data obtained using a scientific method) using the following approach:

If the sample fails the Average Requirement but has no unreasonable package errors **(based upon minus errors exceeding the applicable MAV),** only Step 1 is used. If the sample passes the Average Requirement but fails because the sample included one or more Unreasonable Minus Errors, only Step 2 is used.

If the sample fails the Average and MAV Requirements, both of the following steps are applied.

Use the following approach to apply ~~a Moisture Allowance~~**an adjustment for Reasonable Variation Due to Loss of Moisture** to the Average Requirement after the test is completed:

- the ~~Moisture Allowance~~**Reasonable Variation** is computed;
  Example:
  3 % × 907 g (2 lb) = 27 g (0.06 lb)

- added to the Sample Error Limit;
  Example:
  If the Sample Error Limit is 0.023, add 0.06 to obtain an Adjusted Sample Error Limit of 0.083)

- the Adjusted Sample Error Limit is then compared to the Average Error of the Sample; and

- if the average error (disregarding sign) in Box 18 is smaller than the Adjusted Sample Error Limit, the sample passes.
  HOWEVER,

- if the average error (disregarding sign) in Box 18 is larger than the Adjusted Sample Error Limit, the sample fails.

To apply ~~Moisture Allowance~~**Reasonable Variation Due to Loss of Moisture** to the MAV(s) after the test, the following method is recommended:

- compute ~~Moisture Allowance~~**Reasonable Variation Due to Loss of Moisture**;
  Example:
  3 % × 907 g (2 lb) = 27 g (0.06 lb)

- add to MAV for labeled net quantity of the package to get Adjusted Maximum Allowable Variations **(MAV);**
  Example:

MAV for 907 g (2 lb) is 31.7 g (0.07 lb) + 27 g (0.06 lb) =
Adjusted Maximum Allowable Variation(s) of 58.7 g (0.13 lb)

- compare each minus package error to the Adjusted MAV;
- mark package errors that exceed the Adjusted MAV and record the number of unreasonable minus errors found in the sample; and
- if this number exceeds the number of unreasonable errors allowed, the sample fails.

(~~Added 2010~~**Amended XXXX**)

2.3.8.3. ~~Moisture Allowance~~Reasonable Variation Due To Loss of Moisture or "Gray Area"
When the average error of a lot of fresh poultry, franks/hot dogs, ~~or~~ pasta products**, *Cannabis*, flour, or dry dog food** is minus but does not exceed the established "~~moisture allowance~~**Predetermined Reasonable Variation Due To Loss Of Moisture"** or "gray area," contact the packer or plant management personnel to determine what information is available on the lot in question. **Similarly, when no "Predetermined Reasonable Variation" or "gray area" has been adopted (i.e., not listed in Table 2-3) regarding a commodity under inspection, additional research, inquiry, investigation, and information gathering should be undertaken to determine if the shortage may be due to moisture loss before a compliance decision is rendered.** Questions to the plant management representative may include:

- Is a quality control program in place?
- What information is available concerning the lot in question?
- If net weight checks were completed, what were the results of those checks?
- What adjustments, if any, were made to the target weight?

Note: If the plant management has data on the lot, such data may help to substantiate that the "lot" had met the net content requirements at the point of manufacture.

Additional steps to take in determining whether or not to apply an Adjustment for Reasonable Variations Due To Loss of Moisture:

It is critical to note that Adjustments for Reasonable Variations, consideration of which are based upon "good manufacturing practices" and "good distribution practices," and related determinations of compliance with net content requirements are dependent upon demonstrable adherence by product packers and distributors to those "good" practices. Consideration must be given to, and information should be sought regarding, the following:

- **What is the nature of the product? Is it subject to loss of moisture during distribution?**
- **Have data records been requested from the manufacturer regarding production-run quantity and quality control checks for the lot under inspection? Have they been reviewed for anomalies in filling/packaging processes?**
- **What is the packaging material? Is it porous (subject to product evaporation) or hermetically sealed?**
- **Is the commodity one which should be constantly refrigerated? Was that followed?**
- **How long has the product been in distribution?**
- **Is there evidence that the product was maintained in an inappropriately warm environment for a length of time that would encourage loss of moisture? (i.e., not good distribution practice)**
- **Do industry "best practices" exist for the commodity regarding storage and distribution methods and practices?**
- **Are studies available on equivalent or similar commodities exist regarding quantity variations due to gains or losses of moisture over time?**

The above is not an exhaustive list of considerations that may be applicable. Commodity types and characteristics vary widely, influencing their respective vulnerability to environmental conditions and other factors that may affect loss of moisture resulting in variations from stated net content. In making compliance decisions, the official should be prepared with such collected information and demonstration of appropriate investigation and due process considerations to justify either passage or failure of the packaged commodity test.

The manufacturer must provide data and sufficient information to support and substantiate any claim that any identified shortage in content from the labeled quantity is due to loss of moisture under good manufacturing and distribution practices. If the manufacturer fails to provide such data and information, the official conducting the inspection has reasonable suspicion that the shortage is not due to "unavoidable deviations in good manufacturing practices" or to "reasonable variations during the course of good distribution practices" and may take appropriate enforcement action.

~~This handbook provides "moisture allowances" for some meat and poultry products, flour, pasta products, and dry pet food. These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or further investigation can be conducted.~~

~~Reasonable variations from net quantity of contents caused by the loss or gain of moisture from the package are permitted when caused by ordinary and customary exposure to conditions that occur under good distribution practices.~~ If evidence is obtained and documented to prove that the lot was shipped from the packaging plant in a short-weight condition or was distributed under inappropriate or damaging distribution practices **(i.e., not restricted to "ordinary and customary exposure to conditions that normally occur under good distribution practices," as stated in Section 1.2.6.),** appropriate enforcement action should be taken.

(Amended 2010 and 2013 **and XXXX**)

NEWMA 2026 Interim Meeting:

No comments were heard from the floor.

The committee had no recommendation for this item.

SWMA 2026 Annual Meeting:

Tory Brewer representing the state of West Virigina and acting chair on the Moisture Allowance Task group commented that he is not advocating for the item but informing the body that there is a new version item and it will be presented to the body in January.

SWMA Laws and Regulations committee recommends this item to be given assigned status.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

Michael Peeler, New Jersey | Chair
Mike Harrington, Iowa | Vice-Chair
Austin Shepherd, San Diego County | Member
Jose Arriaga, Orange County, California | Member
Christina Osborn, Texas | Member
Brent Price, Gilbarco | AMC Representative
Rowan Hemsing, Measurement Canada | Canadian Technical Advisor
John McGuire, NIST OWM | NIST Technical Advisor
Loren Minnich, NIST OWM | NIST Technical Advisor
Constantine Cotsoradis, NCWM | Committee Coordinator

Laws and Regulations Committee

Appendix A
Quantity-Related Expressions on a Principal Display Panel

DRAFT 03/31/2026

Quantity-Related Expressions on a Principal Display Panel

Danyelle Dolan info@ncwm.com

Contains Nonbinding Recommendations

Guidance and Recommendations to Manufacturers and Regulators on Best Practices for U.S. Packages

Quantity-Related Expressions Appearing on the Principal Display Panel separate from the Required Statement of Quantity

This document is intended to provide guidance and recommendations regarding best practices for quantity-oriented expressions which appear on a product Principal Display Panel (PDP) in addition to the required Declaration of Net Quantity (DoNQ). The National Council on Weights and Measures (NCWM) has drafted this document to help manufacturers, regulators and retailers assure this added information is truthful, non-misleading and is presented in a manner that complements the required Declaration of Net Quantity.

Introduction

Organization of Document
Discussion of Supplemental Statements

Background

Expression Categories

1. Additional Expression of Quantity
2. Reconstituted Expression of Quantity
3. Derived Unit Expression
4. Comparative Quantity Representation
5. Comparative Performance Representation

Principles & Recommendations by Expression Category

Table 1: Summary of Principles

Table 2: Expression Principles and Guidance

1. Should be useful for consumers
2. Must be accurate and verifiable
3. Must be clear and unambiguous
4. Must not conflict with mandatory Declaration of Net Quantity (DoNQ)
5. Location and prominence must be balanced against Declaration of Net Quantity
6. Should provide consumer relevant information
7. Should not conflict with units of Legal Metrology
8. Must provide directions for how to reconstitute
9. Must provide definition of derived unit
10. Derived unit must be consistent across similar products
11. Comparative expression must appear in its entirety in upper 70% of Principal Display Panel (PDP)
12. If no reference to recognized units of Legal Metrology, must be balanced and complete

Enforcement

Appendix 1: Supplemental Statements

Appendix 2: Illustrations and Discussion of Voluntarily Added Expressions

Resources

Introduction

A number of product package Principal Display Panel (PDP) labels provide additional information regarding product quantity or product performance beyond the information provided in the required Declaration of Net Quantity (DoNQ). In some instances, providing additional information that is not present in the DoNQ can help consumers make more informed product selections. In other instances, providing additional information can help consumers more easily identify the product size they seek. In still other instances, providing additional information can help educate consumers about a new product form or concentration. In short, there are a number of appropriate reasons why a product manufacturer may feel compelled to provide additional information for consumers and also why consumers would want and use this information to make better and more informed product purchase decisions.

While federal and state laws and regulations provide substantial detail regarding the accuracy, location, and appearance of the information appearing in the required Declaration of Net Quantity, provisions for the accuracy, location, and appearance of other quantity-related expressions which manufacturers may add to the PDP relate to general requirements pertaining to product claim content truthful and non-misleading statements. Yet there is little information available to guide manufacturers in the presentation of added quantity-related expressions and information. While the majority of product PDPs that provide consumers additional information do this effectively in a manner that aids consumers, package PDP labels that have caused concerns amongst regulators and consumers have been identified periodically. In several previous instances, certain product PDP labels have been submitted to the NCWM for possible development of regulations targeting a specific practice viewed to be of concern. To date, the consensus of the NCWM has been that the development of this best practice document for manufacturers is a better and more holistic solution as opposed to narrowly targeted regulation. It is believed that best practice information will be valuable to manufacturers at the time they are contemplating package label design, it will assist regulators by providing a source they can direct questions and concerns, and the result will be providing consumers with the best information possible at the time they make value comparisons and product selections.

The recommendations contained herein are intended to provide guidance to manufacturers contemplating the inclusion of additional expressions on their packages to ensure the expressions are clear, accurate, balanced, and non-misleading. These recommendations are also intended to help regulators responsible for package labeling requirements create more consistency in the marketplace.

Organization of Document

This Best Practice document is organized into the following sections to help the user focus on a specific topic, although it is recommended that the document be viewed in its entirety first.

- Discussion of Supplemental Statements
- Background on Additional Expressions
- Categories of Expressions
- Principles and Recommendations by Expression Categories
- Enforcement Discussion
- Supplemental Statement Requirements and Interpretations (Appendix 1)
- Illustrations and Discussion of Voluntarily Added Expressions (Appendix 2)

The recommended procedure for using this document is to first identify the category (or categories) an expression fits within and then to review the detailed principles and recommendations that apply to that category (or categories).

Discussion of Supplemental Statements

A common question is whether statements of the type described in this Best Practice Document would be considered "supplemental statements" and, therefore, not lawfully allowed on the Principal Display Panel (PDP). This question stems from a Fair Packaging and Labeling Act (FPLA) provision that allows supplemental statements that describe the net quantity in nondeceptive terms, provided they appear "at other places on the package" than the net quantity of contents statement and existing regulations that state supplemental statements should not appear on the PDP.

A close review of regulatory precedent reveals surprisingly few statements that have been considered "supplemental" by regulators over the past fifty years. Only one example of formal agency guidance identifying a specific statement as supplemental was located – an FDA determination that a weight declaration is supplemental on a product for which the net contents must be declared in fluid ounces. (FDA Fair Packaging and Labeling Manual Guide 7563.15 – historical – no longer published.) In contrast, numerous statements have been expressly determined to be not supplemental, including directions for use, reconstitution statements (e.g., Makes 1 quart), voluntary declarations of drained weight combined with total package weight including packing liquids, voluntary declarations of count, and metric labeling (prior to metric labeling being mandatory). Numerous other statements have existed in the marketplace for years without challenge. Finally, in an era where consumers increasingly demand more information about the products they purchase and use, regulatory agencies are recognizing that providing accurate information in clear and non-misleading ways would appear to be beneficial to consumers. Additional detail regarding the history of supplemental statements is in Appendix 1.

In light of the regulatory history, the statements in this Best Practice Document are not considered to be prohibited from appearing on the PDP. Every manufacturer, however, must make independent judgments and be prepared to explain why individual statements are permissible. Similarly, regulators may question specific package PDP statements that they believe are misleading or cause consumer confusion.

Background

Manufacturers are responsible for supporting all statements that appear on their labels, including voluntary expressions related to package quantity. Federal and state laws and regulations require voluntary quantity-related claims to be truthful and substantiated and, correspondingly, prohibit false or misleading information. For example, weights and measures laws commonly prohibit selling less than the represented quantity or representing the quantity in a manner that tends to mislead or deceive another person.[2] Consumer protection laws prohibit unfair and deceptive trade practices, such as the failure to possess a reasonable basis (substantiation) for objective claims.[3]

Federal agencies, including the Federal Trade Commission (FTC), the Food and Drug Administration (FDA), State regulatory agencies, and the National Advertising Division of the Council of Better Business Bureaus, may implement laws, regulations, and standards relating to quantity-related information.[4] This document is intended as a resource for both industry and regulators in evaluating voluntary quantity-related statements. For example, industry may find the guidance useful in developing claims and product labeling, and regulators may refer companies to the guidance when questions arise about the usefulness, implementation, or legal status of claims under federal or state requirements.

The purpose of this document is not to redefine or re-interpret existing provisions for the required Declaration of Net Quantity required by the U.S. Fair Packaging and Labeling Act (FPLA) and the regulations promulgated to implement FPLA. This document also does not establish or address methods of sale. Existing Declaration of Net Quantity requirements are the baseline for regulatory compliance, and every recommendation in this document presumes the package already has a compliant Declaration of Net Quantity.

This recommended practice represents the current thinking of the National Council on Weights and Measures (NCWM). As guidance, this document does not establish legally enforceable rights or responsibilities. It does not legally bind either the public, federal or state regulators, and adherence to these guidelines do not ensure legal compliance. Additionally, companies may choose an approach other than the one set forth in this guidance document if it complies with the relevant statutes and regulations.

[2] *See, e.g.*, NIST Handbook 130– Uniform Weights and Measures Law § 15 (Misrepresentation of Quantity).
[3] *See, e.g.*, Federal Trade Commission Act § 5 (15 U.S.C. § 45).
[4] The National Advertising Division of the Council of Better Business Bureaus offers an alternative dispute resolution service that reviews claims made in national advertisements.

Expression Categories

In developing this best practice document, the National Council on Weights and Measures evaluated products in the marketplace to better understand the different kinds of expressions currently appearing on the Principal Display Panel (PDP) in addition to the Declaration of Net Quantity (DoNQ) required by the U.S. Fair Packaging and Labeling Act (FPLA). Some of the expressions employ units of legal metrology (such as pound, ounce, fluid ounce, quart, liter, gram, kilogram, or count) while others appear in non-metrological units which relate to how a consumer might use the product (such as dose, use, load, application, pump, or scoop). Some provide information regarding how much product is produced once the contents have been reconstituted. Some statements are exact, others are inexact. Finally, some statements compare product usage or quantity to other products.

After evaluation of the various expressions currently appearing on the PDP in addition to the Declaration of Net Quantity, the NCWM has created the following five general categories for these statements.

1. Additional Expression of Quantity
2. Reconstituted Expression of Quantity
3. Derived Unit Expression
4. Comparative Quantity Representation
5. Comparative Performance Representation

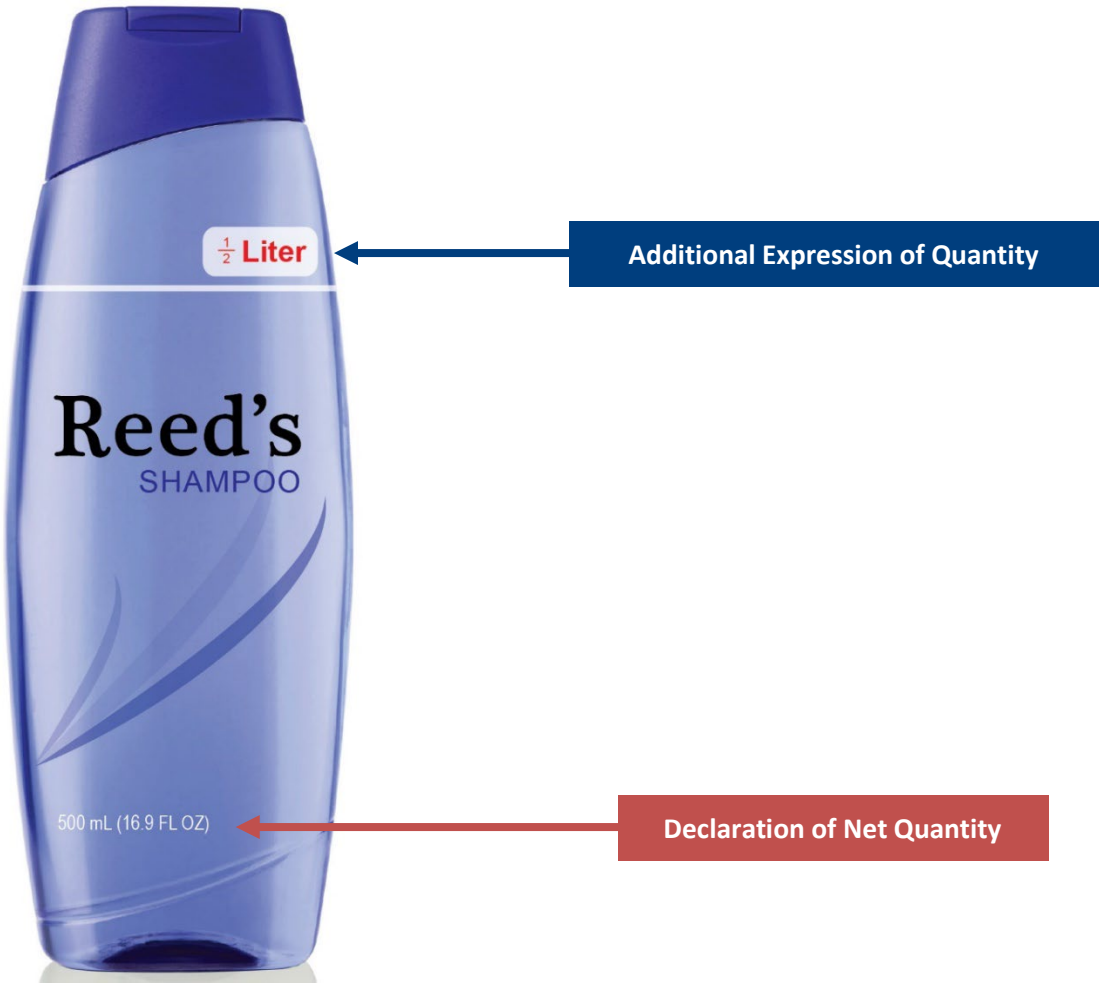
This document provides recommended practices for each of these categories with the overall purpose of promoting the communication of useful information to consumers at the point of purchase.

1. <u>Additional Expression of Quantity (AEQ)</u> – an exact expression of a quantity appearing on the Principal Display Panel (PDP) in terms of legal metrology weight or measure, count or a defined unit of measure which is neither part of nor intended to be part of the required Declaration of Net Quantity (DoNQ). This expression may be identical to a declaration which is part of the DoNQ, may be a declaration equivalent to a declaration contained in the DoNQ, or be another accurate declaration expressing quantity in units or count not present in the DoNQ.

In the package below, the Additional Expression of Quantity (AEQ) would be the "6 Doughnuts" expression which is present on the PDP in addition to the required Declaration of Net Quantity.



Similarly, the AEQ in the package below would be the "1/2 Liter" expression present in addition to the requiredDoNQ.



Additional examples of an Additional Expression of Quantity would be:

- Statement "1 Quart" separately appearing on the PDP from the Declaration of Net Quantity reading "1 Quart (0.946 Liters)"
- Statement "32 Fluid Ounces" separately appearing on the PDP from the Declaration of Net Quantity reading "1 Quart (0.946 Liters)"
- Statement "1.5 Liters" separately appearing on the PDP from the Declaration of Net Quantity reading "1.5 Liters (1.58 Quarts)".
- Statement "3 Pounds" separately appearing on the PDP from the Declaration of Net Quantity reading "3 Pounds (1.36 Kilograms)"
- Statement of "24 Count" separately appearing on the PDP from the Declaration of Net Quantity reading "3 Pounds (1.36 Kilograms)"

- Statement "1/2 Kilogram" separately appearing on the PDP from the Declaration of Net Quantity reading "500 Grams (1.1 Pounds)"

- Statement "2 Dozen Cookies" separately appearing on the PDP from the Declaration of Net Quantity reading "2 Pounds (907 Grams)

- A Declaration of Identity "8 Ounce Steaks" appearing in addition to a PDP Declaration of Net Quantity

2. <u>Reconstituted Expression of Quantity (REQ)</u> – an exact expression appearing on the Principal Display Panel (PDP) in addition to the Declaration of Net Quantity (DoNQ), which details how much product the package contents provide when the product is prepared in accordance with label directions. This expression is most common for products requiring the addition of water but may be appropriate for other products. This expression is generally most useful to consumers when the prescribed directions for product preparation are very straightforward, such as the addition of just water. These statements are less useful when multiple steps or added ingredients are involved.

In the package diagram below, the Reconstituted Expression of Quantity (REQ) would be the "Makes 56 Quarts" expression which is present on the PDP in addition to the required Declaration of Net Quantity (DoNQ).



Additional examples of a Reconstituted Expression of Quantity (REQ) would be:

- Statement "Makes 12 Gallons" separately appearing on the PDP from the Declaration of Net Quantity reading "8 Ounces (226 Grams)"

- Statement "Makes 2 Liters" separately appearing on the PDP from the Declaration of Net Quantity reading "4 Ounces (113 Grams)"

- Statement "Makes 50 Liters" separately appearing on the PDP from the Declaration of Net Quantity reading "1.5 Liters (1.58 Quarts)"

- Statement "Makes 20 Quarts" separately appearing on the PDP from the Declaration of Net Quantity reading "1 Liter (1.05 Quart)"

3. Derived Unit Expression (DUE) – an exact expression appearing on the Principal Display Panel (PDP) in addition to the Declaration of Net Quantity (DoNQ) which expresses a quantity in terms of a unit that is not a recognized unit of weight or measure within Legal Metrology or prevailing systems of measurement (e.g., the U.S. Customary or metric systems). The derived unit may be based upon a recognized unit of measure and/or be based on a measurable factor related to consumer usage.

In the package diagram below, the Derived Unit Expression (DUE) would be the "28 Doses" expression which is present on the PDP in addition to the required Declaration of Net Quantity.



In the following package diagram, the Derived Unit Expression (DUE) would be the “20 Loads” expression which is present on the PDP in addition to the required Declaration of Net Quantity.



Additional examples of a Derived Unit Expression include the following:

- Statement "50 Uses" appearing on the PDP when Declaration of Net Quantity reads "8 Ounces (226 Grams)"
- Statement "75 Applications" appearing on the PDP when Declaration of Net Quantity reads "1.5 Liters (1.58 Quarts)"
- Statement "75 20-mL Applications" appearing on the PDP when Declaration of Net Quantity reads "1.5 Liters (1.58 Quarts)"
- Statement "30 Loads" appearing on the PDP when Declaration of Net Quantity reads "2 Pounds (907 Grams)"

4. <u>Comparative Quantity Representation (CQR)</u> – an expression appearing on the Principal Display Panel (PDP) in addition to the Declaration of Net Quantity (DoNQ) which compares the contents of that package to the contents of a comparable product package produced by the same or a different manufacturer. This comparative statement may be a statement of equivalence (e.g., "This Package Contains the same 24 FL OZ as our old Package"), a statement of differentiation (e.g., "This Box Contains 1 Pound more than Reed's LARGE SIZE Box") or another accurate and verifiable comparative statement.

In the package diagram below, the Comparative Quantity Representation (CQR) would be the "Makes 8 Quarts More than Other 2 LB Juice Mixes" expression which is present on the PDP in addition to the required Declaration of Net Quantity and the optionally added Reconstituted Expression of Quantity (REQ).



In the following package diagram, the Comparative Quantity Representation (CQR) would be, "This 8 Pound package contains the same Volume as our 15 Pound regular product" expression which is present on the PDP in addition to the required Declaration of Net Quantity.



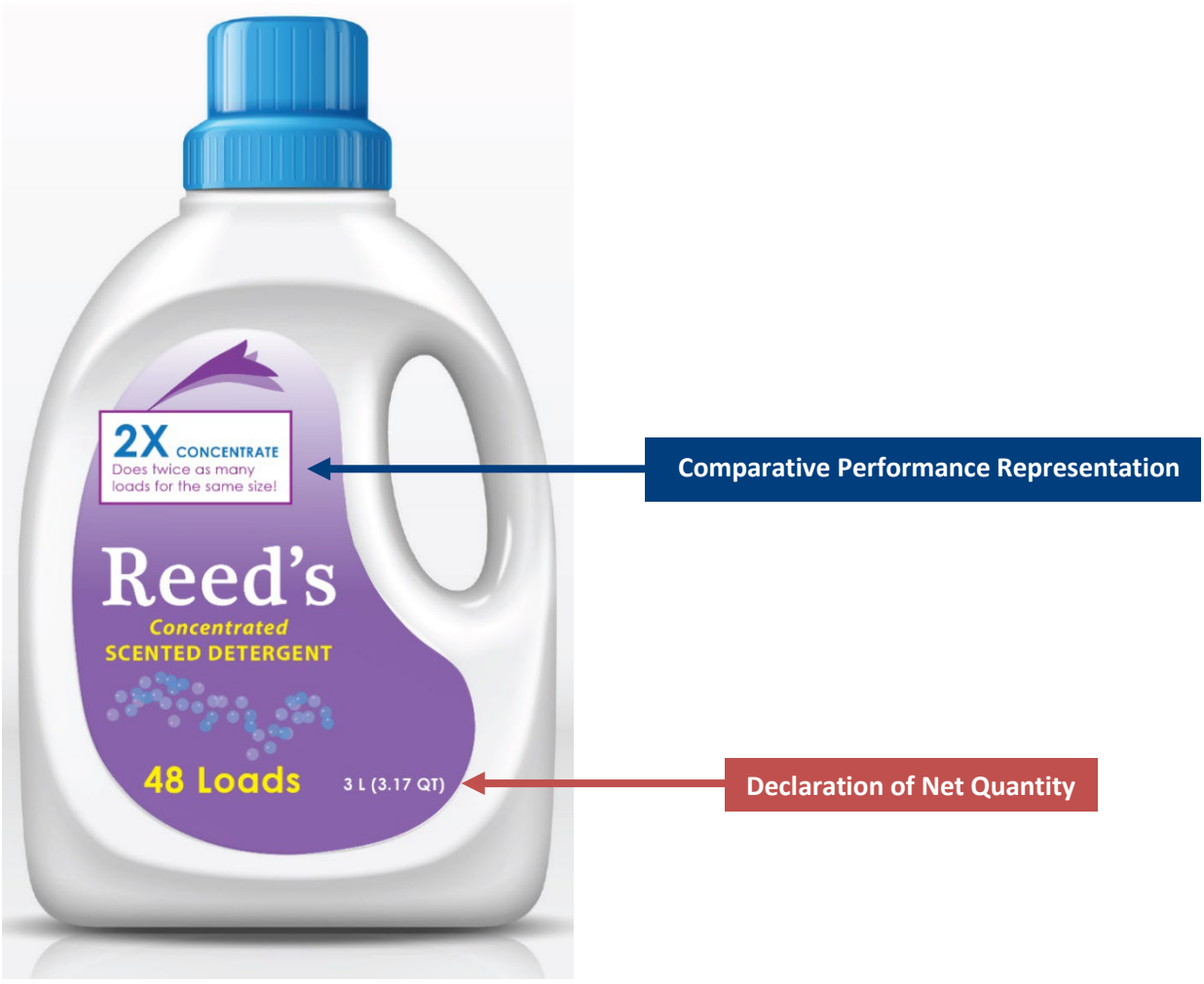
Additional examples of a Comparative Quantity Representation include the following:

- Statement "Contains 1 Pound more than Brand X Largest Size" appearing on the PDP when Declaration of Net Quantity reads "5 Pounds (2.26 Kilograms)"
- Statement "Contains 2 Ounces More than Brand Y 12 Ounce Box" appearing on the PDP when Declaration of Net Quantity reads "14 Ounces (396 Grams) "
- Statement "Contains the Same 1.5 Liters as Our Old Package" appearing on the PDP when Declaration of Net Quantity reads "1.5 Liters (1.58 Quarts)"
- Statement "Contains 5 More Widgets than Brand Z 20 count Super Widget Assortment" appearing on the PDP when Declaration of Net Quantity reads "2 Pounds (907 Grams)"

- Statement "8 Big Rolls = 12 Regular Rolls" appearing on PDP with correct Declaration of Net Quantity for Paper Towel Product.

5. <u>Comparative Performance Representation (CPR)</u> – an expression appearing on the Principal Display Panel (PDP) in addition to the Declaration of Net Quantity (DoNQ) that compares the <u>performance</u> of that package to the performance of a comparable product package produced by the same or a different manufacturer. Examples of Comparative Performance Representations would include expressions such as "Same number of Uses as our Regular 18 Ounce Size", "This Package Does 5 More Loads than Reed's 4 Pound Powder Package". "Lasts as long as Reed's 2 Pound Freshening Bar**".**

In the package diagram below, the Comparative Performance Representation (CPR) would be the "Does twice as many loads for the same size!" expression which is present on the PDP in addition to the required Declaration of Net Quantity and the optionally added Derived Unit Expression (DUE).



Examples of a Comparative Performance Representation include the following:

- Statement "Same Uses as our Regular 18 Ounce Size Product" appearing on the PDP when Declaration of Net Quantity reads "8 Ounces (226 Grams)"

- Statement "20 more Doses than our Regular Size" appearing on the PDP when Declaration of Net Quantity reads "4 Ounces (113 Grams)"

- Statement "Lasts 2 Months Longer than Brand M" appearing on the PDP when Declaration of Net Quantity reads "1.5 Liters (1.58 Quarts)"

- Statement "Double the Absorptive Ability as Regular 20 Pound Products" appearing on the PDP when Declaration of Net Quantity reads "12 Pounds (5.44 Kilograms)"

Principles & Recommendations by Expression Category

In developing category principles and recommendations, the NCWM recognized that some principles should apply broadly across all or most expression categories while others may apply narrowly to a single or limited number of expression categories. To develop principles and recommendations that do not contain category-by-category repetition, the NCWM is providing the information in a tabular fashion.

This document has been drafted according to the schematic below with the presumption that a user would:

1) Determine the applicable expression category from the definitions above,

2) Determine which principles should be evaluated based on Table 1, and

3) Review the additional guidance available in Table 2 as needed. Table 1 identifies the principles generally applicable to each expression category, and Table 2 provides further details and guidance on each principle.

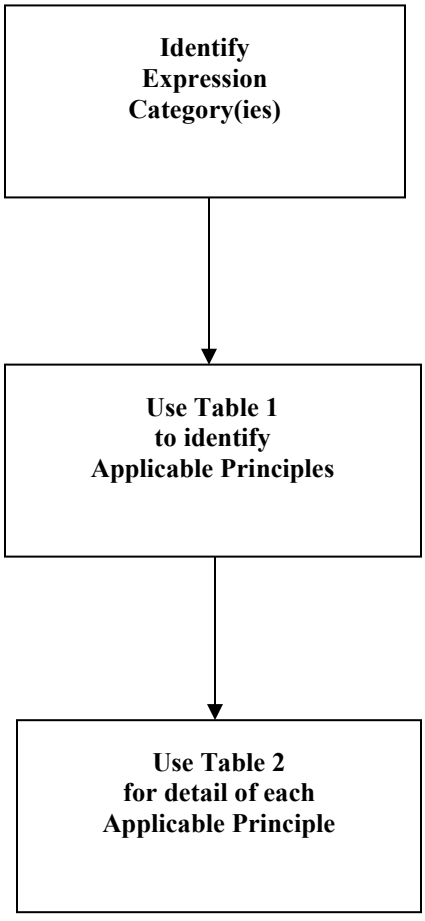


Table 1: Summary of Principles

Principles	**Additional Expression of Quantity** **AEQ** ***"24 Buns"***	**Reconstituted Expression of Quantity** **REQ** ***"Makes 2 gallons"***	**Derived Unit Expression** **DUE** ***"20 Loads"***	**Comparative Quantity Representation** **CQR** ***"40% More Litter Per Pound"***	**Comparative Performance Representation** **CPR** ***"Lasts 25% Longer"***
Expression should provide useful information to help consumers.	X	X	X	X	X
Expression must be accurate and verifiable.	X	X	X	X	X
Expression must be clear and unambiguous.	X	X	X	X	X
Expression must not conflict with mandatory Declaration of Net Quantity(DoNQ).	X	X	X	X	X
Expression location and prominence (size, font, and contrast) must be balanced against the Declaration of Net Quantity (DoNQ).	X	X	X	X	X
Expression should provide Consumer Relevant Information.	X	X	X	X	X
Expressions should not conflict with units of Legal Metrology.			X	X	X
Package Label must provide directions for how to reconstitute.		X			
Package Label must provide definition of derived unit.			X		X
Derived Unit definition must be consistent across similar products.			X		X
Comparative expression must be balanced, complete and appear in its entirety in the upper 70% of the Principal Display Panel (PDP).				X	

Principles	**Additional Expression of Quantity** **AEQ** ***"24 Buns"***	**Reconstituted Expression of Quantity** **REQ** ***"Makes 2 gallons"***	**Derived Unit Expression** **DUE** ***"20 Loads"***	**Comparative Quantity Representation** **CQR** ***"40% More Litter Per Pound"***	**Comparative Performance Representation** **CPR** ***"Lasts 25% Longer"***
Comparative expression which does not contain a reference to recognized units of Legal Metrology must be balanced and complete.					X

Table 2: Expression Principles and Guidance

Principle and Scope	Detailed Guidance
1. Expression should be useful for consumers. *How does the expression provide practical and helpful information to assist consumers?* (Applies to all categories)	Manufacturers should consider whether providing quantity-related information beyond what is in the mandatory Declaration of Net Quantity (DoNQ) will be useful for consumers, and if so, how. Does the expression increase the clarity of quantity information, educate consumers about product quantity or performance, meaningfully assist with value comparisons, or provide other benefits? Generally, an additional quantity expression should have a logical or research-based rationale for why the information is useful to consumers. For example, voluntary expressions may— 1. Help consumers quickly identify a product on the shelf when there are many similar products in various sizes. 2. Help consumers evaluate products used in different forms (liquid or solid) and different levels of concentration – for example, products that require water to be added as compared to those already containing water. 3. Provide a common frame of reference for consumers to make quantity comparisons across multiple possible product forms. 4. Help consumers understand that a new product has a different product concentration or density and how this new product compares to other products. 5. Educate or reassure consumers about a product in comparison to a previous version of the product or a competitive product. Not every product requires a voluntary expression.
2. Expression must be accurate and verifiable. *Is the statement true?* *Can statement accuracy be verified?* (Applies to all categories)	Voluntary expressions that contain quantity-related information must be accurate and verifiable using appropriate objective evaluative procedures and are subject to external evaluation and confirmation. **For expressions using defined units of measure or count**, accuracy should be based on test methodologies recognized by appropriate authorities such as a federal, state or international agency or standards organization. This includes content expressions embedded in a Declaration of Identity. **For expressions relating to product reconstitution**, accuracy should be based upon the directions for product preparation appearing on the product label and test methodologies recognized by appropriate authorities such as a federal, state, or international agency or standards organization. **For Derived Unit Expressions (DUEs) and Comparative Performance Representations (CPR's),** accuracy should be based upon the unit definitions (which

Principle and Scope	Detailed Guidance
	must be present on the product label) and verified using objective testing procedures. For example, since a Derived Unit Expresssion (DUE) does not use a unit of legal metrology, a manufacturer must define that unit on the package label, ensure an appropriate test method or validation process for quantifying the unit has been established, and ensure the expression appearing on the Principal Display Panel (PDP) is accurate and verifiable. Where possible, the accuracy of the declaration should be based on test methodologies recognized by appropriate authorities such as a federal, state or international agency of authority. Statement accuracy must be supportable by manufacturer data and is subject to external evaluation and confirmation.
3. Expression must be Clear and Unambiguous *Is the intended meaning easy to understand?* (Applies to all categories)	Voluntary expressions which contain quantity-related statements must be clear and unambiguous. Short expressions appearing in terms of recognized units with little to no modification such "2 Cups", "5 Yards of Twine", "1.5 Kilograms" or "3 Liters of Water" are typically straightforward and are generally presumed to be clear and unambiguous. The use of additional language accompanying quantity-related terms requires careful consideration and evaluation to ensure their clarity, accuracy, and relevance. Statements that do not provide information to the consumer about the contents of a specific package should not appear on the Principal Display Panel (PDP). 1. Expressions that contain quantity information and appear on the PDP separate from the DoNQ must be accurate, non-misleading, useful, relevant, and verifiable on the basis of the content of the individual package. Statements such as "Approximately 50 Cookies", "About 2 Cups", "300 Pencils on Average" or "Up to 50 Cookies" provide little assurance of the quantity contained in any given individual package. In these examples, a consumer purchasing one package may receive less than the amount stated in the expression, more than the amount stated in the expression or exactly the stated amount. While a statement of "approximately 25 candy bars" may be a technically correct statement based on manufacturing variability, this statement provides a consumer who purchases a single package with little assurance that the specific package they select contains 25 – it may be more, it may be less. As a result, statements using "about," "approximately," "up to" and similar terms are not recommended to appear on the PDP because they are generally considered unclear and ambiguous. 2. An expression such as "Contains Less than 49 Cookies" may be an accurate and verifiable statement but does not provide the consumer with relevant and useful information. 3. An expression such as "Good for 30 Applications" provides clear and verifiable information which can be verifiable whereas expressions such as "Provides Up to 30 Applications" or "30 Applications on Average" may overestimate or underestimate what a consumer should expect. Expressions regarding reconstituted quantities must, clearly indicated information about the amount of ready-to-use product a consumer should expect a package to deliver based on clear label instructions for product preparation. These statements would have to be clearly distinct from the required net quantity information provided in the DoNQ. In many instances, manufacturers use icons to provide reconstituted

Principle and Scope	Detailed Guidance
	information since icons efficiently provide both reconstituted product information and distinctness and separation from the DoNQ. Expressions containing a derived unit require that the manufacturer define the derived unit on the package label so that is it available for consumer inspection prior to product purchase. Expressions that include one or more derived units have to be clearly distinct from the information provided by the required Declaration of Net Quantity (DoNQ). In many instances, manufacturers use icons to provide derived unit information since icons are an effective means to provide additional consumer information which is clearly distinct from the DoNQ. Comparative statements, including Comparative Quantity Representations (CQRs) and Comparative Performance Representations (CPR's), need to be complete and balanced expressions which help the consumer understand how the package with the statement compares to other packages. While product comparison information provided by CQRs and CPR's can often be difficult to communicate in a limited amount of space or limited number of words, it is imperative that a manufacturer ensure a comparative statement appearing on the PDP is a complete, stand-alone statement. While an asterisk may be used to provide additional information substantiating the comparative statement, a manufacturer should not rely on the asterisked information to explain what a comparative statement really means. When an asterisk is used, the added information needs to be provided on the outer package label in a location and font type consistent with other regulatory required information required on other non-PDP panels of the package. Comparative statements must be complete, meaning they can stand on their own in communicating enough information for a consumer to correctly understand the intended message without having to inspect the rest of the package.
4. Expressions must not Conflict with the Information in the Mandatory Declaration of Net Quantity (DoNQ). *Is the statement consistent with the mandatory DoNQ?* (Applies to all categories)	Voluntary expressions which contain quantity-related information should provide information which is equivalent to or consistent with the information present in the required DoNQ. Expressions may: 1. Simply repeat a portion of the of the DoNQ, such as "2 Pounds" 2. Provide an equivalent information such as "4 Quarts" when DoNQ states "1 gallon". 3. Provide accurate and consistent information such as "Over 1 Quart" when DoNQ is "1 Liter". 4. Provide information in terms of other legal metrological units not represented in the DoNQ such as a volume declaration when product is labeled "2 pounds". 5. Provide information in terms of count that is not provided in the DoNQ 6. Provide information on the reconstituted quantity consistent with the declared net quantity and preparation instructions. 7. Provide information in terms of a derived unit consistent with the definition of the derived unit provided on the package. 8. Provide comparative information that accurately accounts for the quantity information in the DoNQ Information provided in voluntary expressions on the package Principal Display Panel (PDP) should supplement the information required to be provided in the DoNQ. Voluntary expressions should be evaluated by the manufacturer to ensure the message and information is consistent with what is provided in the DoNQ. For example, if a package label defines the term "dose" to be 2 fluid ounces, a package containing 1 quart

Principle and Scope	Detailed Guidance
	with an expression in doses should state the package contains 16 doses. An expression of "17 Doses" or "20 Doses" would not be consistent. Similarly, a package labeled "1 Liter" should not contain an expression such as "contains at least 1 Liter" since that is fundamentally a different statement.
5. Expression location and prominence (size, font, and contrast) must be considered in relation to the Declaration of Net Quantity (DoNQ) to ensure appropriate balance. *Does the expression location, size, font contrast, and other attributes effectively provide information in addition to the DoNQ?* (Applies to all categories.)	Manufacturers should consider the cumulative effects of quantity statement location, size, font, color, and contrast on the package in relation to those of other Principal Display Panel (PDP) elements and statements. The location, size, and contrast of a voluntary quantity-related expression should help the consumer make informed value comparisons at the point of purchase and not minimize the visibility or purpose of other information required to appear on the PDP. Importantly, an expression should complement or reinforce the information provided by the DoNQ and should not compete with or replace the visibility of the required DoNQ . When an expression is added to the PDP, the manufacturer should consider the location, size, font, contrast, and other attributes of the expression in relation to the location, size, font and contrast of the DoNQ to ensure they are reasonably balanced. The goal for reasonable balance is to ensure the expression and DoNQ information are effectively communicated to the consumer at the point of purchase. Reasonable balance does not mandate that voluntary expressions must match the size, font, contrast, or other attributes of the DoNQ. Reasonable balance does allow manufacturers to adjust the size (generally equal or larger), adjust the font (generally bolder), modify the contrast (brighter colors, use of icons, banners, and backgrounds) and determine a location (top 70% of the PDP, lower 30% of PDP, distance from the DoNQ), to maximize the visibility of the added expression and the DoNQ. Combining a voluntary quantity expression and the required DoNQ into a common box or other graphical/visual representation that appears to link both is not recommended. The DoNQ is mandated in law and regulation to have separation from other expressions on the PDP and added expressions need to be clearly separate from the DoNQ but in terms of required separation and visual presentation. Since a DoNQ is mandated and required to appear in a limited portion of the PDP where consumers know where it can be found, manufacturers are generally going to design a voluntary expression to maximize the chances the expression is also seen at the point of purchase by the consumer. A voluntarily added expression will generally be of equal or larger size, a different font, and higher contrast than the information provided in the DoNQ since these characteristics are important to help ensure a consumer sees and understands these statements at the time a consumer is making product selections. Not every product has or needs to have a voluntary expression related to quantity added to the PDP, and as a result, for those packages that a manufacturer believes warrant this added information, the manufacturer is attempting to make this information visible to a consumer who may not be necessarily looking for this information. As a result, the manufacturer is going to give this added expression greater prominence than the DoNQ. In doing this, the manufacturer must ensure the visibility of the information provided in the DoNQ is not compromised by the use of fonts, colors, and contrasts which largely mask the visibility of this information at the expense of the added expressions.

Principle and Scope	Detailed Guidance
	In general, an expression that repeats information present in the required DoNQ is more likely to be useful to a consumer if it is substantially separated from the DoNQ. Similarly, an expression that provides quantity-related information that is not present in DoNQ, (for example, count for a package labeled by weight) may be more useful to a consumer if it is located closer to the DoNQ since the consumer will look for and benefit from having all the net quantity-related information in one general area of the product label. Mixing fonts and using icons as part of the added expression can be effective ways to help facilitate conveying additional information in a manner that is clearly separate from the DoNQ. In the end, the manufacturer electing to provide additional information is responsible for ensuring the combination of the expression content and detail, size, location, font, and contrast provide information in addition to the DoNQ for the typical consumer. When a comparative statement is planned, the manufacturer needs to determine where and how this information is best provided for the benefit of the consumer. Since comparisons can have multiple words, which may differ in font and contrast, a manufacturer must fully consider the location and font of each individual word/term of the expression as well as the overall statement in total in to assess how this might affect the information present in the required DoNQ . Examples that help illustrate recommended practices for voluntarily added quantity expressions are provided in Appendix 2.
6. Expression information must be relevant to the consumer purchasing or using the product. *Are the conditions of use well defined and do the statements reflect real-life usage expectations?* (Applies to all categories) Important for derived unit statements and comparative statements based on derived units	Voluntary expressions should provide information that a consumer purchasing the product is likely to want or need to know prior to purchase. Similarly, the voluntarily added information provided should reasonably relate to how a normal user would use the product. Statements about reconstitution can help educate consumers about product quantity, especially when similar products are present in different product forms such as ready-to-use liquids, liquid concentrates, and solids. For example, an expression containing information about the amount of product a consumer can expect when package contents are reconstituted should relate to the purpose of that product. Knowing the contents of a package reliably prepares 5 gallons or 10 gallons of drink can be useful when a consumer is planning to provide beverages for a large group or has a dispenser with a 5-gallon capacity. Similarly, an expression providing information in terms of a recognizable derived unit is more helpful and relevant to a consumer when the product is used in a regular and consistent manner by most users. For example, providing health or medicinal information based on “uses” or “doses” can be useful to consumers as they consider how long they might need to want to use the product. Similarly, providing laundry product information based on “loads” can be useful in helping consumers relate to varying degrees of product concentration, especially when a dosing cup is provided to reinforce the quantity expression. Generally, a derived unit expression should have a logical or research-based rationale for why this information is useful to consumers. On the other hand, statements such as “Makes 60 Waffles” or “Washes 18 Floors” may be less helpful or useful due to variability in factors associated with making waffles such as ingredients, equipment, and actual size, or with the size of rooms in a house, variation in product concentration, differences in expected performance. In these instances, the relevance of the declaration seems less uniform, and the specificity of the expression is less likely to apply broadly to a large subset of consumers.

Principle and Scope	Detailed Guidance
7. Expressions should not conflict with units of Legal Metrology *Is the expression consistent with units of Legal Metrology?* *Is the expression exaggerating or minimizing a unit of measure?* *Does the expression have the potential to create confusion?* (Applies to Derived Unit Expressions (DUE's), Comparative Quantity Representations (CQR's) and Comparative Performance Representations (CPR's)	Voluntary expressions that provide quantity-related information in terms of derived units should ensure the expressions do not conflict with or redefine a unit of legal metrology. Units of legal metrology such as ounce, pound, ton, pint, quart, cup, liter, foot, inch, yard, bushel, etc., have precise definitions, and incorporating these terms into the definition of a derived unit requires careful consideration to ensure the derived unit is clear and non-misleading. Voluntary expressions should avoid practices that could create confusion regarding existing units of measure. For example, federal Law prohibits any term qualifying a unit of weight, measure, or count that tends to exaggerate the amount of product in a container, such as "jumbo quart" or "full gallon". In addition to complying with this requirement, manufacturers should also avoid other practices that may create confusion regarding existing units of measure, such as using a "10-inch foot". Statements of this type provide no added value to consumers and can be viewed as misleading.
8. Expressions containing reconstituted product information must provide directions for reconstitution on the product label. If an expression states how much product the package can make, the directions for how to prepare the product must be provided on the label. (Applies to REQ's)	When a Reconstituted Expression of Quantity (REQ) is present on the Principal Display Panel (PDP), the manufacturer also must provide information on the package label clearly detailing how the product is recommended to be reconstituted for consumer inspection prior to product purchase. Consumers should be able to tell what other products, ingredients, or equipment will be needed to prepare the product for use. A consumer should be able to readily view and accurately understand the directions to reconstitute the product prior to making a purchase decision. The information detailing the reconstitution directions should be located on the outer package (not on the bottom of the package) for consumer inspection prior to product purchase. The location, size and appearance of this accompanying information should be sized appropriately to ensure a consumer can readily find this information either before purchase or during use. A package can provide reconstitution details for how to prepare the entire package contents or a portion of the contents. For example, when a product states "Makes 64 quarts", providing consumers with directions for making 2 quarts is encouraged since it is more practical for most consumers not to make all 64 quarts at one time in one container.
9. Expressions containing Derived Units must provide a definition of that unit on the package label. If an expression conveys a quantity in terms of a Unit that is not defined	A consumer should be able to readily view and accurately understand a derived unit statement prior to making a purchase decision. Since a derived unit is not a recognized unit of Legal Metrology, information that defines, and, if necessary, explains the derived unit to ensure consumer understanding should be provided. The information defining and explaining the derived unit should be located on the outer package (not on the bottom of the package) for consumer inspection prior to product purchase. The location, size, and appearance of this accompanying information should be consistent with the required regulatory language, such as the required product

Principle and Scope	Detailed Guidance
in Legal Metrology, the Unit must be adequately defined on the label. information (Applies to Derived Unit Expressions (DUE's), Comparative Quantity Representations (CQR's) and Comparative Performance Representations (CPR's)	responsible party statement. Consistent with such requirements, the information must be legible and may be placed on the side or back panels of the package. It may have a font smaller than that required for the Declaration of Net Quantity (DoNQ), which is often larger than other required text.
10. Expressions that employ the same Derived Unit term must use the same definition for the Derived Unit. The definition for that Derived Unit must be consistent across similar products using consistent terms amongst similar products. *Is the statement based on a consistent metric and meaning within a product category?* Important for derived unit statements and comparative statements based on derived units (Applies to Derived Unit Expressions (DUE's), Comparative Quantity Representations (CQR's) and Comparative Performance Representations (CPR's)	For statements that are not based on "units" of Legal Metrology, consumers need confidence that expressions appearing on similar and competing product packages can be applied consistently to facilitate value comparisons. Inconsistent definitions for the same "derived unit" or the use of different "derived units" by products in the same product category have the potential to confuse or mislead consumers. Manufacturers using expressions containing derived units are responsible for ensuring that they help consumers and aid in value comparison and purchase decisions. When different definitions are used for similar products, individual companies and trade groups must work together to develop and implement consistent definitions. For example, if competing laundry detergent packages declare the number of "loads", consumers can rely on this declaration only if the term "loads" is defined in a common way, even if one product is a liquid, a second is a liquid concentrate, and a third is a powder. The uniform, common definition can be defined based on common product attributes--such as a delivered concentration or a degree or recognized performance, a defined quantity of product, or another consumer-related parameter. The key attributes of a derived unit that they must be objective, measurable, and verifiable by a third party. Multiple definitions of a derived unit between similar products or competing products neutralize the potential benefit provided by recognizing derived units, and the prevention of multiple definitions should be aggressively enforced and policed within product categories to promote consistency and uniformity. Similarly, the creation of similar-but-different derived units should also be avoided generally. For example, company A should not create an "A-dose", and company B should not create a "B-dose" to compete against other products bearing the term "dose". Consumers need confidence that comparative statements are based on consistent terms to facilitate value comparison. Using inconsistent terms in comparative claims has the potential to confuse or mislead consumers.

Principle and Scope	Detailed Guidance
11. Comparative Expressions which contain a reference to a unit of Legal Metrology must be complete and balanced statements and must appear entirely in the upper 70% of the PDP. (Applies to CQRs)	Manufacturer interest in making comparative statements on their packages has increased as new product technologies have been incorporated into products, resulting in better or longer performance, greater product efficiency, more concentrated products, and lighter-weight products. Traditional comparisons based solely on use of product net content declarations may not provide consumers with sufficient information necessary for consumers to make a fully informed decision. Comparative statements are one means by which manufacturers can provide information about new product forms and performance to consumers. They are also a means by which manufacturers can compare their products to competing products. Manufacturers must carefully consider using comparative statements on the Principal Display panel to ensure the message is complete, clear, correct, relevant, and non-misleading. They also need to ensure that consumers do not interpret a CQR (or parts thereof) as the required DoNQ. Comparative Quantity Representations may provide consumers with important information but also have the potential to confuse or mislead consumers about products. These statements can vary in length, word choice, use of icons and pictograms, the quantity(ies) being compared, and can use limitless choices of fonts, colors, and contrasts to emphasize all or certain parts of a comparative statement. A manufacturer must carefully consider how the CQR content, location, font, and contrast will appear in conjunction with the package's required DoNQ to help facilitate consumers ability to make accurate value comparisons. This is specifically true for a CQR since the weight or measure terms appearing in a CQR have the potential to be interpreted as aDeclaration of Net Quantity. To help ensure CQRs (or portions of the comparative statement) which contain references to units of Legal Metrology are not misinterpreted as net content information, the following is recommended: 1. A comparative expression comprised of one or more units of Legal Metrology must appear in its entirety in the upper 70% of the PDP or on another panel of the package. It should not appear in total or part in the lower 30% of the PDP. 2. A comparative expression comprised of one of more units of Legal Metrology must be a complete statement with clear and explicit reference to the products that are being compared. For example, "This product provides 40% more product than the 20 ounce size". Just saying "40% more product" is not a complete statement. Use of asterisks and asterisked statements located elsewhere on the label are not recommended as means to provide a complete statement. If a statement appears on the PDP, it must be a complete statement on the PDP.

Principle and Scope	Detailed Guidance
	3. Information gathered on comparative products should use the same testing methodology as that used for the package bearing the CQR, unless it is not technically feasible and an alternate objective test method is used. 4. While a CQR is not required to name another brand, it is the manufacturer's responsibility to ensure the CQR statement is accurate and valid. Although CQR accuracy is often easy to assess since the CQR and DoNQ are both present on the PDP, CQR statements are still required to be accurate and verifiable, should be supported by manufacturer data, and are subject to external evaluation and confirmation. 5. A comparative expression comprised of one or more units of Legal Metrology must provide equal emphasis on the units of measure. For example, "This **46 OZ** package provides over 100% more product than our **22 OZ** package". 6. While asterisks may be used in conjunction with a CQR, asterisked information should be used to provide a reference for the basis of the expression and not explain what the CQR really means. A CQR needs to be able to stand on its own. 7. To aid in verification, it is critically important that comparative statements be complete and include correct references to the package and the comparative product(s) to which this package is being compared. For example, a CQR should be a complete statement that makes clear the quantity being compared, the product used in comparison and, if the comparison appears unusual, enough context to ensure the statement is reasonably clear. A consumer's first reaction to a CQR should not be, "that statement is unclear or doesn't make sense". 8. When using a CQR, the comparative product should be another product currently marketed in that general marketplace or the previously marketed version to the same or similar product to make the representation relevant to the consumer. Comparing to a product marketed five years ago provides little value for most consumers. Manufacturers are responsible for ensuring comparative expressions are complete and clear.

Principle and Scope	Detailed Guidance
12. Comparative expression which does not contain a reference to recognized units of Legal Metrology must be balanced and complete. Applies to Comparative Performance Representations (CPR's)	Manufacturer interest in making comparative statements on their packages has increased as new product technologies have been incorporated into products, resulting in better or longer performance, greater product efficiency, more concentrated products, and lighter-weight products. Traditional comparisons based solely on use of product net content declarations may not provide consumers with sufficient information necessary for consumers to make a fully informed decision. Comparative statements are one means by which manufacturers can provide information about new product forms and performance to consumers. They are also a means by which manufacturers can compare their products to competing products. Manufacturers must carefully consider using Comparative Performance Representations (CPR's) on the Principal Display (PDP) panel to ensure the message is complete, clear, correct, relevant, and non-misleading. Comparative Performance Representations may provide consumers with important information regarding how well or long a product might perform but also have the potential to confuse or mislead consumers about products. These statements can vary in length, word choice, use of icons and pictograms, the quantity(ies) being compared, and can use limitless choices of fonts, colors, and contrasts to emphasize all or certain parts of a comparative statement. A manufacturer must carefully consider how the CPR content, location, font, and contrast will appear in conjunction with the package's required Declaration of Net Quantity (DoNQ) and other expressions to help facilitate consumers' ability to make accurate value comparisons. To help ensure CPR's are clear and not misinterpreted, the following is recommended: 1. A comparative performance representation must be a complete statement with clear and explicit reference to the products that are being compared. For example, "This new 20-ounce package provides the same number of uses as our old 46-ounce package." or "This 20-ounce concentrate provides 100% more uses over our 20-ounce unconcentrated product". Just saying "100% more uses." is not a complete statement. The use of asterisks and asterisked statements located elsewhere on the label are not recommended as a means to provide a complete statement. If a statement appears on the PDP, it must be a complete statement on the PDP. 2. Information gathered on comparative products should use the same testing methodology as that used for the package bearing the CPR, Information gathered on comparative products should use the same testing methodology as that used for the package bearing the CPR,

Principle and Scope	Detailed Guidance
	3. While a CPR is not required to name another brand, it is the manufacturer's responsibility to ensure the CPR statement is accurate and valid. Although CPR accuracy is often easy to assess since the CPR and DoNQ are both present on the PDP, CPR statements are still required to be accurate and verifiable, should be supported by manufacturer data, and are subject to external evaluation and confirmation. 4. A comparative expression comprised of one or more units must provide equal emphasis on the units of measure. For example, "This **40 Load** package provides double the uses as our **20 Load** package". 5. While asterisks may be used in conjunction with a CPR, asterisked information should be used to provide a reference for the basis of the expression and not explain what the CPR really means. A CPR needs to be able to stand on its own. 6. To aid in verification, it is critically important that comparative statements be complete and include correct references to the package and the comparative product(s) to which this package is being compared. For example, a CPR should be a complete statement that makes clear the quantity being compared, the product used in comparison and, if the comparison appears unusual, enough context to ensure the statement is reasonably clear. A consumer's first reaction to a CPR should not be, "that statement is unclear or doesn't make sense". 7. When using a CPR, the comparative product should be another product currently marketed in that general marketplace or the previously marketed version to the same or similar product to make the representation relevant to the consumer. Comparing to a product marketed five years ago provides little value for most consumers.

Enforcement

Voluntarily added quantity-related expressions are distinct from the Declaration of Net Quantity (DoNQ) and therefore require a different enforcement strategy. The DoNQ is mandatory and is enforced using practices developed over many decades and set out in extensive detail in applicable laws, regulations, and guidance. In contrast, as a type of voluntary label claim, voluntary statements are enforced in the same way as other voluntary claims.

Importantly, voluntary statements are subject to a wide range of legal and regulatory requirements. Some of these requirements are general in nature, and some are specific to net contents. An example of a general requirement is the FDA's prohibition of false or misleading statements of any kind on food labels. Specific prohibitions are set out in many state laws and regulations, such as laws that prohibit misrepresentations relating to quantity. For example, Florida law provides that "no person shall sell or offer or exposure for sale less than the quantity he or she represents." Wisconsin law prohibits representations “in any manner a false quantity or price in connection with the purchase or sale, or any advertising thereof, of any commodity, thing or service.”

These and other requirements for voluntary statements are legal obligations and companies must be prepared to demonstrate compliance as necessary. Enforcement practices that are selected will depend on the situation and may include a range of tactics:

- Informal inquiries (e.g., questions during inspections or via a phone call)
    - Written requests to demonstrate compliance (e.g., letters sent to the attention of a company's executives or legal/regulatory departments), which may be initiated by either regulators or by industry in the event of a potential competitive dispute.
    - Written warnings from a regulatory agency that a particular product label is false, misleading, or otherwise violative of a specific requirement.
- Negotiations to resolve labeling concerns, such as a regulatory agency seeking a consent decree or a company asking the National Advertising Division (NAD) to resolve a competitive dispute.
- Formal legal challenges, such as product seizures or stop-sale orders, where the relevant requirements for such actions are met.

These guidelines are intended to aid in all such compliance efforts as appropriate. For example:

- A regulatory agency may provide the guidelines as a resource to help educate a company about legal requirements and best practices for clear and non-misleading statements.
- A company may provide the guidelines to a competitor that is making what is believed to be an unsupported or misleading claim, to help emphasize the seriousness of quantity-related statements.
- The guidelines may help define the issues that need to be addressed in a legal negotiation or proceeding.

Due to the inherent nature and diversity of voluntary statements, the guidelines' specific use will be case-specific.

Appendix 1
Supplemental Statements

There has been discussion regarding when, where or how added quantity-related information can appear on a package label. The required Declaration of Net Quantity (DoNQ) statement is specific to its content and location in the Fair Packaging and Labeling Act (FPLA) and in specific product regulations. Conversely, FPLA and federal agency regulations speak minimally and vaguely to the subject of adding other accurate information to the product label.

This Appendix summarizes the legal/regulatory history regarding use of "supplemental statements" which are mentioned in FPLA, and in agency regulations (such as those promulgated by the Federal Trade Commission (FTC) and the Food and Drug Administration (FDA)).

Fair Packaging and Labeling Act (FPLA)

The supplemental statement requirement comes from FPLA Section 4(b):

> **"Requirements of labeling; placement, form, and contents of statement of quantity; supplemental statement of quantity**
>
> **(b) Supplemental statements**
>
> No person … shall distribute … any packaged consumer commodity if any qualifying words or phrases appear in conjunction with the separate statement of the net quantity of contents required by subsection (a), but nothing … shall prohibit supplemental statements, at other places on the package, describing in nondeceptive terms the net quantity of contents: *Provided*, That such supplemental statements of net quantity of contents shall not include any term qualifying a unit of weight or mass, measure, or count that tends to exaggerate the amount of the commodity contained in the package." (15 U.S.C. 1453)

There are three parts to this information from FPLA:

1. No mandatory language is specified for the supplemental statement.
2. Supplemental statements are allowed "at other places".
3. Terms that exaggerate an amount (the net quantity) are not allowed.

What is a Supplemental Statement?

There is no official definition in the FPLA or regulations promulgated by the Federal Trade Commission (FTC) and the Food and Drug Administration (FDA). U.S. congressional legislative history has provided this example: "6 oz. of fast acting X detergent", and in the following, Congress has said this is a "supplemental statement" that can be "apart from the required net quantity statement":

> "Subsection 4(b) prohibits the qualification of the separate quantity statement by any modifying words or phrases. However, a supplemental statement of the net quantity of contents set apart from the separate net quantity statemen, required by the bill, may be modified by nondeceptive words or phrases, so long as such words or phrases do not tend to exaggerate the amount of the commodity contained in the package. For example, where a package contains a separate net quantity statement in conformity with promulgated regulations, such as '6 oz. net weight,' the package could also contain in a supplemental statement, apart from the required net quantity statement, the phrase '6 oz. of fast acting X detergent' but could not contain the statement '6 jumbo oz. of X detergent' at any place on the package." (Senate Report 1186 at 5-6)

Food and Drug Administration (FDA)

The FDA administers the FPLA with respect to foods, drugs, cosmetics and medical devices. Pursuant to their authority under FPLA, FDA has issued food labeling regulations under Title 21, Chapter 1, Subchapter B in the Code of Federal Regulations. 21 CFR §101.7(o) states:

> "Nothing in this section shall prohibit supplemental statements at locations other than the principal display panel(s) describing in nondeceptive terms the net quantity of contents; *Provided,* that such supplemental statements of net quantity of contents shall not include any term qualifying a unit of weight, measure, or count that tends to exaggerate the amount of the food contained in the package; for example, 'jumbo quart' and 'full gallon'."

What this means is that the Declaration of Net Quantity may not contain statements designed to imply that one product is different in quantity from other products that declare the same net contents. What this also means is that Congress wanted the required declaration to be separate from supplemental statements designed to promote product sales. 21 CFR §101.7(o) ensures that such separation exists by permitting supplementary net quantity statements on label panels other than the Principal Display Panel (PDP). However, there is no indication in Senate Report No. 1186, or elsewhere in the legislative history of the FPLA that congressional concern about a "supplementary statement" was intended to encompass other forms of non-misleading information about the quantity of contents other than the one required. To the contrary, the broad congressional policy in Section 2 of the FPLA states:

> "Packages and labels should enable consumers to obtain accurate information as to the quantity of the contents and should facilitate value comparisons". (15 U.S.C. 1451)

Note: Declaration of a statement of net quantity of contents in terms of both drained weight and net weight would not be inconsistent with this policy because such declarations advise consumers of the amount of food and the accompanying packing medium, thereby assisting purchasing decisions. [62 Fed. Reg. 9833-34 (Mar. 4, 1997)]

Federal Trade Commission (FTC)

The FTC administers the FPLA with respect to other "consumer commodities" that are expended in the household. Pursuant to their authority under FPLA, FTC has issued labeling regulations under Title 16, Chapter 1, Subchapter E in the Code of Federal Regulations. 16 CFR §500.24 states:

> **"Supplemental statements.**
>
> Nothing contained in the regulations in this part shall prohibit supplemental statements, at locations other than the principal display panel, describing in non-deceptive terms the net quantity of contents … Required combination declarations of net quantity of contents (for example, a combination of net weight or mass plus numerical count, numerical count plus dimensions of the commodity, etc.) are not regarded as supplemental net quantity statements and shall be located on the principal display panel. Dilution directions or other similar directions for use are not regarded as supplemental net quantity statements and may be located on the principal display panel. Size characterizations in compliance with standards promulgated under section 5(c)(1) of the Act may appear on the principal display panel."

Uniform Packaging and Labeling Regulation (UPLR)

The Uniform Packaging and Labeling Regulation (UPLR) was adopted by the National Council on Weights and Measures (NCWM) to provide accurate and adequate information on packages as to the identity and quantity of contents

so that purchasers can make price and quantity comparisons to parallel regulations adopted by federal agencies under FPLA. Section 6.12 in NIST Handbook 130 states:

> "**Supplementary Quantity Declarations -**
>
> The required quantity declaration may be supplemented by one or more declarations of weight, measure, or count, such declaration appearing other than on a principal display panel."

FDA Interpretations

In the absence of a definition for supplemental statements, several instances emerged over time which required FDA to declare what is and what is not supplemental. The first instance is an FDA example when the regulation was issued, the remaining are cases where FDA expressed an opinion based on a marketplace circumstance.

- On a commodity requiring a declaration of fluid measure, a weight declaration IS supplemental when it is included as part of the Declaration of Net Quantity Statement.
- On a commodity for which weight or volume is sufficient (e.g., sliced cheese, candy bars at Halloween, where weight is enough), count may be voluntarily added and IS NOT supplemental.
- A voluntary declaration of drained weight IS NOT supplemental when combined with a mandatory declaration of the total package weight, including packing liquids.
- A reconstitution declaration such as "makes 1 quart" IS NOT supplemental.
- Metric labeling WAS NOT supplemental when it was voluntarily provided. Metric labeling is now required for most products.

Metric Labeling

Metric labeling is not considered supplemental:

> "(p) A separate statement of the net quantity of contents in terms of the metric system is not regarded as a supplemental statement and an accurate statement of the net quantity of contents in terms of the metric system of weight or measure may also appear on the principal display panel or on other panels." [32 Federal Register 10729, 10733 (July 21, 1967)]

FTC Interpretations

FTC has similarly provided interpretations of their regulation since it has been issued.

- Required combination Declarations of Net Quantity of contents (e.g., net weight plus count) ARE NOT supplemental (seems to be limited to mandatory and differs from FDA).
- Dilution directions or other similar directions for use ARE NOT supplemental.
- Size characterizations in compliance with standards promulgated under section 5(c)(1) of the Act ARE NOT supplemental.
- Performance claims per letter from Robin Rosen Spector, Attorney, FTC Division of Enforcement, Bureau of Consumer Protection, to Michael Tomenga, Nov. 4, 2010:

- "Commission staff believes that the 'lasts the same as' statement on the Kingsford charcoal packaging does not qualify the package's unit of weight. Consumers would likely reasonably interpret that statement as a performance claim about the product. The claim appears as a distinct item on the display panel and is separated from the net quantity declaration in accordance with the requirements of the FPLA regulations. Therefore, we would not recommend that the Commission bring a law enforcement action for violations of the FPLA based on the facts presented in your letter. Nevertheless, under section 5 of the Federal Trade Commission Act, the company must possess and rely upon reasonable substantiation for the claim and the claim should not be deceptive. See FTC Policy Statements on Deception and Substantiation: https://www.ftc.gov/legal-library/browse/ftc-policy-statement-deception and https://www.ftc.gov/legal-library/browse/ftc-policy-statement-regarding-advertising-substantiation

• Performance claims per letter from James A. Kohm, Associate Director, FTC Division of Enforcement, Bureau of Consumer Protection, to David Sefcik, Nov. 30, 2016:

  "All of the quantity-related expressions in the Subcommittee's draft guidance are descriptive or supplemental quantity information. Therefore, this information can only appear elsewhere on the packaging (anywhere except the principal display panel). See 16 CFR Sections 500.6(b) ('The declaration of net quantity shall appear…on the principal display panel…and shall not include any term qualifying a unit of weight or mass, measure, or count…') and 500.24 ('Nothing contained in the regulations in this part shall prohibit supplemental statements, at locations other than the principal display panel, describing in non-deceptive terms the net quantity of contents…'). Nonetheless, we are unlikely to recommend that the FTC pursue enforcement action for non-deceptive labels. Doing so could deprive consumers of valuable information in some situations."

Summary

In summary, the term "supplemental statement" which appears in FPLA, FTC and FDA regulations is not defined. Based on the history of opinions and clarifications provided by the federal agencies since adoption of FPLA, it becomes apparent that the definition is not intended to be expansive and somewhat narrow. The FDA on numerous occasions has opined that certain quantity related expressions are NOT supplemental statements and FTC on at least one occasion has similarly opined this viewpoint as well.

While it is not clear what exactly is and is not a supplemental statement, the many circumstances where the agencies have concluded that an expression is NOT a supplemental statement give some insight into allowable and non-allowable expressions. In the most recent FTC opinion suggesting (which was written without a review of the history of previous FDA and FTC recommendations) that the term supplemental statement could be broadly interpreted, FTC goes on to state that added quantity expressions provide useful information to consumers, and they recommend against enforcement actions for packages which display this information. The other opinions provided by FTC and FDA also appear to similarly recognize that the information being provided is useful to consumers.

As a result, this NCWM Best Practice Document has been developed to help ensure that any and all quantity expressions which might appear on a package are clear, non-misleading and useful.

Appendix 2
Illustrations and Discussion of Voluntarily Added Expressions

The purpose of this Appendix is to illustrate package Principal Display Panel (PDP) examples for the purposes of illustrating some of the principles discussed by this document. These examples are intended to be representative and specifically do not cover every possible permutation of possible label scenario since the number of possible scenarios is extremely large.

This appendix is comprised of diagrams focusing on a limited number of label elements. Diagrams were selected as more appropriate than photos of marketed products to avoid possible product identification and the perception of an implicit product endorsement or critique.

This appendix was developed because it is essential that manufacturers consider the cumulative effects of expression location, size, font, color, and contrast on the package in relation to other required and voluntary PDP elements and statements. Expression location, presentation, size and contrast should help the consumer to make informed value comparisons at the point of purchase and not minimize the visibility or content of other information required to appear on the PDP.

A manufacturer is responsible for ensuring an Additional Expression of Quantity (AEQ's) location, font, graphics or wording provides clear and non-misleading information that does not contradict or marginalize the information provided in the required Declaration of Net Quantity (DoNQ)

Additional Expressions of Quantity can appear on the PDP as illustrated in the following examples, which illustrate differences in color, font size, expression wording, and graphic design such as graphic features or icons. An AEQ may employ a single color and font type or may combine 2 or more colors and fonts. AEQs may express information in the same unit as in the DoNQ or other common recognizable units of legal metrology or count appropriate for the type of product and package size.

1. <u>Additional Expression of Quantity (AEQ)</u> – Additional Expressions of Quantity (AEQ) may appear in the upper 70 % or lower 30% of the Principal Display Panel (PDP). The AEQ can be located opposite the Declaration of Net Quantity (DoNQ), or adjacent to the DoNQ, provided the Declaration of Net Quantity minimum separation requirements are satisfied.



PREFERRED

This example illustrates the inclusion of an AEQ (½ Liter) near the top of the PDP which is equivalent to an element of the DoNQ. The color and contrast of the ½ Liter expression have been selected to increase the visibility of the AEQ. Both the DoNQ and AEQ are clear and non-misleading.



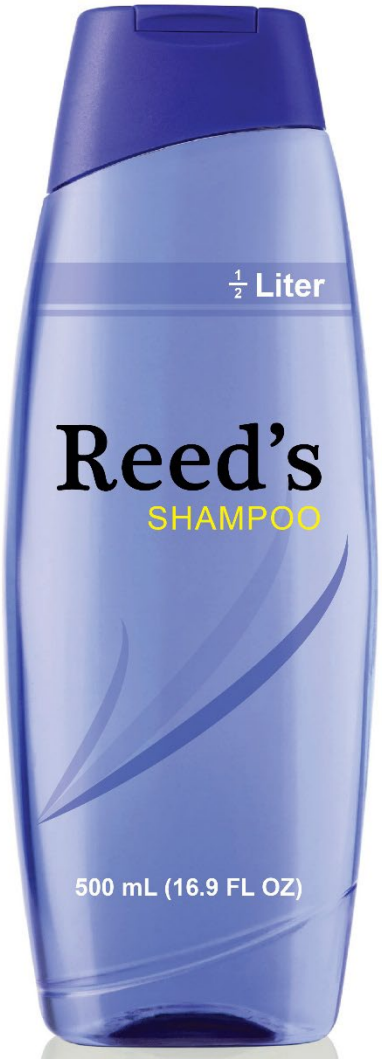
QUESTIONABLE

This example illustrates the inclusion of an AEQ (½ Liter) near the top of the PDP which is equivalent to an element of the DoNQ, however, the color and contrast of the ½ Liter expression could mitigate the visibility of the AEQ on this package.



PROBLEMATIC

This example illustrates the repetition of the DoNQ state-ment at a second location on the PDP. The DoNQ has a prescribed location on the PDP and should be provided only at that location. FTC regulations do not support inclusion of the DoNQ at a second location on the PDP. Reinforcing that there is one and only one DoNQ at a specific location on the PDP is good policy for both consumers and manufacturers.



PREFERRED

This example illustrates the inclusion of an AEQ that states ½ Liter near the top of the PDP which is an equivalent expression to 500 mL in the Declaration of Net Quantity (DoNQ).



PROBLEMATIC

This example illustrates the inclusion of the phrase "At Least ½ Liter" near the top of the PDP while the DoNQ states 500 mL. Since the DoNQ states the package contains 500 mL, the AEQ must be an equivalent statement. "At Least ½ Liter" is not an equivalent statement to 500 mL and implies the package may or may not contain more than 500 mL without any added clarification. As a result, this is viewed as problematic.



PROBLEMATIC

This example illustrates inclusion of the expression "Up to ½ Liter!". This example is problematic since "up to" does not communicate a precise and verifiable quantity to a prospective buyer of an individual package, and may actually contain less. This expression also is not consistent with the DoNQ. Expressions like "up to", "approximately" and "about" suggest a quantity range instead of a verifiable quantity. Additionally, the ½ may be hard to see as a result of its size and contrast.



PREFERRED

This example illustrates the inclusion of an AEQ (6 Doughnuts) near the top of the PDP which provides package count information in addition to the weight/mass information provided by the DoNQ. The "6" and "Doughnuts" appear with differing font, color and contrast in a manner which makes the AEQ clear.

.



PREFERRED

This example illustrates the inclusion of an AEQ (6 DOUGHNUTS) in the lower 30% of the PDP on the opposite side of the label and separate from the DoNQ which provides weight/mass information The "6" and "DOUGHNUTS" appear with the same font, color and contrast in a manner which makes the AEQ clear.



PREFERRED

This example illustrates the inclusion of an AEQ (6 Doughnuts) in the lower 30% of the PDP on the same side separate from the DoNQ. The "6" and "Doughnuts" have different font sizes and their color differs from the DoNQ, which makes the AEQ separate and distinct from the DoNQ.



PROBLEMATIC

This example illustrates the inclusion of an AEQ (6 Doughnuts) in the lower 30% of the PDP immediately adjacent to the DoNQ. In this case, the "6 Doughnuts" is not separate from the DoNQ despite having a different color and font.



PROBLEMATIC

This example illustrates the inclusion of an AEQ (6 Large Doughnuts) in the lower 30% of the PDP which provides package count information in addition to the weight/mass information provided by the DoNQ. The "6" and "Large Doughnuts" appear in differing font sizes and color from the DoNQ, but the AEQ location is almost too close to the DoNQ and the DoNQ separation requirement. The term "Large" in the AEQ is an undefined quantity term which makes the AEQ less objective Terms such as "Large" and "Jumbo" are prohibited from the DoNQ because they can exaggerate quantity, and an AEQ on the PDP should similarly not use exaggerating terms.

2. <u>Reconstituted Expression of Quantity (REQ)</u> – Reconstituted Expressions of Quantity may appear in the upper 70 % or lower 30% of the Principal Display Panel (PDP) as illustrated in the examples below. The REQ may be located opposite the Declaration of Net Quantity (DoNQ), or adjacent to the DoNQ, provided the Declaration of Net Quantity minimum separation requirements are satisfied. Where two or more REQs are present (not shown), they may appear in both the upper 70% and/or lower 30% of the PDP. It is not required for the REQ statements to be identical provided they are both accurate and non-misleading.



PREFERRED

This example illustrates the inclusion of an REQ (Makes 56 Quarts) in the upper 70% of the PDP which provides information concerning how much product the package contents can make per the package instruction. The REQ includes a pitcher related to how the product is mixed and consumed. The REQ is accurate and separate from the DoNQ.



PROBLEMATIC

This example illustrates the inclusion of an REQ (Makes about 56 Quarts) in the upper 30% of the PDP. The REQ separates itself from the rest of the label including the DoNQ, however, the term ~~but~~ "about" does not communicate a precise and verifiable quantity. Expressions like "up to", "approximately" and "about" suggest a quantity range instead of a verifiable quantity, and in this example "About 56 Quarts" is problematic because it is inexact and not verifiable, and a consumer may or may not be able to make 56 quarts of reconstituted product.



PREFERRED

This example illustrates the inclusion of an REQ (Makes 56 Quarts) in the lower 30% of the PDP on the opposite side from the DoNQ. The REQ provides information concerning how much product the package contents can make per the package instruction. The REQ includes a pitcher related to how the product is mixed and consumed. The REQ is accurate and separate from the DoNQ.



PROBLEMATIC

In this example "56 Quarts" appears with the "2.0 LB 907g" in the DoNQ. While the inference might be that this package makes 56 quarts, the actual package contents is not 56 quarts. Whether the 56 Quarts in this example is immediately adjacent to the DoNQ or separate from the DoNQ, stating 56 Quarts without "Makes" is an incorrect statement.



PREFERRED

In this example, we show the PDP and the product reconstitution instructions from the back of the package label.

This PDP with the REQ follow the principles of this Document. One added requirement for REQs are clear and verifiable reconstitution instructions which must appear someplace on the package label. These instructions provide clear and verifiable directions for reconstituting product.

Reconstituted Instructions *(from package back panel labeling)*

To Mix: Add 2 quarts of water to 1/3 cup of powder.



PROBLEMATIC

In this example, we show the PDP and the product reconstitution instructions from the back of the package label.

This PDP with the REQ follow the principles of this Document. One added requirement for REQs are clear and verifiable reconstitution instructions which must appear someplace on the package label. The instructions provided in this example are not specific, objective or verifiable.

Reconstituted Instructions *(from package back panel labeling)*

To Mix: Add water to mix to taste.

3. <u>Derived Unit I</u> ...ion (DUE's) location, font, gr... ...contradict or marginalize the in...

Derived Unit Expressions can appear in the upper 70% or lower 30% of the Principal Display Panel (PDP) as illustrated in the following examples which illustrate differences in color, font size, expression wording, and graphic design such as graphic features or icons. Icons are used commonly for this type of expression. A DUE may employ a single color and font type or may combine 2 or more colors and fonts. Where two or more DUEs are present (not shown), they may appear in both the upper 70% and/or lower 30% of the PDP. It is not required for the DUE statements to be identical provided they are both accurate and non-misleading.





This example includes the PDP and a statement from elsewhere on the package label. In this case, the PDP shows the inclusion of a DUE (20 LOADS) in the upper 70% of the PDP which provides information concerning how many derived units (LOADS) the package contents can deliver. The PDP of this package adheres to the principles for DUEs contained in this Document.

One requirement for DUEs is that there must be a derived unit definition (which is clear and verifiable) someplace else on the package labeling. See examples below.



This example illustrates the inclusion of a DUE (28 DOSES) in the lower 30% of the PDP which provides information concerning how many derived units the package contents can make per the package instruction. The DUE is accurate, verifiable and separate from the DoNQ.

PREFERRED

In this example, the derived unit is defined to be 8 fluid ounces of detergent. This is clear and verifiable.

ONE LOAD IS 1 CUP (8 FL OZ) WHICH IS THE AMOUNT OF DETERGENT TO DO A MEDIUM LOAD

PROBLEMATIC

In this example, the derived unit is not clearly defined and is not verifiable.

USE APPROXIMATELY ONE CUP OF DETERGENT FOR YOUR LAUNDRY LOAD



PROBLEMATIC

In this diagram, the derived unit expression appears with minimal separation from the DoNQ in the lower 30% of PDP. With this spacing the "20 Loads" appears to be part of the DoNQ, which is in violation of DoNQ requirements since Loads (and other Derived Units) are not units of Legal Metrology. As a result, separation of a DUE from the DoNQ must be sufficiently large to ensure that the DUE is clearly not part of the DoNQ.



PROBLEMATIC

In this diagram, the DUE statement "Makes Up to 20 Loads" is an inexact expression that does not provide accurate quantity information that consumers can rely upon and regulators can verify. Exactly how many Loads are delivered? Expressions appearing on the PDP need to provide precise and accurate values, not ranges.

4. <u>Comparative Quantity Representation (CQR)</u> – A manufacturer is responsible for ensuring a Comparative Quantity Representation (CQR's) location, font, graphics or wording provides clear and non-misleading information which does not contradict or marginalize the information provided in the required Declaration of Net Quantity (DoNQ). Because CQRs may employ the same units as those contained in the DoNQ, manufacturers should carefully consider the CQR expression content, location, graphics and fonts to minimize the likelihood that a portion of the CQR is misinterpreted to be the DoNQ.

Comparative Quantity Representations should appear in the upper 70% of the Principal Display Panel (PDP) as illustrated in the following examples which illustrate differences in color, font size, expression wording, and graphic designs. A CQR may employ a single color and font type or may combine 2 or more colors and fonts. CQR's may express information in the same unit as in the DoNQ or other common recognizable units of legal metrology or count appropriate for the type of product and package size.



QUESTIONABLE

The CQR on this package is questionable because the expression is very close to extending into the lower 30% of the PDP. Because CQRs are full statements which have numbers which can be over emphasized, the statements in their entirety need to remain outside the lower 30% of the PDP to ensure separation from the DoNQ.



PROBLEMATIC

The CQR on this package covers the entire right side of the PDP. The expression extends into the lower 30% of the PDP where the 15 LB portion of the expression appears in a larger font with a bolder color. This presentation can be misinterpreted by a consumer shopping in a retail establishment as being a 15 LB package, not the 8 LB package it really is. While CQRs can make words and numbers of differing sizes, colors, and fonts, these statements are to remain outside the lower 30% of the PDP to avoid potential confusion.



PREFERRED

The CQR on this package label provides a comparison between this package and another package which is clearly defined. Its location is outside the lower 30% in its entirety and clearly separate from the DoNQ



PROBLEMATIC

The CQR on this package is problematic because the expression is clearly within the lower 30% of the PDP. Because CQRs are full statements which have numbers which can be over emphasized, the statements in their entirety need to remain outside the lower 30% of the PDP to ensure separation from the DoNQ.

5. <u>Comparative Performance Representation (CPR)</u> – A manufacturer is responsible for ensuring a Comparative Performance Representation (CPR's) location, font, graphics or wording provides clear and non-misleading information which does not contradict or marginalize the information provided in the required Declaration of Net Quantity (DoNQ).

Comparative Performance Representations can appear in the upper 70% or lower 30% of the Principal Display Panel (PDP) as illustrated in the following examples which illustrate differences in color, font size, expression wording, and graphic design. A CPR may employ a single color and font type or may combine 2 or more colors and fonts.



PREFERRED

The CPR on this package is an expression which clearly compares the number of Loads delivered between 2 specific packages. The statement is clearly separate from the DoNQ.



PROBLEMATIC

The CPR on this package is a general statement comparing this package to powdered detergents without clear comparison to any specific package. While located separate from the DoNQ, a CPR needs to provide specific and comparisons which can be used by consumers and verified by regulators.

Resources

Federal Trade Commission Act (15 U.S.C. § 45)
https://www.ftc.gov/legal-library/browse/statutes/federal-trade-commission-act

https://www.ftc.govhttp://uscode.house.gov/view.xhtml

Fair Packaging and Labeling Act
https://www.ftc.gov/legal-library/browse/rules/fair-packaging-labeling-act-regulations-under-section-4-fair-packaging-labeling-act

NIST Handbook 130 Uniform Laws and Regulations *(includes Uniform Weights and Measures Law, Uniform Packaging and Labeling Regulation, Uniform E-Commerce Regulation)*
https://www.nist.gov/pml/owm/owm-products-and-services/publications-and-documentary-standards/handbooks

FDA Food Labeling Guide
https://www.fda.gov/foodlabelingguide

FDA Updated Nutrition Labeling Examples
https://www.fda.gov/media/99151/download

FDA Cosmetic Labeling Regulations
https://www.fda.gov/cosmetics/cosmetics-laws-regulations/regulations-related-cosmetics-title-21-code-federal-regulations-21-cfr

FDA Cosmetic Labeling Guide
https://www.fda.gov/cosmetics/cosmetics-labeling-regulations/cosmetics-labeling-guide

2027 Interim Meeting Agenda
Specifications and Tolerances (S&T) Committee

Mark Lovisa, Committee Chair
Louisiana

INTRODUCTION

This is the agenda of the Specifications and Tolerances Committee (hereinafter referred to as the "Committee") for the 111th Annual Meeting of the National Council on Weights and Measures (NCWM). This report is based on the Interim Report offered in the NCWM Publication 16, testimony heard at public hearings, comments received from the regional weights and measures associations and other parties, the addendum sheets issued at the Annual Meeting, and actions taken by the membership at the voting session of the Annual Meeting. The Informational items presented below were adopted as presented when the Board's report was approved.

Table A identifies the agenda and appendix items. Agenda items are identified in the Report by Reference Key Number, Item Title, and Page Number. Item numbers are those assigned in the Interim Meeting agenda. A Voting item is indicated with a "**V**" after the item number. An item marked with an "**I**" after the reference key number is an Informational item. An item marked with a "**D**" after the reference key number is a Developing item. The developing designation indicates an item has merit; however, the item was returned to the submitter for further development before any action can be taken at the national level. An agenda "Item Under Consideration" is a statement of proposal and not necessarily a recommendation of the BOD. Suggested revisions are shown in **bold** face print by **striking out** information to be deleted and **underlining** information to be added. Table B lists the results of any Voting Items.

Items may be grouped into "Blocks" if they are:

- **Opposing Items:** Items in direct conflict with each other, and only one may be adopted,
- **Interdependent Items:** Items addressing a similar topic where, if one is adopted, all need to be adopted, and
- **Related Items:** Items addressing a similar topic across multiple codes or regulations.

Some Voting Items are considered individually; others may be grouped in a consent calendar. Consent calendar items are Voting Items that the Board has assembled as a single Voting Item during their deliberation after the Open Hearings, assuming that the items are without opposition and will not require discussion. The Voting Items that have been grouped into consent calendar items will be listed on the addendum sheets. Prior to adoption of the consent calendar, the Board will remove specific items from the consent calendar upon request to be discussed and voted upon individually.

The Board may change the status designation of agenda items (Developing, Informational, Assigned, Voting and Withdrawn) up until the report is adopted, except those items which are marked Developing, Informational, Assigned or Withdrawn cannot be changed to Voting Status. Any change from the Board Interim Report (as contained in this publication) or from what appears on the addendum sheets will be explained to the attendees prior to a motion and will be acted upon by the active members of NCWM prior to calling for the vote.

An "Item under Consideration" is a statement of proposal and not necessarily a recommendation of the Board. Suggested revisions are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in ***bold faced italics***. Additional letters, presentation and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-16 to review these documents.

All sessions are open to registered meeting attendees. If the Board must discuss any issue that involves proprietary information or other confidential material; that portion of the session dealing with the special issue may be closed if (1) the Chairman or, in his absence, the Chairman-Elect approves; (2) the Executive Director is notified; and (3) an announcement of the closed meeting is posted on or near the door to the meeting session and at the registration desk. If possible, the posting will be made at least a day before the planned closed session.

Subject Series List

Handbook 44 – General Code ..... GEN Series

Scales ..... SCL Series
Belt-Conveyor Scale Systems ..... BCS Series
Automatic Bulk Weighing Systems ..... ABW Series
Weights ..... WTS Series
Automatic Weighing Systems ..... AWS Series
Weigh-In-Motion Systems used for Vehicle Enforcement Screening ..... WIM Series

Liquid-Measuring Devices ..... LMD Series
Vehicle-Tank Meters ..... VTM Series
Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices ..... LPG Series
Hydrocarbon Gas Vapor-Measuring Devices ..... HGV Series
Cryogenic Liquid-Measuring Devices ..... CLM Series
Milk Meters ..... MLK Series
Water Meters ..... WTR Series
Mass Flow Meters ..... MFM Series
Carbon Dioxide Liquid-Measuring Devices ..... CDL Series
Hydrogen Gas-Metering Devices ..... HGM Series
Electric Vehicle Supply Equipment ..... EVS Series
Non-Utility Electricity-Measuring Systems ..... EMS Series

Vehicle Tanks Used as Measures ..... VTU Series
Liquid Measures ..... LQM Series
Farm Milk Tanks ..... FMT Series
Measure-Containers ..... MRC Series
Graduates ..... GDT Series
Dry Measures ..... DRY Series
Berry Baskets and Boxes ..... BBB Series

Fabric-Measuring Devices ..... FAB Series
Wire-and Cordage-Measuring Devices ..... WAC Series
Linear Measures ..... LIN Series
Odometers ..... ODO Series
Taximeters ..... TXI Series
Timing Devices ..... TIM Series
Grain Moisture Meters (a) ..... GMA Series
Grain Moisture Meters (b) ..... GMB Series
Near-Infrared Grain Analyzers ..... NIR Series
Multiple Dimension Measuring Devices ..... MDM Series
Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices ..... LVS Series
Transportation Network Measuring Systems ..... TNS Series

Other Items ..... OTH Series

Table A
Table of Contents

Reference Key		Title of Item	S&T Page
GEN – GENERAL CODE			**238**
GEN-27.1		G-S.1.1. Location of Marking Information for Not-Built-For-Purpose, Software-Based Devices.	238
GEN-26.1	I	G-S.5.6. Recorded Representations.	239
SCL – SCALES			**243**
SCL-24.2	D	Multiple Sections Regarding Tare	243
SCL-27.4		S.2.3. Tare	252
SCL-27.1		UR.1. Selection Requirements	254
SCL-22.2	A	UR.3.1.X. Required Minimum for Cannabis Products.	256
SCL-27.2		UR.1.1. General., Table 7a. Typical Class or Type of Devices for Weighing Applications	259
SCL-27.3		UR.3.15. Separate Main Elements, $n_{max.}$	264
LMD – LIQUID MEASURING DEVICES			**266**
LMD-26.1	I	S.2. Measuring Elements, S.4. Marking Requirements, N.4. Testing Procedures, U.R.6. ~~Temperature~~ Volume Compensation and Correction Wholesale, and T.5. Density Correction Systems.	266
LMD-27.1		S.4. Marking Requirements., N.3. Test Drafts. N.4. Testing Procedures, Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30., UR.2.2. Discharge Rate., and Liquid-Measuring Device Code Index	278
LMD-27.2		N.3. Test Drafts., N.4. Testing Procedures., Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices. UR.2.2. Discharge Rate.	286
VTM – VEHICLE TANK METERS			**290**
VTM-27.1		N.4.1. Normal Test.	290
LPG – LPG AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES			**292**
LPG-27.1		N.4.1. Normal Test.	292
HGV – HYDROCARBON GAS VAPOR-MEASURING DEVICES			**295**
HGV-25.1	D	S.1.1.4. Advancement of Indicating and Recording Elements., S.11.5. Proving Indicator., S.2.2. Provision for Sealing., S.4.3. Temperature Compensation., S.4.4. ~~Badge~~Identification., N.3. Test Drafts., N.4.1. Normal Tests., and Appendix D. Definitions register	295
CDL - CARBON DIOXIDE LIQUID-MEASURING DEVICES			**301**
CDL-27.1		N.4.1. Normal Test.	301
HGM – HYDROGEN GAS-METERING DEVICES			**303**
HGM-27.1		S.8. Minimum Measured Quantity, Table T.2. Accuracy Classes and Tolerances for Hydrogen gas Measuring Devices, and UR.1.3. Minimum Measured Quantity.	303
EVS – ELECTRIC VEHICLE SUPPLY EQUIPMENT			**310**
EVS-27.1		S.1. Primary Indicating and Recording Elements., and S.2.4. EVSE Indication of Unit Price and Equipment Capacity and Type of Voltage.	310
EVS-27.2		S.2.6. EVSE Recorded Representations. and UR.3.3. EVSE Recorded Representations.	317
MDM – MULTIPLE DIMENSION MEASURING DEVICES			**321**
MDM-25.1	V	Multiple Sections Regarding Adding Volumetric Measuring Devices to Section 5.58.	321
MDM-27.1		Table S.1.6. Required Information to be Provided by Multiple Dimension Measuring Systems, S.2.2. Dimensional Offset, and UR.3.4. Use of Dimensional Offset with Palletized Freight.	333
OTH – OTHER ITEMS			**336**
OTH-25.1	A	2.26 Weigh-in-Motion Systems Used for Vehicle Direct Enforcement	336

OTH-26.5 I Appendix D – Definitions: recorded representation. 355
OTH-26.6 I Appendix D – Definitions: electronic receipt. 358

ITEM BLOCK 1 (B1) – TRANSPORTATION-FOR-HIRE SYSTEMS 361

B1-TNS-25.1 I Section 5.60. Transportation Network Measurement Systems – Tentative Code 361
B1-TXI-25.1 I 5.54 ~~Taximeters~~ Transportation-For-Hire Systems 369

ITEM BLOCK 2 (B2) – ELECTRIC VEHICLE SUPPLY EQUIPMENT 386

B2: EVS-26.2a A EVSE Indicating Element 386
B2: EVS-26.2b A Decimal Standardization 392
B2: EVS-26.2c A Totalizer Availability 398
B2: EVS-26.2d A Removal of NTEP Language 403
B2: EVS-26.2e A Consistent Language between AC and DC Testing 409
B2: EVS-26.2f A Exceptions 414
B2: EVS-26.2g A Network Loss 420
B2: EVS-26.2h A Consumer Labeling 426

Table B
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
ABWS	Automatic Bulk Weighing System	NEWMA	Northeastern Weights and Measures Association
AAR	Association of American Railroads	NIST	National Institute of Standards and Technology
API	American Petroleum Institute	NUEMS	Non-Utility Electricity-Measuring System
CNG	Compressed Natural Gas	NTEP	National Type Evaluation Program
CWMA	Central Weights and Measures Association	OIML	International Organization of Legal Metrology
EPO	Examination Procedure Outline	OWM	Office of Weights and Measures
EVSE	Electric Vehicle Supply Equipment	RMFD	Retail Motor Fuel Dispenser
FHWA	Federal Highway Administration	S&T	Specifications and Tolerances
GMM	Grain Moisture Meter	SD	Secure Digital
GPS	Global Positioning System	SI	International System of Units
HB	Handbook	SMA	Scale Manufactures Association
LMD	Liquid Measuring Devices	SWMA	Southern Weights and Measures Association
LNG	Liquefied Natural Gas	TC	Technical Committee
LPG	Liquefied Petroleum Gas	USNWG	U.S. National Work Group
MMA	Meter Manufacturers Association	VTM	Vehicle Tank Meter
MDMD	Multiple Dimension Measuring Device	WIM	Weigh-in-Motion
NCWM	National Council on Weights and Measures	WWMA	Western Weights and Measures Association

Details of All Items
(In order by Reference Key)

GEN – GENERAL CODE

GEN-27.1 G-S.1.1. Location of Marking Information for Not-Built-For-Purpose, Software-Based Devices.

Source:
NTEP Weighing and Software Sectors

Purpose:
Make G-S.1. identification markings displayed electronically on not-built-for-purpose, software-based devices easier to locate.

Item under Consideration:
Amend NIST Handbook 44 General Code as follows:

G-S.1.1. Location of Marking Information for Not-Built-For-Purpose, Software-Based Devices. *– For not-built-for-purpose, software-based devices either:*

(a) The required information in G-S.1. Identification. (a), (b), (d), and (e) shall be permanently marked or continuously displayed on the device; or

(b) The Certificate of Conformance (CC) Number shall be:

(1) permanently marked on the device;

*(2) continuously displayed***; ~~or~~ when ~~the not-built-for-purpose~~, software-based device is active ~~and~~ provides access to the information required in G-S.1. Identification, (a), (b), and (d) when not provided in accordance with G-S.1.1.(a).~~:~~ or*

*(3) ~~for not-built-for-purpose~~, software-based devices manufactured before January 1, 20XX**, accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."*

Note: *For (b), clear instructions for accessing the information required in G-S.1. Identification, (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.**

*[*Nonretroactive as of January 1, 2004]*

[**Nonretroactive as of January 1, 20XX]
(Added 2003) (Amended 2006 **and 20XX**)

Previous Status:
2027: New Proposal

Original Justification:
Having to navigate through multiple icons and levels of displays to access marking information creates unnecessary burden to regulators conducting market surveillance and Registered Service Agents needing to locate required information found on the NTEP certificate of conformance.

Opposition may be that this would require screen space needed for other items on mobile apps, tablets, and computer displays. Having an NTEP Certificate of Conformance number displayed on the display could cause consumer confusion.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
2027 New Proposal

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

Not applicable.

WWMA 2026 Annual Meeting:

Not applicable.

NEWMA 2026 Interim Meeting:

Not applicable.

SWMA 2026 Annual Meeting:

Not applicable.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

GEN-26.1 I G-S.5.6. Recorded Representations.

Item was improperly identified **in NCWM Publication 15, January 2026, as GEN-26.5**

Source:
NCWM National Type Evaluation Program Committee

Purpose:
Remove the examples from G-S.5.6. Recorder representations and add a definition to HB 44 for Electronic Receipts to assist in clarification for regulatory, manufacturers and NTEP as to what an electronic receipt is.

Item under Consideration:
Amend NIST Handbook 44 General Code

G-S.5.6. Recorded Representations. – Insofar as they are appropriate, the requirements for indicating and recording elements shall also apply to recorded representations. All recorded values shall be presented digitally. In applications where recorded representations are required by a specific code, the customer may be given the option of not receiving the recorded representation. Recorded representations referenced in specific codes shall be made available to the customer in hard copy form, unless otherwise specified by the customer. For systems equipped with the capability of issuing an electronic receipt, ticket, or other recorded representation, the customer may be given the option to receive any required information electronically ~~**(e.g., via cell phone, computer, etc.)**~~ in lieu of or in addition to a hard copy.
(Amended 1975, 2014, 2023 and **20XX**)

Previous Status:
2026: New Proposal

Original Justification:
Having a definition for an electronic receipt will benefit industry, the regulatory community and NTEP and promote uniformity.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Vermont Agency of Agriculture Food & Markets supports the item.
- 2026 Annual: A Representative from Iowa Department of Agriculture/Weights & Measures and NEW Jersey Weights & Measures support this item as presented but would also support the partitioning of the item.
- 2026 Annual: A Representative from New York Department of Agriculture & Markets would support the NIST edits with the removal of the final sentence allowing the consumer to request a receipt by phone.
-
- 2026 Interim: A regulator from California supports this as a Developing item with consideration that the developed term is being placed in the General Code and as such would apply to all device types. They believe that specification and user requirements would be necessary for a QR code to be used to facilitate access to recorded representations. This regulator would also support this as a Voting item if the QR code is removed from the suggested General Code location and the NIST OWM recommended definition change is adopted. In separate comments, this regulator spoke on potential issues such as not being able to scan the QR code, questioning if there is a requirement on how long the code needs to be displayed, and stating that this is different than entering information to receive a receipt.
- 2026 Interim: A regulator from Vermont spoke in support of this item as it will help define what an acceptable method of recorded representation is. This regulator supports the NIST OWM proposed definition change and supports this item as a Voting item.
- 2026 Interim: A regulator from New Jersey spoke in support of the NIST OWM analysis and supports this item as a Voting item.
- 2026 Interim: A regulator from Iowa spoke in support of this item as a Voting item.

Industry:

- 2026 Annual: A Representative from the Meter Manufacturers Association, Gilbarco Inc, and ChargePoint support this item with edits.
- 2026 Annual: A Representative from Tesla stated that this proposal provides clear definition of electronic receipt and is an important clarification for Type Evaluation and manufactures.
- 2026 Annual: A Representative from the Scale Manufacturers Association supports the item.
- 2026 Interim: A representative of NEMA spoke in support of this item as a Voting item.

- 2026 Interim: A representative from Tesla spoke in support of this item as a Voting item and notes that this item brings much needed clarity on the nature of electronic receipts.
- 2026 Interim: A representative from Electrify America spoke in support of this item as it gives clarity to existing ambiguity of the handbook requirements. It was noted that a QR code is not a receipt, but a means to deliver the receipt to a consumer.
- 2026 Interim: A representative from Endress + Hauser Flow USA Inc. echoed comments heard from the MMA and Gilbarco Inc with support to comments heard from the Arkansas regulator. It was stated that this item could reside in the definition section with perpetuity and without much attention. A Developing status was recommended.
- 2026 Interim: A representative from ChargePoint commented that this type of receipt is happening whether we like it or not and that this can continue to be worked while being given a Voting status this cycle.

Advisory:

- 2026 Annual: A Representative from NIST supports this item with NIST edits and recommends striking examples in the definition.
- 2026 Interim: A representative from NIST OWM supports this as a Developing item and voiced appreciation to the NTEP Committee for the work that has been done to address this issue. NIST OWM also provided a suggested modification to the definition of **recorded representation**. If this modification is accepted, NIST OWM would support this as a voting item.

Comments Against:

Regulatory:

- 2026 Annual: A Representative from Arkansas Bureau of Standards recommends the two parts of this item be separated into two individual items (recorded representation and electronic receipt). Arkansas does not support the definition of electronic receipt.
- 2026 Annual: A Representative from Colorado Department of Agriculture asked a question about changes and recommends downgrading to address previous comments.
- 2026 Annual: A Representative from California Division of Measurement Standards supports the intention of the proposal but states no code sections are listed at the end of this item. They are supportive of the NIST recommended edits, but more work is needed to the definition of electronic receipt, so it applies to the correct code.
- 2026 Annual: A Representative from Delaware Department of Agriculture stated opposition to the electronic receipt definition but supports the rest of the proposal.
- 2026 Annual: A Representative from Maryland Department of Agriculture agrees with Arkansas about the definition.
- 2026 Interim: A regulator from Arkansas spoke in opposition to this item and recommended that it remains Developing. The main concern voiced was that having secondary methods of delivering a recorded representation to consumers in the same code and paragraph of the primary method has given industry the impression that the primary method is optional or can be replaced by secondary means. It was conveyed that secondary options are in addition to the primary and that secondary options, if listed, should be in device specific codes. In separate comments, this regulator recommended that this should be placed in device specific codes and not the definitions.
- 2026 Interim: A regulator from Washington spoke in support of comments heard from Arkansas and wants to recognize and emphasize that the default method of receipt delivery should be in printed form.
- 2026 Interim: A regulator from Maryland spoke in agreement with the representatives from Arkansas, California, and the MMA and recommends a Developing status.

Industry:

- 2026 Interim: A representative of MMA spoke in support of this item in principle as a Developing item. It was stated that an exhaustive list should be based on requirements and not a list of technologies of the time.
- 2026 Interim: A representative from Gilbarco Inc. supports the position of the MMA in that this list of recorded representations could be taken as restrictive and that the language could be more generic to allow for different types of technologies.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: After the Annual Meeting, the Committee revised and divided this item into three separate items GEN-26.1, OTH-26.5, OTH-26.6, based on the comments heard during open hearing. The body voted to assign an Informational status to this item at the Annual Meeting. NCWM 2026 Interim Meeting: Hearing comments on this item, the Committee has assigned a voting status to the item, incorporated the definition of **recorded representation** as provided by NIST OWM, and removed the electronic form example list from the proposed **electronic receipt** definition.

The Committee noted that the item was incorrectly identified in Publication 15 at the NCWM 2026 Interim Meeting. The item was corrected from GEN-26.5 to GEN-26.1

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufacturers Association): Supports this item and recommends adoption.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports a voting status.

Mr. Steve Harrington (Oregon Weights & Measures): He believes that the list is not helpful and supports voting.

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): Supports a voting status.

Mr. Khoa Lam (County of Los Angeles, California): Supports a voting status.

The 2026 S&T Committee recommends a Voting status, based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representative from New Jersey Weights & Measures, NYS Weights & Measures, New Hampshire Division of Weights and Measures, and PA Dept. of Agriculture Bureau of Weights and Measures recommended a voting status.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

Representatives from Arkansas, Maryland and Louisiana believe the item is fully developed and recommend Voting.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL – SCALES

SCL-24.2 D Multiple Sections Regarding Tare

Source:
Ross Andersen, New York, Retired

Purpose:
Reduce confusion regarding net weight and tare issues by defining terms and adds specific requirements for tare operations and for marking and printing of net, gross and tare weight values.

Item under Consideration:
Amend Handbook 44, Section 2.20. Scales Code and Appendix D, Definitions as follows:

NOTE: This proposal and justification were modified by the submitter before the fall 2025 regional association meetings.

Based on comments received and extensive discussion with OWM staff, I submit this revised proposal as part of the continuing development of this item. This revision replaces the original item.

The proposal consists of three sections. Part 1. establishes the terminology that is important to understand the meaning of key terms. Part 2. addresses the question of proper testing of weighing instruments, both gross and net indications. Part 3. addresses identification of indicated weight, recorded weight values, and externally calculated weight values. Part 3 also includes the subject of mathematical agreement.

Part 1. Preliminaries: Terminology of Weighing

The language surrounding "weight" is highly nuanced. This reflects thousands of years of evolution in commercial activity and even radical changes that occurred within my lifetime with the invention of digital weighing instruments. The important issue is that a weighing instrument provides weight indications reacting to whatever load it senses. It is the operator that operates the instrument and converts these weight indications into weight values that are used in the commercial transaction based on knowledge of the specific load or loads involved in the weighing operation. The applicable rules for weight indications and weight values are:

- Weighing instruments produce **weight indications** reacting to changes in applied load in real time. Analog indications are unrounded, but Digital indications are rounded per G-S.5.2.2.(c).

- Weighing instruments may record **weight values** from weight indications. Analog must comply with G-S.5.2.2.(b) and digital must comply with G-S.5.2.2.(a)&(d). *Recorded values don't change with applied load.*

- Weighing instruments may externally calculate **weight values** from two measured weight values using the formula: Gross – Tare = Net (and variations).

Analog instruments have a single scale of weight indication beginning at no load zero balance. All digital instruments have a scale of indication beginning at no-load zero parallel to the analog instruments. Some digital instruments have a tare mechanism and will have two scales, one beginning at no-load zero and the other beginning at tare load zero after operation of a tare mechanism.

The loads used by the operator in the weighing process are as follows:

- Dead load – meaning the load receiver and support structure.
  - No load – meaning the dead load plus any additional load that is not part of the transaction, e.g., the scoop used with a computing scale in a candy store, or dirt and debris that accumulates on a vehicle scale.
  - Service load – meaning the item(s) subject to a charge for service based on weight. The terms gross, tare and net have no relevance to a service load.
  - Tare load – meaning the tare materials delivered with the commodity.
  - Net load – meaning the commodity.
  - Gross load – meaning the net load plus the tare load.

The term weight in common usage has the following variants.

- Weight, or gross weight – meaning (a) the indication of an instrument on the measurement scale beginning at no load zero, (b) the weight value derived from weight or gross weight indications for any load, or (c) the weight value derived from weight indications for the gross load.
- Net weight – meaning (a) the indication of an instrument on the measurement scale beginning at tare load zero, (b) the weight value derived from net weight indications for any load, or (c) the weight value derived from net weight indications for the gross load.

The key is that weight values must be derived from indications and require the operator to identify the associated load. Another important takeaway is that multiple meanings for the same term results in always being forced to consider the context to understand the requirement.

Part 2. Testing Procedures for Weighing

Amend section S.1.1. . and add a new section S.1.1.3. as follows:

S.1.1.1. Digital Indicating Elements.

(a) A digital zero indication shall represent a balance condition that is within ± ½ the value of the scale division d. **This does not apply to weight classifiers or to the counting feature on prescription scales.**

(b) After zero-setting (gross zero or net zero after a tare operation) the effect of zero deviation on the result of the weighing shall be not more than ***~~± 0.25 e.~~:***

(i) ± 0.5 e for Class IIIL scales and Class IIII highway weight enforcement scales with values of n = 400 or greater, or

(ii) ± 0.25 e for all other scales. On a multi-interval scale, e shall be replaced by e_1.

(Amended 202X)

[Nonretroactive as of January 1, 2025]

(c) A digital indicating device shall have a "center-of-zero" indicator that indicates a zero-balance condition when the deviation from zero is not more than ***~~± 0.25 e~~ the corresponding values in S.1.1.1.(b)****. A "center-of-zero" indicator may operate when zero is indicated for gross and/or net mode(s). The "center-of-zero" indicator is not mandatory on a device equipped with an auxiliary indication or equipped with an enabled zero tracking mechanism that maintains a "center-of-zero" condition* ***~~to ± 0.25 e~~ compliant with S.1.1.1.(b).***

(Amended 202X)

[Nonretroactive as of January 1, 1993]

(d) For electronic cash registers (ECRs) and point-of-sale systems (POS systems) the display of measurement units shall be a minimum of 9.5 mm ($^3/_8$ inch) in height.

[Nonretroactive as of January 1, 2021]

(Added 2019)

(Amended 1992, 2008, 2019, and 2024)

S.1.1.3. Analog Indicating Elements. – After zero-setting the effect of zero deviation on the result of the weighing shall be not more than:

(a) ± 0.5 e for Class IIIL scales and Class IIII highway weight enforcement scales with values of n = 400 or greater, or

(b) ***± 0.25 e for all other scales****.*

[Nonretroactive as of January 1, 202X]

(Added 202X)

Add a new Note N.1.13., and amend T.N.2.1. and T.N.3.3. as follows:

N.1.13. Testing Requirements. – When measuring errors for compliance with Table 6., the following shall apply.

(a) For Class IIIL scales and Class IIII highway weight enforcement scales with values of n = 400 or greater, the test load shall be applied at a zero/reference value accurate to ± 0.5 e, and the error calculation shall resolve the error to the nearest 1 e.

(b) For all other scales, the test load shall be applied at a zero/reference value accurate to ± 0.25 e, and the error calculation shall resolve the error to the nearest 0.2 e.

(Added 202X)

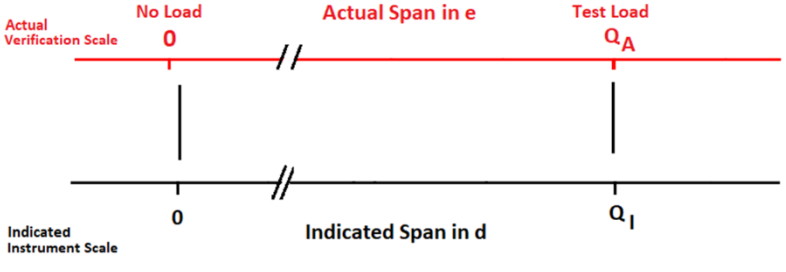
T.N.2.1. General. – The tolerance values ~~**are positive (+) and negative (–)**~~ **herein prescribed shall be applied to errors of overregistration and underregistration.** ~~**with the weighing device adjusted to zero at no load. When tare is in use, the tolerance values are applied from the tare zero reference (zero net weight indication); the tolerance values apply to the net weight indication for any possible tare load using certified test loads.**~~ **The tolerances apply to errors in gross indications when no tare mechanism is in use, and they apply to errors in net indications when a semi-automatic tare mechanism is in use. (See N.1.13.)**

T.N.3.3. Wheel-Load Weighers and Portable Axle-Load Weighers of Class IIII. – The tolerance values are two times the values specified in T.N.3.1. Maintenance Tolerance Values and T.N.3.2. Acceptance Tolerance Values **for scales with n of 400 or greater.**

(Amended 1986 **and 202X**)

Justification: The current S.1.1.1.(a) was written for normal rounding scales. The +/- 0.5 division is an absolute requirement meaning zero must extend from -0.5 d to + 0.5 d and must be 1 d wide. The new exemption in part (a) for weight classifiers is necessary because classifiers round mostly up instead of half up/half down. The width of the zero division is typically much smaller than 1 d for these instruments to provide for rounding up. The exemption in part (a) for pill counters is necessary because counting scales round mostly down. The zero pill indication could extend from no load to just under 1 pill (both plus and minus) making the zero division almost 2 d wide. Both of these types of scales are covered by the accuracy of zero requirements in part (b) ensuring center of zero is accurate.

The error in the Scales Code is calculated from the indication on the instrument scale (in d) and a test load on the verification scale (in e). See figure below. After aligning the zeros of the two measurement scales, you calculate error of under/overregistration as indicated quantity Q_I minus actual quantity Q_A with quantity in weight units. For this to work effectively, the zeros must be accurately aligned and the rounding error in the error calculation must be minimized. Note the small offset between the zeros.



The current zero accuracy requirement in S.1.1.1.(b) of +/- 0.25 e was clarified in amendments made 2024. However, the tolerance structure of class IIIL and IIII highway weight enforcement scales is very different from the other classes with many more e's of tolerance (up to 20 for IIIL and up to 10 for IIII). The 0.25 e accuracy of zero error becomes excessively small for these devices, for example, +/- 5 lb on a 200,000 lb x 20 lb IIIL vehicle scale. This is almost at the limit of detection. After the change, any zero indication within +/-10 lb (+/-0.5 d) is sufficiently accurate. More on this subject follows below. This is reflected in the new test note as well.

The n = 400 or greater limitation for weight enforcement scales is similar to the 2,000 minimum n for class IIIL. Permitting twice the tolerance when n is less than 400 can increase the relative tolerance to 4 %, e.g., 2 e at 50 e load. A search of NTEP approve weight enforcement scales did not reveal any instruments currently with n values less than 400. It is not necessary to update the nonretroactive dates in S.1.1.1.(b) or (c) as the new requirement is less stringent for the class IIIL and highway

weight enforcement scales. Note, the accuracy of zero also applies to a strain-load reference value in a strain-load test which will be a non-zero value.

The new paragraph S.1.1.3. is necessary to apply the accuracy of zero requirements equally to analog instruments. This recognizes that analog zero adjustments may have finite variability.

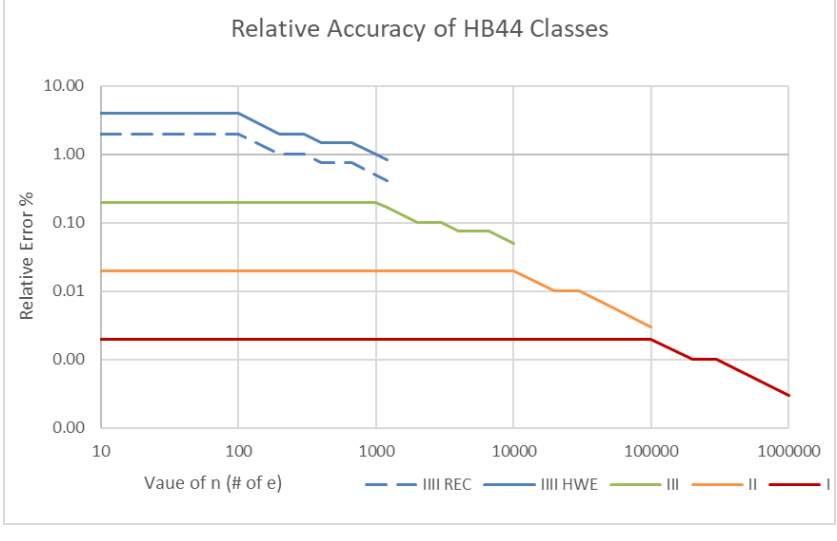
The new test note N.1.13. sets both zero accuracy requirements and resolution requirement for testing the scale. More information of the tolerance structures in the Scales Code and the issue of resolving errors is added below.

The changes to T.N.2.1 clarify that tolerances apply to errors of under/overregistration. The current plus or minus could also be errors in excess/in deficiency. The deleted language is clarified to explain how to conduct the tests to apply the tolerances to both gross and net indications. The limitation to semi-automatic tare reflects the fact that net zero is not normally seen at any time in the transaction and that accurate zero to S.1.1.1.(b) cannot be assumed with these tare methods. Semi-automatic tare must comply with S.1.1.1.(b).

Understanding Scales Code Tolerances

With the step tolerances in the Scales Code, the increased tolerances with increased test loads give us a false sense that tolerances increase as test loads increase. Yet the tolerances are actually decreasing when you look at them relatively rather than absolutely. In addition, we expect weighing instruments to be close to linear in performance. This is why we test at the maximum load in each tolerance step. The result, as the capacity moves into the second, third, or fourth step, is decreased probability of failing at lower steps.

The relative accuracy of the HB44 weight classes in the Scales Code (other than IIIL) are presented in the graph below. The scale tolerances based on relative error can be thought of as tolerance at capacity divided by the capacity, or e's of tolerance divided by n. The basic principle is that more e's generally reflects more accuracy (smaller tolerance) both within a class and between classes.



- Class IIII for highway weight enforcement ranges from 2 e per 50 e or 4% to 10 e per 1,200 e or 0.8%.
- Class IIII for recycling ranges from 1 e per 50 e or 2% to 5 e per 1,200 e or 0.4%.
- Class III ranges from 1 e per 500 e or 0.2% to 5 e per 10,000 e or 0.05%.
- Class II ranges from 1 e per 5,000 e or 0.02% to 3 e per 100,000 e or 0.003%.
- Class I ranges from 1 e per 50,000 e or 0.002% to 3 e per 1,000,000 e or 0.0003%.

Class IIIL is an anomaly, since it does not follow the principle of increasing accuracy with larger n. This class is a constant 0.2% tolerance over the entire class range from n = 2,000 to n = 10,000. The connection to class III is that class IIIL shares the same relative tolerance (0.2%) as Class III up to 1,000 e. The key is to see that the e and d of IIIL are significantly smaller than the equivalent class III for n up to 1,000. If you make a 0.2% accurate class III instrument with 200,000 lb capacity, you get a d of 200 lb. Yet the equivalent class IIIL has 20 lb d. In many respects class IIIL is like having auxiliary indication for class III. Consider the comparison table below for a 200,000 lb scale.

Consideration	III	III	IIIL
Scale Division d/n	20 lb/10,000	200 lb/1,000	20 lb/10,000
Tolerance @ 100 k/200 k	100 lb/100 lb	200 lb/400 lb	200 lb/400 lb
Suitable Test Load	80,000 lb	100,000 lb	30,000 lb
Accuracy of Zero	5 lb	50 lb	10 lb
AZT Window	10 lb	100 lb	60 lb
Print Stability	20 lb	200 lb	60 lb
Minimum Load	400 lb	4,000 lb	1,000 lb

If we tried to fit a 200,000 lb x 20 lb scale (column 2) into class III, not only do the tolerances get far too small but you also are faced with stringent requirements (shaded areas) such as:

- testing at a minimum of 80,000 lb to test at 4,000 e with its 60 lb (3 e) tolerance.
- trying to enforce 0.25 e accuracy at zero which is at the limit of detection.
- the scale would have to return to zero within 10 lb in order to get into the AZT window of ½ d.
- indication stability would have to be within 20 lb (+/-1 d) to print with wind.
- the 20 d minimum load would permit weighing down to 400 lb.

Increasing the d to 200 lb (column 3) returns the tolerances to the current 0.2% but some of those values that were too small at 20 lb d now are too large, like the 200 lb print motion and 4,000 lb minimum load. Class IIIL with its smaller 20 lb divisions (column 4) solved many problems (and required a good number of compromises).

Class IIII weight enforcement scales in contrast to class IIII follow a similar pattern to the IIIL vs III. The doubling of the tolerance along with the n = 400 minimum solved many problems.

Consideration	IIII	IIII	IIII(2xT)
Scale Division d/n	50 lb/400	200 lb/100	50 lb/400
Tolerance @ 10 k/20 k	100 lb/150 lb	200 lb/400 lb	200 lb/300 lb
Accuracy of Zero	12.5 lb	50 lb	12.5 lb
AZT Window	25 lb	100 lb	25 lb
Print Stability	50 lb	200 lb	50 lb
Minimum Load	500 lb	2,000 lb	500 lb

Resolving Errors

NTEP specifies that error calculations be resolved to 0.2 e or finer parallel to R76, reducing rounding error to a maximum of 0.1 e. The resolution of the error to 0.2 e is important because the value of d may be smaller than e with auxiliary indication, larger than e for most weight classifiers, greater than 3 e for counting scales, and equal to e for other scales. When computing error ($Q_I - Q_{A)}$ the different resolution of the indication results in very different resolution in the error.

This means rounding errors in calculating the error may be 0.05 e with e = 10 d auxiliary indication, ~10 e with e = 0.1 d weight classifiers, ~3 e with e = 0.33 d counting, and 0.5 e for other scales. R76 stipulated 0.2 e or finer to standardize the measurement of error. The principle is that once error resolution is reduced to 0.2 e or less, rounding error is considered insignificant.

The codification of these parameters formally authorizes the NTEP practices and clarifies that the rounding error is not included in the tolerances in Table 6. This does not prevent field tests from resolving errors to 1 e, when considering enforcement discretion. Just as many tests are not normally performed in field tests, this test may be modified for convenience with the full understanding that the practice can significantly increase the tolerances above the intended values.

To resolve error calculations to 0.2 e you can use one of three test methods:

1. Test at a whole number of e and resolve the indication to 0.2 e of finer. For example, for class II at the first tolerance step apply a load of 5000 e and resolve the indication to 0.2 e by (a) interpolating the analog indication to 0.2 e or finer, (b) by using indications with auxiliary indication to 0.2 e or finer, or (c) using extended display mode with temporary d = 0.2 e or finer.

2. Test at a whole number of d and apply test load in increments of 0.2 e or finer. For analog the test begins at the zero graduation and ends at a load graduation by adjusting the test load. For digital, the break points between divisions is used beginning at 0.5 d and ending at the test indication +0.5 d. For the first step in class III this could mean a final indication of 500.5 d. The span from 0.5 d to 500.5 d is precisely 500 d.
3. Test at a random point (as with the dynamic monorail). The instrument records values with auxiliary indication to 0.2 e or finer and the actual value is found on a reference scale with verified scale divisions = 0.2 e or finer.

The proposed resolution of the error for classes IIIL and IIII weight enforcement is to the nearest 1 e. This means error weights are not require ever to test these scales. The important issue is how rounding error in the indication impacts the pass/fail threshold. Remember, in field tests the instrument has to fail in order to take action. You find the fail threshold by adding the rounding error to the tolerance.

Consider a class III scale when testing at 500 e where the tolerance is 1 e or 0.2%, If you resolve error to 1 d, the rounding error is 0.5 d or e. This means you will not fail the scale until the error exceeds 1.5 e or 0.3%. That's 50 % more than the Table 6. tolerance. If you resolve the error to 0.2 e as described above, the rounding error is reduced to 0.1 e and you will not fail until the error exceeds 0.22%. This explains why HB44 directs that tests be performed at the tolerance break points which represent the tightest tolerance in each tolerance step. It also partially explains why class IIIL was created.

With large capacity scales of class III it would be a hardship to test at the first tolerance break point at 500 e. Consider a IIIL of 200,000 lb with d/e = 200 lb. That requires 100,000 lb of test weights to get to the tolerance break point. Bringing 4 weight trucks to test a single scale is not an acceptable solution. Often you can only muster 150 e (30,000 lb) of test weights where the fail threshold is 1%. That's not a meaningful test.

For large capacity Class III with error resolution 1 d

@ 500 e load – (1 e tolerance + 0.5 e rounding error) / 500 e * 100 = 0.30 % fail threshold

@ 150 e load – (1 e tolerance + 0.5 e rounding error) / 150 e * 100 = 1.0 % fail threshold

Now follow R76 rule of resolving error to 0.2 e. The fail threshold is better, 0.22 % at 500 e, but it is still 0.73% at 150 e. Again this cannot hold the scale to 0.2% error.

For large capacity Class III with error resolution 0.2 d

@ 500 e load – (1 e tolerance + 0.1 e rounding error) / 500 e * 100 = 0.30 % fail threshold

@ 150 e load – (1 e tolerance + 0.1 e rounding error) / 150 e * 100 = 0.73 % fail threshold

This rounding issue s is one reason class IIIL was created. Consider a class IIIL with e = 20 lb resolving error to 1 e. The values below show the fail threshold at the first four steps. Even at only 30 k test load the effective tolerance is very close to the 0.2% desired. Also, this test is repeated upscale with the strain-load test evaluating the 0.23 accuracy over another part of the weighing range.

For Class IIIL error resolution 1 e (direct reading to nearest d means 0.5 e rounding error)

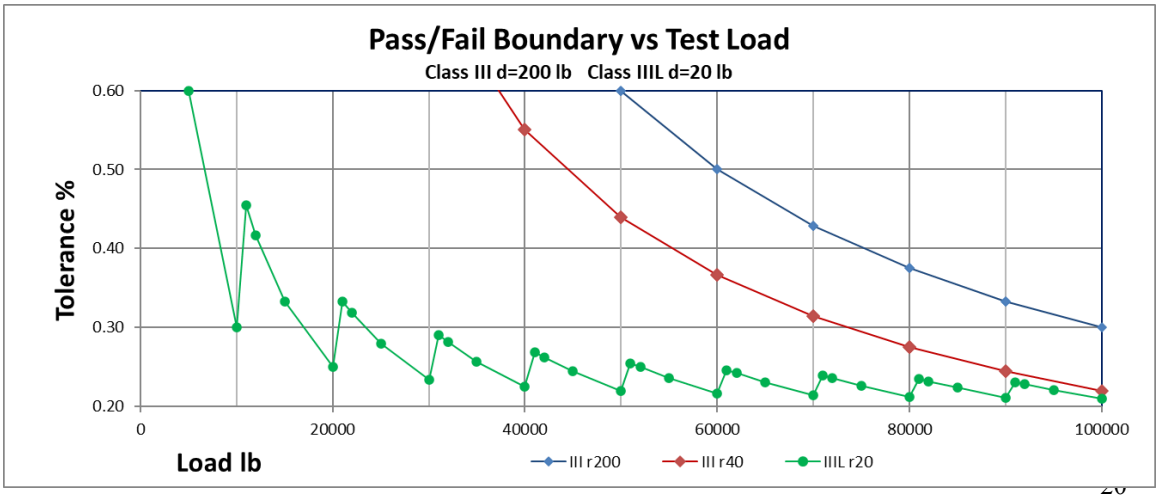
@ 500 e load – (1 e tolerance + 0.5 e rounding error) / 500 e * 100 = 0.3 % fail threshold

@ 1,000 e load – (2e tolerance + 0.5 e rounding error) / 1,000 e * 100 = 0.25 % fail threshold

@ 1,500 e load – (3 e tolerance + 0.5 e rounding error) / 1,500 e * 100 = 0.23 % fail threshold

@ 2,000 e load – (4 e tolerance + 0.5 e rounding error) / 2,000 e * 100 = 0.23 % fail threshold

In the graphic below, the fail thresholds are shown for class III with d = 200 lb and class IIIL with d = 20 lb. The blue line for class III depicts rounding to nearest d (200 lb) while the red line for class II depicts rounding to the nearest 0.2 d (40 lb) as proposed. The green line for class IIIL depicts rounding to nearest 1 d (20 lb). This means rounding error to 1 e is sufficient to evaluate the 0.2 % tolerance for class IIIL.



Note that NTEP presently uses the 0.2 e resolution for class IIIL. Consider that in tests close to CLC you are using 4 lb error weights to evaluate a tolerance of maybe 160 lb.

Part 3. Identification of Weight Indications and Recorded and Calculated Weight Values
Add a new S.1.15. and S.1.16. as follows:
S.1.15. Identification of Weight Indications.

(a) Gross indications need not be identified, but may be identified by the symbol "G" to the right of the weight value, e.g., 4.48 kg G.

(b) Net indications shall be identified by the symbol "N" to the right of the weight value, e.g., 4.48 kg N.

(c) ***However, it is permitted to replace the symbols "N" or "G" with the terms "net" or "net weight", or "gross" or "gross weight" respectively adjacent to the weight display.***

(Added 20XX)
(Nonretroactive as of January 1, 202X)

S.1.16. Identification of Recorded and Calculated Weighing Results.

(a) Recorded values shall match associated indicated values, including any gross or net identification of the corresponding indication using the symbols "G" or "N" to the right of the weight value, e.g., 4.48 kg G.

(b) If only net weight values are recorded without corresponding gross or tare values, they may be recorded without any identification. This applies also where semi-automatic zero setting and semi-automatic tare are initiated by the same key.

(c) Recorded values may include additional gross, net, and/or tare identification based on operator knowledge of the applied. If gross, tare, and net weight values are all recorded together, the net and tare values shall at least be identified by the corresponding symbols "N" and "T."

(d) However, it is permitted to replace the symbols "G", "N" and "T" by corresponding text, e.g., "gross" or "gross weight," "net", or "tare" respectively either before or after the weight value, e.g., 10 kg N or Net 10 kg.

(e) When gross, net and tare values are recorded together, one of these values may be calculated from two recorded weight values based on the formula Gross – Tare = Net. The calculation shall be mathematically correct. See Note. In the case of a multi-interval or multiple range scale the calculated weight value may be presented with a smaller scale division. Example:

455 kg Gross Weight (WR2 d = 5 kg)

- 14 kg Tare Weight (WR1 d = 2 kg)

= 441 kg Net Weight (mathematically correct but d is 1 kg)

Note: when gross, net, and tare values are recorded together and all three values are independently measured, it is not possible to ensure mathematical agreement due to rounding errors.
(Nonretroactive as of January 1, 202X)
(Added 20XX)

Justification: These new sections provide clear specifications for identifying net weight and the use of tare mechanisms. Because these changes may be significant, they are proposed as nonretroactive. There is nothing in the Scales Code to specify how to identify weight indications and recorded values. Without these sections, any decisions regarding appropriate identifications are arbitrary. Note that NTEP relies heavily on G-S.5.2.4. Values, but general rules are not sufficient in this case. Also, Pub 14 has no legal standing and HB44 must be clear on its own.

The new S.1.15. recognizes that indications can only be gross or net. Not identifying gross indications is a long-standing practice, and this requires an explicit exemption from G.S.5.2.4. However, these indications may be identified as gross. Net weight indications, when a tare mechanism is in use, must be identified as net. A tare weight display is a recoded value covered in the proposed S.1.16. The OWM has suggested this could be accomplished through examples of acceptable indications or by combining indications and recorded requirements. However, legal requirements cannot be expressed through examples. Examples are only used to further clarify stated requirements and could be valuable in a comprehensive training program for weight indications.

In S.1.16. the specifications governing recorded and calculated weight values are added. This section comes largely from R76 section 4.6.11. This is presented separate from indications in S.1.1.5., since it adds multiple layers of options that are not suitable for indications.

In (a) the General Code principle (G-S.5.2.2.) that recorded values should mirror the associated indications is reinforced. If the indication has gross or net identification, then the recorded values must include it as well.

In (b) Net values presented alone (no gross or tare weights) are exempt from identification consistent with the UWML definition of Net Weight. This includes weighing the net load with gross indications as well as gross load with net indications. In the latter case, the indication is required to identified “net” but the recorded value is exempt.

In (c) the option for the operator to add information that is not available from the indication is recognized. The scale can only indicate gross or net weight and cannot know what load is on the load receiver. The operator knows that the gross indication of the tare load is Tare Weight, the gross indication of the gross load is Gross Weight, the gross indication of the net load is Net Weight, and the gross indication of the service load is weight.

It is the operator that adds this information through controls on the instrument. This section also exempts Gross Weight from being identified when gross, tare and net are presented. Gross is exempted since there is a long standing trade practice to not require identification of gross indications, also from R76.

In (e) the calculation of weight values is permitted, based on using two recorded weight values and calculating the third using the formula gross – tare = net. In this sense, calculation is external to the weighing capability of the instrument. A good example is the weigh-in/weigh-out system. The net weight is calculated by subtracting the tare weight from the gross weight. This is unlike internal calculations for keyboard or programmed tare performed internally. The example shows that the calculated value has a 1 kg d that is smaller than either the 2 kg or 5 kg d of the instrument indications. The note is vital to explain that if gross, tare, and net values are each measured independently with semi-automatic tare, 25 % of the time the results will not be in mathematical agreement due to rounding errors. For example, with d = 1 lb and gross = 23.7 lb, tare = 3.4 lb and net = 20.3 lb, the corresponding measured values indicated and recorded will be 24 lb G, 3 lb T and 20 lb N (no mathematical agreement). This particularly impacts multiple range and multi-interval scales. If all three values are measured, the agreement of digital values in G-S.5.2.2. requires that digital values indicated and recorded agree exactly. If gross, net and tare values are all measured they may be in different weighing ranges it is likely that they will not be in mathematical agreement.

The Office of Weights and Measures has suggested that the calculated value part of S.1.16. be put in a separate section. The proposal keeps it with recorded values because the scale is using recorded values to perform the calculations. The proposal followed R76 as these were all in the same section.

Comments in Favor:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Comments Against:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: A representative from the Scale Manufactures Association made comments in opposition to this item and recommended a Withdrawn status due to not being enough confusion to warrant a change.

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: A representative from NIST OWM stated that this item should remain Developing because the submitter has continued to make changes to the item each cycle.

Item Development:
NCWM 2026 Annual Meeting: The Committee chose to retain the Developing status to allow the submitter to further develop the item, however the item may be withdrawn if the submitter fails to further develop the item.

NCWM 2026 Interim Meeting: After hearing comments from the floor, the Committee assigned a Developing status to allow the submitter to further develop the item.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item is withdrawn.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufacturers Association): Reiterates comments from the April meeting and recommends withdrawal. He believes that there is not enough confusion to warrant the changes and it is not needed.

Mr. John McGuire (NIST OWM): Recommends voting with amended changes. This item has been on the agenda for two years without significant progress towards its adoption. The language of the proposal has not been updated in more than a year, nor has the submitter provided any testimony at any of the regional or national meetings in the last year. NIST OWM is of the opinion that this amendment addresses the core problem with minimal change to the Handbook and is therefore easier to understand. The implementation of the mathematical agreement of gross, net, and tare values as described in S.1.2.1. causes an offset in the net zero value, which leads to multiple problems.

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): Recommends that the item be withdrawn. Issues have not been addressed and no progress has been made.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports developing with NIST recommended changes.

The 2026 WWMA S&T Committee recommends that this item be assigned a Withdrawal status, based on testimony heard on the floor during open hearings and noting printed comments from the 2026 NCWM Annual meeting S&T Committee. No further development has been submitted.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representative from New Jersey Weights & Measures, NYS Weights & Measures, New Hampshire Division of Weights and Measures, and PA Dept. of Agriculture Bureau of Weights and Measures recommended a voting status.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

Representatives from Arkansas and Maryland recommend Withdrawn due to lack of development.

A representative from Scales Manufacturing Association opposes this item.

The committee recommends Withdrawn on this item.

Additional letters, presentations, and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL-27.4 S.2.3. Tare

Source:
NCWM

Purpose:
Devices such as POS shopping carts with NCWM NTEP CCs that collect multiple items/weighments on or in the load receiving element. These devices return to zero between weighments. The NTEP evaluation treats proceeding weighments as "tare." This proposal will allow for multiple tare weights on the same platform and the platform returning to net zero between weighments.

Item under Consideration:
Amend NIST Handbook 44 Scales Code as follows:

S.2.3. Tare. – *On any scale (except a monorail scale equipped with digital indications and multi-interval scales or multiple range scales when the value of tare is determined in a lower weighing range or weighing segment), the value of the tare division shall be equal to the value of the scale division.** The tare mechanism shall operate only in a backward direction (that is, in a direction of under registration) with respect to the zero-load balance condition of the scale. *A device*

*designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.** ***The tare value shall reduce the scale's capacity proportionally.*****
*[*Nonretroactive as of January 1, 1983]*

A tare mechanism can be used progressively or regressively, where multiple gross loads are applied to (or removed from) the scale and weighments are performed to return the scale to net zero, without returning to gross zero between weighments. Examples of progressive / regressive use of a tare mechanism include, but are not limited to, POS shopping carts and hopper scales. **

[**Nonretroactive as of January 1, 20XX]

(Amended 1985 and 2008)

Previous Status:
2027: New Proposal

Original Justification:
The current tare section is not applicable to technology entering the marketplace. The NIST Handbook 44 definition of tare mechanism follows:

tare mechanism. – A mechanism (including a tare bar) designed for determining or balancing out the weight of packaging material, containers, vehicles, or other materials that are not intended to be included in net weight determinations. [2.20]

Possible opposing arguments include:

- Implications on point-of-sale systems recorded representations.
- The current definition may already encompass the new application based on interpretation.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Iowa Department of Agriculture/Weights & Measures was not opposed to this item but had concerns about durability of the device and questions how the environment will impact accuracy.

A representative from Richard Suiter Consulting reported manufacturers are doing testing and the concerns raised by the representative from Iowa are being addressed.

A representative from Missouri Department of Agriculture reported that an inspector had removed all devices from service in his area after testing.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Richard Suiter (Richard Suiter Consulting): Problems came up after POS shopping carts received NTEP CoCs. Amazon and Instacart have these devices and they don't meet Handbook 44 requirements for either zero or tare, these changes address those issues. Mr. Suiter has videos available for view. Requests voting status.

Mr. Steve Harrington (Oregon Weights & Measures): Requests voting status.

The 2026 S&T Committee recommends a Voting status, based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures questions the need for the sentence "The tare value shall reduce the scale's capacity proportionally". They are unaware of any scale that will increase its marked capacity based on the addition of tare within the POS system. Additionally, the progressive/regressive tare should be limited to specific device applications; we should not give examples but name them explicitly. If additional device applications appear in the future, they can be added.

2026 NEWMA: A representative from NYS Weights & Measures disagrees with adding examples to the main body of the handbook. They believe the examples could be added to a definition.

2026 NEWMA: A representative from Richard Suiter Consulting stated that the Weighing Sector Task Group thought it useful to include the examples. The current definition for tare does not account for how these scales operate.

2026 NEWMA: A representative from Instacart gave a presentation on the Capercart.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Richard Suiter Consulting gave a presentation on behalf of the weighing sector.

A representative from Arkansas Department of Agriculture supports the item, but question progressive tare abilities.

A representative from weighing sector specifically states POS carts.

A representative from Maryland Department of Agriculture supports this item.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL-27.1 UR.1. Selection Requirements

Source:
NIST Office of Weights and Measures

Purpose:
Correct terms in UR.1. Selection Requirements to align with the changes made to the Scales Code in 2024 by SCL-23.3.

Item under Consideration:
Amend NIST Handbook 44 Scales Code as follows:

> **UR.1. Selection Requirements.** – Equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to, its capacity, number of **verification** scale ~~**divisions**~~**intervals (n)**, value of the **verification scale interval (e) or** scale division **(d)** ~~**or verification scale division**~~, minimum capacity, and computing capability.[3]
> **(Amended 20XX)**

Previous Status:
2027: New Proposal

Original Justification:
At the 2024 NCWM Annual Meeting, item SCL-23.3 was adopted, which amended the term "verification scale division", replacing it with "verification scale interval", and in some instances replacing the term "scale division" with "verification scale interval" throughout Section 2.20. Scales. This paragraph was overlooked during the development and eventual adoption of SCL-23.3. Subsequently, the terminology in UR.1. is outdated regarding references to the number of verification scale intervals (n) and the verification scale interval (e), and is inconsistent with the other paragraphs in the Scales Code and with terms in Appendix D, Definitions. This proposal also reorders the terms "verification scale interval" and "scale division" to emphasize the significance of e relative to d, because e determines the accuracy class (along with n) and the tolerance applicable to the device, which is a key part of the selection process.

Through the adoption of SCL-23.3 in 2024, the weights and measures community has agreed that these are the correct terms, so there should be no opposition to this item.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports voting.

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): Supports voting.

The 2026 S&T Committee recommends a Voting status, based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representative from New Jersey Weights & Measures and NYS Weights & Measures recommended a voting status.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NIST add clarification to the item and recommended Voting.

A representative from Arkansas Department of Agriculture supports this item and recommends Voting.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL-22.2 A UR.3.1.X. Required Minimum for Cannabis Products.

Source:
NCWM Cannabis Task Group

NOTE: The Scales Focus Group of the NCWM Cannabis Task Group modified the proposal in the fall of 2024 as represented below.

Purpose:
Establish uniform scale suitability requirements among the states for sales of cannabis.

Item Under Consideration:
Amend Handbook 44, Section 2.20. Scales Code as follows:

The passing of SCL 25.1 at the July 2026 Annual Meeting and the update to Table 8 have provided new guidance for the scale suitability for cannabis. Since cannabis often sells in quantities less than 0.5 g and the new guidance indicates that any values less than 0.5 g should be weighed on a 0.01 e device, we propose the following:

UR.3. Use Requirements.

UR.3.1. Recommended Minimum Load. – A recommended minimum load is specified in Table 8. Recommended Minimum Load since the use of a device to weigh light loads is likely to result in relatively large errors.

Table 8.
Recommended Minimum Load

Class	Value of Verification Scale Interval (e*)	Recommended Minimum Load (d)
I	equal to or greater than 0.001 g	100
II	0.001 g to 0.05 g, inclusive	20
	equal to or greater than 0.1 g	50
III	All**	20
III L	All	50
IIII	All	10

*The value of "e" is specified by the manufacturer as marked on the device (see Table S.6.3.a). For Class I and II devices equipped with auxiliary reading means (i.e., a rider, a vernier, or a least significant decimal differentiated by size, shape or color), the value of the verification scale interval "e" is the value of the scale division immediately preceding the auxiliary means. For Class III and IIII devices "e" must be equal to "d."

**A minimum load of 10 d is recommended for a weight classifier marked in accordance with a statement identifying its use for special applications.

(Amended 1990 and 2027)

UR.3.1.1. Minimum Load, Grain Dockage Determination. – When determining the quantity of foreign material (dockage) in grain, the weight of the sample shall be equal to or greater than 500 scale divisions. (Added 1985)

UR.3.1.2. *Cannabis* and *Cannabis* Products. - A scale used to determine the net weight of *cannabis* or *cannabis* products in quantities not exceeding 4 oz (113 g) shall have a verification scale interval (e) not greater than 0.01 g.
(Added 20XX)

Previous Action:
2025: Assigned to the Cannabis Task Group
2024: Assigned to the Cannabis Task Group
2023: Assigned to the Cannabis Task Group
2022: Assigned to the Cannabis Task Group

Original Justification:
As states legalize sales of cannabis in its various forms, the need has arisen for uniform standards for scale suitability. Uniform requirements from one state to the next, will strengthen each jurisdiction's ability to effectively regulate the industry in a fair and equitable manner. Uniform standards also provide industry with expectations regardless of the jurisdiction, reducing potential conflict or confusion.

Some states may already have scale suitability requirements differing for those proposed here. The task group is hopeful that differences can be resolved so that the standards are the same in every jurisdiction:

The proposed suitability requirements are based on existing standards as set forth by the California Division of Standards, Division of Measurement Standards.

The submitter requested that this item be a Developing Item.

Comments in Favor:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: A representative from the Scale Manufacturers Association did not review the newly submitted verbiage for this item but spoke in favor of the item as posted in the agenda as a Voting item.

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Comments Against:

Regulatory:
- 2026 Annual: None
- 2026 Interim: A regulator from California commented that this item has changed significantly. It was noted that there was a version of this item that was ready for a vote, but not this version.
- 2026 Interim: A regulator from Delaware commented that this item has been repeatedly pushed back waiting for an update for Table 8. This regulator was in favor of the previous version of this item but is not in favor of the current version of the item. The current version received a recommendation of Developing while the previous version received a recommendation of Voting from this regulator.

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- Annual 2026: A Representative from the Cannabis Task Group reported the task group has been meeting and should have a proposal available to the body this fall.
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: A representative from NIST OWM noted that there is a new chair of the Cannabis Task Group and that there is new language for this item that was submitted late in the fall of 2025.

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Item Development:
NCWM 2026 Annual Meeting: The Committee has chosen to retain the Assigned status to allow the task group to continue developing the item.

NCWM 2026 Interim Meeting: After receiving comments during open hearings on this item with several concerns regarding the updated language, the Committee assigned it a Developing status.

Evan Foisy, Chair
NCWM Cannabis Task Group
EFoisy@andonline.com

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remains assigned.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufacturers Association): Supports the intent of this item and recommends a developing status.

Mr. Steve Harrington (Oregon Weights & Measures): Expressed concern with product specific suitability, and Handbook 130 requirement for method of sale but also noted that there are many good points to other products. He recommends an assigned status.

Mr. John Beall (Ventura County, California): Expressed concern that having a specific regulation for a type of scale specific to a type of product is not a good idea and recommends an assigned status.

The 2026 S&T Committee recommends that the item remain Assigned to allow for continued development, based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures believes this should be a retroactive requirement. Scales currently in use with a smaller resolution could be in service for years to come. Having two types of scale applications weighing the same product, sometimes in the same business, will be problematic. They recommend a voting status with retroactive change.

2026 NEWMA: A representative from NYS Weights & Measures questions the use of "total weight" in UR3.1.5. The proposal needs to clarify whether total weight is Gross or Net Weight.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Scales Manufacturing Association supports the intent but wants further developing and recommends Assigned.

A representative from NIST believes the item is fully developed but careful consideration should be taken regarding the average weight of a cannabis transaction and recommended Assigned.

A representative from Florida Department of Agriculture supports informational status and would like the group to provide additional information.

A representative from Delaware Department of Agriculture doesn't believe the current proposal was submitted from the task group.

The committee recommends Assigned on this item.

Additional letters, presentations, and data may have been submitted for consideration with this item. Please refer to www.ncwm.com/publication-15 to review these documents.

SCL-27.2 UR.1.1. General., Table 7a. Typical Class or Type of Devices for Weighing Applications.

Source:
Volvo Construction Equipment

Purpose:
Amend table 7a to recognize On-Board Weighing systems (built-in scales) on front-end loaders (wheel loaders) for legal-for-trade applications.

Item under Consideration:

Amend NIST Handbook 44 Scales Code as follows:

Table 7a. Typical Class or Type of Device for Weighing Applications	
Class	**Weighing Application or Scale Type**
I	Precision laboratory weighing
II	Laboratory weighing, precious metals and gem weighing, grain test scales
III	All commercial weighing not otherwise specified, grain test scales, retail precious metals and semi-precious gem weighing, grain-hopper scales, animal scales, postal scales, vehicle on-board weighing systems with a capacity less than or equal to 30 000 lb, and scales used to determine laundry charges
III L	Vehicle scales, vehicle on-board weighing systems with a capacity greater than 30 000 lb, axle-load scales, livestock scales, railway track scales, crane scales, and hopper (other than grain hopper) scales
IIII	Wheel-load weighers and portable axle-load weighers used for highway weight enforcement **Wheel loader On-board Weighing System for construction material.**
Note: A scale with a higher accuracy class than that specified as "typical" may be used.	

(Amended 1985, 1986, 1987, 1988, 1992, 1995, 2012, ~~and~~ 2021**, and** 20XX)

Previous Status:

2027: New Proposal

Original Justification:

Business benefits for US operations (quarries, mines, construction and others)

- Reduced need for weighbridge at **temporary and remote sites**.
- Reduced risk of overloading trucks leading to **heavy fines** for trucking companies (or quarries). While loader systems can be used for this purpose, a certification would lead to more trust in the system to by-pass the weighbridge.
- Often-times loader operators will favor overloading slightly to ensure customers are not shorted → Resulting in **systemic product loss** over time.
- Certified weighing systems allow a more **streamlined and efficient** load out process.
- Less re-work, reduced bottle necks, possibility to digitalize workflow by invoicing on data created directly by the loader

Efficiency:

- Overloaded trucks are detected upon exiting a quarry at the weighbridge/scale house. The truck will need to return into the quarry and dump the complete load and get re-loaded at the pile → Fuel is wasted by both truck and loader
- Reduced idle time for trucks waiting in line to enter or exit the quarry waiting in line to be weighed → Fuel wasted

Safety

- Reduced need for truck drivers to step in and out of the cab to retrieve load tickets from the scale house.
- The Bureau of Labor Statistics (BLS) reports that truck drivers experience tens of thousands of injuries every year that require medical leave from work. Many of them are due to falls when mounting and dismounting the truck cab.
    - Journal of Economics: https://www.longdom.org/open-access/fall-risk-factors-for-commercial-truck-drivers-21187.html
    - Monthly Labor Review: https://www.bls.gov/opub/mlr/2015/article/workplace-hazards-of-truck-drivers.htm

Environmental Sustainability

- Reduced idle time of trucks queuing to be weighed at scale house → Less fuel used
- Less re-work for overloaded trucks that need to be re-loaded → Less fuel used
- The scale house is bottle neck for trucks both entering and leaving the sites

Future-proofing the industry

- High need for automation and digitalization with the current labor shortage (mainly due to massive retirement wave)

Certified On-Board weighing (legal for trade) is an excellent fit with digital tools for automatic invoicing

The submitter requests that this be a Retroactive requirement and given Developing status in 2027.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Missouri Department of Agriculture asked about how much data the submitter has collected and what percentage of tests failed. The representative also asked if tire pressure would impact accuracy and noted that this device should not be a Class IV device but should be a Class IIIL device.

A representative from Dick Suiter Consulting stated that data was limited at this point and that tire pressure issues would be

dealt with at NTEP. It was also stated that there were issues with Class IIIL tolerances relating to this item and that the device would be better suited for Class IV according to Canada and OMIL. This representative also reported that this device would be suitable for construction equipment and that suitability would be a factor when selling commodities. Recommends a developing status.

A representative from Kansas Department of Agriculture opposes this item and feels it should be withdrawn and started over. It was commented that making this a Class IV device is a mistake because Class IV is reserved for law enforcement only and that maybe this device should have its own section.

A representative from Nebraska FCSP-Weights and Measures said item does not belong in Class IV. It was stated that if this device is used in direct sales, then it would be a Class III device. A comment was also made that this would be great for approximation and that we need more data for prolonged usage.

A representative from Iowa Department of Agriculture/Weights & Measures supports the item in theory but needs more information and the material being used.

The committee recommends this item is assigned a developing status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

An industry member from Volvo gave a presentation on this item during open hearings.

Mr. Steve Harrington (Oregon Weights & Measures): States that there are many good business use cases but believes that class IIII is not a good case for these scales. He presumes that class IIII was chosen because it cannot meet tolerances in class III and IIIL. He also noted that wheel weighers are only for law enforcement. He recommends a developing status.

Mr. Richard Suiter (Richard Suiter Consulting): States that NIST Handbook 44 only has four classes. He recommended class IIII because the devices will not meet class IIIL consistently and noted that Class IIII is very similar to Canada and OMIL tolerances. He provided an example showing that the error in dollar value is very low compared to other devices. He recommends a developing status.

Mr. Cory Hainy (Avery Weigh-Tronix): Agrees with the comments from the representative from Oregon but does not believe class IIII is appropriate and supported class III or IIIL. He recommends a developing status.

Mr. John Sorfleet (Santa Clara County, California): States that the proposed equipment is not for highway enforcement and does not support it being class IIII. These systems are not weighing trucks and cargo and they are not preventing overweight. He recommends a developing status.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Agrees with previous commenters and stated that the current language and table already addresses onboarding scales. He recommends a developing status.

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): Provided comments on behalf of Mr. Aaron Yanker (Colorado Department of Agriculture, Weights and Measures) and stated that it is worth noting that the proposal lists the device under Class IIII accuracy category in Table 7a. of the scale code. In the justification by the submitter this application would be considered a commercial device and thus should be classified as a class III/IIIL. For the regulatory official to properly apply tolerances to a commercial device per Table 6, the tolerances would be much tighter than what the proposal is suggesting by listing this as a class IIII device. By simply lumping this device into the class IIII designation, the regulatory official does not have clear guidelines on whether they are to apply T.N.3.3. or other requirements for commercial devices. Potential impact to NIST Handbook 130 Section IV. Uniform Regulations under the Method of Sale of Commodities should be considered for the term “construction materials” in the proposal. The submitter needs to confirm if “construction materials” applies to commonly known commodities that are generally used in construction as outlined in the following sections of NIST Handbook 130 Method of Sale of Commodities which clearly define how the products can be sold (weight or volume): 2.29, 2.18, 2.7, 2.10, 2.11, 2.12. If the implementation of an on-board weighing system is approved for front end loaders, the possibility of incorrect weight tickets exponentially increases due to the difference of loader operator, stable weight, balance zero condition if the loader is moving, and the implementation of remote printed record requirements. Due to the item not being fully developed, not meeting its purpose, and not having merit, the Colorado Department of Agriculture, Weights and Measures is recommending the item be assigned a withdrawn status.

The 2026 S&T Committee recommends a Developing status, based on testimony heard during open hearings. The Committee recommends that the submitter address comments heard and continue to refine the item.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from Volvo Construction Equipment gave a presentation on this item.

2026 NEWMA: A representative from NYS Weights & Measures appreciates the presentation and agrees that these devices should be added to the handbook but not as shown in this proposal. These items should not be added as a class IIII item.

2026 NEWMA: A representative from New Jersey Weights & Measures stated that class IIII tolerances are too large for commercial applications. This Class is for law enforcement devices. Class III already lists on-board weighing systems.

2026 NEWMA: A representative from Richard Suiter Consulting responded to class IIII designation comments. Scale classes were introduced based on OIML in the 1980's. These devices will not meet class IIIL tolerances consistently. The value of error is suitable for only construction materials.

2026 NEWMA: A representative from PA Dept of Agriculture Bureau of Weights and Measures asked a question about general wear and tear of part of this equipment. The representative from Volvo Constructions Equipment answered that the scale must return to zero before it can measure a new load.

2026 NEWMA: A representative from New Hampshire Division of Weights and Measures asked if the purchases are itemized by the bucket load. The representative from Volvo Constructions Equipment answered that the invoice does not show the individual bucket weights.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture asked if the system has the capacity of showing the customer the zero value and the net weight.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Volvo gave a presentation.

A representative from Arkansas Department of Agriculture does not support the item and does not agree that it should go into the scales due to hardware, environmental conditions, and recommends its own code.

A representative from Richard Suiter Consulting representing Volvo stated Class IIII is not just for law enforcement; there was a problem with them fitting into Class IIIL. Wheel load weighers were always in Class IIII due to the tolerances needed. The largest load would have a minimal economic error. Devices can be very accurate.

A representative from West Virginia Department of Agriculture questioned type approval and how long they hold calibration.

A representative from Richard Suiter Consulting responded stated they are verified daily.

A representative from Avery is opposed to Class IIII, the truck scales would be held at Class IIIL.

A representative from NIST stated the term “wheel load” used in the code is not defined and suggests that a wheel loader on board weighing system needs a definition or term should be changed to vehicle on board weighing systems.

A representative from Richard Suiter Consulting Industry term would like to verify with OWM the correct verbiage and supports the change.

A representative from North Carolina Department of Agriculture wondered how this aligns with zero balance and customer display.

A representative from Richard Suiter Consulting responded there is an ability to have a remote display; the truck driver is only onsite. This depends on whether or not it is a direct or indirect sale.

A representative from Delaware Department of Agriculture stated they do have issues with repeatability.

A representative from Maryland Department of Agriculture believes it is placed in the incorrect class. It should be in IIIL instead of IIII. The accuracy shouldn’t be changed because a device can’t meet tolerances.

A representative from North Carolina Department of Agriculture recommends Developing.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL-27.3 UR.3.15. Separate Main Elements, $n_{max.}$

Source:
NCWM Professional Certification Program Coordinator

Purpose:
Place a clear requirement in the scales code that addresses the limiting factor for the nmax of separate elements that are interfaced.

Item under Consideration:
Amend the NIST Handbook 44 Scales Code as follows:

UR.3.15. Separate Main Elements, n_{max}. – The maximum number of verification scale intervals permitted for an installation is limited to the lowest n_{max} marked on the scale indicating element, weighing element, or load cell.

Previous Status:
2027: New Proposal

Original Justification:
Enforceable code language for addressing scale installations made up of separate weighing elements, indicating elements, and load cells of different capabilities does not exist in the Scales Code. It is not uncommon to have a system made up of different components installed to fit a specific weighing application. Currently, regulatory officials and the industry rely on the last sentence of the definitions below. These definitions are published in NIST Handbook 44, Appendix D.

nmax (maximum number of scale divisions). – The maximum number of scale divisions for which a main element or load cell complies with the applicable requirements. The maximum number of scale divisions permitted for an installation is limited to the lowest nmax marked on the scale indicating element, weighing element, or load cell.

nmax (maximum number of verification scale intervals). – The maximum number of verification scale intervals for which a main element or load cell complies with the applicable requirements. The maximum number of verification scale intervals permitted for an installation is limited to the lowest nmax marked on the scale indicating element, weighing element, or load cell.

While these definitions are clear, definitions alone are not enforceable. Definitions inform or control how the rules and restrictions within the code are interpreted, applied, and enforced.

Manufacturers and service providers apply the codes from the appropriate sections of NIST Handbook 44

in designing products to meet marketplace needs. Regulatory officials carefully study and train enforcement staff on the contents and application of NIST Handbook 44. Officials cite appropriate code sections when taking regulatory enforcement actions that may be challenged through legal appeal processes. Manufacturers, service providers, and officials rely on the definitions in Appendix D to provide clarity when a technical definition is needed or when a common dictionary definition is insufficient.

Some may argue that the definitions are sufficient for addressing these types of scale installations.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Believes that this should remain on the agenda as developing at minimum. He would like to hear from NIST. Is the language necessary in the Handbook?

Mr. Steve Harrington (Oregon Weights & Measures): States that he has no issues with the language as written and recommends a voting status.

Mr. Richard Suiter (Richard Suiter Consulting): States that in previous NTEP training programs this was one of the items. This was historically done and he recommends a voting status.

The 2026 S&T Committee recommends a Developing status, and would like input from NIST OWM.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from NYS Weights & Measures supports this with a voting status.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

Representatives from Arkansas and Florida support this item and recommend Voting.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

LMD – LIQUID MEASURING DEVICES

LMD-26.1 I S.2. Measuring Elements, S.4. Marking Requirements, N.4. Testing Procedures, U.R.6. ~~Temperature~~ Volume Compensation and Correction Wholesale, and T.5. Density Correction Systems.

Source:
American Petroleum Institute

Purpose:
Clarify the acceptable use of specific density correction methods that allow for the accurate determination of volume growth that occurs when gasoline is blended with ethanol to make a finished motor fuel.

Item under Consideration:
Amend NIST Handbook 44 Liquid Measuring Devices Code as follows:

S.2. Measuring Elements

...

S.2.9. Wholesale Devices Equipped with Automatic Density-Correction Systems.

S.2.9.1. Automatic Density Correction. – A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to correct for the additional volume when separately metered components are combined to create a gasoline-ethanol blend.

When equipped with an automatic density-correction system, the device shall also be equipped with:

(a) A means to:
- **i. measure the density of the individual gasoline and ethanol base components or,**
- **ii. accept the manual entry of a measured density of the individual gasoline and ethanol base components**

(b) An Automatic Temperature-Compensating System.

(Added 20XX)

S.2.9.2. Provision for Deactivating. – On a device equipped with an automatic density-correction system, provision shall be made for deactivating the automatic density-correction system so that the meter can indicate and record in terms of the uncorrected volume.
(Added 202X)

...

S.4 Marking Requirements

...

S.4.3. Wholesale Devices.

...

S.4.3.3. Automatic Density Correction – If a device is equipped with automatic density-correction, the primary indicating elements, recording elements, and recorded representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

(Added 202X)

N.4. Testing Procedures

...

N.4.1.2. Wholesale Devices Equipped with Automatic Density Correction. – On wholesale devices equipped with automatic density-correction, for changes in product composition normal tests shall be conducted

(a) by comparing the density corrected volume indicated by the device to the actual delivered volume corrected to 15 °C (60 °F) using the latest version of ASTM D1250, Standard Guide for the Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1.

(b) with the density correction system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume. The test shall be performed with the automatic density-correction system operating.

On devices that indicate or record the density-corrected volume and uncompensated volume for each delivery, the tests in N.4.1.1.(a), N.4.1.1.(b), and N.4.1.2., may be performed as a single test.

(Added 202X)

...

T. Tolerances

T.5. Automatic Density Correction Systems. - The difference between the density-corrected volume on the bill of lading, calculated using ASTM D1250, Standard Guide for the Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1, and the temperature-corrected volume in the test standard shall not exceed 0.1% of the total delivered volume.

(Added 202X)

UR.3.6. Temperature Compensation and Density Correction, Wholesale

UR.3.6.1. Automatic.

UR.3.6.1.1. When to be Used. – If a device is equipped with a mechanical automatic temperature compensator, it shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature-compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

Note: This requirement does not specify the method of sale for product measured through a meter.

(Amended 1989)

UR.3.6.1.2. Density Determination. – If the volume of the product delivered is adjusted using a density-correction system, then the product density before blending the gasoline and ethanol shall be determined either through the use of a densitometer or by manual entry in accordance with the procedures in the current version of API MPMS Chapter 8.1 "*Manual Sampling of Petroleum Products,*" and API MPMS Chapter 11.3.3. *Miscellaneous Hydrocarbon Properties—Denatured Ethanol Density and Volume Correction Factors* and applied in the calculation via analysis of each of the base components.

(Added 202X)

UR.3.6.1.3. Invoices.

(a) A written invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

(b) The invoice issued from an electronic wholesale device equipped with an automatic temperature-compensating system shall also indicate **for each metered component or the finished product:**

(1) the API gravity, specific gravity, or coefficient of expansion ~~**for the product**~~;

(2) ~~**product**~~ temperature**(s)**; and

(3) gross reading.

(Amended 1987 **and 20XX**)

(c) For gasoline-ethanol blends, the invoice issued from a wholesale device equipped with an automatic density-correction system, in addition to the requirements in (b) above, shall indicate:

(1) the additional volume due to density correction for the finished product; and

(2) the temperature compensated volume inclusive of the additional volume due to density correction.

Note: Shall include the statement, "Volume delivered has been adjusted to the volume at 15 °C (60 °F) and for changes in density."

(Added 202X)

UR.3.6.2. Nonautomatic.

...

UR.3.6.2.2. Density Determination. – If the volume of the product delivered is adjusted using a density-correction system, then the product density before blending the gasoline and ethanol components shall be determined either through the use of a densitometer or in accordance with the procedures in the current version of API MPMS Chapter 8.1 *Manual Sampling of Petroleum Products, or a densitometer and API MPMS Chapter 11.3.3. Miscellaneous Hydrocarbon Properties—Denatured Ethanol Density and Volume Correction Factors* and applied in the calculation via analysis of each of the base components.

UR.3.6.2.3. Invoices. The accompanying invoice for a nonautomatic density-corrected finished product shall show that the density-corrected volume of the blended product delivered has been adjusted to a volume at 15 °C (60 °F), and the invoice shall also indicate for each metered component or the finished product:

(1) the API gravity, specific gravity, or coefficient of expansion;

(2) temperature(s);

(3) gross reading;

(4) additional volume due to density correction for the finished product; and

(5) the temperature-compensated volume inclusive of the additional volume due to density correction.

Note: Shall include the statement, "Volume delivered has been adjusted to the volume at 15 °C (60 °F) and for changes in density".

[Nonretroactive as of January 1, 20XX]

(Added 20XX)

Previous Status:
New Proposal

Original Justification:
The volume of gasoline and ethanol when blended is more than the volume of the two liquids measured separately. Due to the way terminal load racks are configured, some measure the blended product using the custody meter and therefore capture the volume gain at the custody transfer meter (side stream blending), while others use multiple custody transfer meters to measure the gasoline and ethanol components separately (ratio blending) and do not capture the volume gain. The proposed changes will codify that a calculation can be applied at the Ratio-Blend terminal such that the two terminals have a comparable PTD.

The difference in terminal operations can cause inequity between the two types of terminals. The solution is for terminals that don't directly measure the volume growth in the final blended product to apply an industry standard (API Chapter 11.3.4) that calculates that volume expansion. Correcting the volume for this growth is known as Density Correction. The calculation used for density correction would use the same API gravities used by the automatic temperature compensation system to calculate the net volume of the gasoline-ethanol blend at 60OF.

Variable	Temperature Compensation (GST)	Density Correction (Net Volume)
Reference Density of Gasoline (BOB) in API gravity units	✓ (API MPMS 11.1)	✓ (API MPMS 11.1)
Reference Density of Ethanol in API gravity units	✓ (API MPMS 11.3.3)	✓ (API MPMS 11.3.3)
Gross Meter Readings	✓ (API MPMS 12.2)	✓ (API MPMS 12.2)
Product Temperature (load average)	✓ (API MPMS 7.4)	✓ (API MPMS 7.4)
Net Meter Readings for ethanol and BOB	*(output from Temp Comp)*	
Ideal Fraction Ethanol (i.e., ethanol blend percentage)		✓ (API MPMS 11.3.4)

The proposed changes to Handbook 44 identify the sections that should be updated to codify the use of the API standard without replumbing the terminal. [Note there is also a separate but related proposal to change Handbook 130, Method of Sale.]

The proposed changes to HB 44 are the result of nine task force meetings where the group reviewed the science of the expanded volume, raised and discussed concerns, and discussed the proposed language incorporated in this proposal. The task force was

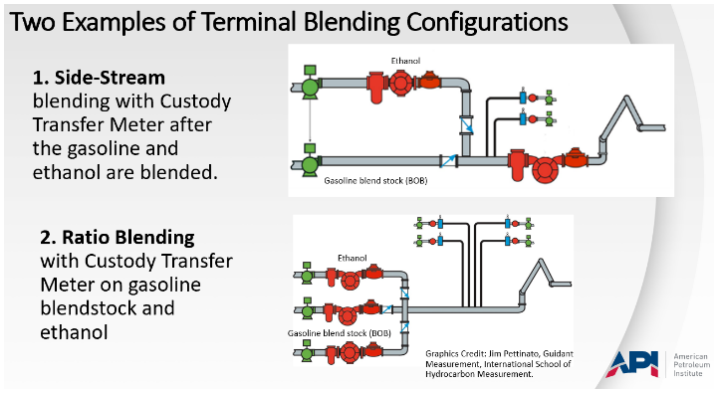
led by API with participation from five states, NIST staff, retailer representatives, meter manufacturers, terminal operators, ethanol representatives, and consultants.

Background:

When gasoline and ethanol are blended the volume of the finished fuel increases by about 0.2% (range 0.08% to 0.4%) that is dependent on the density of the gasoline blend stock and the percentage of ethanol blended into the finished gasoline-ethanol fuel.

Some terminal configurations capture the volume expansion in the overall net calculation, while others do not, resulting in an inequity between the two configurations. To understand the inequity at the terminals, it is helpful to consider two of the terminal configurations that blend gasoline and ethanol (e.g., 10% ethanol, 15% ethanol, 85% ethanol). For simplicity, when we refer to a fuel it will be E10 as that fuel is more than 95% of the consumed gasoline in the U.S.

The first configuration is a **Side-Stream terminal.** It measures the ethanol which is then added to the gasoline blend stock ahead of the custody transfer meter. This configuration captures the volume growth that takes place when the net volume of the blended product is calculated.



The second is a **Ratio-Blending terminal.** The ethanol is measured through a custody transfer meter and the gasoline blend stock is measured through a separate custody transfer meter. The two components are blended in the terminal piping or in the tank truck where the volume growth takes place. Since the component net volumes are calculated separately, the volume growth of the blended product is not captured.

In a Ratio-Blending terminal a calculation can be applied using the process identified in API MPMS Ch. 11.3.4. that corrects for the change in the density of the combined products and the additional volume gain that will occur.

Additional questions and answers:

Q1. If the API standard is used at a Ratio-Blending Terminal, how does an inspector prove that the density correction has been appropriately applied?

A1. An inspector would use a process similar to proving a terminal with an automatic temperature compensation system. The EPO No. 25, Loading Rack Meters, would be updated.

Q2. What are the Density Correction System requirements?

A2. API believes that HB 44 allows for a system to correct for a density shift in a gasoline-ethanol blend and recognizes that some NTEP devices are currently approved for that use. However, to ensure that the use of this correction is clearly permissible, we identify language in Handbook 44 that would be clarifying for devices that provide density correction algorithms per API standards.

A metering system uses the same data to determine the excess volume as it uses for the correction for temperature (the reference density, the meter gross volume reading and the live temperature measurement). The device then will apply the density of the finished product or of the base components (e.g., gasoline or ethanol) to determine the correction for excess volume. The BOB reference density is typically quite stable. Only the observed (live) density varies from batch to batch, depending on temperature. As such a density correction system can accept, calculate, or measure the density of the finished product or of each base component (i.e., gasoline or ethanol) using these inputs. This would apply to HB 44 Section 3.30 Liquid Measuring Devices paragraphs S.2.9., S.4., N.4., UR.3.6.1., and T.5.

Q3. How is the density of the gasoline blend stock measured?

A3. Terminals measure the density (as an API Gravity) of gasoline in the aboveground storage tank by using a handheld density meter, an in-tank densitometer, or sending it to the lab. The sample that is tested using the handheld device or the lab uses the

procedures identified in API MPMS Ch. 8 which details how to grab a sample from the bottom, middle, and top of tank. The API Gravity of the gasoline blend stock must be brought to a reference temperature of 60ºF or 15ºC.

The API gravity is entered into the terminal automation system either manually or through a connected system. The API Gravity, corrected to 60ºF of the individual products (i.e., BOB) does not change between the tank and the meter.

Q4. How is the API Gravity of ethanol determined?

A4. Ethanol is a single-molecule fuel that is denatured with 2-5% petroleum fuel. The small percentage of denaturant does not meaningfully affect the API Gravity of the ethanol between batches. Thus when calculating denatured ethanol net volumes, for any ethanol with 1 to 5% denaturant (regardless of whether the denaturant is natural gasoline or gasoline), the calculation should use API Table 6C with an alpha coefficient of 0.000603 ºF or use API Table 6B with 50.61 ºAPI.

API MPMS Chapter 11.3.3, paragraph 4.2 Denatured 95 % to 99 % Fuel Ethanol

> For volume or density correction from observed temperature to 60 °F, the implementation procedure given in API MPMS Ch. 11.1-2004 shall be used for ethanol denatured with 1 % to 5 % by volume of either natural gasoline or gasoline (Annex B). Such denatured ethanol is classified a "special application" (formerly known as Table 6C or Table 54C) with an alpha coefficient of 0.000603 °F or 0.001085 °C (Annex C). For more information on denaturant choice, see Annex B. For more information on the applicability of these alpha coefficients to other denaturants, see Annex C and Annex D.

Q5: With the possibility of the density of the BOB changing each time the terminal receives a batch from the pipeline, and given that the density impacts the calculated net temperature correction and the density correction, is the density traceable within the terminal metering system? If not when new density values are entered, should they be traceable and verifiable?

A5: The answer to both questions is, yes. Some, if not all systems have an audit log, and if it is properly configured, it will log the changes to the reference density. Each system will be different, but as an example, an inspector could look at the log to see the old densities that were entered. To determine if the system is properly configured, an inspector could perhaps change the reference density value temporarily to determine if it is properly logged in the system.

Q6. What is the relationship between specific gravity and API gravity of a fuel?

A6. According to Pennsylvania State University, "Density is defined as mass per unit volume of a fluid. The density of crude oil and liquid hydrocarbons is usually reported in terms of specific gravity (SG) or relative density, defined as the density of the liquid material at 60°F (15.6°C) divided by the density of liquid water at 60°F. At a reference temperature of 15.6°C, the density of liquid water is 0.999 g/cm^3 (999 kg/m^3), which is equivalent to 8.337 lb/gal (U.S.). Therefore, for a hydrocarbon or a petroleum fraction, the SG is defined as:

$$\text{SG } (60^{O}\text{F}/60^{O}\text{F}) = (\text{Density of liquid at } 60^{O}\text{F in g/cm3})/(0.999\text{g/cm3})\text{"}$$

In the early years of the petroleum industry, the American Petroleum Institute (API) adopted the API gravity (°API) as a measure of the crude oil density. The API gravity is calculated from the following equation:

$$API = 141.5/(SG15.6\,°C/15.6°C) - 131.5$$

Source: https://www.e-education.psu.edu/fsc432/content/api-gravity

Q7. At what temperature should API gravity be observed?

A. API gravity and specific gravity must always be observed at 60^{O}F or 15^{O}C.

Q8. How will an invoice or product transfer document (PTD) be affected?

A8. The major requirement would be that the invoice/PTD reflects either the metered components or the finished product. All the appropriate information to provide a transparent invoice would be included on the invoice/PTD for an Automatic Density Correction system and Nonautomatic system. Specifically, it would include API gravity, temperature, gross readings, excess

volume, and the net volume including the calculated growth. A statement would be required stating, “Volume delivered has been adjusted to the volume at 15 °C (60 °F) and for changes in density”.

Q9. What API standards are used in a terminal to ensure an accurate measurement?

A9. There are at least 12 different API Manual of Petroleum Measurement Standards (MPMS) that form the basis of an accurate measurement at a terminal.[1]

- Ch. 8.1 Manual Sampling of Petroleum Products (ASTM D4057)
- Ch. 5.x Metering (5.1 General Considerations for Measurement by Meters, with specific chapters that address for displacement meters, turbine meters, Coriolis meters, ultrasonic flow meters, Fidelity and Security of Flow Measurement Pulsed-Data Transmissions Systems)
- Ch. 6.x – Metering Systems (6.1 Metering Assemblies- General Considerations, with specific chapters for - Truck and Rail Loading and Unloading Measurement Systems; - Pipeline and Marine Loading/Unloading Measurement Systems; and Lease Automatic Custody Transfer Systems)
- Ch. 4.x Proving Systems (Displacement Provers, Master-Meter Provers, Field Standard Test Measures, Methods of Calibration for Displacement and Volumetric Tank Provers, Part 1—Introduction to the Determination of the Volume of Displacement and Tank Provers)
- Ch. 7.4 Dynamic Temperature Measurement
- Ch. 11 Physical Properties Data (ASTM D1250, Adjunct)
    - Chapter 11.1 - Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils
    - Ch. 11.3.3 Miscellaneous Hydrocarbon Product Properties—Denatured Ethanol Density and Volume Correction Factors
    - Ch. 11.3.4 Miscellaneous Hydrocarbon Properties - Denatured Ethanol and Gasoline Component Blend Densities and Volume Correction Factors
    - Ch. 11.4.1 Density of Water and Water Volumetric Correction Factors for Water Calibration of Volumetric Provers
- Ch. 12.2 Calculation of Petroleum Quantities using Dynamic Measurement Methods and Volumetric Correction Factors
- Ch. 21.2 Electronic Liquid Measurement Using Positive Displacement and Turbine Meters

Q10. How are API standards used in terminals today?

A10. Terminals require the implementation of multiple API standards including all the standards identified in A9 above to ensure there is an accurate and transparent measurement for the customer receiving the product into the tank and the customer receiving the product from the terminal into a tank truck for delivery to a retail gasoline station. Further, sales agreements may state that where temperature compensation is used, those calculations incorporate the methods and procedures specified in API MPMS Chapter 11.

[1] https://www.api.org/-/media/files/publications/2024-catalog/2024-publication-catalog.pdf.

Q11. How is an automatic temperature compensation system proven today?

A11. Regulators may use spreadsheets, lookup tables or commercial software to compare the calculated temperature compensated volume to the net volume that is printed on the Bill of Lading, Invoice or on the ticket from the terminal system.

Q12. How would an inspector prove the calculated volume expansion at a terminal?

A12. The volume expansion that occurs due to physical chemistry can be proven in the same manner as an automatic temperature compensation system that calculates the net volume of gasoline. The volume expansion that occurs when the components are blended can be demonstrated using a spreadsheet, look-up table or commercial software. Additionally, the Examination Procedure Outline (EPO) No. 25 for Loading Rack Meters would be updated to incorporate the appropriate procedures.

Q13. Is there a specific API standard that should be used to calculate the volume expansion?

A13. Yes. API MPMS Ch. 11.3.4 which is a subchapter of Ch. 11.1 should be used. The volume change calculated using Ch. 11.3.4 is needed to reconcile the fact that the volume of gasoline and ethanol when blended is slightly greater than the volume of the two liquids measured separately. In equation form,

$$\text{Gasoline BOB}_{\text{(net volume)}} + \text{Ethanol}_{\text{(net volume)}} \neq \text{Gasoline-Ethanol Blend}_{\text{(net volume)}}$$

Q14. In the context of NCWM, why should the API standards be accepted?

A.14. Handbook 130, Uniform Weights and Measures Law, Section 16, recognizes "firmly established trade custom and practice" that dictate how liquid fuels are sold. Specifically, it states,

> **Section 16. Method of Sale**
>
> Except as otherwise provided by the Director or by firmly established trade custom and practice,
>
> (a) commodities in liquid form shall be sold by liquid measure or by weight; and
>
> (b) commodities not in liquid form shall be sold by weight, by measure, or by count.
>
> The method of sale shall provide accurate and adequate quantity information that permits the buyer to make price and quantity comparisons.
>
> (Amended 1989)

In 2024, the U.S. customers consumed 137 billion gallons of gasoline (most of which was 10% ethanol) and 63 billion gallons of diesel fuel. Another 24 billion gallons of jet fuel were consumed in the U.S. At each stage of the process from producing the crude oil to selling the finished fuel to a retail gasoline station the product is measured. So, while there is over 224 billion gallons of finished product consumed in the U.S., those molecules have likely been measured many times over. These measurements are so important that the API Committee on Petroleum Measurement (COPM) meets twice a year, with over 700 people in attendance, at each meeting to review the standards that are used in the U.S. and around the world. By definition, the petroleum industry uses the API standards which are firmly established trade custom and practice.

- **Possible Opposing Arguments:** Demonstrate that you are aware and have considered possible opposition.

Some have suggested that the terminal should be replumbed to allow the finished fuel to flow through a custody meter. However, this is often not possible due to the footprint and design of the terminal. Regardless, it should not be required as there is accurate technology available and approved NTEP equipment already available.

Some have raised concerns that metering systems should not modify the volume of the product after it has gone through the custody meter. This concern appears to be premised on the belief that the gross volume **and** the net volume are measured. In practice, the only measured volume is the gross volume and that is measured by counting pulses from the meter in accordance with an API standard. The gross volume is then used by the custody transfer system or the automatic terminal management system to calculate the net volume using another set of API standards including Chapters 5.x, 6x, 7.4, 11.1, 11.3.3, 11.3.4, 12.2, and 21.2. Please see above for the names of these standards.

Some have shared concerns that only standards approved by NCWM or by NIST and referenced in the Handbooks or in Publications can be used to determine volumes. As stated in the previous paragraph, this is simply not possible. None of the API standards that are needed to calculate the temperature corrected volume of fuels is listed in the NIST/NCWM publications or Handbooks. With this logic, it would be impossible to determine the net volume of fuels and other chemicals.

The submitter requested Voting status in 2026.

Comments in Favor:

Regulatory:

- 2026 Annual: None
- 2026 Interim: None

Industry:

- 2026 Annual: None
- 2026 Interim: An associate member from American Petroleum Institute gave a presentation and handouts and recommends voting.
- 2026 Interim: An associate member from Guidant Measurement stated that the work was evaluated by independent lab and verified by OIML tests. The reason some data was removed was due to issues found in the process. Says that “estimate” was used in the standard which was a poor choice in words. It is not perfect but better than not accounting for the error.
- 2026 Interim: An associate member from Chevron aligning with API and Guidant Measurement recommends voting, as he wants everyone to work off the same calculations. Chevron would like to be part of the work group if it is formed.
- 2026 Interim: An associate member from Marathon states it has already been added to ASTM Standards in 2019 and has gone through a lot of scrutiny. Recommends this for voting.
- 2026 Interim: An associate member from Exxon Mobil recommends it as a voting item and states we can go to the field and prove it. They see the growth in the terminals and other companies can provide this information.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Comments Against:

Regulatory:

- 2026 Annual: None
- 2026 Interim: A regulator from Illinois gave a presentation against this item. Opposed to any adoption standard that substitutes modeled estimates for traceable measurements in commercial billing.
- 2026 Interim: A second regulator from Illinois stated they found this system used in 2019, and this was a hidden charge being applied at the loading rack. Recommends withdrawal.

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Annual: None
- 2026 Interim: A Regulator from Maryland recommend the item be assigned for additional development and amendments to the proposal to make the intent clear. They would recommend a work group (not FALS) and combining both L&R and S&T items together. Additional testing and data collection with W&M regulatory oversight and by subject matter experts are needed.
- 2026 Interim: A Regulator from California echoes Maryland and NIST OWM and recommends developing but will not be opposed to assigning it to a work group.
- 2026 Interim: A Regulator from Kansas echoes Maryland and NIST OWM and would not oppose assigning to a work group.
- 2026 Interim: A Regulator from Florida echoes comments from California, NTEP, and Maryland. Recommends developing status.

Industry:

- 2026 Annual: None
- 2026 Interim: An associate member from Murray Equipment, Inc recommends developing as there is not sufficient real-world data to justify this proposal.
- 2026 Interim: An associate member from Endress + Hauser Flow USA, Inc. recommends assigned status to a work group so testing can be done with regulatory agency involvement.

Advisory:

- Annual 2026: A Representative from Liquid Measuring Device Density Correction Task Group, reported the task group was given the following charge: "The Task Group will oversee further vetting and development of item MOS 26.3 of the Laws and Regulations Committee and item LMD 26.1 of the Specifications and Tolerances Committee, determine whether both are needed, and decide whether they should move forward contingent upon each other. In addition, if MOS 26.3 is determined to have merit, the task group will develop the final language and include it in the Uniform Fuels and Automotive Lubricants Regulation, section 3.2.5 to align both sections." The Task Group decided that indeed, if these proposals are to move forward, they are contingent upon one another, and that the FLR regulations would need to be updated to align. The language seen in the proposals sent back to the standing committees is reflective of the task group's work to get these proposals to a spot where the task group has removed as much uncertainty in the language used as possible. The task group wants to make clear that there are still concerns that will need to be addressed further with these proposals, the most notable are as follows.
  - The task group determined it was ultimately best left up to the S&T committee as to which standards should be referenced in the UR sections 3.6.1.2. and 3.6.2.2. of the LMD proposal. Currently everyone will find API MPMS Chapter 8.1 referenced, however there was discussion that it may be better suited to use ASTM D4057 as a reference in these sections.
  - The task group also believed that the S&T committee will need to collect data and analyze better the applicability of both temperature and density compensation tolerances as it relates to the overall tolerance of the device or system being utilized.
  - Provide jurisdictions with proper testing procedures and results for in field testing, as weights and measures officials will not be testing this application in a laboratory environment.

- 2026 Interim: A technical advisor from The National Institute of Standards and Technology recommends developing status due to formatting issues and concerns with how we properly identify the values.
- 2026 Interim: A technical advisor from National Type Evaluation Program stated that they had no position, but these changes would be viewed as metrological change, and any system would have to come back for recertifications.
- 2026 Interim: A technical advisor from The National Institute of Standards and Technology asked the industry how regulators can verify the accuracy of the system? An associate member from Exxon Mobile replied that you should be able to blend and measure in a prover. An associate member from American Petroleum Institute also replied that to get to a reference temperature is difficult at the rack the lab has a more controlled environment for the purpose of testing.

Item Development:

NCWM 2026 Annual Meeting: The Committee adopted the language as recommended by the Liquid Measuring Device Density Correction Task Group. The Committee assigned an Informational status for the item to receive comments on the item including whether the code should reference API MPMS Chapter 8.1, or ASTM D4057, or neither in UR sections 3.6.1.2. and 3.6.2.2.

NCWM 2026 Interim Meeting: The Committee recommends creating a new task group specifically tasked with developing the 2026 L&R item MOS-26.3 and the 2026 S&T item LMD-26.1. The Committee has removed the nonretroactive requirements.

The Committee formally requests the formation of a joint task group to concurrently develop item LMD-26.1 on the S&T Committee agenda and item MOS-26.3 on the L&R Committee agenda. Both Committees feel these items are dependent upon one another and should be developed in conjunction with one another.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Kansas Department of Agriculture recommended the item is sent back to the LMD Density Correction Task Group to address several concerns. The written concerns have been attached to this report.

A representative from Nebraska FCSP-Weights and Measures does not support this item and had concerns about accuracy of the study and stated that data has been withheld and cherry picked. It was stated that final product amounts should be measured and not estimated and recommends withdrawal.

A representative from Illinois Weights & Measures agreed with previous comments and noted that only measured gallons should be billed. It was stated that "About" should be a "dirty word" And recommends withdrawal.

A representative from Missouri Department of Agriculture agrees with counterparts that product should be measured and recommends withdrawal.

A representative from Marathon Petroleum Company said that when applied consistently and in accordance with the agreed commercial basis of sale, API MPMS Chapter 11.3.4 supports accurate, transparent and equitable custody transfer transactions and is consistent with the principles embodied in NIST Handbook 44. The written comments in support of this item are attached to this report.

A representative from Chuck Corr Consulting said that meter configuration at a terminal is a business decision and that terminals can choose to put meters in places to measure this expansion.. This person does not believe the estimating of the expansion of the mixture is accurate enough.

The committee recommends this item is assigned back to the LMD Density Correction Task Group to address concerns from the body.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

An industry member from the American Petroleum Institute gave a presentation on this item during open hearings.

Mr. Kenn Burt (San Luis Obispo County, California / WWMA S&T Committee): Had questions about the tolerance applied.

Mr. Matthew Sheehan (Chevron): Recommends a voting status. He clarified that the same calculation is used for everyone that is using this.

Mr. Stephen Benjamin (TSL Consulting, representing the American Petroleum Institute): States that this past summer, the NCWM Density Correction Task Group, which API participated in, completed its task to develop language for these items and return them back to the respective committees. The language is reflective of the task group's work to get the proposals to a point where it removed as much uncertainty in the language used as possible. Furthermore, API supports the Density Correction Task Group decision that the two proposals are contingent upon one another, and that the FLR regulations in section 3.2.5 would need to be updated to align with the MOS section (referencing this item as well as MOS-26.3 on the 2026 L&R Committee Agenda). The proposed changes to the regulations would occur as a wholesale business transaction at the petroleum terminal and do not include or impact retail transactions between seller and buyer. When two different liquids are mixed, there can be a change to density and volume. In the case of gasoline blended with ethanol, the density decreases and the volume increases. Therefore, an adjustment is necessary because the sum volume of the two individual components is less than what is physically present in the blended volume. The need for calculating volume expansion is driven by the fact that gasoline-ethanol blends exhibit non-linear volumetric behavior, which led to the development of the API standard Chapter 11.3.4 in the

Manual of Petroleum Measurement Standards (MPMS). Chapter 11.3.4 is the recognized industry methodology for determining VCFs for gasoline and denatured ethanol blends. Accordingly, use of Chapter 11.3.4 is not a departure from accepted petroleum measurement practice, but rather the implementation of the methodology identified within the industry's principal net volume correction standard. When applied consistently and in accordance with the agreed commercial basis of sale, Chapter 11.3.4 supports accurate, transparent, and equitable custody transfer transactions and is consistent with the principles embodied in NIST Handbook 44. API requests a voting status.

Mr. Steve Harrington (Oregon Weights & Measures): He is supportive of the work and the goal, and wants to see it in the Handbook, but he has some questions. He is confused about automatic density, is it a device like a temperature compensator? He also has questions and wants more information on testing and how to test.

Mr. Jim McDonell (Marathon Petroleum): Provided clarification on temperature compensation, blend ratio and density.

Mr. Russ Lewis (Marathon Petroleum): States that this has been through a lot of scrutiny and is ready for a vote. It would cost 3.4 billion dollars to convert all of the terminals in the U.S. to side stream blending.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports the above comments from Steve Harrington, but is not against the proposal. He recommends that this item be assigned or further developed.

The 2026 S&T Committee recommends a Voting status. The committee believes that the item has merit and is fully developed with the changes below.

The 2026 S&T Committee recommends changes to the title of the item to match the body of the item:

S.2. Measuring Elements, S.4. Marking Requirements, N.4. Testing Procedures, T.5. Automatic Density Correction Systems, and UR.3.6. Temperature Compensation and Density Correction, Wholesale.

Regarding the NCWM 2026 Annual meeting S&T Committee question, our committee recommends the use of the latest edition of ASTM D4057 in the Handbook UR.3.6.1.2. Density Determination.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee would like the task group to review the comments made by NYS to ensure the language is as intended.

2026 NEWMA: A representative from American Petroleum Institute gave a presentation on this item.

2026 NEWMA: A representative from NYS Weights & Measures believes the following change in UR.3.6.2.2 and UR.3.6.2.3 has unintentionally removed some devices from providing invoices correctly. The section (UR.3.6.2) is currently for non-automatic TC products, and the invoice requirements generated for them

1. Current HB44, LMD code, UR.3.6.2.2 Invoices is changed to UR.3.6.2.3 in the new proposal, and 3.6.2.2 is now "Non-automatic Density Determination".

2. However, the language change to the proposed "UR.3.6.2.3 Invoices" is now only for non-automatic density corrected finished products, and no longer includes Invoices for non-automatic Temperature corrected products (ex: all other distillates, neat gasoline, etc). These wholesale products are typically sold temperature corrected as well.

3. I am unsure if the author intended this removal of language? And, if so – shouldn't it be struck instead of overwritten?

4. If it was unintended then a suggested language change would be to renumber – but including the adopted language from HB44 (existing) UR.3.6.2.2 as well.

Ex: (change the existing HB44 language to instead read:)

UR.3.6.2.23.(a). Invoices. – The accompanying invoice for a temperature-corrected product shall indicate that the volume of the product has been adjusted for temperature variations to a volume at 15 °C (60 °F) and shall also state the product temperature used in making the adjustment.

UR.3.6.2.3.(b) Invoices. The accompanying invoice for a nonautomatic density-corrected finished product shall show that the density-corrected volume of the blended product delivered has been adjusted to a volume at 15 °C (60 °F), and the invoice shall also indicate for each metered component or the finished product:

2026 NEWMA: A representative from State of Vermont Agency of Agriculture opposes this item but would support an Assigned status to have a committee further develop the item.

2026 NEWMA: A representative from Marathon Petroleum supports voting status.

2026 NEWMA: A representative from the Task Group stated that the group wanted to see more data from the field with proper testing procedures.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from API gave a presentation on the item.

A representative from Maryland Department of Agriculture opposed the item and recommended Withdrawn.

A representative from Chevron considers the item fully developed and recommends Voting.

A representative from Marathon Petroleum Buyer and Sellers fully supports the item and considers it fully developed. Supports D 4057 reference and believes the science works. Voting status recommended.

A representative from API recommended an editorial change: U.R. 3.6 now, recommend that the committee match the title Temp Comp and Density Correction to 3.6.

A representative from West Virginia Department of Agriculture considers item fully developed and would like Voting status.

A representative from Marathon Petroleum stated the calculations are automated.

The committee recommends Voting on this item with the updated title to match wording in Section 3.6

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

LMD-27.1 S.4. Marking Requirements., N.3. Test Drafts. N.4. Testing Procedures, Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30., UR.2.2. Discharge Rate., and Liquid-Measuring Device Code Index

Source:
Wisconsin DATCP

Purpose:
Adopt the term discharge flow rate in accordance with N.4.1. Normal Tests. - throughout the code section to have one term replace the many terms currently used in the code that have the relatively same meaning (e.g. flow rate, discharge rate, designed discharge rate, flow rate of the installation, designed or marked flow rate, and rated discharge rate).

Item under Consideration:
Amend the NIST Handbook 44 Liquid Measuring Devices Code as follows:

S.4. Marking Requirements.

…

S.4.3. Wholesale Devices.

S.4.3.1. ~~Discharge Rates~~ Discharge Flow Rates. – A wholesale device shall be marked to show its designed maximum and minimum ~~**discharge rates**~~ **discharge flow rates**. However, the minimum ~~**discharge rate**~~ **discharge flow rate** shall not exceed 20 % of the maximum ~~**discharge rate**~~ **discharge flow rate**.

…

S.4.4. Retail Devices.

S.4.4.1. ~~Discharge Rates~~ Discharge Flow Rates. *– On a retail device with a designed maximum* ~~***discharge rate***~~ ***discharge flow rate*** *of 115 L (30 gal) per minute or greater, the maximum and minimum* ~~***discharge rates***~~ ***discharge flow rates*** *shall be marked in accordance with*

S.4.4.2. Location of Marking Information; Retail Dispensers. The marked minimum ~~***discharge rate***~~ ***discharge flow rate*** *shall not exceed 20 % of the marked maximum* ~~***discharge rate***~~ ***discharge flow rate****. [Nonretroactive as of January 1, 1985]*

(Added 1984) (Amended 2003 and 2019)

Example: With a marked maximum ~~**discharge rate**~~ **discharge flow rate** of 230 L/min (60 gpm), the marked minimum ~~**discharge rate**~~ **discharge flow rate** shall be 45 L/min (12 gpm) or less (e.g., 40 L/min [10 gpm] is acceptable). A marked minimum ~~**discharge rate**~~ **discharge flow rate** greater than 45 L/min (12 gpm) (e.g., 60 L/min [15 gpm]) is not acceptable.

…

N.3. Test Drafts.

…

N.3.4. Other Retail Devices. – On devices with a designed maximum ~~**discharge rate**~~ **discharge flow rate** of:

(a) less than 80 L (20 gal) per minute, tests shall include drafts of one or more amounts, including a draft of at least 19 L (5 gal).

(b) 80 L (20 gal) per minute or greater, tests shall include drafts of one or more amounts, including a draft of at least the amount delivered by the device in one minute at the maximum ~~**flow rate**~~ **discharge flow rate** of the installation. (Amended 1984)

N.3.5. Wholesale Devices.

N.3.5.1. Test Drafts. – The delivered quantity shall be equal to at least the amount delivered by the device in one minute at its maximum ~~**discharge rate**~~ **discharge flow rate**. (Amended 1987, 1996, and 2023)

N.3.5.2. Small Volume Prover Test. – The total delivered quantity for any required accuracy test shall be representative of at least the amount delivered by the device in one minute of continuous flow at its maximum ~~**discharge rate**~~ **discharge flow rate**.

(Added 2023)

N.3.5.3. Field Standard Meter Test. *– The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the* ~~***flow rate***~~ ***discharge flow rate*** *being tested. [Nonretroactive as of January 1, 2024]*

(Added 2023)

N.4. Testing Procedures.

N.4.1. Normal Tests. – The "normal" test of a device shall be made at the maximum discharge flow rate developed under the conditions of installation. Any additional tests conducted at ~~**flow rates**~~ **discharge flow rates** down to and including one-half of the sum of the maximum discharge flow rate (MDRF) and the rated minimum discharge flow rate (RMDFR) shall be considered normal tests.

As a formula, this is stated as: MDFR + RMDFR / 2 = minimum discharge flow rate for additional tests

(Amended 1991 and 2023)

…

N.4.2.1. Slow-Flow Meters. – A "special" test shall be made at a ~~**flow rate**~~ **discharge flow rate**:

(a) not larger than twice the actual minimum ~~**flow rate**~~ **discharge flow rate**; and

(b) not smaller than the actual minimum ~~**flow rate**~~ **discharge flow rate** of the installation.

N.4.2.2. Retail Motor-Fuel Devices and DEF Devices

(a) Devices without a marked minimum ~~**flow rate**~~ **discharge flow rate** shall have a "special" test performed at the slower of the following rates:

(1) 19 L (5 gal) per minute; or
(2) the minimum ~~**discharge rate**~~ **discharge flow rate** at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting.

(b) Devices with a marked minimum ~~**flow rate**~~ **discharge flow rate** shall have a "special" test performed at or near the marked minimum ~~**flow rate**~~ **discharge flow rate**.

(Added 1984) (Amended 2005 and 2019)

N.4.2.3. Other Retail Devices. – "Special" tests of other retail devices shall be made at the slower of the following rates:

(a) 50 % of the maximum ~~**discharge rate**~~ **discharge flow rate** developed under the conditions of installation; or

(b) the minimum ~~**discharge rate**~~ **discharge flow rate** marked on the device.

N.4.2.4. Wholesale Devices. – "Special" tests shall be made to develop the operating characteristics of a measuring system and any special associated or attached elements and accessories. "Special" tests shall include a test at or slightly above the slower of the following rates:

(a) 20 % of the marked maximum ~~**discharge rate**~~ **discharge flow rate**; or

(b) the minimum ~~**discharge rate**~~ **discharge flow rate** marked on the device.

In no case shall the test be performed at a ~~**flow rate**~~ **discharge flow rate** less than the minimum ~~**discharge rate**~~ **discharge flow rate** marked on the device. (Amended 2014)

…

N.4.5. Verification of Linearization Factors**.** – All enabled linearization factors shall be verified. The verification of enabled linearization factors shall be done through physical testing, or a combination of physical testing and empirical analysis at the discretion of the official with statutory authority. (Added 2016)

N.4.6. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and ~~**flow rate**~~ **discharge flow rate** are reduced to the extent that they will not affect the results obtained. When conducting the tests, the ~~**flow rates**~~ **discharge flow rates** shall be within the minimum and maximum ~~**discharge rates**~~ **discharge flow rates** as marked by the manufacturer. For devices with no marked minimum and maximum ~~**flow rates**~~ **discharge flow rate**, the minimum ~~**discharge rates**~~ **discharge flow rates** shall be as specified in N.4.2.1. Slow-Flow Meters or N.4.2.2. Retail Motor-Fuel Devices and DEF Devices and the maximum ~~**discharge rates**~~ **discharge flow rates**

shall be the maximum ~~discharge rate~~ **discharge flow rates** developed under the conditions of the installation. For devices equipped with an automatic temperature compensator, the results shall be based on the uncompensated (gross) volume (e.g., with the temperature compensator deactivated). (Amended 2019)

…

Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30.

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance[1]
0.3	-Petroleum products delivered from large capacity (~~flow rates~~ **discharge flow rates** greater than 115 L/min or 30 gpm)**devices, including motor-fuel devices-Heated products (other than asphalt) at temperatures greater than 50 °C (122 °F)-Asphalt at temperatures equal to or below 50 °C(122 °F)-All other liquids not shown in the table where the typical delivery is over 200 L (50 gal)	0.2 %	0.3 %	0.5 %
0.3A	-Asphalt at temperatures greater than 50 °C (122 °F)	0.3 %	0.3 %	0.5 %
0.5*	-Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min or30 gpm)** motor-fuel devices-Agri-chemical liquids-All other applications not shown in the table where the typical delivery is ≤ 200 L (50 gal)	0.3 %	0.5 %	0.5 %
1.1	-Petroleum products and other normal liquids from devices with ~~flow rates**~~ **discharge flow rates**** less than 1 gpm. -Devices designed to deliver less than 1 gal	0.75 %	1.0 %	1.25 %

*For test drafts ≤ 40 L or 10 gal, the tolerances specified for Accuracy Class 0.5 in the table above do not apply.

For these test drafts, the following applies:

(a) Maintenance tolerances on normal and special tests shall be 20 mL plus 4 mL per indicated liter or 1 in^3 plus 1 in^3 per indicated gallon.
(b) Acceptance tolerances on normal and special tests shall be one-half the maintenance tolerance values.

[1] Special test tolerances are not applicable to retail motor fuel and retail Diesel Exhaust Fluid (DEF) dispensers.

** ~~Flow rate~~ **Discharge flow rate** refers to designed or marked maximum ~~flow rate~~ **discharge flow rate**.

…

UR.2.2. Discharge Rate. – A device shall be installed so that the actual maximum ~~**discharge rate**~~ **discharge flow rate** will not exceed the rated maximum ~~**discharge rate**~~ **discharge flow rate**. Automatic means for flow regulation shall be incorporated in the installation if necessary.

…

Liquid-Measuring Device Code Index

Acceptance 20, 21, 22
Adjustable element 12
Advancement.....6
Agreement 9, 10, 12
Agri-chemical.....5, 6, 21
Antidrain means.....16
Automatic 12, 14, 15, 16, 18, 19, 20, 21, 22, 25
Automatic temperature compensation 14
Automatic temperature compensators 14, 16, 25
Automatic temperature-compensating systems
…….14, 18, 21

Automatic Timeout – Pay-At-Pump for Retail

Device 11

Auxiliary elements.....9
Blend 8, 23
Clear interval 6
Clearance 7
Computing device.....8, 9, 23
Directional flow valves.....12
Discharge hose.....15, 16, 22
Discharge lines 15
~~**Discharge rate.....16, 17, 19, 22**~~
Discharge flow rate …….16, 17, 18, 19, 20, 21, 22

Diversion 22
Dry-hose 15
Fleet sales 8, 10, 11, 23
Grade 8, 9, 23
Graduations.....6, 7, 11, 12, 16
Gravity-discharge unit 15
Index of an indicator.....6, 7
Indicating element 6, 8, 14
Indicators.....6
Installation requirements 22
Interlock.....14
Invoices.....25
Key-lock 7, 23
Lubricant devices.....11, 15, 17
Maintenance 20, 21, 22
Maintenance Requirements 25
Marking requirements.....16
Mass.....5
Mass flow meters.....5
Measuring element 12
Money value computation 19

Money value divisions.....9
Money values -mathematical agreement 12
Money-value computation.....8, 19
Money-value divisions 9
Motor-fuel device 21, 22
Nonautomatic 25
Normal tests.....18
Operating requirements 7, 12
Parallax.....7
Power loss.....7
Price contract sales 8, 10, 11, 23
Primary indicating element.....5, 7, 8, 16, 23, 24
Product identity 8, 11, 23
Pump-discharge unit.....15
Quantity.....7, 9, 10, 12, 17, 19
Recording element.....5, 6, 7, 8, 11, 14, 16, 23, 24
Repeatability.....20, 21
Retail devices.....7, 16, 17, 19
Retail motor-fuel device.....5, 14, 18, 22, 24, 26
Retail motor-fuel dispensers.....17
Seal.....12, 13, 14, 16
Sealing 12, 13, 14
Security.....12, 14, 16
Slow-flow meters.....7, 17, 18
Special tests 18
Stop mechanism.....13
Temperature compensation.....14, 16
Temperature compensators.....14, 16, 25
Temperature correction.....20
Temperature determination.....14, 25
Temperature-compensating systems.....14, 18, 21
Test drafts 17, 21
Tolerances.....13, 20
Total price.....9, 24
Totalizers 17, 23
Truck refueling 10, 15, 23
Unit price.....7, 8, 9, 10, 11, 23, 24
User information.....7
Valves.....12, 15, 22
Vapor elimination.....12
Wet-hose.....15, 16
Wholesale devices 5, 12, 14, 16, 17, 18, 19, 20, 25
Zero-set-back interlock.....14, 24

Previous Status:
2027: New Proposal

Original Justification:
This would provide uniformity in terminology across the code.

The submitter also asks:

1. Could this proposed change be accomplished with a addition to Appendix D. Definitions
2. Is there confusion between discharge rate and flow rate?
3. What about other sections of Handbook 44 that have the same issue i.e. Section 3.31. Vehicle Tank Meters > should this be look at more comprehensively.
4. What does Industry say about this suggested proposal?

The submitter requests that this be a Developing Item in 2027.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Wisconsin DATCP said that throughout the LMD section, “discharge rate” and “flow rate” appear to be used interchangeably. Written notes are attached.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): He believes this to be editorial in nature and supports a voting status.

Mr. Matt Douglas (State of California, Division of Measurement Standards): He supports the intent but believes that it needs to be developed further. He would like to hear more feedback on the item.

The 2026 S&T Committee initially recommended a Voting status. During the voting session the following comments were heard:

Mr. Matt Douglas (State of California, Division of Measurement Standards): States that at the 2026 NCWM Annual meeting this past July, item LMD-24.2. was voted upon amending the 3.30. Liquid Measuring Devices code section N.4.1. for the 2027 edition of NIST Handbook 44 (the voting record, S&T agenda, and NCWM S&T Committee addendum are available for review on the NCWM website). The language as it appears on the WWMA S&T agenda does not reflect the language the item intends to amend. In this particular case, the language in N.4.1. that this item (LMD-27.1) intends to amend has already been removed and replaced. It is also worth noting that the recently accepted language inserts the terms “minimum flow rate”, “maximum rate of flow”, and “minimum discharge rate” later in the paragraph; which would need to be addressed given the intention of the item under consideration.

He feels that it is imperative that the committee either strike N.4.1 in its entirety from the item, or replace N.4.1. with the recently voted upon language. Otherwise, this item should be de-escalated to a developing status with feedback which will assist the submitter in preparing the item so that it is fully developed ahead of the Interim meeting.

Mr. Kurt Floren (County of Los Angeles, California): Hearing this testimony, he is opposed to putting the item forward in its current form.

After considering the above testimony, the 2026 S&T Committee revised their recommended status from Voting to Developing. The Committee recommends that the submitter review the concerns above in finalizing the item.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures agrees with the proposal and recommends a voting status.

2026 NEWMA: A representative from NYS Weights & Measures recommends caution and that we should be conscious that this change could have unintended consequences.

2026 NEWMA: A representative from New Hampshire Division of Weights and Measures brought forth that other proposals are trying to standardize the language around normal test in all applicable codes and would like to see this apply to all those codes.

The committee recommends an informational status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NIST while not finished their analysis noted many different terms are used throughout and was concerned with the term flow rate.

A representative from Maryland Department of Agriculture supports the item, however it needs further development. She feels they are attempting to use one term for two different concepts. Care needs to be taken with the intent.

A representative from Gilbarco echoes Maryland’s comments. In addition, the term is in the title but not amended.

A representative from Arkansas Department of Agriculture supports item but recommends assigned to a committee at the national level for further development.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

LMD-27.2 N.3. Test Drafts., N.4. Testing Procedures., Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices. UR.2.2. Discharge Rate.

Source:
Wisconsin DATCP

Purpose:
Define and provide the method for testing and applying the correct tolerance to liquid measuring devices in accordance with Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices.

Item under Consideration:
Amend the NIST Handbook 44 Liquid Measuring Devices Code as follows:

N.3. Test Drafts.

…

N.3.4. Other Retail Devices. – On devices with a ~~**designed maximum discharge rate**~~ **maximum discharge flow rate measured at the time of testing** of:

(a) less than 80 L (20 gal) per minute, tests shall include drafts of one or more amounts, including a draft of at least 19 L (5 gal).

(b) 80 L (20 gal) per minute or greater, tests shall include drafts of one or more amounts, including a draft of at least the amount delivered by the device in one minute at the maximum-flow rate of the installation **measured at the time of testing.**
(Amended 1984)

…

N.4. Testing Procedures.

N.4.1. Normal Tests. – The "normal" test of a device shall be made at the maximum discharge flow rate ~~**developed under the conditions of installation**~~ **measured at the time of testing.** Any additional tests conducted at flow rates down to and including one-half of the sum of the maximum discharge flow rate (MDFR) and the rated minimum discharge flow rate (RMDFR) shall be considered normal tests. As a formula, this is stated as:

MDFR + RMDFR / 2 = minimum discharge flow rate for additional tests

(Amended 1991 and 2023)

…

Table T.2.

Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in

NIST Handbook 44, Section 3.30.

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance[1]
0.3	- Petroleum products delivered from large capacity (flow rates greater than 115 L/min or 30 gpm)** devices, including motor-fuel devices - Heated products (other than asphalt) at temperatures greater than 50 °C (122 °F) - Asphalt at temperatures equal to or below 50 °C (122 °F) - All other liquids not shown in the table where the typical delivery is over 200 L (50 gal)	0.2 %	0.3 %	0.5 %
0.3A	- Asphalt at temperatures greater than 50 °C (122 °F)	0.3 %	0.3 %	0.5 %
0.5*	- Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min or 30 gpm)** motor-fuel devices - Agri-chemical liquids - All other applications not shown in the table where the typical delivery is ≤ 200 L (50 gal)	0.3 %	0.5 %	0.5 %
1.1	- Petroleum products and other normal liquids from devices with flow rates** less than 1 gpm. - Devices designed to deliver less than 1 gal	0.75 %	1.0 %	1.25 %

* For test drafts ≤ 40 L or 10 gal, the tolerances specified for Accuracy Class 0.5 in the table above do not apply. For these test drafts, the following applies:

(a) Maintenance tolerances on normal and special tests shall be 20 mL plus 4 mL per indicated liter or 1 in^3 plus 1 in^3 per indicated gallon.

(b) Acceptance tolerances on normal and special tests shall be one-half the maintenance tolerance values.

[1] Special test tolerances are not applicable to retail motor fuel and retail Diesel Exhaust Fluid (DEF) dispensers.

** Flow rate refers to ~~**designed or marked maximum flow rate**~~ **discharge flow rate measured at the time of testing.**

(Added 2002) (Amended 2006, 2013, and 2022)

…

UR.2. Installation Requirements.

…

UR.2.2. Discharge Rate. – A device shall be installed so that the ~~**actual**~~ maximum discharge rate **measured at the time of testing** will not exceed the ~~**rated**~~ **designed or marked** maximum discharge rate. Automatic means for flow regulation shall be incorporated in the installation if necessary.

Previous Status:
2027: New Proposal

Original Justification:
Regarding N.3.Test Drafts: The term "designed maximum discharge rate" is not a single value > meters are "designed" to cover a range of flow rates. The "maximum flow rate of the installation" is unknown because there is no Marking Requirement for Retail Devices (meters) with flow rates < 30 gpm, S.4.4 Retail Devices., S.4.4.1. Discharge Rates. The maximum flow rate less than (<) 30 gpm would have to be measured by the accepted method of a draft of at least the amount delivered in one minute at the maximum flow rate measured at the time of testing as required for wholesale devices <see below>.

This section requires that you measure the maximum discharge rate at the time of testing.

Regarding N.4. Testing Procedures: What is meant by "developed under the conditions of installation"? Is this a requirement of manufacturers, service companies, or both? What is the definition of "Installation"? It could mean meters installed at the factory or installed at Retail/Wholesale sites by a service company when placed into service. In either case, the maximum discharge flow rate would need to be measured at the time of testing.

Regarding Table T.2.:

EXAMPLE:

Retail High Speed Diesel meters are typically Marked with a maximum discharge flow rate of 60 gpm.

Table T.2.Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30. would have you refer to Accuracy Class 0.3 for meters with a Marked discharge flow rate of greater than 30 gpm and apply the maintenance tolerance of 0.3%. These retail high speed diesel meters commonly run at maximum discharge flow rates below 30 gpm which would allow for a larger tolerance of 0.5% maintenance tolerance.

Regarding UR.2.2. Discharge Rate: The distinction here between "designed" and "marked" being that retail meters below 30 gpm are not required to be Marked, so you would need to find what the designed maximum discharge flow rate is from the manufacturer or NTEP Certificate.

The submitter requests that this be a Developing Item in 2027.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:

-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Wisconsin DATCP said that the actual flow rate of the meters and the marked flow rate of the meters can differ significantly, to the point where a meter could fall under a different accuracy class in Tolerance table T.2. It was stated that the submitter believes the more reasonable position to take would be to measure the flow rate at the time of testing. Written notes are attached.

A representative from Kansas Department of Agriculture said clarification should be added to the EPO. It was stated that an inspector measures the flow rate at time of inspection and that this item does not account for clogged filters. This person recommended developing status.

The committee recommends this item is assigned a developing status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): States that the item needs to be withdrawn since this is talking about the maximum discharge rate at the time of testing and should not be the maximum flow rate at the time of testing. Devices should be tested at maximum flow rate.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports Mr. Wagner's comments, as well as his request for withdrawal, and said that there were recent updates that would change the language.

The 2026 S&T Committee recommends that this item be assigned a Withdrawal status, based on testimony heard during open hearings. If not withdrawn, consider LMD-27.1, as both items amend language in the same code section.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures does not agree with proposed language as flow rates can be manipulated prior to testing, as through a PTO throttle or clogged filters.

2026 NEWMA: A representative from NYS Weights & Measures opposes the proposal since it may change the tolerances due to many factors affecting flow rates at the time of test.

The committee recommends this item be withdrawn.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture does not support and recommended Withdrawn.

A representative from Arkansas Department of Agriculture supports the idea but believes it needs more development and should be assigned to a national committee.

A representative from Gilbarco opposes this item and recommends Withdrawn.

The committee recommends Withdrawn on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

VTM – VEHICLE TANK METERS

VTM-27.1 N.4.1. Normal Test.

Source:
New Hampshire Division of Weights and Measures and the NCWM Professional Certification Program Coordinator

Purpose:
Provide clarity to N.4.1. Normal Tests.

Item under Consideration:
Amend the NIST Handbook 44 Vehicle-Tank Meter Code as follows:

N.4.1. Normal Tests. – The "normal" test of a **device**~~measuring system~~ shall be made at the maximum discharge **flow** rate ~~that may be anticipated~~**developed** under the conditions of ~~the~~ installation. **Any test conducted at the maximum discharge flow rate developed under the conditions of installation down to and including one-half of the sum of the maximum discharge flow rate developed under the conditions of installation and the rated minimum discharge flow rate shall be considered a normal test.** ~~**Any additional tests conducted at flow rates down to and including one-half of the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests.**~~

To determine the minimum flow rate at or above which a "normal" test is conducted, the following equation is provided:

$$\frac{(\text{maximum discharge flow rate} + \text{rated minimum discharge flow rate})}{2}$$

Where:

The maximum discharge flow rate is the maximum rate of flow developed under the conditions of installation.

The rated minimum discharge flow rate is the marked minimum discharge rate or the minimum flow rate specified by the manufacturer.

At a minimum, one "normal" test shall be conducted on each meter at the maximum discharge flow rate developed under the conditions of installation.

(Amended 1992 **and 20XX**)

Previous Status:
2027: New Proposal

Original Justification:
The existing code is wordy, ambiguous, and difficult to understand. This proposal adds a formula and conditions of application that will give clarity to N.4.1. Normal Tests.

A similar update was adopted for normal tests in the Liquid Measuring Devices (LMD) Code at the 2026 NCWM Annual Meeting. A proposal was made in 2024 and further developed in 2025. It was acknowledged during the development of the LMD code for normal tests that other sections of NIST Handbook 44 would need to be changed to be consistent.

Proposals to amend Sections 3.32 Liquefied Petroleum Gas and Anhydrous Ammonia and 3.39 Carbon Dioxide Liquid-Measuring Devices have been submitted at the same time as this proposal.

Some may believe the current code is satisfactory and there is no need to add a formula and clarifying language.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Kansas Department of Agriculture asked if this item brought clarity or confusion.

The committee recommends this item is assigned a voting status and recommends this item is blocked with LPG-27.1 and CDL-27.1.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference no comments were received.

The 2026 S&T Committee recommends a Voting status. The committee believes the item has merit and is fully developed. The 2026 S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1. Additionally, the committee would like the submitter to review the use of "device" vs "measuring system" for each item.

2026 NEWMA: A representative from New Hampshire Division of Weights and Measures reiterates that there should be consistency in normal test language across all applicable code and wouldn't be opposed to blocking the items.

2026 NEWMA: A representative from New Jersey Weights & Measures supports this item and recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1 as they all accomplish the same goal.

2026 NEWMA: A representative from NYS Weights & Measures suggests maintaining this as a "measuring system" not just a "device". NYS would not support the item as a device but would support the item as a "measuring system".

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NIST stated they have not finished analysis but some verbiage in the item may not be the correct verbiage. They don't believe that the term "device" is correct because it's more of a system.

A representative from Arkansas Department of Agriculture does not support this item. She has concerns with line 34, the definition of what flow rate would be and is incorrectly implying the flow rate would not change. Recommended Assigned.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

LPG – LPG AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES

LPG-27.1 N.4.1. Normal Test.

Source:
New Hampshire Division of Weights and Measures and the NCWM Professional Certification Program Coordinator

Purpose:
Provide clarity to N.4.1. Normal Tests.

Item under Consideration:
Amend the NIST Handbook 44 LPG and Anhydrous Ammonia Liquid-Measuring Devices Code as follows:

N.4.1. Normal Tests. – The "normal" test of a device shall be made at the maximum discharge flow rate developed under the conditions of the installation. Any ~~**additional**~~ tests conducted at **the maximum discharge flow rate developed under the conditions of installation down to and including one-half of the sum of the maximum discharge** flow rate~~**s**~~ **developed under the conditions of installation** ~~**down to and including one-half the sum of the maximum discharge flow rate**~~ and the rated minimum discharge flow rate shall be considered normal tests.

(Amended 1998)

To determine the minimum flow rate at or above which a "normal" test is conducted, the following equation is provided:

$$\frac{(\textbf{maximum discharge flow rate} + \textbf{rated minimum discharge flow rate})}{\mathbf{2}}$$

Where:

The maximum discharge flow rate is the maximum rate of flow developed under the conditions of installation.

The rated minimum discharge flow rate is the marked minimum discharge rate or the minimum flow rate specified by the manufacturer.

At a minimum, one "normal" test shall be conducted on each meter at the maximum discharge flow rate developed under the conditions of installation.

(Amended 1992 **and 20XX**)

Previous Status:

2027: New Proposal

Original Justification:

The existing code is wordy, ambiguous, and difficult to understand. This proposal adds a formula and conditions of application that will give clarity to N.4.1. Normal Tests.

A similar update was adopted for normal tests in the Liquid Measuring Devices (LMD) Code at the 2026 NCWM Annual Meeting. A proposal was made in 2024 and further developed in 2025. It was acknowledged during the development of the LMD code for normal tests that other sections of NIST Handbook 44 would need to be changed to be consistent.

Proposals to amend Sections 3.32 Liquefied Petroleum Gas and Anhydrous Ammonia and 3.39 Carbon Dioxide Liquid-Measuring Devices have been submitted at the same time as this proposal.

Some may believe the current code is satisfactory and there is no need to add a formula and clarifying language.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:

-

Industry:

-

Advisory:

-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Kansas Department of Agriculture asked if this item brought clarity or confusion.

The committee recommends this item is assigned a voting status and recommend this item is blocked with VTM-27.1 and CDL-27.1.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): States that this item seems to be a duplication of another item. This item as written is very lengthy and can accomplish the goal with less words, but he supports the intent.

The 2026 S&T Committee recommends a Voting status. The committee believes that the item has merit and is fully developed. The 2026 S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1. Additionally, the committee would like the submitter to review the use of "device" vs "measuring system" for each item.

2026 NEWMA: A representative from New Jersey Weights & Measures supports this item and recommends blocking VTM-21.1, LPG-27.1, and CDL-27.1 as they all accomplish the same goal.

2026 NEWMA: A representative from National Propane Gas Association supports this item.

2026 NEWMA: A representative from NYS Weights & Measures recommends blocking the 3 items together.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NIST stated the best way to describe would be not stating "at installation" and should say conditions "of installation." Conditions do impact the rate of flow and believes rephrasing it that so we can all agree. Not necessarily opposed but needs rewriting. In addition not replacing the word "measuring system".

A representative from Maryland Department of Agriculture explained that this item is attempting to identify what a "normal test" is. She supports this item for further development.

A representative from Richard Suiter Consulting has concerns with the wording time of test, the volume and amount of product being pulled depending on uncontrolled conditions such as number of other pumps operating at the time of test. He recommends Withdrawn.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

HGV – HYDROCARBON GAS VAPOR-MEASURING DEVICES

HGV-25.1 D S.1.1.4. Advancement of Indicating and Recording Elements., S.11.5. Proving Indicator., S.2.2. Provision for Sealing., S.4.3. Temperature Compensation., S.4.4. ~~Badge~~Identification., N.3. Test Drafts., N.4.1. Normal Tests., and Appendix D. Definitions register

Source:
California Department of Food and Agriculture – Division of Measurement Standards

Purpose:
The proposed changes are to recognize new technologies in hydrocarbon gas vapor-measuring devices.

Item under Consideration:
Amend the Handbook 44 Hydrocarbon Gas Vapor-Measuring Devices Code as follows:

S.1.1.4. Advancement of Indicating and Recording Elements. – Primary indicating and recording elements shall advance ~~digitally or continuously and be susceptible to advancement only by the mechanical operation of the device~~only by the designed operation of the device.

(Amended 20XX)

S.1.1.5. Proving Indicator. – **A device shall be equipped with a proving indicator or proving indication.**

S.1.1.5.1. Mechanical Proving Indicators.

(a) Devices rated less than 280 m^3/h (10 000 ft^3/h) gas capacity shall be equipped with a proving indicator measuring 0.025 m^3, 0.05 m^3, 0.1 m^3, 0.2 m^3, or 0.25 m^3 per revolution, (1 ft^3, 2 ft^3, 5 ft^3, or 10 ft^3 per revolution) for testing the meter. ~~Devices with larger capacities shall be equipped as follows:~~

(~~a~~b) Devices rated 280 m^3 (10 000 ft^3) up to but not including 1 700 m^3/h (60 000 ft^3/h) gas capacity shall be equipped with a proving indicator measuring not greater than 1 m^3 (100 ft^3) per revolution.

(~~b~~c) Devices rated 1 700 m^3/h (60 000 ft^3/h) gas capacity or more shall be equipped with a proving indicator measuring not more than 10 m^3 (1 000 ft^3) per revolution.

~~The t~~**T**est circle ~~of the~~ proving indicator**s** shall be divided into ten equal parts. Additional subdivisions of one or more of such equal parts may be made.

S.1.1.5.2. Electronic Proving Indication. – The smallest unit of volume displayed shall be no larger than 1/1000 of the value of the smallest unit of indicated delivery required in S.1.1.3. Value of Smallest Unit. The meter shall be capable of displaying the proving indication continuously while testing the meter.

(Amended 1973**, ~~and~~** 1988**, and 20XX**)

…

S.2.2. Provision for Sealing. – For devices or systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. Devices and Systems Adjusted Using Removable Digital Storage Devices. For parameters adjusted using other means, the following applies.

Adequate provision shall be made for **an approved means of security (e.g., data change audit trail) or for physically** applying **a** security seal**~~s~~** in such a manner that **~~no~~ requires the security seal to be broken before an** adjustment or interchange can be made of**~~: any measurement element.~~**

(a) any measuring or indicating element;

(b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries; and

(c) any metrological parameter that will affect the metrological integrity of the device or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

Audit trails shall use the format set forth in Table S.2.2. Categories of Device and Methods of Sealing.*

[*Nonretroactive as of January 1, 20XX]

(Amended 2019**, and 20XX**)

Table S.2.2. *Categories of Device and Methods of Sealing*	
Categories of Device	***Method of Sealing***
Category 1: No remote configuration capability.	***Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.***
Category 2: Remote configuration capability, but access is controlled by physical hardware. The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.	***The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.***
Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password). The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.	***An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. The event logger information shall be available at the time of inspection, as a printed copy or transmitted in an electronic format. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)***

[Nonretroactive as of January 1, 20XX]

(Table Added 20XX)

S.2.5. Adjustments and Corrections for Measuring Elements and Measuring Systems. – Other than devices with mechanical meters, a device shall be equipped with automatic means to determine and correct for changes in the product's properties or variations in other parameters having a significant metrological effect that results in a measured quantity in excess of allowable error limits when compared with the delivered quantity. The device shall provide a means to identify when these features are not operating properly.

[Nonretroactive as of January 1, 20XX]
(Added 202X)

…

S.4. Marking Requirements. - In addition to all the marking requirements of Section 1.10. General Code, paragraph G-S.1. Identification, each device shall have the following information conspicuously, legibly, and permanently marked:

(Amended 20XX)

S.4.1. Limitations of Use. – If a device is intended to measure accurately only products having particular properties, or to measure accurately only under specific installation or operating conditions, or to measure accurately only when used in conjunction with specific accessory equipment, these limitations shall be clearly and permanently stated on the device.

S.4.2. Discharge Rates. – A device shall be marked to show ~~**it's**~~ **the** rated gas capacity in cubic meters per hour or cubic feet per hour~~.~~ **for the particular products that the device was designed to meter as identified by the manufacturer.**

(Amended 20XX)

S.4.3. Temperature Compensation. – If a device is equipped with an automatic temperature compensator, this shall be **marked on the front of the** ~~**indicated on the badge or immediately adjacent to the badge of the**~~ device**. If the device is equipped with a removable indicating and/or recording element, the required automatic temperature compensation information shall also appear** ~~**and**~~ on the ~~**register**~~ **indicating/recording element**.

(Amended 20XX)

~~**S.4.4. Badge. – A badge affixed in a prominent position on the front of the device shall show the manufacturer's name, serial number and model number of the device, and capacity rate of the device for the particular products that it was designed to meter as recommended by the manufacturer.**~~

…

N.3. Test Drafts. – Except for low-flame tests, test drafts shall be at least equal to**:**

N.3.1. For meters equipped with a mechanical indicating and/or recording elements:

N.3.1.1 Meters equipped with test circles - O~~**o**~~ne complete revolution of the largest capacity proving indicator and shall in no case be less than 0.05 m^3 or 2 ft^3.

N.3.1.2. Meters not equipped with test circles - Ten times the smallest proving indicator division and shall in no case be less than 0.05 m^3 or 2 ft^3.

N.3.2. For meters equipped with an electronic indicating and/or recording elements - Ten times the smallest proving indicator division and in no case less than 0.05 m^3 or 2 ft^3.

All flow rates shall be controlled by suitable outlet orifices.

(Amended 1973**,** ~~**and**~~ 1991 **and 20XX**)

…

N.4.1. Normal Tests. – The normal test of a device shall be made at a rate not to exceed the capacity rate ~~**given on the badge**~~ **marked on**~~**of**~~ the meter.

(Amended 1988**, and 20XX**)

…

N.4.2.4. Leak Test. – The device shall be tested for leaks up to a pressure not to exceed the manufacturer's maximum rated pressure. The device shall not leak. Meters that are not intended to be leak tested by submersion under water are to be leak tested as described on the type approval certificate.

(Added 20XX)

…

UR.2.6. Customer Indicating Element, Accessibility. – For systems that utilize additional indicating elements for use by the customer, one of the following shall be provided.

(a) ***A console display that the customer has access to, can clearly identify, and then select the view device indications,***

(b) ***A remote display which is provided to the customer as part of the system, or***

(c) ***At the option of the customer, an application that provides indications in real time.***
[Nonretroactive as of January 1, 20XX]

(Added 20XX)

UR.2.7. Tenant Premise Identification. – Tenant premise identification shall be clearly and permanently shown on or at the device, and on all separate components of a device. Remote indications and all recorded representations shall be readily identifiable and readily associated with the customer's premises. Recorded representations shall also include the time and date.

[Nonretroactive as of January 1, 20XX]

(Added 20XX)

…

NIST HB 44 – Appendix D. Definitions

~~**badge. A metal plate affixed to the meter by the manufacturer showing the manufacturer's name, serial number and model number of the meter, and its rated capacity. [3.33]**~~

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from California Division of Measurement Standards stated that the item is collaborative process and requests a developing status to continue working on the item.
- 2026 Interim: None

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: A technical advisor from The National Institute of Technology, Office of Weights and Measures supports voting with corrected numbering but also supports the submitter requesting developing.

Comments Against:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- 2026 Annual: None
- 2026 Interim: A regulator from California, the submitter of the item, noted that some formatting issues exist in the current proposal. They recommend developing to correct these errors and receive feedback.

Industry:
- 2026 Annual: None
- 2026 Interim: An associate member from National Propane Gas Association supports the item for continued development.

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Item Development:
NCWM 2026 Annual Meeting: The Committee updated the language for this item based on feedback from the submitter and chose to retain a Developing status for this item based on the submitter's comment heard during Open Hearing.

NCWM 2026 Interim Meeting: The Committee assigned Developing status to this item based on the comments heard during Open Hearings. The Committee encourages the submitter to continue developing the item.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item is assigned a developing status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): States that this item is fully developed and ready for voting.

The 2026 S&T Committee recommends a Voting status. The committee believes that the item has merit and is fully developed.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from National Propane Gas Association recommends a developing as they are still waiting for information from the manufacturer.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NPGA recommends this remains under development; forwarded suggested modifications to the item. Edits N.4.2.4. - Relate to leak detection and would allow this to continue, UR.2.6.- concerns about the wording "real time"

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

CDL - CARBON DIOXIDE LIQUID-MEASURING DEVICES

CDL-27.1 N.4.1. Normal Test.

Source:
New Hampshire Division of Weights and Measures and the NCWM Professional Certification Program Coordinator

Purpose:
Provide clarity to N.4.1. Normal Tests.

Item under Consideration:
Amend the NIST Handbook 44 Carbon Dioxide Liquid-Measuring Devices Code as follows:

N.4.1. Normal Tests. – The "normal" test of a device shall be made at the maximum discharge flow rate developed under the conditions of installation. Any ~~**additional tests**~~ conducted at **the maximum discharge** flow rate~~s~~ **developed under the conditions of installation** down to and including one-half of the sum of the maximum discharge flow rate **developed under the conditions of installation** and the rated minimum discharge flow rate shall be considered normal tests.

To determine the minimum flow rate at or above which a "normal" test is conducted, the following equation is provided:

$$\frac{(\text{maximum discharge flow rate} + \text{rated minimum discharge flow rate})}{2}$$

Where:

The maximum discharge flow rate is the maximum rate of flow developed under the conditions of installation.

The rated minimum discharge flow rate is the marked minimum discharge rate or the minimum flow rate specified by the manufacturer.

At a minimum, one "normal" test shall be conducted on each meter at the maximum discharge flow rate developed under the conditions of installation.

(Amended 1992 **and 20XX**)

Previous Status:
2027: New Proposal

Original Justification:
The existing code is wordy, ambiguous, and difficult to understand. This proposal adds a formula and conditions of application that will give clarity to N.4.1. Normal Tests.

A similar update was adopted for normal tests in the Liquid Measuring Devices (LMD) Code at the 2026 NCWM Annual Meeting. A proposal was made in 2024 and further developed in 2025. It was acknowledged during the development of the LMD code for normal tests that other sections of NIST Handbook 44 would need to be changed to be consistent.

Proposals to amend Sections 3.32 Liquefied Petroleum Gas and Anhydrous Ammonia and 3.39 Carbon Dioxide Liquid-Measuring Devices have been submitted at the same time as this proposal.

Some may believe the current code is satisfactory and there is no need to add a formula and clarifying language.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from the Kansas Department of Agriculture said it provides less clarity without the word "test."

The committee recommends a voting status and recommends this item is blocked with VTM-27.1 and LPG-27.1.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): He supports the intent of the item and recommends a Developing Status with simplification (less words).

The 2026 S&T Committee recommends a Voting status, with an editorial change to N.4.1. Normal Tests. - keeping the word “tests”. The 2026 S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1. Additionally, the committee would like the submitter to review the use of "device" vs "measuring system" for each item.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture believes that the word “test” is stricken unintentionally in line 4.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

HGM – HYDROGEN GAS-METERING DEVICES

HGM-27.1 S.8. Minimum Measured Quantity, Table T.2. Accuracy Classes and Tolerances for Hydrogen gas Measuring Devices, and UR.1.3. Minimum Measured Quantity.

Source:
Toyota Motor North America

Purpose:
Amend NIST Handbook 44 Section 3.39 to recognize heavy-duty hydrogen fueling dispensers with maximum discharge rates up to 30 kg/min and a maximum Minimum Measured Quantity (MMQ) of 3.0 kg.

Item under Consideration:
Amend NIST Handbook 44 Hydrogen Gas-Metering Devices Code as follows:

S.1. Minimum Measured Quantity. - The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

(a) Measuring systems having a maximum flow rate less than or equal to 4 kg/min shall have a minimum measured quantity not exceeding 0.5 kg.

(b) Measuring systems having a maximum flow rate greater than 4 kg/min but not greater than 12 kg/min shall have a minimum measured quantity not exceeding 1.0 kg.

(c) **Measuring systems having a maximum flow rate greater than 12 kg/min but not greater than 30 kg/min shall have a minimum measured quantity not exceeding 3.0 kg.**

…

~~Table T.2.~~ ~~Accuracy Classes and Tolerances for Hydrogen Gas-Measuring Devices~~			
~~Accuracy Class~~	~~Application or Commodity Being Measured~~	~~Acceptance Tolerance~~	~~Maintenance Tolerance~~
~~7.0~~	~~Hydrogen gas as a vehicle fuel~~	~~5.0 %~~	~~7.0 %~~

Table T.2 **Accuracy Classes and Tolerances for Hydrogen Gas-Measuring Devices**			
Accuracy Class	**7.0**		
Application or Commodity Being measured		**Hydrogen gas as a vehicle fuel**	
Flow Rate	**MMQ**	**Acceptance Tolerance**	**Maintenance Tolerance**
≤ 4 kg/min	**0.5 kg**	**5.0%**	**7.0%**
>4 kg/min to ≤12 kg/min	**1.0 kg**	**5.0%**	**7.0%**
>12 kg/min to ≤30 kg/min	**3.0 kg**	**5.0%**	**7.0%**

…

UR.1.3. Minimum Measured Quantity.

(a) The minimum measured quantity shall be specified by the manufacturer.

(b) The minimum measured quantity appropriate for a transaction may be specified by the weights and measures authority. A device may have a declared minimum measured quantity smaller than that specified by the weights and measures authority; however, the device must perform within the performance requirements for the declared or specified minimum measured quantity up to deliveries at the maximum measurement range.

(c) The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

(1) measuring systems having a maximum flow rate less than or equal to 4 kg/min shall have a minimum measured quantity not exceeding 0.5 kg; **~~and~~**

(2) measuring systems having a maximum flow rate greater than 4 kg/min but not greater than 12 kg/min shall have a minimum measured quantity not exceeding 1.0 kg**~~.~~; and**

(3) **measuring systems having a maximum flow rate greater than 12 kg/min but not greater than 30 kg/min shall have a minimum measured quantity not exceeding 3.0 kg.**

Previous Status:

2027: New Proposal

Original Justification:

Introduction:

This proposal is supported by a supplemental technical package consisting of the Proposal to Amend NIST Handbook 44 Section 3.39 and Appendices A through D, which provide the detailed regulatory, technical, metrological, and implementation basis for recognizing heavy-duty (HD) hydrogen fueling applications. Collectively, these documents address the proposed Handbook 44 amendments, high-flow hydrogen mass flow meter performance, an appropriate accuracy classification for heavy-duty vehicle fueling, and the potential impact of the proposed HD application on

NCWM Publication 14 requirements. The supplemental information is provided to fully address the key technical and regulatory considerations associated with establishing a distinct heavy-duty hydrogen dispenser application.

This proposal recommends amending NIST Handbook 44 Section 3.39, Hydrogen Gas-Measuring Devices – Tentative Code, to recognize heavy-duty hydrogen dispensers and associated mass flow meters intended for the commercial fueling of heavy-duty fuel-cell vehicles. The proposal establishes a new dispenser category for maximum flow rates above 12 kg/min and up to 30 kg/min, with a maximum minimum measured quantity (MMQ) of 3.0 kg. The objective is to preserve legal-for-trade integrity while accommodating emerging high-capacity hydrogen fueling infrastructure.

The purpose of the proposal is to provide a clear regulatory framework for high-flow hydrogen dispensers that are not adequately addressed by the current Handbook 44 classifications, while maintaining consumer protection, measurement accuracy, and practical field verification.

Background and History:

Existing Handbook 44 hydrogen provisions were developed primarily around passenger-vehicle fueling systems and the flow rates and delivery quantities associated with those applications. Heavy-duty commercial fuel-cell vehicles present substantially different operating conditions. Commercial trucks may require approximately 40–80 kg of hydrogen per fueling event and increasingly rely on higher fueling rates to achieve operationally acceptable fueling times.

As dispenser flow rates increase, startup and shutdown transients become a larger contributor to measurement uncertainty when evaluating very small deliveries. Consequently, requirements developed around lower-flow passenger-vehicle fueling systems may not appropriately represent the metrological characteristics of high-flow heavy-duty dispensers.

Technical Justification:

A maximum MMQ of 3.0 kg represents approximately 4–7% of a typical 40–80 kg heavy-duty vehicle fill. At a flow rate of 18 kg/min, a 3.0 kg delivery occurs in approximately 10 seconds; at 30 kg/min, the same quantity is delivered in approximately 6 seconds. These delivery durations provide a practical balance between measurement uncertainty, testability, and commercial usability.

High-flow Coriolis mass flow meters are capable of excellent steady-state measurement accuracy. However, verification using very small delivery quantities becomes increasingly influenced by transient effects associated with dispenser operation, including meter stabilization, hose expansion and pressurization, valve timing, and startup and shutdown behavior. Establishing an MMQ appropriate to the heavy-duty application therefore allows the complete dispensing system to be evaluated under conditions that are more representative of its intended commercial use.

The supporting technical and regulatory basis for these recommendations is provided in the supplemental documents accompanying this Form 15:

Proposal to Amend NIST Handbook 44 Section 3.39 – Presents the overall proposed change and regulatory rationale for recognizing heavy-duty hydrogen fueling applications.

Appendix A – NCWM HB-44 Amendment Package – Provides the specific proposed Handbook 44 amendments and associated code language.

Appendix B – Hydrogen Mass Flow Meter Evaluation for Heavy-Duty Fueling – Provides the technical evaluation of high-flow hydrogen mass flow meter capabilities and their application to heavy-duty fueling rates.

Appendix C – Heavy-Duty Hydrogen Vehicle Fueling Accuracy Class – Evaluates the appropriate accuracy and tolerance framework for heavy-duty hydrogen dispensing applications.

Appendix D – Impact of Heavy-Duty Fueling on NCWM Publication 14 – Evaluates the effect of recognizing heavy-duty hydrogen fueling on applicable NCWM Publication 14 requirements, evaluation procedures, and device certification considerations.

Anticipated Questions and Technical Responses:

The following questions identify potential technical and implementation concerns associated with establishing a heavy-duty hydrogen dispenser category with a maximum declared MMQ of 3.0 kg. These issues are addressed to demonstrate that the proposed requirements can maintain appropriate legal-for-trade measurement performance while recognizing the significantly higher flow rates and delivery quantities associated with heavy-duty hydrogen vehicle fueling.

Point 1 – Could a Heavy-Duty Vehicle Receive a Delivery of Only 3.0 kg, Such as During a Topping-Off Transaction?

Although a typical heavy-duty vehicle fueling transaction is expected to involve substantially more than 3.0 kg of hydrogen, a smaller delivery could occur under certain operating conditions, including a topping-off transaction. Therefore, the proposed 3.0 kg MMQ should not be justified solely on the assumption that small commercial transactions will not occur.

The proposed MMQ instead recognizes the relationship between the intended application, dispenser flow rate, typical delivery quantity, and the ability of the complete dispensing system to maintain acceptable measurement performance during short-duration deliveries.

Representative high-flow Coriolis mass flow meter technology is capable of approximately ±0.5% measurement accuracy over a flow range of approximately 0.8 kg/min to 30 kg/min. Therefore, the meter itself is capable of measuring hydrogen during a 3.0 kg delivery. However, the MMQ applies to the performance of the complete commercial measuring system, not solely to the steady-state accuracy of the Coriolis meter.

At high flow rates, a 3.0 kg delivery represents a very short-duration transaction. For example:

At 18 kg/min, 3.0 kg is delivered in approximately 10 seconds.

At 30 kg/min, 3.0 kg is delivered in approximately 6 seconds.

During these short-duration deliveries, total system performance may be influenced by startup and shutdown transients, meter stabilization, valve timing, hose pressurization and expansion, and other dynamic effects.

Accordingly, the proposed 3.0 kg MMQ establishes a practical lower boundary for evaluating the complete heavy-duty dispensing system while still providing protection for a customer who may receive a relatively small or topping-off delivery.

During these short-duration deliveries, total system performance may be influenced by startup and shutdown transients, meter stabilization, valve timing, hose pressurization and expansion, and other dynamic effects.

Accordingly, the proposed 3.0 kg MMQ establishes a practical lower boundary for evaluating the complete heavy-duty dispensing system while still providing protection for a customer who may receive a relatively small or topping-off delivery.

Point 2 – Will Existing Field Test Equipment Have Sufficient Capacity to Test a Dispenser With a 3.0 kg MMQ?

Recognition of a heavy-duty hydrogen dispenser with a declared MMQ of 3.0 kg has implications for the capacity of field test standards and equipment used by weights and measures officials.

Based on the test draft requirements currently specified in NIST Handbook 44 Section 3.39, a 3.0 kg MMQ may result in the following nominal test quantities:

N.3. Test Drafts

Tests based on twice and five times the declared MMQ would require nominal test drafts of:

$2 \times \text{MMQ} = 6.0 \text{ kg}$

5 × MMQ = 15.0 kg

Master Meter (Transfer) Standard Test

Tests based on the declared MMQ and ten times the MMQ would require nominal test drafts of:

1 × MMQ = 3.0 kg

10 × MMQ = 30.0 kg

Gravimetric Tests and N.4.3. PVT Tests

Tests based on twice and five times the declared MMQ would require nominal test drafts of:

2 × MMQ = 6.0 kg

5 × MMQ = 15.0 kg

These quantities may exceed the capacity or practical operating range of some test equipment currently used for light-duty hydrogen dispenser verification.

Accordingly, implementation of a heavy-duty hydrogen dispenser category may require appropriately rated heavy-duty field test standards or test equipment capable of safely and accurately verifying deliveries at the required test quantities and flow rates.

This should be considered an implementation requirement associated with the new application rather than a reason to limit the commercial dispenser technology to the capabilities of test equipment originally developed for lower-flow, light-duty hydrogen fueling.

The development and recognition of suitable test equipment, test procedures, and applicable requirements should therefore accompany implementation of the proposed heavy-duty dispenser category, including consideration of any corresponding changes or guidance needed within NCWM Publication 14.

Point 3 – How Does the Proposed 3.0 kg MMQ Relate to the 1 kg Maximum MMQ in OIML R 139?

OIML R 139-1, Compressed Gaseous Fuel Measuring Systems for Vehicles – Part 1: Metrological and Technical Requirements, specifies a maximum MMQ of 1 kg for hydrogen compressed gaseous fuel measuring systems.

The proposed 3.0 kg maximum MMQ for the heavy-duty application therefore represents a deliberate difference from the current OIML requirement and should be clearly identified and technically justified.

NIST Handbook 44 provides the principal model requirements used by U.S. weights and measures jurisdictions for commercial measuring devices. The purpose of the proposed amendment is to establish requirements appropriate for an emerging class of high-flow hydrogen dispensers serving heavy-duty fuel-cell vehicles that operate at substantially higher flow rates and delivery quantities than the passenger-vehicle applications around which existing requirements were largely developed.

The proposed 3.0 kg MMQ is not intended to reduce measurement accuracy requirements or consumer protection. Rather, it recognizes the interaction between significantly increased dispenser flow rates and the transient effects that become increasingly important when very small test quantities are delivered over only a few seconds.

For a typical heavy-duty vehicle delivery of approximately 40–80 kg, a 3.0 kg MMQ represents approximately 4–7.5% of the total transaction. The proposal therefore seeks to establish an MMQ that remains small relative to the normal commercial delivery while allowing meaningful and repeatable verification of high-flow dispensing systems.

The difference between the proposed Handbook 44 requirement and OIML R 139 should also be communicated to the appropriate international standards organizations. As experience and technical data become available from commercial heavy-duty hydrogen fueling installations, the results may provide a basis for future consideration within OIML R 139 and other applicable standards.

Such coordination would support the long-term objective of maintaining appropriate international uniformity while allowing U.S. weights and measures requirements to address heavy-duty hydrogen fueling technology as it enters commercial service.

Point 4 – Why Was a Maximum MMQ of 3.0 kg Selected Rather Than 1.0 kg, 2.0 kg, or Another Value?

The proposed maximum MMQ of 3.0 kg was selected based on the operating characteristics of high-flow heavy-duty hydrogen dispensing systems, the typical quantity of hydrogen delivered to heavy-duty vehicles, the duration of very small deliveries at the proposed flow rates, and the need to provide a practical and repeatable basis for legal-for-trade verification.

Heavy-duty hydrogen dispensers operating at flow rates of approximately 18 kg/min to 30 kg/min deliver relatively large quantities of hydrogen in a short period of time. As a result, MMQ values developed for lower-flow passenger-vehicle applications can correspond to extremely short delivery durations when applied to heavy-duty dispensers.

For comparison, at a flow rate of 18 kg/min, an MMQ of 1.0 kg would be delivered in approximately 3.3 seconds, an MMQ of 2.0 kg in approximately 6.7 seconds, and an MMQ of 3.0 kg in approximately 10 seconds. At the proposed maximum flow rate of 30 kg/min, an MMQ of 1.0 kg would be delivered in approximately 2 seconds, an MMQ of 2.0 kg in approximately 4 seconds, and an MMQ of 3.0 kg in approximately 6 seconds.

At these high flow rates, particularly for 1.0 kg and 2.0 kg deliveries, startup and shutdown conditions may represent a substantial portion of the total transaction. Although the Coriolis mass flow meter itself may be capable of excellent steady-state measurement accuracy, the legal-for-trade performance of a hydrogen dispenser is determined by the complete measuring system. During a very short delivery, system-level effects such as meter stabilization, valve opening and closing sequences, hose pressurization and expansion, pressure and temperature changes, control timing, and other transient operating conditions can have a proportionally greater influence on the measured result.

A 3.0 kg MMQ increases the minimum delivery duration to approximately 6 seconds at 30 kg/min and 10 seconds at 18 kg/min, providing a more representative interval over which the complete dispensing system can be evaluated. The proposed value is therefore intended to provide a practical balance between meaningful system-level measurement verification and protection of the customer during smaller commercial transactions.

The proposed MMQ should also be considered in relation to the intended commercial application. A typical heavy-duty hydrogen vehicle may receive approximately 40–80 kg during a fueling transaction. A

3.0 kg MMQ therefore represents approximately 7.5% of a 40 kg delivery and approximately 3.75% of an 80 kg delivery. The MMQ remains small relative to the expected commercial transaction while recognizing the substantially higher flow rates associated with heavy-duty fueling.

The proposed 3.0 kg value represents a maximum allowable declared MMQ and does not require every heavy-duty hydrogen dispenser to have an MMQ of 3.0 kg. A dispenser capable of demonstrating compliance with the applicable requirements at a lower MMQ may declare a lower value. This approach allows improved measurement technology and dispenser performance to support lower MMQs where technically demonstrated while establishing a practical upper limit for the heavy-duty application.

The selection of a 3.0 kg MMQ is not intended to establish a permissible measurement error of 3.0 kg, nor does it reduce the applicable accuracy or tolerance requirements. The MMQ establishes the minimum quantity at or above which the dispensing system is required to satisfy the applicable metrological performance requirements.

For these reasons, a maximum MMQ of 3.0 kg is considered an appropriate application-specific value for heavy-duty hydrogen dispensers with maximum flow rates above 12 kg/min and up to 30 kg/min. It recognizes the physical and

operational characteristics of high-flow dispensing while maintaining legal-for-trade measurement integrity, consumer protection, and a practical basis for field verification.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

An industry member from Toyota gave a presentation on this item during open hearings.

Mr. Matthew Sheehan (Chevron): Asked if there was data on the tolerances?

Mr. Ken Loewenthal (Hycert Solutions): Stated that mass flow meters can run more accurately, it doesn't make sense to start at a tighter tolerance. There's no need to change the last 10 years of tolerance just because we're adding high flow.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports the intent of the item. He pointed out that on page 63, line 32 of the S&T Agenda "S.1." should be "S.8." as an editorial correction.

Mr. Robbie Parke (Washington Department of Agriculture): Brought up questions on the MMQ and asked if you could have a manufacturer that says 6 but the book says 3 kg?

Mr. Ken Loewenthal (Hycert Solutions): Clarified that they are only adding "c" (in the agenda). The spec plate will show you the tolerance.

The 2026 S&T Committee recommends a Developing status. The committee recommends that the submitter consider comments heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from NYS Weights & Measures stated that the author's proposal change shown as S.1 should be for "S.8.(c) Measuring systems having a maximum flow rate greater than 12 kg/min but not greater than 30 kg/min shall have a minimum measured quantity not exceeding 3.0 kg."

The values in the Table T.2 is the maximum value allowed, and not the "MMQ" (minimum measured quantity) in the EV world. This table is for the greatest value of the measured quantity. For example, T.2 for 4 kg/min flow rate, conflicts with S.1.(a). They recommend Table T.2 adding a ≤ or "up to" statement. The proposed change to the tolerance table T.2 duplicates information already provided in S.8. and UR.1.3., but having this information in all three places is causing confusion. They suggest the existing Table T.2 is left unchanged so there is no problem with S.8.(c).

Further, the way that the proposed Tolerance table reads, is inconsistent with the remainder of the Meter codes in HB44. They also question if the existing HB44, Section N.3 Test Drafts language should also be updated by the submitter – to reflect the new speed that the author is introducing "…and one test draft at approximately five times the minimum measured quantity, or 4kg, 12kg, whichever is greater…" with the updated flow rate speeds they propose.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

No comments were given on this item.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

EVS – ELECTRIC VEHICLE SUPPLY EQUIPMENT

EVS-27.1 S.1. Primary Indicating and Recording Elements., and S.2.4. EVSE Indication of Unit Price and Equipment Capacity and Type of Voltage.

Source:
AMPECO

Purpose:
Address four regulatory gaps arising from the interaction between the NIST HB 44 Section 3.40 requirements, and the Open Charge Point Protocol (OCPP) communication framework used by the majority of deployed EVSE in the United States. The proposal seeks to: (1) recognize alternative indicating elements for EVSE without integrated displays, distinguishing between physically integrated external displays and operator-hosted digital interfaces rendered on the customer's personal device; (2) add a note directing type evaluators to verify that the metrological record achieving S.1.3.2 sub-watt-hour resolution is the record used for billing and receipts, where the OCPP 1.6 primary transaction fields are constrained to integer watt-hour values; (3) address the unit price display obligation in multi-party transactions where the retail price is set by a third-party service provider independently of the EVSE operator; and (4) clarify that time-based fees applied after the cessation of energy delivery constitute a time-based service under S.1.1(b) whose terms must be disclosed to the customer prior to delivery under S.2.4.3..

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Supply Equipment Code as follows:

S.1. Primary Indicating and Recording Elements.

S.1.1. Electric Vehicle Supply Equipment (EVSE). – An EVSE used to charge electric vehicles shall be of the computing type and shall indicate the electrical energy, the unit price, and the total price of each transaction.

(a) EVSEs capable of applying multiple unit prices over the course of a single transaction shall also be capable of indicating the start and stop time, the total quantity of energy delivered, the unit price, and the total price for the quantity of energy delivered during each discrete phase corresponding to one of the multiple unit prices.

(b) EVSEs capable of applying additional fees for time-based and other services shall also be capable of indicating the total time measured; the unit price(s) for the additional time-based service(s); the total computed price(s) for the time measured; and the total transaction price, including the total price for the energy and all additional fees.

(c) Where an EVSE is capable of applying time-based fees after the cessation of energy delivery (e.g., idle fees assessed while the vehicle remains connected), such fees constitute a time-based service under (b). The applicable unit price, the conditions under which the time-based fee becomes effective (e.g., upon cessation of energy flow, after a grace period), and any grace period duration shall be disclosed to the customer as part of the price structure prior to the commencement of delivery, consistent with S.2.4.3.

Note: Section 3.40 does not currently define when "delivery" ends for purposes of S.2.4.3. Where an EVSE applies time-based fees after energy flow has ceased but while the vehicle remains physically connected, the transaction may remain open for billing purposes beyond the cessation of energy delivery. The pre-session disclosure of the idle fee structure under this paragraph satisfies the customer approval requirement of S.2.4.3 for the time-based fee component. The receipt required by S.2.6 shall itemize the time-based fee separately, including the information required by S.2.6(e).

S.1.2. EVSE Indicating Elements. – An EVSE used to charge electric vehicles shall include an indicating element that accumulates continuously and displays, for a minimum of 15 seconds at the activation by the user and at the start and end of the transaction, the correct measurement results relative to quantity and total price. Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the device. All indications and representations of electricity sold shall be clearly identified and separate from other time-based fees indicated by an EVSE that is used for both the sale of electricity as vehicle fuel and the sale of other separate time-based services (e.g., vehicle parking).

S.1.2.1. Multiple EVSEs Associated with a Single Indicating Element. – A system with a single indicating element for two or more EVSEs shall be provided with means to display information from the individual EVSE(s) selected or displayed, and shall be provided with an automatic means to indicate clearly and definitely which EVSE is associated with the displayed information.

S.1.2.2. Alternative Indicating Elements. — Where an EVSE is not equipped with an integrated visual display, the indication requirements of S.1.2 may be satisfied through one of the following:

(a) An external indicating element that is physically integrated with or permanently attached to the EVSE system (e.g., a payment terminal display), provided that it displays the information required by S.1.2 and is continuously accessible to the customer throughout the transaction; or

(b) An operator-hosted digital interface accessible at the EVSE via a machine-readable link (e.g., QR code or NFC tag) displayed on the face of the EVSE, rendered on the customer's personal device, provided that:

(1) the digital interface displays the information required by S.1.2 without requiring account registration or login by the customer;

(2) the digital interface is continuously accessible to the customer throughout the transaction;

(3) the machine-readable link is clearly and conspicuously displayed on the face of the EVSE; and

(4) the authorization method used to initiate the transaction provides the customer with access to the digital interface prior to the commencement of delivery.

Note: The digital interface described in (b) is hosted and controlled by the EVSE operator, but is rendered on a device that is not part of the EVSE system. This is a distinct category from a physically integrated display under (a). Where the authorization method does not provide the customer with access to any indicating element or digital interface prior to delivery (e.g., RFID on an EVSE without a display, without a payment terminal, and without a linked digital interface), the EVSE does not satisfy S.1.2 for that authorization method.

S.1.3. EVSE Units.

S.1.3.1. EVSE Units of Measurement. – EVSE units used to charge electric vehicles shall be indicated and recorded in kilowatt-hours (kWh) and decimal subdivisions thereof.
(Amended 2022)

S.1.3.2. EVSE Value of Smallest Unit. – The value of the smallest unit of indicated delivery by an EVSE, and recorded delivery if the EVSE is equipped to record:

(a) for AC systems shall not exceed 0.000 1 kWh;

(b) for DC systems shall not exceed 0.001 kWh; and

(c) the value of the kWh shall be expressed only as a decimal submultiple of 1 that satisfy (a) and (b). (Amended 2022)

Note: Under OCPP 1.6, the meterStart and meterStop fields in StartTransaction and

StopTransaction messages are constrained to integer watt-hour values and do not, on their face, satisfy S.1.3.2(a) for AC systems. The OCA Application Note v3.0 (S.1.3.2 commentary) prescribes that sub-watt-hour precision values be provided through the transactionData field of StopTransaction.req. The type evaluation should verify that the metrological record used for billing, receipt generation, and regulatory audit is the record that achieves S.1.3.2 resolution — not solely the integer-typed primary transaction fields. This Note does not modify or reduce the resolution requirement of S.1.3.2. Where the communication protocol supports decimal meter values natively (e.g., OCPP 2.0.1 TransactionEventRequest), this Note does not apply.

S.1.3.3. Values Defined. – Indicated values shall be adequately defined by a sufficient number of figures, words, symbols, or combinations thereof. An indication of "zero" shall be a zero digit for all displayed digits to the right of the decimal mark and at least one to the left.

S.2. EVSE Operating Requirements.

…

S.2.4. EVSE Indication of Unit Price and Equipment Capacity and Type of Voltage.

S.2.4.1. Unit Price. – An EVSE shall be able to indicate on each face the unit price at which the EVSE is set to compute or to dispense at any point in time during a transaction.

S.2.4.1.1. Unit Price Where Retail Price Is Determined by a Third Party. — Where the customer obtains charging access through a third-party service provider that sets its own retail price independently of the EVSE operator, and the EVSE operator does not have access to the third party's retail price at the time of the transaction, the EVSE shall indicate the unit price established by the EVSE operator. The EVSE or its associated indicating element shall include a clear notice that the final price charged to the customer may differ from the displayed unit price where additional charges are applied by the customer's service provider.

Note: Section 3.40 does not currently define or recognize intermediary service providers in the EVSE billing chain. In practice, third-party providers that issue their own authentication tokens (e.g., RFID cards or mobile app accounts) and apply independent retail pricing are increasingly common in the U.S. market through bilateral network access agreements. The European Union's Alternative Fuels Infrastructure Regulation (AFIR, Regulation (EU) 2023/1804) addresses this through a defined "e-mobility service provider" role with corresponding price transparency obligations (Articles 5 and 7). No equivalent definition or framework exists in U.S. weights-and-measures regulation. This paragraph is intended as a first step toward addressing multi-party pricing structures within the existing HB 44 framework.

S.2.4.2. Equipment Capacity and Type of Voltage. – An EVSE shall be able to conspicuously indicate on each face the maximum rate of energy transfer (i.e., maximum power) and the type of current associated with each unit price offered (e.g., 7 kW AC, 25 kW DC, etc.).

S.2.4.3. Selection of Unit Price. – When electrical energy is offered for sale at more than one unit price through an EVSE, the selection of the unit price shall be made prior to delivery through a deliberate action of the purchaser to select the unit price for the fuel delivery. Except when the conditions for variable price structure have been approved by the customer prior to the sale, a system shall not permit a change to the unit price during delivery of electrical energy.

Note: When electrical energy is offered at more than one unit price, selection of the unit price may be through the deliberate action of the purchaser: 1) using controls on the EVSE; 2) through the purchaser's use of personal or vehicle-mounted electronic equipment communicating with the system; or 3) verbal instructions by the customer.

S.2.4.4. Agreement Between Indications. – All quantity, unit price, and total price indications within a measuring system shall agree for each transaction.

Previous Status:

2027: New Proposal

Original Justification:

This proposal addresses national-scale regulatory gaps affecting the growing U.S. EVSE installed base. (1) A significant share of deployed AC EVSE lack integrated screens, creating uncertainty on whether S.1.2 and S.2.4.1 display requirements can be met through external displays or operator-hosted digital interfaces. (2) OCPP 1.6, the dominant communication protocol in the U.S. market, constrains transaction meter value fields to integer watt-hours, which does not satisfy S.1.3.2(a) sub-watt-hour resolution for AC systems; evaluators need explicit guidance on which transaction record to verify. (3) Multi-party billing structures where a third-party service provider sets the retail price independently of the EVSE operator are increasingly common in the U.S. through bilateral roaming agreements, but HB 44 does not contemplate this structure or specify whose price satisfies the display obligation. (4) Post-delivery idle fees are widely applied but Section 3.40 does not address whether they require pre-session disclosure under S.2.4.3 or how they interact with the definition of "delivery."

Amendment 1 — Pre-Session Disclosure of Time-Based Fees After Energy Delivery

Idle fees after session end are an increasingly common operational tool at public EVSE, used to incentivize turnover of charging bays. Section 3.40 currently addresses time-based fees under S.1.1(b) and requires customer approval of variable price structures under S.2.4.3, but does not explicitly address the scenario where a time-based charge begins after energy delivery has ceased. This creates ambiguity on two points: whether an idle fee constitutes a permissible element of the pre-approved price structure, and whether its activation after energy flow stops constitutes a "change to the unit price during delivery" under S.2.4.3. The proposed amendment clarifies that idle fees are a time-based service under S.1.1(b) whose terms must be disclosed prior to delivery, and that pre-session disclosure satisfies the S.2.4.3 approval requirement. It does not address the on-device display of accumulated idle charges during the post-delivery period, which raises separate protocol-dependent considerations that vary across OCPP versions.

Amendment 2 — Screenless Chargers

A growing proportion of deployed AC EVSE — particularly Level 2 wall-mount and pedestal units — do not have an integrated screen. Section 3.40 was drafted with screen-equipped dispensers in mind, and the current text does not address how the display requirements of S.1.2 and S.2.4.1 apply to screenless hardware. This creates regulatory uncertainty for several authorization methods: RFID-initiated sessions provide no price indication; Plug & Charge and Autocharge sessions begin automatically without any display surface; and sessions initiated via a CPO mobile app can display the required data in the app but not on the device face. The proposed amendment provides a structured framework for recognizing external indicating elements while preserving the consumer protection intent of the display requirements.

Amendment 3 — Meter Precision

Under OCPP 1.6J, the meterStart and meterStop fields are integer watt-hours. For AC EVSE, S.1.3.2(a) requires 0.0001 kWh (0.1 Wh) resolution — a sub-integer value in Wh. The OCA Application Note v3.0 acknowledges this conflict and prescribes a workaround via the transactionData field, but its effectiveness depends on charge point firmware behavior that varies across models. OCPP 2.0.1 resolves the issue natively with decimal-typed meter values. The proposed Note provides evaluators with explicit guidance on verifying that the metrological record meets the required resolution regardless of the primary transaction field type.

Amendment 4 — Multi-Party Pricing

An increasing number of U.S. EV charging transactions involve a third-party service provider that issues its own authentication credential (RFID card, mobile app account) and bills the customer at a retail price that includes a markup over the EVSE operator's tariff. The EVSE operator and its CSMS do not have access to the third party's retail price — it is determined by the third party's own commercial terms and communicated to the customer through the third party's own platform. HB 44 Section 3.40 requires unit price display on the EVSE face (S.2.4.1; UR.3.1) but does not contemplate a billing structure where the seller at the point of sale and the party that invoices the customer are different entities. The EU has addressed this through AFIR, which defines the "e-mobility service provider" role and imposes corresponding price transparency obligations on both the CPO and the service provider. No equivalent framework exists in U.S. regulation. The proposed amendment clarifies that the EVSE operator's own tariff satisfies the display obligation, with a notice to the customer that additional charges may apply, as a practical interim measure until a more comprehensive multi-party framework is developed.

Possible Opposing Arguments

Amendment 1: Opponents may argue that classifying idle fees as a pre-approved element of the price structure effectively permits post-delivery charges without real-time cost visibility. The proposed amendment addresses consent (pre-session disclosure) but not indication (ongoing display of accumulating idle charges). This is intentional: the indication question is protocol-dependent and warrants separate treatment. The amendment does not reduce existing consumer protections — it establishes that idle fees must be disclosed upfront and itemized on the receipt under S.2.6(e), which is more prescriptive than the current silence on the topic.

Amendment 2: Opponents may argue that permitting external indicating elements weakens the consumer-facing visibility of pricing information, particularly for customers unfamiliar with QR codes or mobile web portals. The proposed conditions — no-login access, conspicuous identification on the EVSE face, and continuous availability throughout the transaction — are intended to address this concern while accommodating the physical reality of screenless hardware.

Amendment 3: Some may argue that the Note creates a perceived exception for OCPP 1.6 hardware. The Note does not reduce the S.1.3.2 resolution requirement; it clarifies the evaluation methodology for systems where the primary transaction field type differs from the metrological record used for compliance.

Amendment 4: It may be argued that displaying the EVSE operator's tariff when the customer will be billed at a different price by a third party is misleading. The proposed notice requirement addresses this directly. The alternative — requiring the EVSE to display the third party's retail price — is not technically feasible under current interoperability protocols. There is no standardized mechanism for the EVSE operator to retrieve the third party's retail tariff in real time. A longer-term solution may require defining the intermediary service provider role in U.S. regulation, as the EU has done through AFIR.

Supporting references:

OCA Application Note v3.0 (February 2024); OCPP 1.6J and 2.0.1 specifications;

EU Alternative Fuel Infrastructure Regulation 2023/1804

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:

New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Iowa Department of Agriculture/Weights & Measures supports this item and recommends a voting status.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Agrees with the Open Charge Point Protocol (OCPP). However, he strongly disagrees with the language in S.2.4.1.1. "the final price charged to the customer may differ from the displayed unit price where additional charges are applied by the customer's service provider." Additionally, formatting issues with S.1.2. He recommends an assigned status.

Mr. John Sorfleet (Santa Clara County, California): Noted formatting issues with the item and the price posted vs price charged as a significant issue with the item, additionally stated that the item should be further refined. He recommends the item be withdrawn.

Ms. Mal Skowron (Tesla): States that this element is being addressed by the NCWM EVSE task group. She recommends that the item be assigned.

The 2026 S&T Committee recommends a Developing status and that the item to be assigned to the NCWM EVSE task group. The committee further recommends that the submitter consider S.2.4.1.1. Unit Price Where Retail Price Is Determined by a Third Party, formatting of section S.1.2. EVSE Indicating Elements, and other testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures feels the notes throughout are not necessary or needs to be reworded. They do not contain specifications, but descriptions. S.2.4.1.1. suggests that an EVSE can display a notice that the final price charged to a consumer may differ from the display. NJ opposes this.

2026 NEWMA: A representative from ChargePoint, Inc. stated this proposal should be referred to the task group. The code already addresses many of these issues. S.2.4.1.1. does reflect real world situations for third-party pricing.

2026 NEWMA: A representative from NYS Weights & Measures stated that S.1.2.2. should not be using acronyms in the handbook, and questions how the consumer would access the information. There must be agreement between indications. S.2.4.1. NYS opposes this.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture opposes this proposal and recommends withdrawal. The change to S.2.4.1.1. would allow third parties to charge whatever they wanted. The unit price on the display needs to be the price. Third parties can't charge a different fee. Vermont would be ok assigning this proposal to the EVSE Task Group to develop any pieces that may be useful.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments.

Representatives from Maryland and Arkansas Departments of Agriculture oppose this item and recommend Withdrawn

A representative from Texas Department of License and Regulations shared concerns with verbiage in the item, no mention of the dynamic QR, this is very easily manipulated in fraud cases and recommended Developing.

The committee recommends Withdrawn on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

EVS-27.2 S.2.6. EVSE Recorded Representations. and UR.3.3. EVSE Recorded Representations.

Source:
Tesla and the Iowa Department of Agriculture

Purpose:
Establish a fleet sales exception for recorded representations applicable to EVSE, consistent with an existing exception for liquid fuels.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Supply Equipment Code as follows:

S.2.6. EVSE Recorded Representations. – **Except for fleet sales and other price contract sales and for transactions where a post-delivery discount is provided, a** ~~A~~ receipt, either printed or electronic, providing the following information shall be available at the completion of all transactions:

(a) the total quantity of the energy delivered with unit of measure;

(b) the total computed price of the energy sale;

(c) the unit price of the energy, and for systems capable of applying multiple unit prices for energy during a single transaction, the following additional information is required:

(1) the start and stop time of each phase during which one of the multiple unit prices was applied;

(2) the unit price applied during each phase;

(3) the total quantity of energy delivered during each phase;

(4) the total purchase price for the quantity of energy delivered during each phase;

(d) the maximum rate of energy transfer (i.e., maximum power) and type of current (e.g., 7 kW AC, 25 kW DC, etc.);

(e) any additional separate charges included in the transaction (e.g., charges for parking time) including:

(1) the time and date when the service begins and the time and date when the service ends; or the total time interval purchased, and the time and date that the service either begins or ends;

(2) the unit price applied for the time-based service;

(3) the total purchase price for the quantity of time measured during the complete transaction;

(f) the final total price of the complete transaction including all items;

(g) the unique EVSE identification number;

(h) the business name; and

(i) the business location.

(Amended 20XX)

UR.3.3. EVSE Recorded Representations. – **Except for fleet sales and other price contract sales where a post-delivery discount is provided, a** ~~A~~ receipt, either printed or electronic, providing the following information shall be available at the completion of all transactions:

(a) the total quantity of the energy delivered with unit of measure;

(b) the total computed price of the energy sale;

(c) the unit price of the energy, and for systems capable of applying multiple unit prices for energy during a single transaction, the following additional information is required:

(1) the start and stop time of each phase during which one of the multiple unit prices was applied;

(2) the unit price applied during each phase;

(3) the total quantity of energy delivered during each phase;

(4) the total purchase price for the quantity of energy delivered during each phase;

(d) the maximum rate of energy transfer (i.e., maximum power) and type of current (e.g., 7 kW AC, 25 kW DC, etc.);

(e) any additional separate charges included in the transaction (e.g., charges for parking time) including:

(1) the time and date when the service begins and the time and date when the service ends; or the total time interval purchased, and the time and date that the service either begins or ends;

(2) the unit price applied for the time-based service;

(3) the total purchase price for the quantity of time measured during the complete transaction;

(f) the final total price of the complete transaction including all items;

(g) the unique EVSE identification number;

(h) the business name; and

(i) the business location.

(Amended 20XX)

Previous Status:
2027: New Proposal

Original Justification:
Electric vehicles (EVs) are increasingly entering operation in commercial and private fleets, driving deployment of EV fueling stations that sell electricity as vehicle fuel under fleet sale or price contract sale arrangements. These arrangements involve business-to-business (B2B) or controlled commercial agreements between known parties. They may include terms for pre-negotiated pricing, monthly invoicing of fuel charges, and unit price discounts applied after fuel is delivered.

NIST Handbook 44 Section 3.30 (Liquid-Measuring Devices) waives the requirement for fleet sales or price contract sales of liquid fuels to provide a receipt at the end of the transaction. This exception is appropriate because, in dedicated fleet arrangements, employed drivers are not responsible for managing payment or receipt collection. Instead, billing and receipt delivery occur via pre-established monthly invoices sent directly to fleet administrative staff. Because the parties in a fleet or price contract sale already have an established commercial relationship and alternative method of record-

keeping for transactions, requiring a receipt be provided at the end of the transaction is unnecessary and creates avoidable administrative hassle.

For reference, NIST Handbook 44 Section 3.30, S.1.6.7 states:

"S.1.6.7. Recorded Representations. – Except for fleet sales and other price contract sales and for transactions where a post-delivery discount is provided, a receipt providing the following information shall be available through a built-in or separate recording element for all transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash:..."

The exception for recorded representations in a fleet sale context does not currently apply to electricity dispensed as vehicle fuel. This code change is necessary to promote consistency across fuel types and better reflect the operational reality of how receipts are transferred for commercial fleet fueling, regardless of the commodity dispensed.

Opponents may argue that the existing exception for liquid fuels is very narrow in its application, and they may have concerns about expanding an exception. However, this code change proposal adopts identical language applicable to liquid fuel dispensers in a fleet context, and so this exception will remain narrow and targeted to the fleet sale use case. The receipt requirements applicable to arms-length or retail fuel sales for fleets, in which there is no pre-existing B2B agreement, would remain unchanged.

Another potential concern is that the terms “fleet sale” and “price contract sale” are not defined in Handbook 44. This may raise the question of how this exception will be applied and understood if added to Section 3.40. However, existing code (Section 3.30) already uses these terms, so defining them is not necessary to consider this item..

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:

-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Iowa Department of Agriculture/Weights & Measures supports this item and recommends a voting status.

The committee recommends this item be assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Ms. Mal Skowron (Tesla): Gave the example of the LMD code allowance for fleet billing and that EVSE should be allowed to have similar business transactions as other devices in Handbook 44, allowing for equity in business practices among all fuel types. She recommends a voting status.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Stated that the LMD code has a definition for contract sales and asked that before this item moves forward that a definition for contract sales is developed and included. He additionally commented that LMD devices for fleet or contract sales must still have indication.

Mr. Robbie Parke (Washington Department of Agriculture): He supports the addition of fleet sales for EVSE and recommends a voting status.

Mr. Isaac Carrera (EV Test Solutions): Brought up the definition of fleet sales and asked, what about post discount after the transaction is completed? He recommends a developing status.

Mr. Mahesh Albuquerque (Colorado Division of Measurement, Oil and Public Safety): States that all other fuel sales have contract sales exemptions for receipt, EVSE should also be included. He recommends a voting status.

Mr. John Sorfleet (Santa Clara County, California): States that fleet sales are well established and supports a voting status.

The 2026 S&T Committee initially recommended a Voting status and noted that if passed, the contract sales definition would need to be updated to include EVSE reference. The following comment was then heard during the voting session:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Stated that he does not believe that the item is fully developed, further stating that the 3.30. LMD code for contract sale will not apply to the EVSE code. Additionally, he expressed concern for the item as written for not being specific enough to define Fleet/Contract sales. He recommended that the item be assigned to the NCWM EVSE task group.

The item status recommendation of Voting then went to a vote and did not pass with 10 yea and 12 nay votes.

NEWMA 2026 Interim Meeting:

NEWMA S&T recommends voting with the following language: "Except for fleet sales and for transactions where a post-delivery discount is provided, a ~~A~~"

2026 NEWMA: A representative from State of Vermont Agency of Agriculture supports this proposal with the removal of the words "and other contract sales". This would help make it clear that just because a customer has an account on any app that this exception does not apply to their sale. Additionally, a definition of fleet sales might be useful.

2026 NEWMA: A representative from NYS Weights & Measures agrees with Vermont. Voting with change.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture believes verbiage similar to LMD and suggested striking the wording "contract sales"

A representative from Tesla will take suggestions back to the team

Representatives from TDLR and Arkansas Department of Agriculture echo Maryland's suggestions.

The committee recommends Voting on this item with suggested edits.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

MDM – MULTIPLE DIMENSION MEASURING DEVICES

MDM-25.1 V Multiple Sections Regarding Adding Volumetric Measuring Devices to Section 5.58.

Source:
Multiple Dimension Measuring Devices Work Group

Purpose:
Rename and amend Section 5.58. Multiple Dimension Measuring Devices to incorporate devices that measure volume directly rather than measuring three dimensions to calculate a volume. These devices measure, either statically or in-motion, the volume of a commodity, such as sand, gravel, rock, and dirt, etc., which is transported in a truck or other conveyance. The proposal will amend the application paragraphs and add or amend the specifications, test notes, tolerances and user requirements in this section to ensure these devices are designed to operate correctly and to facilitate their proper operation and evaluation.

Item under Consideration:
Amend the Handbook 44, Section 5.58. Multiple Dimension Measuring Devices Code as follows:

Section 5.58. Multiple Dimension and Volumetric Measuring Devices

A. Application

A.1. General. – This code applies to**:** ~~**dimension and volume measuring devices used for determining the dimensions and/or volume of objects for the purpose of calculating freight, storage, or postal charges based on the dimensions and/or volume occupied by the object. A multiple dimension measuring device:**~~

(a) Multiple Dimension Measuring Devices used for determining the dimensions and/or dimensional volume of objects which are generally hexahedron-shaped but may be irregularly-shaped for the purpose of calculating freight, storage, or postal charges based on the dimensions and/or volume occupied by the object.~~is generally used to measure hexahedron-shaped objects; and~~

(Added 2008) **(Amended 20XX)**

(b) Volumetric Measuring Devices that make multiple measurements to determine the volume of a bulk commodity~~**may be used to measure irregularly-shaped objects.**~~

(Added 2008) **(Amended 20XX)**

(Amended 2008 **and 20XX**)

~~**A.2. Other Devices Designed to Make Multiple Measurements Automatically to Determine a Volume** – **Insofar as they are clearly applicable, the provisions of this code apply also to devices designed to make multiple**~~

~~measurements automatically to determine a volume for other applications as defined by Section 1.10. General Code Paragraph G-A.1. Commercial and Law Enforcement Equipment.~~

A.2~~3~~. Additional Code Requirements. – In addition to the requirements of this code, Multiple Dimension **and Volumetric** Measuring Devices shall meet the requirements of Section 1.10. General Code.

(Amended 20XX)

A.3~~4~~. Exceptions. – This code does not apply to:

(a) devices designed to indicate automatically (with or without value-computing capabilities) the length of fabric passed through the measuring elements (also see Section 5.50. for Fabric-Measuring Devices);

(b) devices designed to indicate automatically the length of cordage, rope, wire, cable, or similar flexible material passed through the measuring elements (also see Section 5.51. for Wire- and Cordage-Measuring Devices); or

(c) any linear measure, measure of length, or devices used to measure individual dimensions for the purpose of assessing a charge per unit of measurement of the individual dimension (also see Section 5.52. for Linear Measures).

~~A.5. Type Evaluation. The National Type Evaluation Program (NTEP) will accept for type evaluation only those devices that comply with all requirements of this code.~~

...

S.1.4. Dimensions Indication, Multiple Dimension Measuring Device. – If ~~in~~**during** normal operation the device indicates or records only volume, a testing mode shall be provided to indicate dimensions for all objects measured.

(Amended 20XX)

S.1.5. Value of ~~Dimension/Volume~~Measuring Division Units. – The value of a ~~**device**~~**measuring** division "d" expressed in a unit of dimension **or volume** shall be ~~**presented in a decimal format. The value of "d" for each measurement axis shall be in the same unit of measure and**~~ expressed as:

(a) 1, 2, or 5;

(b) a decimal multiple or submultiple of 1, 2, or 5; or

(c) a **decimal** binary submultiple of a specific U.S. customary unit of measure.

Examples: device divisions may be 0.01, 0.02, 0.05; 0.1, 0.2, or 0.5; 1, 2, or 5; 10, 20, 50, or 100; 0.5, 0.25, 0.125, 0.0625, etc.

(Amended 20XX)

S.1.5.1. Value of Measuring Division Units, Multiple Dimension Measuring Device.

(a) The value of "d" for each measurement axis shall be in the same unit of measure.

(Amended 20XX)

~~**S.1.5.1.**~~**(b)** For Indirect Sales~~. In~~ addition to the values specified in S.1.5. Value of ~~**Dimension/Volume**~~**Measuring** Division Units, the value of the division may be 0.3 inch and 0.4 inch.

(Amended 20XX)

~~**S.1.5.2. (c) Devices Capable of Measuring Irregularly Shaped Objects.**~~ For devices capable of measuring irregularly shaped objects, the value of the **measuring** division size (d) shall be the same for the length axis (x) and the width axis (y) and may be different for the height axis (z), provided that

electronic rotation of the object to determine the smallest hexahedron is calculated in only a two-dimension horizontal plane, retaining the stable side plane as the bottom of the hexahedron.

(Added 2008) **(Amended 20XX)**

S.1.6. Customer Indications and Recorded Representations.

S.1.6.1. Multiple Dimension Measuring Devices. – Multiple dimension measuring devices or systems must provide information as specified in Table S.1.6.**1.** Required Information to be Provided by Multiple Dimension Measuring Systems. As a minimum, all devices or systems must be able to meet either column I or column II in Table S.1.6.**1.** Required Information to be Provided by Multiple Dimension Measuring Systems.

(Amended 2004 **and 20XX**)

Table S.1.6.1.
Required Information to be Provided by Multiple Dimension Measuring Systems

Information	Column I[1]	Column II[1]		Column III
	Provided by device	Provided by invoice or other means		Provided by invoice or other means as specified in contractual agreement
		Customer present	Customer not present	
1. Device identification[2]	D or P	P	P	P or A
2. Error message (when applicable)	D or P	P	N/A	N/A
3. Hexahedron dimensions[3]	D or P	P	P	P or A
4. Hexahedron volume (if used)[3]	D or P	P	P	P or A
5. Actual weight (if used)[3]	D or P	P	P	P or A
6. Dimensional Offset (if used)[3]	D or P	N/A	N/A	N/A
7. Hexahedron measurement statement[4]	D or P or M	P	P	P or G

A = AVAILABLE UPON REQUEST BY CUSTOMER[5]
D = DISPLAYED
G = PUBLISHED GUIDELINES OR CONTRACTS
M = MARKED
N/A = NOT APPLICABLE
P = PRINTED or RECORDED IN A MEMORY DEVICE and AVAILABLE UPON REQUEST BY CUSTOMER[5]

Notes:
[1] As a minimum all devices or systems must be able to meet either column I or column II.

[2] This is only required in systems where more than one device or measuring element is being used.

[3] Some devices or systems may not utilize all of these values; however, as a minimum either hexahedron dimensions or hexahedron volume must be displayed or printed.

[4] This is an explanation that the dimensions and/or volume shown are those of the smallest hexahedron in which the object that was measured may be enclosed rather than those of the object itself.

[5] The information "available upon request by customer" shall be retained by the party having issued the invoice for at least 30 calendar days after the date of invoicing.

(Amended 2004**, ~~and~~** 2021**, and 20XX**)

S.1.6.2. Volumetric Measuring Devices. – Devices that determine the volume of a bulk commodity shall:

(a) indicate or record an error message as specified in S.1.8.2. Indications Below Minimum and Above Maximum, Volumetric Measuring Device.

(b) indicate and record the net volume of the commodity

(Added 20XX)

S.1.6.3. Recorded Representations, Volumetric Measuring Devices. – When interfaced with the elements that are necessary for a point-of-sale system, the recorded representation provided shall contain:

(a) the net volume of the commodity

(b) the identity of the commodity

(c) the unit price of the commodity

(d) the total price of the commodity

(Added 20XX)

S.1.7. Minimum Measurement.

S.1.7.1. Multiple Dimension Measuring Devices. – Except for entries of dimensional offset, the minimum measurement by a device is 12 d. The manufacturer may specify a longer minimum measurement. For multi-interval devices, this applies only to the first measuring range (or segment) of each measurement axis (length, width, and height).

(Amended 20XX)

S.1.7.2. Volumetric Measuring Devices. – The minimum measurement by a device is 12 d. The manufacturer may specify a larger minimum measurement. For multi-interval devices, this applies only to the first measuring range (or segment).

(Added 20XX)

(Amended 2017**, ~~and~~** 2021**, and 20XX**)

S.1.8. Indications Below Minimum and Above Maximum.

S.1.8.1. Multiple Dimension Measuring Device. – When objects are smaller than the minimum dimensions identified in paragraph S.1.7.**1. Multiple Dimension Measuring Devices** or larger than any of the **marked** maximum dimensions plus 9 d, and/or maximum volume marked on the device plus 9 d, or when a combination of dimensions, including dimensional offset, for the object being measured exceeds the measurement capability of the device, the indicating or recording element shall either:

(a) not indicate or record any usable values; or

(b) identify the indicated or recorded representation with an error indication.

(Amended 2004, 2017, **~~and~~** 2021**, and 20XX**)

S.1.8.2. Volumetric Measuring Device. – When the commodity being measured is smaller than the minimum measurement identified in paragraph S.1.7.2 Volumetric Measuring Devices or larger than the marked maximum volume plus 9 d, or when the commodity being measured exceeds the measurement capability of the device, the indicating or recording element shall either:

(a) not indicate or record any usable values; or

(b) identify the indicated or recorded representation with an error indication.

(Added 20XX)

…

S.4.1. Multiple Dimension and Volumetric Measuring Devices, Main Elements, and Components of Measuring Devices. – Multiple dimension **and volumetric** measuring devices, main elements of multiple dimension **and volumetric** measuring devices when not contained in a single enclosure for the entire dimension/volume measuring device, and other components shall be marked as specified in Table S.4.1.a. Marking Requirements for Multiple Dimension **and Volumetric** Measuring Systems and explained in the accompanying notes, Table S.4.1.b. Multiple Dimension **and Volumetric** Measuring Systems Notes for Table S.4.1.a.

Table S.4.1.a.
Marking Requirements for Multiple Dimension and Volumetric Measuring Systems

To Be Marked With ⇓	**Multiple Dimension and Volumetric Measuring Equipment**			
	Multiple Dimension or Volumetric Measuring Device and Indicating Element in Same Housing	**Indicating Element not Permanently Attached to Multiple Dimension or Volumetric Measuring Element**	**Multiple Dimension or Volumetric Measuring Element Not Permanently Attached to the Indicating Element**	**Other Equipment (1)**
Manufacturer's ID	x	x	x	x
Model Designation	x	x	x	x
Serial Number and Prefix	x	x	x	x (2)
Certificate of Conformance Number (8)	x	x	x	x (8)
Minimum and Maximum Dimensions **or Volume** ~~**for Each Axis for Each Range in Each Axis**~~ (3)(9)	x	x	x	
Value of Measuring Division, d ~~**(for each axis and range)**~~ (9)	x	x	x	
Temperature Limits (4)(9)	x	x	x	
Minimum and Maximum ~~**s**~~**S**peed (5)(9)	x	x	x	
Special Application (6)(9)	x	x	x	
Limitation of Use (7)(9)	x	x	x	

(Amended 2016 **and 20XX**)

Table S.4.1.b.

Multiple Dimension and Volumetric Measuring Systems Notes for Table S.4.1.a.

1. Necessary to the dimension and/or volume measuring system, but having no effect on the measuring value, e.g., auxiliary remote display, keyboard, etc.

2. Modules without "intelligence" on a modular system (e.g., printer, keyboard module, etc.) are not required to have serial numbers.

3. **For multiple dimension measuring systems, t**~~**T**~~he minimum and maximum dimensions **for each axis and for each range in each axis** ~~**(using upper or lower case type)**~~ shall be marked. For example:

Table S.4.1.b.

Multiple Dimension and Volumetric Measuring Systems Notes for Table S.4.1.a.

Length: min _____ max _____

Width: min _____ max _____

Height: min _____ max _____

For volumetric measuring devices the minimum and maximum volume shall be marked. For example:

Volume: min _____ max _____

4. Required if the range is other than − 10 °C to 40 °C (14 °F to 104 °F).

5. Multiple dimension measuring **~~devices~~systems**, which require that the object or device be moved relative to one another, shall be marked with the minimum and maximum speeds at which the device is capable of making measurements that are within the applicable tolerances.

   Volumetric Measuring Systems shall be marked with the minimum and maximum speeds at which the device is capable of making measurements that are within the applicable tolerances.

6. A device designed for a special application rather than general use shall be conspicuously marked with suitable words visible to the operator and the customer restricting its use to that application.

7. Materials, shapes, structures, combination of object dimensions, speed, spacing, minimum protrusion size, or object orientations that are inappropriate for the device or those that are appropriate.

8. Required only if a Certificate of Conformance has been issued for the equipment.

9. This marking information may be readily accessible via the display. Instructions for displaying the information shall be described in the NTEP CC **if not marked on the components of the system**.

(Amended 2004, 2008, ~~and~~ 2016**, and 20XX**)

…

N.1. Test Procedures.

N.1.1. General. ~~– The~~

N.1.1.1. Multiple Dimension Measuring Device – **A** device **that measures the dimensions and/or dimensional volume of an object** shall be tested using test standards and objects of known and stable dimensions.
(Added 20XX)

N.1.1.2. Volumetric Measuring Devices – A device that measures the volume of a bulk commodity shall be tested using a transfer standard. The means of conveyance of the transfer standard, e.g., vehicles, rail cars, etc., shall be representative of the conveyance used during the normal operation of the device.
(Added 20XX)

(Amended 20XX)

N.1.2. Position Test. – Measurements ~~are~~**shall be** made using different positions of the test object **or conveyance and** ~~and~~ consistent with the manufacturer's specified use for the device.

(Amended 20XX

…

N.1.4. Test Object or Transfer Standard Size. – Test objects **or transfer standards** may vary in size from the smallest **volume or** dimension to the largest **volume or** dimension marked on the device, and for field verification examinations, shall be an integer multiple of "d.

…

N.1.4.3. Transfer Standards. – The volume of the transfer standard must be known to an expanded uncertainty (coverage factor k = 2) of not more than one-third of the applicable device tolerance. The volume shall also be checked to the same uncertainty when used at the extreme values of the influence factors.

The volume of the transfer standard shall be verified using a reference standard that is traceable to NIST (or equivalent national laboratory) and meets the tolerances expressed in NIST Handbook 44 Fundamental Considerations, paragraph 3.2 (i.e., one-third of the smallest tolerance applied to the device).

(Added 20XX)

(Amended 2008~~ and,~~ 2012**, and 20XX**)

N.1.5. Digital Zero Stability. – A zero indication change test shall be conducted on all devices which ~~show~~**display** a digital zero. After the removal of any test object **or conveyance**, the **device shall return to a** zero indication ~~shall not change~~. (Also see G-UR.4.2. Abnormal Performance.)

(Amended 20XX)

…

T.1. Principles~~**Design. The tolerance for a multiple dimension measuring device is a performance requirement independent of the design principle used.**~~

T.1.1. Design. – The tolerance for a multiple dimension measuring device or volumetric measuring device is a performance requirement independent of the design principle used.

(Added 20XX)

T.1.2. Device Division. – The tolerance for a multiple dimension measuring device or volumetric measuring device is related to the value of the measuring division (d) and is expressed in terms of d.

(Added 20XX)

(Amended 20XX)

…

T.3. Tolerance Values. ~~**– The maintenance and acceptance tolerance values shall be ± 1 division.**~~

T.3.1. For Volumetric Measuring Devices.

(a) Maintenance Tolerance Values. – The maintenance tolerance values shall be as specified in Table T.3.1. Maintenance Tolerances.

(b) Acceptance Tolerance Values. – The acceptance tolerance values shall be one-half of the maintenance tolerance values with a minimum tolerance of 1 d.

(Added 20XX)

Table T.3.1. Volumetric Measuring Devices

Maintenance Tolerances

(All values in this table are in measuring divisions)

1	2	3	4
0 – 200[1]	**201 – 400**	**401- 800**	**801 +**

[1] See S.1.7. Minimum Measurement (12 d).

(Added 20XX)

T.3.2. For Multiple Dimension Measuring Devices. – The maintenance and acceptance tolerance values shall be ± 1 division.

(Added 20XX)

(Amended 2004 **and 20XX**)

…

UR.3.1. Minimum and Maximum Measuring Ranges. – A device shall not be used to measure objects ~~**smaller than**~~ **or a commodity in an amount less than** the minimum or ~~**larger**~~**more** than the maximum **volume or** dimensions marked on the device.

(Amended 20XX)

UR.4.1. Zero or Ready Condition. – The zero-setting adjustment of a multiple dimension measuring device **or volumetric measuring device** shall be maintained so that, with no object **or conveyance** ~~**in or**~~ on **or within the range of** the measuring element, the device shall indicate or record a zero or ready condition.

(Amended 20XX)

And Appendix D, Definitions amend the definition of "d," dimension division value as follows:

measuring division, value of "d," ~~**dimension division value.**~~ – The smallest increment that the device displays for any axis and length of object in that axis **or for the total volume**. [5.58]

(Amended 20XX)

dimensional volume. - Volume of the smallest rectangular box which fully encloses the object, and is the product of the indicated values of length axis (x), width axis (y) and height axis (z) ($dv = x \times y \times z$). [5.58]

(Added 20XX)

Previous Status:
2025: Informational

Original Justification:
These devices are already in the marketplace and two manufacturers have a Provisional NTEP Certificate of Conformance. The changes to NIST Handbook 44 will permit the certificates to be accepted in all states. The MDMD Work Group voted to support this proposal with no opposing votes.

Some may believe that the tolerance are rather large. Currently in the marketplace methods being used include front end loaders with the bucket being an approximation of X cubic yard. Scales are also being used with a conversion from weight to cubic yards. The conversion from weight to cubic yards using a conversion number for the commodity being weighed. Weighing fails to take into account the moisture content of the commodity or the accuracy of the conversion number for the actual commodity being weighed. The MDMD direct volume devices accurately measure the actual volume of the commodity being sold.

To arrive at the proposed tolerance for these devices the current MDMD tolerance was used as a starting point. The current MDMD maintenance and acceptance tolerance is 1d for the entire measurement range of each of the 3 axes. Looking at the many NTEP Certificates for devices making 3 measurements to determine a volume the tolerance at the largest dimension in terms of percent was consistently 0.2% for each axis. This means the effective tolerance for the measurement of volume is plus or minus 0.6%. The maintenance tolerance proposed for devices directly measuring volume is slightly tighter at 0.5% at the break points in the proposed tolerance table with acceptance tolerance being one half of maintenance tolerance and a minimum tolerance of 1d.

The submitter recommends that this be a Retroactive Voting item in 2025.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Nebraska: FCSP- Weights & Measures, supports this item, and stated volume measuring is not limited to liquid and those terms being used intermixed should not hold this up. states that the initial testing has been completed in Nebraska and that transfer standards are typically maintained on site, and they understand they will need those devices for testing these devices.
- 2026 Annual: A Representative from Iowa Department of Agriculture/Weights & Measures, supports this item.
- 2026 Annual: A Representative from Maryland Department of Agriculture is in support of this item and does not want to limit technology. The Representative stated these devices do not replace scales.
- 2026 Annual: A Representative from Florida Department of Agriculture and Consumer Services, supports the item.
- 2026 Annual: A Representative from Delaware Department of Agriculture raised concern with the supply of testing standards and how to use them. A Representative from NIST responded that general code allows for jurisdictions to require owners to provide equipment and standards for field testing. Later stated they recommend voting.
- 2026 Interim: Regulators from Iowa, New York, Florida, Minnesota, and Arizona support this item and recommend voting status.

Industry:

- 2026 Annual: A Representative from Richard Suiter Consulting gave a presentation which is available on the website.
- 2026 Annual: A Representative from Loadscan Ltd. gave a presentation which is available on the website.
- 2026 Annual: A Representative from Wingfield Scales Company, Inc. gave a presentation which is available on the website.
- 2026 Annual: A Representative from Richard Suiter Consulting, stated the assistance requirement that is needed to test the device is in the handbook. They reiterated that the item needs to be adopted.
- 2026 Annual: A Representative from Zebra supports this item.
- 2026 Annual: A Representative from MDMD Focus Group, commented what appears in this agenda is work from the committee and NIST, and they find it developed and support it. At the NCWM interim

meeting open hearing support for the item was stated from the floor. The only opposition was expressed by a representative of the SMA. He believes that during the open hearing the MDMD Volume Focus Group provided a response to each of the concerns. Some states don't allow provisional NTEP certificates. Stated this item is the result of the close collaboration between OWM and the Volume Focus Group. The MDMD Volume Focus Group believes the changes are complete and appropriate for recognition of devices that directly measure the volume of a commodity.

- 2026 Annual: A Representative from Walz Scale & Scanner supports this item.
- 2026 Interim: An associate member from Waltz Scale recommends voting.
- 2026 Interim: An associate member from Richard Suiter Consulting stated, during the presentation, that the item is complete and ready to vote.
- 2026 Interim: An associate member from Rice Lake Weighing System recommends the item be given a voting status.

Advisory:

- 2026 Annual: None
- 2026 Interim: A technical advisor with The National Institute of Standards and Technology, Office of Weights and Measures, recommends voting status and explained that separating the terms MDMD, VMD and specifically outline which device could measure volume.

Comments Against:

Regulatory:

- 2026 Annual: A Representative from California Division of Measurement Standards, agreed with SMA and Los Angeles County with concerns over speed. Currently devices require an error, and this will not apply to these devices. There is precedence that different commodities have different tolerances, different commodities may require different tolerance as of right now there is only one tolerance. He does not doubt the accuracy of these devices but with concerns with code as presented. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting discussed it's the commodities with large voids that causes a limitation, not the technology.
- 2026 Annual: A Representative from Colorado Department of Agriculture stated that Los Angeles County brought up good points on material being tested and being on provisional certificate. Questioned why we are including it in NTEP certificates but not in HB 44 to be used. Has concerns that throughout the item we are mixing devices for dimensions and volume needs to be specified. Concerns about UR.4.1 - is this addressing if these devices are returning to zero and/or going past zero, as it is a requirement for all other devices not in this section. He also stated the certificate and/or the handbook should exclude liquids. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting responded to the questions and concerns and stated that there is precedence for listing materials/products on NTEP certificates and gave an example of liquid measuring devices. The representative also stated these devices measure volume directly and do not apply to dimensional measurements, and lidar technology can't be used to measure liquids. The Representative from Colorado Department of Agriculture stated we must look at how the device is being used not how it is used in perfect conditions and gave the example that moisture meters can measure multiple different grains. The representative later asked, are the field standard tolerances tighter than the device tolerances? Do they meet the requirement in definition of a field [transfer] standard? The item refers to a zero indication or ready condition, and they are concerned about the practicality of this language in the field. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting, responded to the concern stating that "ready condition" is already in the code, and transferred standards should be able to meet the 1/3 requirement.
- 2026 Interim: None

Industry:

- 2026 Annual: A Representative from SMA stated the SMA opposes this item in its current state and recommends further development. They believe this item should reference Handbook 130 as a reminder that selling by volume is only allowed for certain commodities. They also believe this item is missing many specifications that were included when Weigh-In-Motion Vehicle Scales (section S.1.14, additions to Table S.6.3.b, section N.7) were added in 2021, including out of measurement zone, direction (one way/both ways), out of level, and operator notifications of an error condition.

- 2026 Interim: An associate member from the Scale Manufacturers Association opposes this item as written and recommends it be assigned a developing status.

Advisory:

- 2026 Annual: None
- 2026 Interim: No comments were heard from the floor.

Neutral Comments:

Regulatory:

- 2026 Annual: A Representative from Ohio Department of Agriculture Division of Weights & Measures asked a question of the NTEP Coordinator about the NTEP's method for the approving these devices without a published process. The representative stated they would support this item if there was a plan for a pub 14. A Representative from NTEP responded that the NTEP committee has a document that isn't published but could be finalized within 30 days of the approval of this proposal.
- 2026 Annual: A Representative from Maryland Department of Agriculture requested clarification about equating the division and tolerances of scales with these systems. It appears the effective tolerance of MDM devices would be much larger than those of a scale measuring the same product. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting, responded you cannot make the comparison of these to a scale. For example, the liquid measuring code is different than the scale code.
- 2026 Annual: A Representative from Los Angeles County Agricultural Commissioner/Weights & Measures, asked if there are any guidelines on restricting the speed the vehicle goes through, he didn't see it in regulation or NTEP certificates? Perhaps it needs to be in the user requirement. Other concern is the compatibility of the material, (clay or moisture, or grain) do we have to take into account compactibility. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting, replied the NTEP procedure does take speed in account. NTEP uses material that is not compactable and moisture does not have an impact and is not a concern.
- 2026 Interim: A regulator from Maryland recommended an informational session be held during the 2026 Annual meeting to assist regulators with a better understanding of the technology and ask questions.

Industry:

- 2026 Annual: A Representative from Guidant Measurement stated there is confusion in the language between volumetric measuring vs volumetric dimensioning. By using the word 'dimensioning' instead of 'measuring', this could eliminate some confusion.
- 2026 Interim: An associate member from Guidant Measurement questioned why an MDMD states it is used to measure volume?
- 2026 Interim: An associate member from Endress + Hauser posed the question if this device could be used for liquids? An associate member from Richard Suiter Consulting replied these devices are not for liquids. An associate member from Wingfield Scale Company explained the device does not measure liquids because lidar refracts in liquids.
- 2026 Interim: An associate member from Richard Suiter Consulting responded to Guidant Measurement and Endress + Hauser that the NTEP Certificate of Conformance outlines the commodities that can be measured.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: This item was voted on and not adopted and will be carried over as a Voting item. The Committee edited Table T.3.1. to include "Volumetric Measuring Devices to provide clarity in the 2026 Annual Meeting Addendum.

NCWM 2026 Interim Meeting: After hearing comments from the floor the committee believes the item is fully developed and assigned a Voting status.

NCWM 2025 Annual Meeting: Following comments during the open hearing and after requesting clarification from the developer during the work session, the Committee modified Table T.3.1 tolerances and added "Volumetric Measuring Devices" to the title of S.1.6.3. During the voting session, Sherry Turvey, representing the CWMA, requested the item be downgraded to Informational due to substantial changes made by the NCWM S&T Committee during the Annual Meeting work session. Considering this request and prior open hearing comments on the item's development, the Committee agreed to downgrade the item to Informational before it was voted on by the body.

NCWM 2025 Interim Meeting: The Committee has combined MDM-25.1, MDM-25.2, and MDM-25.3 into a single item and updated the proposal to include revisions from NIST OWM and agreed upon by the submitter. The Committee believes the item has merit, is fully developed, and has assigned it a voting status.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from MDMD Volume Focus Group said questions from California and Colorado representatives have been answered and submitted written comments in support of this item. Written comments are attached.
Representatives from Iowa Department of Agriculture/Weights & Measures, Illinois Department of Agriculture, Nebraska FCSP-Weights & Measures, and Kansas Department of Agriculture support this item and recommended a voting status.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufacturers Association): The SMA opposes this item in its current state and recommends further development. The SMA believes this item should reference Handbook 130 as a reminder that selling by volume is only allowed for certain commodities. SMA also believes this item is missing many specifications that were included when Weigh-In-Motion Vehicle Scales (section S.1.14, additions to Table S.6.3.b, section N.7) were added in 2021, including out of measurement zone, direction (one way/both ways), out of level, and operator notifications of an error condition. SMA written comments are also available in Pub 16.

Mr. Richard Suiter (Richard Suiter Consulting and MDMD Chair): PowerPoint is available on the website. He supports this as a voting item. He indicated that there was support at NCWM, and the 3 regions. The changes proposed have been developed through a lengthy process involving the manufacturers, the MDMD work group, and NIST OWM. Those groups and the NCWM S&T Committee agree that the item is fully developed and ready. The speed limitation is on the CoC, if it is above or below, it will give no reading.

Mr. Steve Harrington (Oregon Weights & Measures): Supports this as a voting item.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Overall California supports this, but he feels that their concerns have not been satisfactorily addressed. He recommends that the submitter introduce language similar to S.1.14. from the 2.20 Scales Code requiring an indication of a fault for volumetric measuring devices. Currently, the only fault indication identified is based on when the commodity being measured is smaller than the marked minimum or larger than the marked maximum volume plus 9 divisions. What if the vehicle is traveling at speeds outside of the marked minimum and maximum for instance? They could support a voting status if this concern is addressed.

The 2026 S&T Committee recommends a Voting status. The committee believes that the item meets its intended purpose and is ready for a vote.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from Richard Suiter Consulting gave a presentation on this item.

2026 NEWMA: A representative from NYS Weights & Measures stated the item is fully developed and ready for a vote.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from MDMD Volume Focus Group gave a presentation and gave comments addressing concerns presented during the annual meeting and believes they've been answered. He believes the item is fully developed.

A representative from Scales Manufacturing Association SMA opposes and recommends further development, feels that it's missing many items. Several statements they've suggested were not included.

A representative from MDMD Volume Focus Group believes group has addressed all the SMA.

A representative from Arkansas Department of Agriculture supports item.

A representative from Maryland Department of Agriculture supports item, recommends additional informational session on the item.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

MDM-27.1 Table S.1.6. Required Information to be Provided by Multiple Dimension Measuring Systems, S.2.2. Dimensional Offset, and UR.3.4. Use of Dimensional Offset with Palletized Freight.

Source:
Louisiana Department of Agriculture and Forestry

Purpose:
Clearly identify and to restrict the use of dimensional offset in Multiple Dimension Measuring Devices.

Item under Consideration:
Amend NIST Handbook 44 Multiple Dimension Measuring Devices Code as follows:

Table S.1.6.
Required Information to be Provided by Multiple Dimension Measuring Systems

Information	Column I[1]	Column II[1]		Column III
	Provided by device	Provided by invoice or other means		Provided by invoice or other means as specified in contractual agreement
		Customer present	Customer not present	
1. Device identification[2]	D or P	P	P	P or A
2. Error message (when applicable)	D or P	P	N/A	N/A
3. Hexahedron dimensions[3]	D or P	P	P	P or A
4. Hexahedron volume (if used)[3]	D or P	P	P	P or A
5. Actual weight (if used)[3]	D or P	P	P	P or A
6. Dimensional Offset (if used)[3]	D ~~or~~ **and** P	~~N/A~~ **P**	~~N/A~~ **P**	~~N/A~~ **P**
7. Hexahedron measurement statement[4]	D or P or M	P	P	P or G

A = AVAILABLE UPON REQUEST BY CUSTOMER[5]
D = DISPLAYED
G = PUBLISHED GUIDELINES OR CONTRACTS
M = MARKED
N/A = NOT APPLICABLE
P = PRINTED or RECORDED IN A MEMORY DEVICE and AVAILABLE UPON REQUEST BY CUSTOMER[5]

Notes:
[1] As a minimum all devices or systems must be able to meet either column I or column II.
[2] This is only required in systems where more than one device or measuring element is being used.
[3] Some devices or systems may not utilize all of these values; however, as a minimum either hexahedron dimensions or hexahedron volume must be displayed or printed.
[4] This is an explanation that the dimensions and/or volume shown are those of the smallest hexahedron in which the object that was measured may be enclosed rather than those of the object itself.
[5] The information "available upon request by customer" shall be retained by the party having issued the invoice for at least 30 calendar days after the date of invoicing.

…

S.2.2. Dimensional Offset.
– The dimensional offset shall eliminate the effect of the conveyance method resulting in the measurement of only the object intended to be measured. **When a dimensional offset is applied, the value of the dimensional offset and a clear indication that a dimensional offset has been applied, shall be indicated and shall be recorded as part of the transaction record.**
(Amended 2021) **(Amended 20XX)**

…

UR.3.4. Use of Dimensional Offset with Palletized Freight.

-Dimensional offset shall not be used when measuring palletized freight consisting of non-standard-size or different size pallets. When non-standard or different size pallets are measured, the device shall be operated without dimensional offset, or the offset shall be set to zero, and the actual measured dimensions of the palletized load shall be used.
(Added 20XX)

Previous Status:
2027: New Proposal

Original Justification:
It seems to have become common practice for freight companies to use MDMDs to measure palletized freight in transit through their facilities to determine dimensions and/or density class of the freight. The majority of these devices, if not all of them, are ceiling mounted and can not accurately capture the pallet height when the freight is measured from the forks of a forklift rather than from the floor. Due businesses wanting to measure without setting the pallet on the floor, and the device lacking the ability to accurately capture pallet height, they have begun using a dimensional offset feature which adds a set amount of height to each measurement. For example, if a business decides that a typical pallet is six inches tall, they will simply set the device to add 6 inches to the height dimension measurement. The idea being that the device will measure from the forks up, and adding the 6 inches will capture the height of the pallet. The folly in this practice is multifold. First, the top deck portion of the pallet is captured in the measurement since it is above the forks. So, the dimensional offset should not have included the entire height of the pallet, only the portion below the forks. The measurement of the top deck thickness alone could vary enough from pallet to pallet to make the use of a standard offset untenable. The measurement of the lower section of the pallet can vary even more than the top deck, also making the use of a standard offset inappropriate. Additionally, these businesses receive freight on pallets from all of their different customers. This means that almost every pallet they measure is of a different size. Obviously, the practice of adding a standard offset of say 6 inches, when pallet height could vary from 4 to 8 inches, is not capable of producing fair, consistently accurate, or equitable measurements. Some businesses even compound their error by charging their customers an excessive fee for any change in dimensional measurement or density class, even if the change or error is in the shipper's favor.

Device manufacturers could argue that these devices can measure pallet height with the addition of a floor level element. Requiring that element could nullify the need for the user requirement. They could also argue that dimensional offset is already an NTEP approved feature for some of these devices, and any restriction would negatively affect that status. Freight shippers will argue that setting the pallets on the floor for measurement takes up too much time and that the offset is close enough.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item, however, the S & T committee feels there are new terms introduced without definition.

The committee recommends his item as assigned to the MDMD Work Group with the task of defining "standard" and "non-standard" pallet sizes.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference no comments were received.

The 2026 S&T Committee recommends an Informational Status. The Committee would like to hear from other stakeholders.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures believes this item has merit and recommends a developing status.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture had a question about how this is currently being applied.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Louisiana Department of Agriculture and Forestry who is the submitter of the item stated that due to a consumer complaint, this is for dimensional devices and not volume, sensors have a problem measuring palletized freight below the forks. This item requires that an offset be displayed and printed if it is being utilized. Because the offset is not able to be standardized on pallets dimensional offset is not appropriate.

Representatives from Maryland and Arkansas Departments of Agriculture support this item and recommend voting.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH – OTHER ITEMS

OTH-25.1 A 2.26 Weigh-in-Motion Systems Used for Vehicle Direct Enforcement

Source:
New York City Department of Transportation

Purpose:
Add a new Section 2.26 Weigh-In-Motion Systems Used for Vehicle Direct Enforcement to standardize the testing method for WIM systems for jurisdictions involved in direct weight limit enforcement. The update is being requested by

NYS Dept of Ag & Markets, NJ Off. of W & M, Oregon Dept of Ag, NYCDOT, Washington DC DOT, C2SMARTER and Kistler.

Item under Consideration:
Amend Handbook 44, adding new Section 2.26. Weigh-in-Motion Systems Used for Vehicle Direct Enforcement as follows:

Table of Contents

Section 2.26 Weigh-In-Motion Systems Used for Vehicle Direct Enforcement Error! Bookmark not defined.

A. Application ..... Error! Bookmark not defined.

A.1. General. ..... **Error! Bookmark not defined.**

A.2. Exception. ..... **Error! Bookmark not defined.**

A.3. Additional Code Requirements. ..... **Error! Bookmark not defined.**

S. Specifications ..... Error! Bookmark not defined.

S.1. Design of Indicating and Recording Elements and of Recorded Representations. **Error! Bookmark not defined.**

S.1.1. Ready Indication. ..... **Error! Bookmark not defined.**

S.1.2. Value of System Division Units. ..... **Error! Bookmark not defined.**

S.1.3. Maximum Value of Division. ..... **Error! Bookmark not defined.**

S.1.4. Value of Other Units of Measure. ..... **Error! Bookmark not defined.**

S.1.5. Capacity Indication. ..... **Error! Bookmark not defined.**

S.1.6. Identification of a Fault. ..... **Error! Bookmark not defined.**

S.1.7. Recorded Representations. ..... **Error! Bookmark not defined.**

S.1.8. Value of the Indicated and Recorded System Division. ..... **Error! Bookmark not defined.**

S.2. System Design Requirements. ..... **Error! Bookmark not defined.**

S.2.1. Violation Parameters. ..... **Error! Bookmark not defined.**

S.3. Design of Weighing Elements. ..... **Error! Bookmark not defined.**

S.3.1. Multiple Load-Receiving Elements. ..... **Error! Bookmark not defined.**

S.4. Design of Weighing Devices. ..... **Error! Bookmark not defined.**

S.5. Design of Balance ..... **Error! Bookmark not defined.**

S.5.1. Zero-Tracking Device. ..... **Error! Bookmark not defined.**

S.5.2. Totalizing Device. ..... **Error! Bookmark not defined.**

S.5.3. Vehicle Recognition/Presence Device. ..... **Error! Bookmark not defined.**

S.6. Accidental Breakdown and Maladjustment. ..... **Error! Bookmark not defined.**

S.7. Marking Requirements. ..... **Error! Bookmark not defined.**

S.7.1. Location of Marking Information. ..... **Error! Bookmark not defined.**

N. Notes ..... Error! Bookmark not defined.

N.1. Test Procedures. ..... **Error! Bookmark not defined.**

N.1.1. Selection of Test Vehicles. ..... **Error! Bookmark not defined.**

N.1.2. Test Loads. ..... **Error! Bookmark not defined.**

N.1.3. Reference Scale. ..... **Error! Bookmark not defined.**

N.1.4. Test Speeds. ..... **Error! Bookmark not defined.**

N.1.5. Reference Axle Spacings. ..... **Error! Bookmark not defined.**

N.1.6. Test Procedures. ..... **Error! Bookmark not defined.**

T. Tolerances ..... Error! Bookmark not defined.

T.1. Principles. **Error! Bookmark not defined.**
T.1.1. Design. **Error! Bookmark not defined.**
T.2. Tolerance Values. **Error! Bookmark not defined.**
T.2.1. Acceptance Tolerance. **Error! Bookmark not defined.**
T.2.2 Tests Involving Digital Indications or Representations. **Error! Bookmark not defined.**
T.2.3. Maintenance Tolerance Values for Dynamic Load Test. **Error! Bookmark not defined.**
T.2.4. Tolerance Value for Axle Spacing. 337
T.3. Influence Factors. **Error! Bookmark not defined.**
T.3.1. Temperature. **Error! Bookmark not defined.**
T.3.2. Temperature Effect on Zero-Load Balance. **Error! Bookmark not defined.**
T.3.3. Power Supply. **Error! Bookmark not defined.**
T.4. Radio Frequency Interference (RFI) and Other Electromagnetic Interference Susceptibility. **Error! Bookmark not defined.**
UR. User Requirements Error! Bookmark not defined.
UR.1. Selection Requirements. **Error! Bookmark not defined.**
UR.2. Installation and Maintenance. **Error! Bookmark not defined.**
UR.2.1. System Modification. **Error! Bookmark not defined.**
UR.2.2. Foundation, Supports, and Clearance. **Error! Bookmark not defined.**
UR.2.3. Access to Weighing Elements. **Error! Bookmark not defined.**
UR.2.4. Site Selection. **Error! Bookmark not defined.**
UR.3. Maximum Load. **Error! Bookmark not defined.**
UR.4. Enforcement Guidance. **Error! Bookmark not defined.**
UR.5. Notification of Violation. **Error! Bookmark not defined.**

Section 2.26 Weigh-In-Motion Systems Used for Vehicle Direct Enforcement

A. Application

A.1. General. – This code only applies to systems installed in a fixed location used to weigh vehicles, while in motion, for the purpose of direct enforcement of legal weight limits.

A.2. Exceptions.

A.2.1. This code does not apply to weighing systems intended for the collection of statistical traffic data and weighing systems used for the purpose of screening and sorting the vehicles based on the vehicle weight to determine if a static weighment is necessary. (Also see Section 2.25. Weigh-In-Motion Systems Used for Vehicle Enforcement Screening – Tentative Code)

A.2.2. This code does not apply to highway vehicles mounted with tanks or coupled to tank trailers that are designed to contain liquids.

A.3. Additional Code Requirements. – In addition to the requirements of this code, weigh-in-motion systems shall meet the requirements of Section 1.10. General Code.

S. Specifications

S.1. Design of Indicating and Recording Elements and of Recorded Representations.

S.1.1. Ready Indication. – The system shall provide a means of verifying that the system is operational and ready for use.

S.1.2. Value of System Division Units. – The value of a system division "d" expressed in a unit of weight shall be equal to:

(a) 1, 2, or 5; or

(b) a decimal multiple or submultiple of 1, 2, or 5.

Examples: divisions may be 10, 20, 50, 100; or 0.01, 0.02, 0.05; or 0.1, 0.2, 0.5, etc.

S.1.2.1. Units of Measure. – The system shall indicate weight values using only a single unit of measure.

S.1.3. Maximum Value of Division. – The value of the system division "d" for weigh-in-motion (WIM) system shall not be greater than 200 kg or 500 lb.

S.1.3.1. Number of System Divisions. – The number of system divisions shall be a minimum of 50 and a maximum of 1,000.

S.1.3.2. Minimum Capacity. – The minimum capacity in system divisions shall be 10.

S.1.4. Value of Other Units of Measure.

S.1.4.1. Speed. – Vehicle speeds shall be measured in miles per hour or kilometers per hour.

S.1.4.2. Axle-Spacing (Length). – The center-to-center distance between any two successive axles shall be measured in:

(a) meters and decimal submultiples of a meter;

(b) feet and inches; or

(c) feet and decimal submultiples of a foot.

S.1.4.3. Vehicle Length. – If the system is capable of measuring the overall length of the vehicle, the length of the vehicle shall be measured in feet and/or inches, or meters.

S.1.5. Capacity Indication. – An indicating or recording element shall not display nor record values greater than 105 % of the specified capacity of the load receiving element.

S.1.6. Identification of a Fault. – Fault conditions affecting accuracy as specified in Table T.2.3. Maintenance Tolerances shall be presented to the operator in a clear and unambiguous means. No weight values shall be indicated or recorded when a fault condition is detected. The following fault conditions shall be identified:

(a) Vehicle speed is below the minimum or above the maximum system specified speed.

(b) The maximum number of vehicle axles as specified has been exceeded.

(c) A change in vehicle speed greater than that specified has been detected.

(d) Imbalanced weight between the left and right wheels has exceeded the specified values.

(e) Vehicle has changed lanes between or in the proximity of the first and the last sensors.

(f) Any axle or wheel, or part of each is not on the load-receiving element of the sensors.

(g) Vehicle direction of travel is not valid for the installation.

S.1.7. Recorded Representations.

S.1.7.1. Values to be Recorded. – At a minimum, the following values shall be stored electronically for each vehicle weighment. Values shall be stored electronically for a minimum of one year and available at the time of inspection. A printed copy shall be available upon request.

(a) time and date;

(b) transaction identification number;

(c) station ID;

(d) lane identification (required if more than one lane at the site has the ability to weigh a vehicle in motion);

(e) vehicle speed;

(f) number of axles;

(g) weight of each axle;

(h) identification and weight of axle groups;

(i) axle spacing;

(j) total wheelbase length;

(k) gross vehicle weight;

(l) all fault conditions that occurred during the weighing of the vehicle, as identified in paragraph S.1.6. Identification of a Fault; and

(m) violations, as identified in paragraph S.2.1. Violation Parameters, which occurred during the weighing of the vehicle.

Note: Consult the specific jurisdictional legislation for additional values that may be required to issue enforcement violations. All gross vehicle, axle, and axle group weights must be stored with the corrected values and any additional reductions as outlined in UR.4. Enforcement Guidance.

S.1.8. Value of the Indicated and Recorded System Division. – The value of the system's division "(d)," as recorded, shall be the same as the division value indicated.

S.2. System Design Requirements.

S.2.1. Violation Parameters. – The instrument shall be capable of accepting user-entered violation parameters for the following items:

(a) single axle weight limit;

(b) axle group weight limit;

(c) gross vehicle weight limit; and

(d) bridge formula maximum.

The instrument shall display and/or record violation conditions when these parameters have been exceeded.

Note: Jurisdiction-defined weight limits for S.2.1 Violation Parameters (a) through (d) can be used to determine the violation.

S.3. Design of Weighing Elements.

S.3.1. Multiple Load-Receiving Elements. – An instrument with a single indicating or recording element, or a combination indicating-recording element, that is coupled to two or more load-receiving elements with independent weighing systems, shall be provided with means to prohibit the activation of any load-receiving element (or elements) not in use, and shall be provided with automatic means to indicate clearly and definitely which load receiving element (or elements) is in use.

S.4. Design of Weighing Devices. – WIM systems for direct enforcement of legal weight limits shall meet the requirements of this code.

S.5. Design of Balance

S.5.1. Zero-Tracking Device. – A zero-tracking device shall have a range of 4% of the system capacity and operate only when:

(a) the system is in a no-load condition;

(b) is in stable equilibrium; and

(c) the corrections are not more than 0.5 d per second

S.5.2. Totalizing Device. – WIM systems may be provided with a totalizing device for determining gross vehicle weight which operates:

(a) automatically, in which case the instrument shall be provided with a vehicle recognition device defined in S.5.3. Vehicle Recognition/Presence Device; or

(b) semi-automatically (e.g., it operates automatically following a manual command).

S.5.3. Vehicle Recognition/Presence Device. – WIM systems which are able to operate without the intervention of an operator shall be provided with a vehicle recognition device. The device shall detect the presence of a vehicle in the weigh zone and shall detect when the whole vehicle has been weighed. WIM systems shall not indicate or print the vehicle mass unless all wheel loads of the vehicle have been weighed.

S.6. Accidental Breakdown and Maladjustment. – WIM systems shall be so constructed that an accidental breakdown or maladjustment of control elements likely to disturb its correct functioning cannot take place without its effect being evident.

S.7. Marking Requirements. – In addition to the marking requirements in G-S.1. Identification, the system shall be marked with the following information:

(a) value of the system division "d";

(b) operational temperature limits;

(c) number of instrumented lanes (not required if only one lane is instrumented);

(d) minimum and maximum vehicle speed;

(e) maximum number of axles per vehicle;

(f) maximum change in vehicle speed during weighment;

(g) minimum and maximum load;

(h) any restrictions specified in the NTEP Certificate of Conformance; and

(i) accuracy class.

S.7.1. Location of Marking Information. – The marking information required in Section 1.10. General Code, G-S.1. Identification and S.7. Marking Requirements shall be visible after installation. The information shall be marked on the system or recalled from an information screen.

N. Notes

N.1. Test Procedures.

N.1.1. Selection of Test Vehicles. – All dynamic testing associated with the procedures described in each of the subparagraphs of N.1.6 Test Procedures shall be performed with vehicles of these three types, at a minimum.

(a) a two-axle, six-tire, single-unit truck or Federal Highway Administration (FHWA) Class 5; that is, a vehicle with two axles with the rear axle having dual wheels;

(b) a three-axle, single-unit truck or FHWA Class 6; and

(c) a five-axle, single-trailer truck or FHWA Class 9 (3S2 Type).

(d) The gross vehicle weights shall be as stated in N.1.2.2. Dynamic Test Loads.

Note 1: Consideration should be made for testing the system using vehicles that are typical of the roadway in which the system is installed, if different than the types listed in (a) through (c) above.

N.1.1.1. Weighing of Test Vehicles. – All test vehicles shall be weighed statically on a reference scale, meeting the requirements of Appendix A, before being used to conduct dynamic tests.

N.1.1.2. Determining Reference Weights for Axles, Axle Groups, and Gross Vehicle Weight. – The reference weights shall be the average weight value of a minimum of three static weighments of all single axles, axle groups, and gross vehicle weight on a reference scale before being used to conduct the dynamic tests.

Note: The axles within an axle group are not considered single axles.

N.1.2. Test Loads.

N.1.2.1. Static Test Loads. – All static test loads shall use certified field standards

N.1.2.2. Dynamic Test Loads. – Test vehicles used for dynamic testing shall be loaded as specified below. The "load" shall be non-shifting and shall be positioned to present as close as possible, an equal side-to-side load.

(a) a half load condition (60-80% of the legal load limit of the test vehicle) for a minimum of 10 runs per test vehicle type;

(b) a full load condition (> 90% of the legal load limit for the test vehicle) for a minimum of 20 runs per test vehicle type; and

(c) When it is anticipated that a system will be used to enforce weight limits for vehicles that may be unloaded, e.g., an unloaded Class 9 vehicle crossing a bridge with a 20 TN maximum capacity, tests shall include unloaded vehicles as part of the test load.

N.1.3. Reference Scale. – Each reference vehicle shall be weighed statically on a multi-independent platform vehicle scale. The scale shall be tested no more than one day prior to use to establish reference test loads and shall meet the applicable NIST Handbook 44 tolerances.

N.1.3.1. Multi-Independent Platform Vehicle Scale System. – When using a multi-independent platform vehicle scale system, the three individual weighing/load receiving elements shall be of such dimensions and spacing to facilitate the single-draft weighing of all reference test vehicles;

(a) the simultaneous weighing of each single axle and axle group of the reference test vehicles on different individual elements of the scale; and

(b) gross vehicle weight determined by summing the values of the different reference axle and reference axle groups of a test vehicle.

N.1.4. Test Speeds. – All dynamic tests shall be conducted at two designated speeds.

(a) at a high speed – posted speed limit (S_{max}); and

(b) at a low speed – site-specific minimum speed, not below manufacturer's requirement (S_{min}).

N.1.5. Reference Axle Spacings. – To establish reference axle spacing, before measuring the axle spacing, the test vehicle shall be positioned straight, and the driving axle shall also be straight. A steel tape measure shall be used for measurement. Both left and right axle spacing shall be measured, and the average of two measurements shall be recorded by the nearest cm (inches). Each axle spacing shall be made by a single measurement.

N.1.6. Test Procedures.

N.1.6.1. Dynamic Load Test. – The dynamic test shall be conducted using the test vehicles defined in N.1.1. Selection of Test Vehicles and at the load condition as stated in N.1.2. Test Loads and at the speed as stated in N.1.4. Test Speeds. The number of runs shall be per Table N.1.6.

N.1.6.2. Initial Verification Test. – Initial verification tests shall be performed on any new WIM system, a WIM system at an existing direct enforcement site that has undergone major reconditioning or overhaul, or when the pavement in which the system is installed requires maintenance. At the conclusion of the dynamic test, there shall be a minimum of 20 weight readings for each single axle, axle group, and gross vehicle weight of each test vehicle. The tolerance for each weight reading shall be based on the percentage values specified in Table T.2.1. Maintenance Tolerances.

N.1.6.3. Subsequent Verification Test. – At the conclusion of the dynamic test, there shall be a minimum of 10 weight readings for each single axle, axle group, and gross vehicle weight of each test vehicle. The tolerance for each weight reading shall be based on the percentage values specified in Table T.2.3. Maintenance Tolerances.

Note. Any vehicle records identified as fault conditions listed in S.1.6. Identification of a Fault or jurisdiction defined fault conditions shall be excluded from the minimum weight readings in N.1.6.1. Dynamic Load Test.

See Table N.1.6 below to summarize the minimum number of test runs for Initial and Subsequent Verification Tests.

Table N.1.6 **Minimum Number of Test Runs per Each Test Vehicle**	
Initial Verification Test	
Load Condition	**Speed**
Half Load (10 runs)	**High Speed S_{max} (5 runs)**
	Low Speed S_{min} (5 runs)
Full Load (20 runs)	**High Speed S_{max} (10 runs)**
	Low Speed S_{min} (10 runs)
Subsequent Verification Test	
Load Condition	**Speed**
Half Load (6 runs)	**High Speed S_{max} (3 runs)**
	Low Speed S_{min} (3 runs)
Full Load (10 runs)	**High Speed S_{max} (5 runs)**
	Low Speed S_{min} (5 runs)

N.1.6.4. Axle Spacing Test. – The axle spacing test is a review of the displayed and/or recorded axle spacing distance of the test vehicles. The tolerance value for each distance shall be based on the tolerance value specified in T.2.4. Tolerance Value for Axle Spacing.

T. Tolerances

T.1. Principles.

T.1.1. Design. – The tolerance for a weigh-in-motion system is a performance requirement independent of the design principle used.

T.2. Tolerance Values.

T.2.1. Acceptance Tolerance. – Acceptance tolerance shall be 50% of tolerances in Table T.2.3. Maintenance Tolerances. The acceptance tolerance shall apply to a new installation, within 30 days of a new installation being placed in service, when an existing system undergoes major reconditioning or overhaul, or during type evaluation.

T.2.2 Tests Involving Digital Indications or Representations. – To the tolerances that would otherwise be applied in paragraphs T.2.3. Tolerance Value for Dynamic Load Test, there shall be added an amount equal to one-half the value of the system division to account for the uncertainty of digital rounding.

T.2.3. Maintenance Tolerance Values for Dynamic Load Test. – The tolerance values applicable during dynamic load testing are as specified in Table T.2.3. Maintenance Tolerances based on class. See UR.1. Selection Requirements

Table T.2.3. Maintenance Tolerances		
Load Description	**Tolerance as a Percentage of Applied Test Load GVW ±5% = Class 5 Tolerances**	**Tolerance as a Percentage of Applied Test Load GVW±10% = Class 10 Tolerances**
Gross Vehicle Weight	**± 5 %**	**± 10 %**
Axle Load	**± 10 %**	**± 20 %**
Axle Group Load (including bridge formula)	**± 8 %**	**± 15 %**

T.2.4. Tolerance Value for Axle Spacing. – The tolerance value applied to each axle spacing measurement shall be ± 0.15 m (6 inches) at 100% compliance.

T.3. Influence Factors. – The following factors are applicable to tests conducted under controlled conditions only.

T.3.1. Temperature. –The instrument shall operate within tolerance throughout the specified operational temperature range.

T.3.2. Temperature Effect on Zero-Load Balance. – The zero-load indication shall not vary by more than one division per 5°C (9°F) change in temperature.

T.3.3. Power Supply. – System shall satisfy the tolerance requirements in Table T.2.3. Maintenance Tolerances under voltage ranges of -15% to +10% of the marked nominal line voltage(s) at 60 Hz or the voltage range marked by the manufacturer at 60 Hz. The battery-operated systems shall satisfy the tolerance requirements in Table T.2.3. Maintenance Tolerances when the battery power output is not excessive or deficient.

T.4. Radio Frequency Interference (RFI) and Other Electromagnetic Interference Susceptibility. – The difference between the weight indication due to the disturbance and the weight indication without the disturbance shall not exceed the tolerance value as stated in Table T.2.3. Maintenance Tolerances.

UR. User Requirements

UR.1. Selection Requirements. – Equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to, its capacity, number of system divisions, value of the system division, minimum capacity, and the accuracy class. The system owner shall determine the appropriate accuracy class based on an analysis of the site per ASTM E1318, roadway maintenance capacity, legislative requirements, and manufacturer's recommendations.

UR.2. Installation and Maintenance.

UR.2.1. System Modification. – The dimensions (e.g., length, width, thickness, etc.) of the load receiving element of a system shall not be changed beyond the manufacturer's specifications, nor shall the capacity of a sensor be increased beyond its design capacity by replacing or modifying the original primary indicating or recording element with one of a higher capacity, except when the modification has been approved by a competent engineering authority, preferably that of the engineering department of the manufacturer of the system, and by the weights and measures authority having jurisdiction over the system.

UR.2.2. Foundation, Supports, and Clearance. – The foundation and supports shall be such as to provide strength, rigidity, and permanence of all components.

On load-receiving elements which use moving parts for determining the load value, clearance shall be provided around all live parts to the extent that no contacts may result when the load-receiving element is empty, nor throughout the weighing range of the system.

UR.2.3. Access to Weighing Elements. – If necessary, adequate provision shall be made for inspection and maintenance of the weighing elements.

UR.2.4. Site Selection. - In order for any WIM system to perform properly, the user must provide and maintain an adequate operating environment for the system's sensors and instruments. This includes maintaining surface smoothness in advance of and beyond the WIM-system sensors per manufacturer's recommendation.

UR.3. Maximum Load. – A system shall not be used to weigh a load of more than the marked maximum load of the system.

UR.4. Enforcement Guidance. – Prior to the issuance of an enforcement violation, the enforcement entity shall subtract the maintenance tolerance from the weighments to calculate the corrected value. All gross vehicle, axle, and axle group weights must be electronically stored, along with the corrected values and any additional reductions as outlined in specific jurisdictional legislation.

UR.5. Notification of Violation. – If a violation occurs, there shall be an audible or visual notification provided to the vehicle operator. The method used to provide notification of a violation shall be determined by the jurisdiction with authority.

Add the following definitions to Appendix D:

axle. – The axis oriented transversely to the nominal direction of vehicle motion, and extending the full width of the vehicle, about which the wheel(s) at both ends rotate. [2.26]

axle-group load. – The sum of all tire loads of the wheels on a group of adjacent axles; a portion of the gross-vehicle weight. [2.26]

axle load. – The sum of all tire loads of the wheels on an axle; a portion of the gross-vehicle weight. [2.26]

axle spacing. – The distance between the centers of any two axles. When specifying axle spacing, the axels used also need to be identified. [2.26]

federal bridge formula.-The formula incorporating axle spacing and weights used to determine the maximum weight any set of axles on a motor vehicle may carry on the road or bridge surface. The formula can be found at 23 U.S.C. § 127 and 23 C.F.R. § 658.

corrected value. – The difference of the gross weight of the vehicle, individual axles, axle groups, and the maintenance tolerance of the system for each.

weigh-in-motion (WIM). – A process of determining a moving vehicle's gross weight and the portion of that weight that is carried by each wheel, axle, or axle group, or combination thereof, by measurement and analysis of dynamic vehicle tire forces. [2.26]

WIM System. – A set of load receptors and supporting instruments that measure the presence of a moving vehicle and the related dynamic tire forces at specified locations with respect to time; determine tire loads; calculate speed, axle spacing, vehicle class according to axle arrangement, and other parameters concerning the vehicle; and process, display, store, and transmit this information. This standard applies only to highway vehicles. [2.26]

Previous Status:
2026: Assigned
2025: New Proposal

Original Justification:

1. INTRODUCTION

As noted in NIST Special Publication 2200-05 and according to the 2021 Fact Sheet: The Bipartisan Infrastructure Deal, one in five miles of U.S. highways and major roads and over 45,000 bridges are in poor condition. A major contributor to road damage stems from heavy or excess weight vehicles – or to be more precise – the heavy axle loads of these vehicles onto the road surface and/or pavement. As claimed by an article of Inside Science, this damage grows exponentially with the axle load of the vehicle. For comparison, a 40-ton commercial truck with 8 axles causes 625 times more road damage than a 2-ton passenger sedan with 2 axles. See Attachment B for NIST Special Publication 2200-5 for full document.

Enforcement of vehicle weight limits is typically cumbersome, requiring dedicated stations, contributing to freight and travel delays and strain on law enforcement resources. Even with the use of portable scales and virtual WIM systems, these efforts are not comprehensive, and have led to a culture where the disregard of the highway weight limits is giving an unfair economic advantage to those companies willing to risk running overweight trucks on our highways. This issue is exacerbated in our urban environments where limited space and enforcement personnel make it difficult or impossible to catch and cite these violators.

Recognizing the need for better weight limit enforcement, the New York State legislature authorized the New York City Department of Transportation (NYCDOT) in 2021 to conduct direct overweight vehicle enforcement using WIM as a demonstration program on a portion of the I-278 , connecting Brooklyn to Manhattan, Staten Island, and Queens otherwise known as the Brooklyn Queens Expressway or the BQE. The system was certified by the New York State Department of Weights and Measures using the procedure previously submitted for handbook 44 update item WIM 23.1 as developed by NYCDOT, C2SMARTand Kistler. NYCDOT provided all the logistical support and covered the cost of the testing.

In the seven months leading up to the launch of the program, a monthly average of 7,777 overweight trucks traveled this section of the roadway. During the first seven months of direct enforcement, the rate dropped to monthly average of 2,769 overweight trucks. As shown in Figure 1, the decline comes as the overall number of vehicles, including trucks, remains steady, with the share of overweight trucks falling from about 6.3 percent of all trucks on the roadway to 1.9 percent in most recent months. There have been no challenges in this time related to the accuracy of the system.

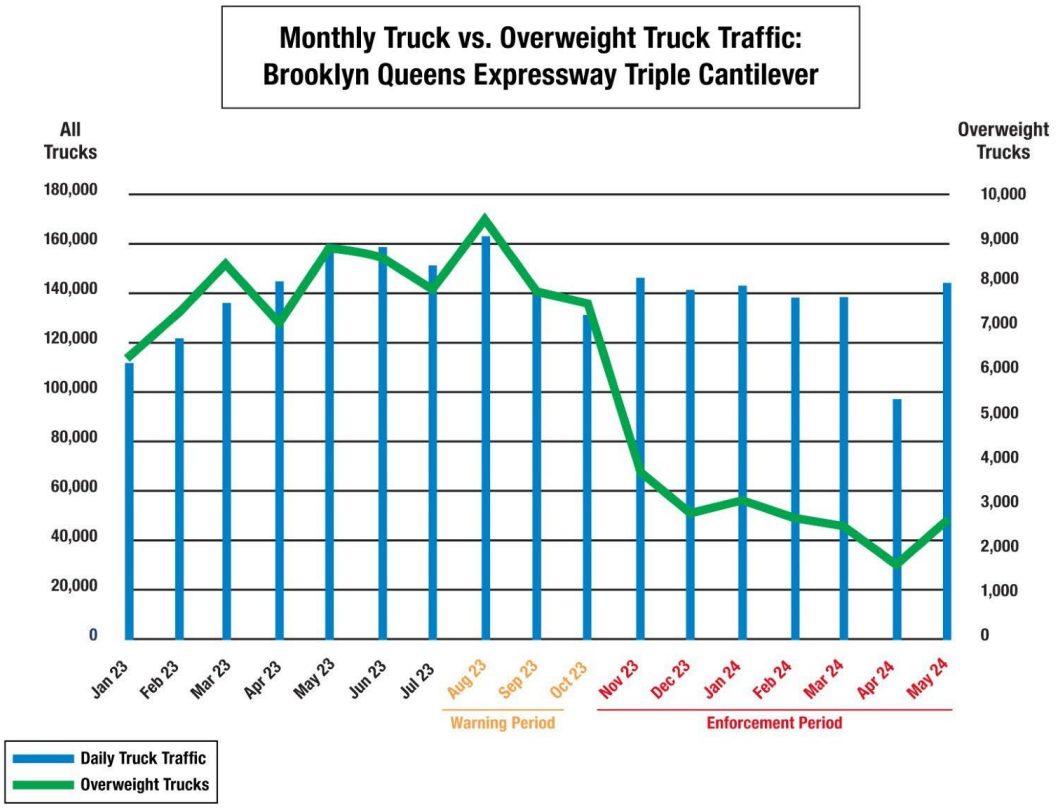


Figure 1 – Monthly Truck versus Overweight Truck Traffic on Brooklyn Queens Expressway (BQE) Triple Cantilever Structure

Since the time NYCDOT began its effort, several other states have proposed legislation for direct enforcement including Georgia and New Jersey. Several other jurisdictions are considering Direct Enforcement using WIM Systems.

The inclusion of the procedure in the handbook does not require a jurisdiction to begin direct enforcement using WIM. That authority remains with the legislative bodies of the jurisdiction. However, it is important for the proposed standard for the system to be formalized and harmonized across the nation to ensure that a unified testing protocol is being used by jurisdictions who so choose. Guarding against violations of vehicle weight restrictions to protect critical infrastructure is an issue of national concern and each jurisdiction will proceed based on local legislative authority

In addition to enforcing weight limits, officers in most States are responsible for checking Commercial Motor Vehicles (CMV's) for safety. This includes different levels of truck inspection, including the driver credentials, hours of service, key systems on the truck, load securement, and many more. Automating the weighing portion of the inspection will allow for a more efficient flow of vehicles through an inspection site and allow officers more time to focus on these other safety issues. Currently, with most sites running with a single officer, as they are focused on weighing, doing an inspection, or interviewing a driver, other unsafe vehicles behind the current one go by without scrutiny. See Attachment C Supporting Letters for letters of support from CVSA and ASCE.

This proposal seeks an amendment of NIST Handbook 44 by adding Section 2.26 to allow for Weigh-In-Motion Systems Used for Direct Vehicle Weight Enforcement certification requirements to be standardized. The remainder of this proposal lays out the justification for the amendment as well as address some of the arguments that have been raised previously in opposition, using the BQE as an example to establish the urgent need for the amendment.

2. REVIOUS PROPOSAL DATA

A similar proposal, item WIM 23.1 was voted on during the 109th Annual meeting. The original submission was made on 8/15/2022 and received a voting status at the 2024 interim meeting. However, that proposal did not receive adequate support for inclusion into HB 44.

Commenters expressed concerns of the system's tolerance and the testing procedure during open hearings that was previously considered. Previously submitted documents and comments from the regions can be found in the archives of the 108th and 109th annual meeting archives as well as 2023 and 2024 interim meeting archives. Some of the relevant documents are being attached to this submission.

During the development of the item over the time between August 2022 and voting in July 2024, all of the regions had an opportunity to review the proposal and amendments and hear from the stakeholders including the proposers in various forums. A demonstration of the proposal was also conducted in April of 2023 in Madison Wisconsin and witnessed by members of NCWM as well as NIST. In October of 2023, NYS Department of Agriculture certified the BQE site in NYC based on the proposal version of August, 2023. NYCDOT began issuing violations in November of 2023 and data related to decrease in overweight since this effort began was also shared with the council. See Attachment F 2024 Annual Meeting WIM Presentation for summary of previous data.

3. READINESS OF PROPOSAL

With the input that was gathered in the prior efforts, the current proposal has been updated to address several concerns that were raised in the process.

A. Testing Requirements: - Some jurisdictions were concerned that the testing requirements could be burdensome and lengthy. The current proposal has incorporated a potential for reduced number of runs for operational testing after the first acceptance testing is done with the larger number of runs. In addition, a test procedure guidance based on successful testing in NYC with potential ways to handle the test logistics has been attached to provide a roadmap of actual implementation. While the requirements are extensive, they are in line with belt scale testing which is included in the handbook and match international standards. Additionally, the time required is comparable to testing large belt scale installations, in-motion rail systems, and other weighing systems for materials testing where evaluating performance using materials and a reference scale is necessary.

B. Thorough Technical Review: At the Interim 2023 meeting, the previous proposal received a status of informational. This allowed close collaboration with the S&T committee as well as NIST. With this collaboration, the entire proposal was thoroughly reviewed and harmonized with other applicable sections of the Handbook 44 as well as comparable international standards like OIML. Clarifications and updates based on actual implementation in NYC have been incorporated along with the lessons learnt from the demonstration in Wisconsin.

C. Need Across the Nation: While the proposal was brought forward by NYCDOT in 2022, currently there are multiple jurisdictions who are either actively seeking legislation to move forward with Direct Enforcement or are interested in having standards made available for future efforts to obtain legislative approval. Having a national standard will ensure that jurisdictions moving forward with this approach to weight enforcement will have a better understanding of the resources needed to implement and can appropriately plan for it. In addition, while several WIM manufactures exist, without a clear standard there are varying outcomes from the systems, the industry will have clarity on expectations and can develop their products to match a recognized standard.

4. AUTOMATED TRUCK ENFORCEMENT USING WIM: ACCURACY OF WIM TECHNOLOGY VERSUS ACCEPTABLE TOLERANCE

ACCEPTABLE TOLERANCE: One of the more frequent concerns often voiced is the relatively large tolerance applied to gross vehicle weights, the axle loads, and axle-group loads. The proposal has been updated to include 2 classes of tolerance similar to the OIML standards allowing those officials charged with enforcing the regulations specific to commercial vehicles to select as appropriate based on need, site conditions, and manufacturer's recommendations.

While the tolerances proposed may seem large to the weights and measures community in comparison to commercial weighing equipment, they are non-the-less realistic and suitable for use by law enforcement. Unlike commercial vehicle scales which are installed and operated under very controlled conditions these systems are installed on interstate highways to weigh fully loaded vehicles traveling at highway speeds. The systems are continuously subject to the vibrations and stresses inherent to that environment. Unlike commercial applications where scale tolerances are made intentionally low so that they are a neglectable part of any business transaction in which the scale is used, the law enforcement official must consider the system's tolerances when issuing citations if those citations are to be upheld by a court of law. There is precedence in Handbook 44 to the idea that law enforcement scales be treated separate from commercial scales. Wheel load weighers have their own accuracy class, class IIII and weighing systems are allowed to collect and sum axle weights as an estimate of the gross vehicle weight. It is important to remember that the goal here is to protect our public roads and bridges from some of the worst offenders who are responsible for a disproportionate share of the damage to our infrastructure. Putting it another way, in a state with 80,000 lb weight limits we can risk allowing a truck weighing 85,000 lb to pass undetected if we can catch the one weighing 100,000 lbs.

Scales are evaluated not only to tolerance but to permanence. We expect them to hold their calibration for an extended period of time.

ACCURACY OF THE SYSTEM: The WIM system on the BQE has been certified multiple times and consistently met the tolerances included in the proposal. Prior to the 2nd certification, the system was tested to verify the accuracy retention over 6 months. The maximum error was 6.2%, 9.2% and 5.7% for GVW, single axle weight, and group axle weight, respectively.

The overweight enforcement system retained its accuracy over 6 months. In addition, after the system was installed but before it began to be used for direct violations at the BQE, the data from WIM was shared with NYPD in real time and then violations were issued based on portable scale weighments by the Highway Patrol. Over a span of 27 days, the NYPD enforced penalties on 48 overweight trucks, averaging less than 2 trucks per day using the more typical portable scales. The maximum GVW error was 9.2%, while the mean and average GVW errors were 0.25% and 0.05%, respectively. It should be noted that at the same time several overweight trucks identified by the WIM System could not be stopped as it took the Officers more than 2 hours to completed the inspection of each truck. No major impact was seen in the total number of overweight trucks on the corridor during this period. This is in stark contrast to the impact observed after the direct enforcement began.

Table 1 shows a summary of the data for the accuracy achieved at various sites that have applied similar WIM-based systems. The related background data is provided in Attachment D Sample WIM System Data and Attachment E Purdue WIM Report.

Table 1 – Maximum observed error for WIM-based systems collected at various sites

Sites and Testing Dates	Maximum Observed Error (%)		
	GVW	Single Axle	Group Axle
1- NY BQE Site NY PD Comparison in Mar-Apr '23	9.01%	N/A	N/A
2- NY BQE Site Validation 1 in Oct. '23	9.7%	13.1%	14.2%
3- NY BQE Site Validation 2 in Apr. '24	9.5%	19.2%	13.5%
4- WI Madison SWEF Demonstration in Apr. '23	6.4%	11.3%	7.8%
5- Indiana Study (2018)	5%*	N/A	N/A
* 5% maximum error at 95% compliance			

5. LOGISTICS OF THE TEST

The certification testing requires multiple trucks with varying loads along with drivers to complete the required number of runs. The results are then observed by the inspectors. This type of situations have already been addressed in Handbook 44 General Code, G-UR.4.4

Assistance in Testing Operations. – If the design, construction, or location of any device is such as to require a testing procedure involving special equipment or accessories or an abnormal amount of labor, such equipment, accessories, and labor shall be supplied by the owner or operator of the device as required by the weights and measures official.

As these systems are likely to be owned and operated by the state Department of Transportations, with readily available equipment and personnel to provide assistance with trucks and drivers along with traffic management should it be needed, such assistance should not be difficult to obtain for certification testing. The DOTs also have the option to contract with vendors to provide these services.

In addition, to reduce the time it would require the inspectors to test the systems, the proposal allows for reduced level of testing after the initial acceptance test has been successfully conducted. The requirements around testing and certification of reference scales have also provided jurisdictions with the ability to move forward with the option that best meets their needs based on the WIM site that is to be certified. The attached Test Procedure Guidance for WIM for Direct Enforcement Examination provides potential ways to address the logistics of the test. For reference, the demonstration runs at Wisconsin were completed in a single daytime 8 hour shift for 1 lane, while at the BQE due to traffic congestion, the test occurred during overnight single shift. Overnight testing was a site specific decision and not a requirement of the proposal. See Attachment G for Test Procedure Guidance.

6. CONCLUSIONS

Across the nation, the deterioration of aging infrastructure is exacerbated by the presence of overweight vehicles in excess of the Federal Bridge Formula (FBF). Though several states have implemented vehicle weight enforcement measures using a screening protocol that includes the use of mobile enforcement officers and stationary scales, these measures have been insufficient in significantly reducing the volumes of overweight vehicles on the nation's infrastructure. The use of WIM for the purposes of direct vehicle weight enforcement would both alleviate this problem and free up local and state resources to address other safety concerns. As noted in the attached letter from CVSA "This action correlates to a positive impact for highway safety, congestion reduction by means of an option to traditional weighing techniques especially in high traffic volume areas and acts as a force multiplier for jurisdictions facing increased traffic volumes with static weight enforcement resources. Coupled with WIM certification standards in place and accurate technology, direct WIM enforcement provides a mechanism for enabling jurisdictions to align weight compliance beyond inefficient past weight enforcement methodologies traditionally used only for screening purposes with minimal detection capability and an effective leveling of the playing field for the trucking industry."

The amendment of NIST Handbook 44 to include the attached proposal as Section 2.26 will provide a standard directly comparable to international standards. This request is not to introduce new regulations to the trucking industries but to guide the trucking industries to comply with the existing applicable laws to protect our infrastructure, provide safe

corridors to the nation's taxpayers, and improve the resilience of our built environment. Moreover, this request would allow the United States to catch up with other countries globally (shown in Figure 2) that have successfully implemented and proved automated weight enforcement, including China (2004), the Czech Republic (2010), Russia (2013), Hungary (2016), France (in process) and Brazil (in process).

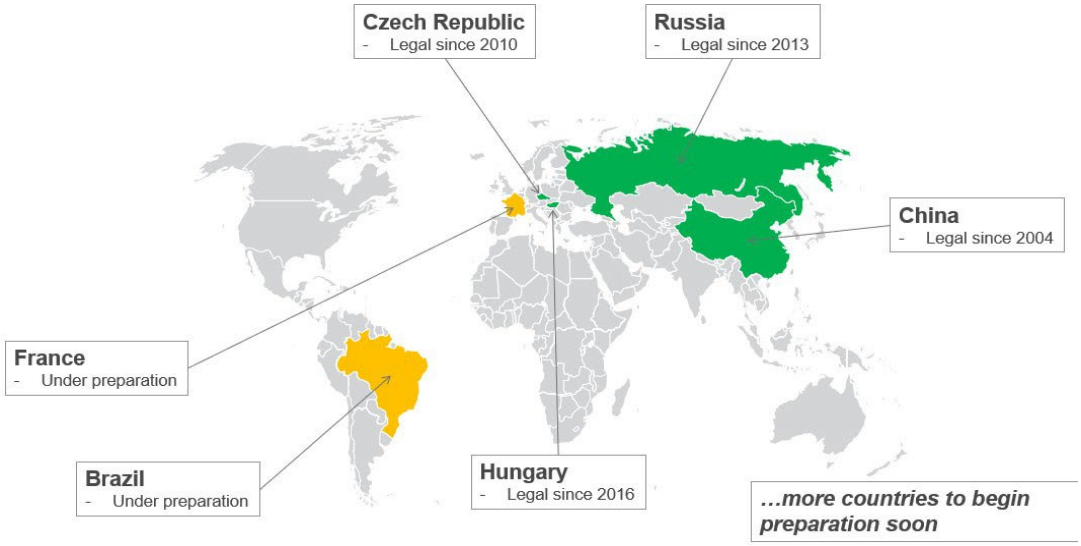


Figure 2. Automated enforcement around the world

The submitter included attachments that are available at https://www.ncwm.com/publication-15.

The submitter recommended that this be a Nonretroactive Voting item in 2025.

Comments in Favor:

Regulatory:

- 2026 Interim: Regulators from New Jersey, New York, Iowa, and Massachusetts support this item as written and recommend it be assigned a voting status.
- 2026 Interim: A regulator from New York stated that these systems will not replace regular weigh stations, instead the code would provide a roadmap to use these devices for enforcement.

Industry:

- 2026 Interim: Associate members from Quarterhill and Rutgers support this item and recommends it be assigned a voting status.

Advisory:

- 2026 Interim: A technical advisor from the National Institute of Standards and Technology, Office of Weights and Measures feels all technical problems have been addressed and recommends it be assigned a voting status

Comments Against:

Regulatory:

- 2026 Interim: A regulator from Arkansas opposes this item and recommends it be withdrawn with concerns based on opposing the intended use, permanence of the device, accuracy, and potential environmental effects on the device.
- 2026 Interim: A regulator from West Virginia opposes this item and recommends it be withdrawn stating the tolerances are too large and all variables are not accounted for.

- 2026 Interim: A regulator from California agrees with Arkansas and West Virgina and recommends the item be withdrawn.
- 2026 Interim: A regulator from Delaware is opposed to the item stating concerns on using wheel load weighers as a standard and recommends the item be withdrawn.
- 2026 Interim: A regulator from Maryland opposes the item as written and provided suggested amendments to the submitter of the item and committee in writing to include added wording to outline enforcement only when tolerances are exceeded; the ability to retrieve recorded values for one year; remove sections indicating axle-load, portable axle-load weighers, wheel load weighers as a reference standard; provide clarity to refence scale testing timeline; and additional suggested wording; the regulator recommends a voting status with these suggested amendments.
- 2026 Interim: A regulator from Louisiana states the item needs more work and recommends assignment to a task group.

Industry:

- 2026 Interim: An associate member from the Scale Manufactures Association says they oppose this item and recommends it be withdrawn.
- 2026 Interim: An associate member from the National Motor Freight Traffic Association spoke in opposition stating concerns surrounding tolerances and accuracy of the device and safety checks not being utilized due to automatic nature.

Advisory:

- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Interim: None

Industry:

- 2026 Interim: None

Advisory:

- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: The item remains Assigned to the Weigh in Motion Task Group.

NCWM 2026 Interim Meeting: The Specification and Tolerances committee is requesting the formation of a task group to further develop this item. The committee recommends an Assigned status.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Nebraska FCSP-Weights & Measures does not support this item and recommends this item is withdrawn.

A representative from Iowa Department of Agriculture/Weights & Measures supports this item and recommends this item remains assigned to the task group.

A representative from Iowa Department of Agriculture/Weights & Measures questioned a representative from Nebraska about why they do not support this item. The representative answered he had concerns about accuracy during commercial use and that, if this is in code, then it could be used for commercial use. They support if it is for law enforcement use only. The Nebraska representative further stated that if it was adopted into Handbook 44 the state of Nebraska would not be able to adopt Handbook 44 in its entirety.

The committee recommends this item remain assigned to WIM Vehicle Scale Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufactures Association): The SMA opposes this item, and recommends it be withdrawn.

Mr. Jason Flint (State of New Jersey and Member of Weigh-in-Motion Vehicle Scale Task Group): Since the NCWM Annual meeting the Task Group has met several times to address. The work is complete and reflective in the current proposal, and should be ready for voting.

Mr. Steve Harrington (State of Oregon): Supports the task group and their work.

Mr. John Sorfleet (Santa Clara County, California): Opposes the item. He believes that the tolerances are too large and that the item should be withdrawn.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Agrees with John Sorfleet's comment and believes the item should be withdrawn.

The 2026 S&T Committee initially recommended a Voting status based on testimony heard during open hearings. The following comments were then heard during the voting session:

Mr. Steve Harrington (State of Oregon): Stated that he felt that the written comments in the addendum sheets did not capture the spirit of the comments heard on the floor and that the item should be given an assigned status based on a correction to the comments spoken from the WIM task group member.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Spoke specifically to items on S&T agenda page 102 access to a certified vehicle scale, 3 different class of semi-trucks, tolerance values, what does 100% compliance mean, T.3.3. Power Supply-voltage rages, how will this be verified, S.7.1. Information screen, an inspector must know how to get to this correct display screen. He recommended that the item stay assigned to the NCWM WIM task group.

Mr. Kurt Floren (County of Los Angeles, California): Stated that he is conflicted on the item because of the extensive testing requirements and the 15% to 20% tolerance. He opposes the item.

Mr. John Beall (Ventura County, California): Stated that the tolerance is just too large to be able to vote in favor. He recommended that the item remain assigned to the NCWM WIM task group.

The item then went to a vote and the WWMA S&T Committee's recommendation of a Voting status was not passed.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from NYS Weights & Measures gave an update from the task group.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture continues to oppose this item as written. For Vermont to support this proposal the class 10 tolerances would need to be removed and there would need to be a requirement that the reference scale be adjusted to zero error in preparation for the test. Additionally, line S.1.7.1. (b) refers to a "transaction number", these devices are not commercial, so there isn't a transaction.

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group continues to work on the item and engage with stakeholders regarding their concerns.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no comments.

The committee recommends Assigned on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH-26.5 I Appendix D – Definitions: recorded representation.

Item was previously part of GEN-26.1

recorded representation. – The printed, embossed, electronic, or other representation that is recorded as a quantity, unit price, total price, product identity, or other information required by a weighing or measuring device **that the consumer can obtain in a readily accessible, reasonably permanent form, which is unalterable**. [1.10, 2.20, 2.21, 2.22, 2.24, 2.25, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 5.54, 5.55, 5.56(a), 5.56(b), 5.57, 5.58, 5.60]

Previous Status:
2026: New Proposal

Original Justification:
Having a definition for an electronic receipt will benefit industry, the regulatory community and NTEP and promote uniformity.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Vermont Agency of Agriculture Food & Markets supports the item.
- 2026 Annual: A Representative from Iowa Department of Agriculture/Weights & Measures and NEW Jersey Weights & Measures support this item as presented but would also support the partitioning of the item.
- 2026 Annual: A Representative from New York Department of Agriculture & Markets would support the NIST edits with the removal of the final sentence allowing the consumer to request a receipt by phone.
- 2026 Interim: A regulator from California supports this as a Developing item with consideration that the developed term is being placed in the General Code and as such would apply to all device types. They believe that specification and user requirements would be necessary for a QR code to be used to facilitate access to recorded representations. This regulator would also support this as a Voting item if the QR code is removed from the suggested General Code location and the NIST OWM recommended definition change is adopted. In separate comments, this regulator spoke on potential issues such as not being able to scan the QR code, questioning if there is a requirement on how long the code needs to be displayed, and stating that this is different than entering information to receive a receipt.
- 2026 Interim: A regulator from Vermont spoke in support of this item as it will help define what an acceptable method of recorded representation is. This regulator supports the NIST OWM proposed definition change and supports this item as a Voting item.
- 2026 Interim: A regulator from New Jersey spoke in support of the NIST OWM analysis and supports this item as a Voting item.
- 2026 Interim: A regulator from Iowa spoke in support of this item as a Voting item.

Industry:

- 2026 Annual: A Representative from the Meter Manufacturers Association, Gilbarco Inc, and ChargePoint support this item with edits.
- 2026 Annual: A Representative from Tesla stated that this proposal provides clear definition of electronic receipt and is an important clarification for Type Evaluation and manufactures.
- 2026 Annual: A Representative from the Scale Manufacturers Association supports the item.
- 2026 Interim: A representative of NEMA spoke in support of this item as a Voting item.
- 2026 Interim: A representative from Tesla spoke in support of this item as a Voting item and notes that this item brings much needed clarity on the nature of electronic receipts.
- 2026 Interim: A representative from Electrify America spoke in support of this item as it gives clarity to existing ambiguity of the handbook requirements. It was noted that a QR code is not a receipt, but a means to deliver the receipt to a consumer.

- 2026 Interim: A representative from Endress + Hauser Flow USA Inc. echoed comments heard from the MMA and Gilbarco Inc with support to comments heard from the Arkansas regulator. It was stated that this item could reside in the definition section with perpetuity and without much attention. A Developing status was recommended.
- 2026 Interim: A representative from ChargePoint commented that this type of receipt is happening whether we like it or not and that this can continue to be worked while being given a Voting status this cycle.

Advisory:

- 2026 Annual: A Representative from NIST supports this item with NIST edits and recommends striking examples in the definition.
- 2026 Interim: A representative from NIST OWM supports this as a Developing item and voiced appreciation to the NTEP Committee for the work that has been done to address this issue. NIST OWM also provided a suggested modification to the definition of **recorded representation**. If this modification is accepted, NIST OWM would support this as a voting item.

Comments Against:

Regulatory:

- 2026 Annual: A Representative from Arkansas Bureau of Standards recommends the two parts of this item be separated into two individual items (recorded representation and electronic receipt). Arkansas does not support the definition of electronic receipt.
- 2026 Annual: A Representative from Colorado Department of Agriculture asked a question about changes and recommends downgrading to address previous comments.
- 2026 Annual: A Representative from California Division of Measurement Standards supports the intention of the proposal but states no code sections are listed at the end of this item. They are supportive of the NIST recommended edits, but more work is needed to the definition of electronic receipt, so it applies to the correct code.
- 2026 Annual: A Representative from Delaware Department of Agriculture stated opposition to the electronic receipt definition but supports the rest of the proposal.
- 2026 Annual: A Representative from Maryland Department of Agriculture agrees with Arkansas about the definition.
- 2026 Interim: A regulator from Arkansas spoke in opposition to this item and recommended that it remains Developing. The main concern voiced was that having secondary methods of delivering a recorded representation to consumers in the same code and paragraph of the primary method has given industry the impression that the primary method is optional or can be replaced by secondary means. It was conveyed that secondary options are in addition to the primary and that secondary options, if listed, should be in device specific codes. In separate comments, this regulator recommended that this should be placed in device specific codes and not the definitions.
- 2026 Interim: A regulator from Washington spoke in support of comments heard from Arkansas and wants to recognize and emphasize that the default method of receipt delivery should be in printed form.
- 2026 Interim: A regulator from Maryland spoke in agreement with the representatives from Arkansas, California, and the MMA and recommends a Developing status.

Industry:

- 2026 Interim: A representative of MMA spoke in support of this item in principle as a Developing item. It was stated that an exhaustive list should be based on requirements and not a list of technologies of the time.
- 2026 Interim: A representative from Gilbarco Inc. supports the position of the MMA in that this list of recorded representations could be taken as restrictive and that the language could be more generic to allow for different types of technologies.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: After the Annual Meeting, the Committee revised and divided this item into three separate items GEN-26.1, OTH-26.5, OTH-26.6, based on the comments heard during open hearing. The body voted to assign an Informational status to this item at the Annual meeting. NCWM 2026 Interim Meeting: Hearing comments on this item, the Committee has assigned a voting status to the item, incorporated the definition of **recorded representation** as provided by NIST OWM, and removed the electronic form example list from the proposed **electronic receipt** definition.

The Committee noted that the item was incorrectly identified in Publication 15 at the NCWM 2026 Interim Meeting. The item was corrected from GEN-26.5 to GEN-26.1

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): He is supportive of a voting status. He pointed out that this does not apply to EVSE. If it does apply to EVSE, the EVSE code will need to be changed or merged.

The 2026 S&T Committee recommends a Voting Status. The committee believes that the item has merit and is fully developed.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends voting with the removal of ", reasonably permanent".

2026 NEWMA: A representative from New Jersey Weights & Measures recommends a voting status.

2026 NEWMA: A representative from NYS Weights & Measures questions the words "reasonably permanent".

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture supports this item and recommends the item be assigned a voting status with the following verbiage addition. that the consumer can obtain "immediately following the completion of the transaction in a readily accessible, reasonably permanent form, which is unalterable. "

Representatives from Louisiana, Arkansas and TDLR support Maryland's comments

The committee recommends Voting on this item with updated version included adding "immediately following the completion of the transaction."

Additional letters, presentation and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH-26.6 I Appendix D – Definitions: electronic receipt.

Item was previously part of GEN-26.1

Source:
NCWM National Type Evaluation Program Committee

Purpose: Remove the examples from G-S.5.6. Recorder representations and add a definition to HB 44 for Electronic Receipts to assist in clarification for regulatory, manufacturers and NTEP as to what an electronic receipt is.

Item under Consideration:
Amend NIST Handbook 44 Definitions

electronic receipt. – A~~n electronic~~ version of a recorded representation in electronic form ~~the form of a downloadable PDF or HTML file~~ accessed or delivered electronically. [1.10, 2.20, 2.21, 2.22, 2.24, 2.25, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 5.54, 5.55, 5.56(a), 5.56(b), 5.57, 5.58, 5.60]
(Added 20XX)

Previous Status:
2026: New Proposal

Original Justification:
Having a definition for an electronic receipt will benefit industry, the regulatory community and NTEP and promote uniformity.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Vermont Agency of Agriculture Food & Markets supports the item.
- 2026 Annual: A Representative from Iowa Department of Agriculture/Weights & Measures and NEW Jersey Weights & Measures support this item as presented but would also support the partitioning of the item.
- 2026 Annual: A Representative from New York Department of Agriculture & Markets would support the NIST edits with the removal of the final sentence allowing the consumer to request a receipt by phone.
- 2026 Interim: A regulator from California supports this as a Developing item with consideration that the developed term is being placed in the General Code and as such would apply to all device types. They believe that specification and user requirements would be necessary for a QR code to be used to facilitate access to recorded representations. This regulator would also support this as a Voting item if the QR code is removed from the suggested General Code location and the NIST OWM recommended definition change is adopted. In separate comments, this regulator spoke on potential issues such as not being able to scan the QR code, questioning if there is a requirement on how long the code needs to be displayed, and stating that this is different than entering information to receive a receipt.
- 2026 Interim: A regulator from Vermont spoke in support of this item as it will help define what an acceptable method of recorded representation is. This regulator supports the NIST OWM proposed definition change and supports this item as a Voting item.
- 2026 Interim: A regulator from New Jersey spoke in support of the NIST OWM analysis and supports this item as a Voting item.
- 2026 Interim: A regulator from Iowa spoke in support of this item as a Voting item.

Industry:

- 2026 Annual: A Representative from the Meter Manufacturers Association, Gilbarco Inc, and ChargePoint support this item with edits.

- 2026 Annual: A Representative from Tesla stated that this proposal provides clear definition of electronic receipt and is an important clarification for Type Evaluation and manufactures.
- 2026 Annual: A Representative from the Scale Manufacturers Association supports the item.
- 2026 Interim: A representative of NEMA spoke in support of this item as a Voting item.
- 2026 Interim: A representative from Tesla spoke in support of this item as a Voting item and notes that this item brings much needed clarity on the nature of electronic receipts.
- 2026 Interim: A representative from Electrify America spoke in support of this item as it gives clarity to existing ambiguity of the handbook requirements. It was noted that a QR code is not a receipt, but a means to deliver the receipt to a consumer.
- 2026 Interim: A representative from Endress + Hauser Flow USA Inc. echoed comments heard from the MMA and Gilbarco Inc with support to comments heard from the Arkansas regulator. It was stated that this item could reside in the definition section with perpetuity and without much attention. A Developing status was recommended.
- 2026 Interim: A representative from ChargePoint commented that this type of receipt is happening whether we like it or not and that this can continue to be worked while being given a Voting status this cycle.

Advisory:

- 2026 Annual: A Representative from NIST supports this item with NIST edits and recommends striking examples in the definition.
- 2026 Interim: A representative from NIST OWM supports this as a Developing item and voiced appreciation to the NTEP Committee for the work that has been done to address this issue. NIST OWM also provided a suggested modification to the definition of **recorded representation**. If this modification is accepted, NIST OWM would support this as a voting item.

Comments Against:

Regulatory:

- 2026 Annual: A Representative from Arkansas Bureau of Standards recommends the two parts of this item be separated into two individual items (recorded representation and electronic receipt). Arkansas does not support the definition of electronic receipt.
- 2026 Annual: A Representative from Colorado Department of Agriculture asked a question about changes and recommends downgrading to address previous comments.
- 2026 Annual: A Representative from California Division of Measurement Standards supports the intention of the proposal but states no code sections are listed at the end of this item. They are supportive of the NIST recommended edits, but more work is needed to the definition of electronic receipt, so it applies to the correct code.
- 2026 Annual: A Representative from Delaware Department of Agriculture stated opposition to the electronic receipt definition but supports the rest of the proposal.
- 2026 Annual: A Representative from Maryland Department of Agriculture agrees with Arkansas about the definition.
- 2026 Interim: A regulator from Arkansas spoke in opposition to this item and recommended that it remains Developing. The main concern voiced was that having secondary methods of delivering a recorded representation to consumers in the same code and paragraph of the primary method has given industry the impression that the primary method is optional or can be replaced by secondary means. It was conveyed that secondary options are in addition to the primary and that secondary options, if listed, should be in device specific codes. In separate comments, this regulator recommended that this should be placed in device specific codes and not the definitions.
- 2026 Interim: A regulator from Washington spoke in support of comments heard from Arkansas and wants to recognize and emphasize that the default method of receipt delivery should be in printed form.
- 2026 Interim: A regulator from Maryland spoke in agreement with the representatives from Arkansas, California, and the MMA and recommends a Developing status.

Industry:

- 2026 Interim: A representative of MMA spoke in support of this item in principle as a Developing item. It was stated that an exhaustive list should be based on requirements and not a list of technologies of the time.

- 2026 Interim: A representative from Gilbarco Inc. supports the position of the MMA in that this list of recorded representations could be taken as restrictive and that the language could be more generic to allow for different types of technologies.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Annual: None
- 2026 Interim: None

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: After the Annual Meeting, the Committee revised and divided this item into three separate items GEN-26.1, OTH-26.5, OTH-26.6, based on the comments heard during open hearing. The body voted to assign an Informational status to this item at the Annual meeting. NCWM 2026 Interim Meeting: Hearing comments on this item, the Committee has assigned a voting status to the item, incorporated the definition of **recorded representation** as provided by NIST OWM, and removed the electronic form example list from the proposed **electronic receipt** definition.

The Committee noted that the item was incorrectly identified in Publication 15 at the NCWM 2026 Interim Meeting. The item was corrected from GEN-26.5 to GEN-26.1

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Ms. Mal Skowron (Tesla): Recommends a voting status.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports the item and recommends further development. He does not think the strike through is needed.

Mr. Steve Harrington (State of Oregon): Recommends that the item remain Informational.

The 2026 S&T Committee recommends a Developing Status. The committee recommends adding language that is being proposed in OTH-26.5 (that the consumer can obtain in a readily accessible, reasonably permanent form, which is unalterable).

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends voting with the following change: "electronic receipt. – A version of a recorded representation accessed or delivered electronically. [1.10, 2.20, 2.21, 2.22, 2.24, 2.25, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 5.54, 5.55, 5.56(a), 5.56(b), 5.57, 5.58, 5.60]"

2026 NEWMA: A representative from New Jersey Weights & Measures is unsure if this is needed. A receipt is a receipt no matter how you get it. The language is also clunky. NJ submits the following language change:

electronic receipt. – A version of a recorded representation which can be accessed or delivered electronically.

The string of code reference in brackets needs to be sifted through. Not all of the codes reference electronic receipts and some need to be deleted.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture does not think this language adds anything to the handbook but might suggest the words “digital proof of purchase” to replace most of what is currently in this proposal.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture supports this item and recommends the item be assigned a voting status with the following verbiage addition “immediately following the completion of the transaction”

A representative from Arkansas Department of Agriculture supports Maryland’s comments.

The committee recommends Voting on this item with updated version included adding “immediately following the completion of the transaction.”

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ITEM BLOCK 1 (B1) – TRANSPORTATION-FOR-HIRE SYSTEMS

B1-TNS-25.1 I Section 5.60. Transportation Network Measurement Systems – Tentative Code

Source:
Transportation-For-Hire Systems Task Group

Purpose:
Remove the Transportation Network Measurement Systems Tentative Code completely.

Item under Consideration:
Delete the Handbook 44, Section 5.60. Transportation Network Measurement Systems – Tentative Code as follows:

~~Table of Contents~~

~~Page Section 5.60. Transportation Network Measurement Systems – Tentative Code ..... 5-101~~
~~A. APPLICATION ..... 5-101~~
~~A.1. General ..... 5-101~~
~~A.2. Exceptions ..... 5-101~~
~~A.3. Additional Code Requirements ..... 5-101~~
~~S. SPECIFICATIONS ..... 5-101~~
~~S.1. Design of Indicating and Recording Elements ..... 5-101~~
~~S.1.1. General Indicating Elements ..... 5-101~~

~~S.1.2. General Recording Elements ..... 5-102~~
~~S.1.3. Identification ..... 5-102~~
~~S.1.4. Location of Identification Information. ..... 5-102~~
~~S.1.5. Display of Rates and Additional Charges ..... 5-102~~
~~S.1.6. Fare Estimates ..... 5-102~~
~~S.1.7. Actuation of Measurement System ..... 5-102~~
~~S.1.8. Fare Adjustment ..... 5-102~~
~~S.1.9. Fare Identification and Other Charges ..... 5-103~~
~~S.1.10. Receipt ..... 5-103~~
~~S.1.11. Driver's Summary ..... 5-103~~
~~S.2. Provision for Sealing. ..... 5-104~~
~~S.2.1. System Security ..... 5-104~~
~~S.2.2. System Audit. ..... 5-104~~
~~S.2.3. Change Tracking. ..... 5-104~~
~~S.3. Provision for Trip Data Loss. ..... 5-104~~
~~S.3.1. Intermittent Trip Data Loss ..... 5-104~~
~~S.3.2. Significant Trip Data Loss ..... 5-104~~
~~S.3.3. Alternative Fare Structures ..... 5-104~~
~~**N. NOTES ..... 5-104**~~
~~N.1. Distance Tests. ..... 5-104~~
~~N.1.1. Test Methods ..... 5-104~~
~~N.1.2. Test Procedures. ..... 5-105~~
~~N.1.3. Test Conditions ..... 5-105~~
~~N.2. Time Test. ..... 5-105~~
~~**T. TOLERANCES. ..... 5-106**~~
~~T.1. Tolerance Values ..... 5-106~~
~~T.1.1. Distance Tests ..... 5-106~~
~~T.1.2. Time Tests ..... 5-106~~
~~T.2. Tests Using Transfer Standards ..... 5-106~~
UR. USER REQUIREMENTS 5-106
~~UR.1. System Indications ..... 5-106~~
~~UR.1.1. Statement of Rates ..... 5-106~~
~~UR.2. Change Tracking. ..... 5-106~~
~~UR.3. System Installation and Operation. ..... 5-106~~
~~UR.4. Fare Estimates. ..... 5-106~~
~~UR.5. Determination of Total Charges When Location Service Data Is Lost. ..... 5-106~~
~~APPENDIX D. DEFINITIONS ..... 5-107~~
~~digital network ..... 5-107~~
~~network-arranged ride ..... 5-107~~
~~transportation network company ..... 5-107~~

transportation network company driver 5-107

transportation network company rider 5-107

transportation network measurement system 5-107

Section 5.60. Transportation Network Measurement Systems – Tentative Code

This tentative code has a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final code. Officials wanting to conduct an official examination of a device or system are advised to see paragraph G-A.3. Special and Unclassified Equipment.

(Tentative Code Added 2017)

A. Application

A.1. General. This code applies to a transportation network measurement system used in connection with a digital network that determines the actual time elapsed and/or distance travelled during a network-arranged ride to calculate a fare for transportation services.

Note: The fare is calculated by software services residing on the transportation network company servers using data transmitted by the indicating elements present in the vehicle, which are running software applications or services supplied by the transportation network company. The measurement data is generated from sources not physically connected to the vehicle (e.g., a navigation satellite system such as GPS and/or other location services).

A.2. Exceptions. This code does not apply to the following:

(a) Any system that charges a flat rate or fixed charge, and/or does not use a measurement of actual time elapsed or distance travelled to calculate a fare for transportation services.

(b) Odometers on vehicles that are rented or hired on a distance basis. (Also see Section 5.53. Odometers.)

(c) Taximeters. (Also see Section 5.54. Taximeters.)

(d) Any system where the fare is calculated by equipment located in the vehicle.

A.3. Additional Code Requirements. In addition to the requirements of this code, transportation network measurement systems shall meet the requirements of Section 1.10. General Code.

S. Specifications

S.1. Design of Indicating and Recording Elements. Indicating and recording elements shall provide indications and recorded representations that are clear, definite, accurate, and easily read under any conditions of normal operation of the device(s).

All indicating and recording elements used in a transportation network measurement system shall operate correctly while using the online-enabled technology application service provided by the transportation network company.

S.1.1. General Indicating Elements. A transportation network measurement system shall include, as a minimum:

(a) an indicating element used by a transportation network company driver that displays information and facilitates the measurements during a network-arranged ride to calculate a fare for transportation services; and

~~(b) an indicating element used by a transportation network company rider that displays information that allows the rider to review the current rate(s) for the transportation service and to request a ride.~~

~~**S.1.2. General Recording Elements.** A transportation network measurement system shall be capable of:~~

~~(a) recording all information necessary to generate a receipt specified in S.1.10. Receipt;~~

~~(b) providing information to transportation network company drivers, including, but not limited to, a summary of rides given as specified in S.1.11. Driver's Summary; and~~

~~(c) providing a copy of all metrological data required by law to a weights and measures jurisdiction with statutory authority.~~

~~**S.1.3. Identification.** All transportation network measurement system indicating elements shall display for the purposes of identification the following information:~~

~~(a) the name, initials, or trademark of the transportation network measurement system manufacturer, distributor, or developer; and~~

~~(b) the current version or revision identifier of the software application service provided by the transportation network company running on the indicating elements identified in S.1.1. General Indicating Elements.~~

~~(1) The version or revision identifier shall be prefaced by words or an abbreviation that clearly identifies the number as the required version or revision.~~

~~(2) Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the word "Number." Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the word "Number." The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).~~

~~**S.1.4. Location of Identification Information.** The information required by S.1.3. Identification shall be accessible through an easily recognized menu and, if necessary, a submenu or other appropriate means. Examples of menu and submenu identification include, but are not limited to, "Help," "About," "System Identification," "Weights and Measures Identification," or "Identification."~~

~~**S.1.5. Display of Rates and Additional Charges**. The transportation network measurement system shall be designed to make available to transportation network company riders the rate(s) for transportation services before the beginning of a network arranged ride. The system shall be capable of providing an explanation of the basis for calculating a fare including, if applicable, the base fare, rates for time and distance, and the amount of a booking fee, platform fee, or other similar service fee, before a rider submits the request for a network arranged ride.~~

~~**S.1.6. Fare Estimates.** The transportation network measurement system shall be capable of displaying a fare estimate to the transportation network company rider before a request for a network arranged ride is made.~~

~~**S.1.7. Actuation of Measurement System.** Following the initiation of a network arranged ride by the transportation network company driver, and prior to the conclusion of that network arranged ride, the transportation network measurement system shall only indicate and/or record measurements resulting from the movement of the vehicle or by the time mechanism.~~

~~***S.1.8. Fare Adjustment.** A transportation network measurement system shall be designed with:~~

~~*(a) a "time off" mechanism and a "distance off" mechanism provided for the transportation network system driver to render the measurement of time and distance either operative or inoperative during the ride; or*~~

~~*(b) the capability to make post-transaction fare adjustments to reduce the amount of the fare, provided the*~~

system creates a record of all location and time data from the time the ride request was accepted by the transportation network company driver.

[Nonretroactive as of January 1, 2018]

S.1.9. Fare Identification and Other Charges.

S.1.9.1. Fare Identification. Fare indications shall be identified by the word "Fare" or by an equivalent expression when displayed on the transportation network company system receipt required by S.1.10 Receipt. Values shall be defined by suitable words or monetary signs.

S.1.9.2. Other Charges. Other charges shall be indicated as separate line items when displayed on the receipt required by S.1.10. Receipt. Other charges shall be identified using an appropriate descriptive term, including but not limited to "Booking Fee," "Tolls," "Airport Pickup/Drop-off Surcharge" or an equivalent expression. Values shall be defined by suitable words or monetary signs.

S.1.10. Receipt. A transportation network measurement system shall issue a printed or electronic receipt to a transportation network company rider. This receipt shall include as a minimum the following:

(a) date of the start of the trip;

(b) unique identifying information sufficient for the transportation network company to identify the transaction, or other identifying information as specified by the statutory authority;

(c) start and end time of trip, total time of trip (maximum increment of one second), and if applicable, the total elapsed time during any time-off period;

(d) distance traveled, maximum increment of 0.01 km or 0.01 mi;

(e) the associated fare in $;

(f) other charges where permitted shall be identified and itemized;

(g) total charge in $;

(h) the start and end addresses or locations of the trip;

(i) a map showing the route taken; and

(j) a means to obtain transportation network company rider assistance.

S.1.11. Driver's Summary. A transportation network measurement system shall be capable of providing a summary of the driver's activity regarding network-arranged rides. The summary shall include, but not be limited to, the following information about each ride:

(a) date and time for start of trip;

(b) unique identifying information sufficient for the transportation network company to identify the transaction, or other identifying information as specified by the statutory authority;

(c) total time of trip, maximum increment of one second;

(d) distance traveled, maximum increment of 0.01 km or 0.01 mi;

(e) the total fare received;

(f) other charges where permitted; and

(g) a means to obtain transportation network company driver assistance.

S.2. Provision for Sealing.

S.2.1. System Security. Adequate provision shall be made to provide security for a transportation network measurement system. The system shall be designed to:

(a) protect the integrity of metrological data and algorithms used to compute fares from such data against unauthorized modification using industry standard technological protection mechanisms such as data encryption; and

(b) use software based access controls or equivalent technological protections that limit access to metrological data and algorithms used to compute fares from such data only to authorized persons.

S.2.2. System Audit. The transportation network measurement system shall be designed in a manner that permits officials having statutory authority to verify compliance with this transportation network measurement system code.

S.2.3. Change Tracking. Changes made by the manufacturer, distributor, or developer of a transportation network measurement system to any algorithms or code, which have a metrological effect, shall be logged and recorded. The period covered by this change record is not required to exceed one year.

S.3. Provision for Trip Data Loss. If a portion of the trip data is lost due to power or signal interruption by the transportation network company driver's indicating element, the transportation network measurement system shall be capable of determining the information needed to complete any transaction in progress at the time of the power or signal loss.

S.3.1. Intermittent Trip Data Loss. When the location services signal is lost intermittently during a prearranged ride (e.g., traveling through a tunnel), but recovered prior to the end of the ride, the transportation network measurement system shall be capable of calculating an accurate fare in accordance with T.1. Tolerance Values.

S.3.2. Significant Trip Data Loss. When the location services signal is lost for a significant portion of the network-arranged ride, the transportation network measurement system shall provide for alternative fare structures.

Note: Significant trip data loss refers to instances when the location services signal is lost to the extent the transportation network measurement system is not capable of calculating an accurate fare in accordance with T.1. Tolerance Values using actual time and actual distance, or when the signal is not regained by the end of the ride.

S.3.3. Alternative Fare Structures. If the transportation network measuring system is not using actual time and actual distance for a particular trip (e.g., zone based fares, signal loss), that portion of the fare not based on actual time and actual distance is not subject to this code. Charges not based on actual time and actual distance measurements may be based on the terms of service.

N. Notes

N.1. Distance Tests.

N.1.1. Test Methods. To determine compliance with distance tolerances, distance test(s) of a transportation network measurement system shall be conducted. The distance test(s) shall consist of a road test unless safety or other practical concerns prohibit road testing. A transfer standard test may be performed in the absence of a road test. At least one test shall be of a length sufficient to exceed the minimum fare.

N.1.1.1. Road Test. The test consists of operating the conveyance over a precisely measured course calibrated to a traceable linear measure of at least one mile in length

N.1.1.2. Transfer Standard Test. The test consists of operating the conveyance over an unmeasured course while

using a calibrated transfer standard, such as a fifth-wheel, to measure the distance travelled.

Note: Field examinations of transportation network measurement systems need not include testing of all individual devices used as driver/passenger indicating elements in connection with the service provided. It is considered sufficient that a representative sample of various indicating elements be incorporated in testing to verify proper operation of the system.

N.1.2. Test Procedures.

N.1.2.1. Test Length. All tests must be at least one mile in length. If a measured course or testing equipment is not readily available that will enable a test of a length sufficient to exceed the minimum fare, after completing the testing specified in N.1.1. Test Methods, an additional unmeasured test may be conducted. The purpose of this additional unmeasured test is to verify compliance with S.1.10. Receipt.

N.1.2.2. Additional Tests. If during testing a transportation network measurement system produces a measurement that does not comply with the tolerance values in T.1.1. Distance Tests, a minimum of three additional tests shall be conducted at the same location where all test variables are reduced to the greatest extent practicable to verify the system's ability to repeat transaction indications. Repeatability testing performed in excess of these three additional tests is done at the discretion of the official with statutory authority.

To verify system-wide noncompliance, tests for variability shall be conducted, including a minimum of three consecutive tests of varying lengths, locations, and/or environmental conditions.

N.1.3. Test Conditions.

N.1.3.1. General. Except during type evaluation, all tests shall be performed under the conditions that are considered usual and customary within the location(s) where the system is normally operated as deemed necessary by the statutory authority.

N.1.3.2. Roads. All tests shall be conducted on public roads.

N.1.3.3. Testing for Environmental Influences. During type evaluation, the distance test may include a route traveled by the vehicle that will expose the system to conditions that could contribute to the loss of, or interference with, the location service's signal. This may include:

(a) objects that may obstruct or reflect signals such as tall buildings/structures, forestation, tunnels, etc.;

(b) routes that do not follow a straight line path;

(c) significant changes in altitude; and

(d) any other relevant environmental conditions.

N.2. Time Test. A transportation network measurement system, which determines time elapsed, shall be tested for compliance with the tolerances values specified in T.1.2. Time Tests, using a certified, traceable standard.

T. Tolerances

S.4. Tolerance Values. The tolerances will be as specified in T.1.1. Distance Tests and T.1.2. Time Tests. (The following proposed tolerance values will be confirmed based on performance data evaluated by the NIST U.S. National Work Group on Taximeters before the transportation network measurement systems code becomes a permanent code.)

S.4.1. Distance Tests. Maintenance and acceptance tolerances shall be as follows:

(a) On Overregistration: 2.5

(b) On Underregistration: 2.5 %

S.4.2. Time Tests. Maintenance and acceptance tolerances shall be as follows:

(a) On Overregistration: 5 seconds or 0.5 %, whichever is greater

(b) On Underregistration: 5 seconds or 0.5 %, whichever is greater

S.5. Tests Using Transfer Standards. To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

UR. User Requirements

UR.1. System Indications. The indicating elements identified in S.1.1. General Indicating Elements shall display indications and information in a manner such that they can be conveniently read by the user of the device, computer, website, or online-enabled technology application service.

UR.1.1. Statement of Rates. The transportation network company rider shall be able to view the basis for calculating the fare including, if applicable, the base fare, rates for time and distance, and the amount of a booking fee, platform fee, or other similar service fees.

UR.2. Change Tracking. Upon request by an official having statutory authority, the transportation network company shall provide an explanation of changes that are logged pursuant to S.2.3. Change Tracking requirement during the time period covered by the request. Any such request shall be answered within two business days, unless extended by the official having statutory authority. Records provided pursuant to S.2.3. Change Tracking shall be treated as confidential and proprietary to the extent permitted by any applicable law.

UR.3. System Installation and Operation. The transportation network company driver shall use the indicating elements identified in S.1.1.(a) General Indicating Elements in accordance with the requirements of the manufacturer, distributor, or developer.

UR.4. Fare Estimates. Estimates for fare charges shall be provided by the transportation network measurement system when requested by the transportation network company rider and following the input of a final destination for the trip being requested. The recipient of the fare estimate shall be able to access information about the fare estimate, including key variables that may lead to discrepancies between actual fare charged and the fare estimate provided as required by law.

UR.5. Determination of Total Charges When Location Service Data Is Lost. At the conclusion of the trip, the transportation network company shall disclose to the transportation network measurement service rider and driver the manner in which total charges are determined when there is significant data loss from location services.

Appendix D.

Definitions D

digital network. An online enabled technology application service, website, or system offered or used by a transportation network company that enables a transportation network company rider to arrange a network arranged ride with a transportation network company driver. [5.60]

N

network arranged ride. The provision of transportation by a transportation network company driver to a transportation network company rider, or other persons selected by the transportation network company rider, arranged through a digital network. [5.60]

T

~~**transportation network company.** An entity that uses a digital network to connect transportation network company riders with transportation network company drivers who provide network arranged rides, and offers or provides a transportation network measurement system, subject to an agreement or terms of service between the transportation network company and transportation network company rider or driver. [5.60]~~

~~**transportation network company driver.** An individual authorized by the transportation network company to access the digital network and receive connections to transportation network company riders for the purpose of providing network arranged rides. [5.60]~~

~~**transportation network company rider.** An individual who has obtained an account with a transportation network company and uses the transportation network company's digital network to connect with a transportation network company driver who can offer or provide a network arranged ride to the transportation network company rider or other persons selected by the transportation network company rider. [5.60]~~

~~**transportation network measurement system.** The information technology infrastructure and services offered or used by a transportation network company that receives data collected through a digital network and calculates a fare for a network arranged ride. [5.60]~~

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard from the floor on this item.

The committee recommends this item remain informational.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comment was received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Recommends that this block be assigned to the Transportation-For-Hire Systems Task Group. While he is generally supportive of the item and the intent, he does not believe the item is fully developed. He questioned whether an app-based taxi falls under S.1.1.1. or S.1.1.2.? Or if this can vary based on design? S.1.1.1. speaks to "built for purpose" devices, while S.1.1.2. states in the title "Application Software Installed on Not Built-for-Purpose Devices" which seems to fit the description of an App-based taxi). The language speaks to "transportation network measurement systems". He also commented on S.1.10 regarding recorded representations – these requirements seem to only apply to a "built-for-purpose device installed in the vehicle", while S.1.12 speaks to electronic representations being required, it does not speak to the required content of the recorded representation. This seems to imply that only built for purpose devices will need to provide the content identified in S.1.10.

The 2026 S&T Committee recommends that the item be assigned back to the Transportation for Hire Systems Task Group based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representatives from New Jersey Weights & Measures and NYS Weights & Measures support a voting status.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Louisiana Department of Agriculture and Forestry stated the task group has been dissolved; this group was put together at the request of NCWM. This code provides an equitable code for transportation for hire for measurement of time and distance.

A representative from NIST shared concerns that were brought forward that are not HB 44 related items. He believes this is fully developed.

A representative from Maryland Department of Agriculture supports Voting status.

The committee recommends Voting on this item.

B1-TXI-25.1 I 5.54 ~~Taximeters~~ Transportation-For-Hire Systems

Source:
Transportation-For-Hire Systems Task Group

Purpose:
Add a new Transportation-For-Hire Systems Code to replace the existing Taximeter Code and Transportation Network Measurement Systems Tentative Code.

This code has been developed by the Transportation for Hire Task Group with the goal of producing a unified code that can be applied to all transportation for hire systems including traditional taximeters and app based rideshare companies.

It is based off of Section 5.54 Taximeters, which it will ideally replace. Bold and underlined portions in the submission indicate Task Group additions to the existing Taximeter Code. The Committee can decide whether a better path would be to wholly replace Section 5.54 with this item or to amend it throughout.

Item under Consideration:
Amend the Handbook 44, Section 5.54. Taximeters Code as follows:

Section 5.54. ~~Taximeters~~Transportation-for-Hire-Systems 372
A. Application 372
A.1. General. 372
A.2. Exceptions. 372
A.3. Additional Code Requirements. 372
S. Specifications 372
S.1. Design of Indicating and Recording Elements. 372
S.1.1. General. 372
S.1.~~1~~2.~~1.~~Recording Elements, General. 373
S.1.~~2~~3. Advancement of Indicating Elements. 373
S.1.~~3~~4. Visibility of Indications. 374
S.1.~~4~~5. Actuation of Fare Indicating Mechanism. 375
S.1.~~5~~6. Operating Condition. 375
S.1.~~6~~7. Fare Identification. 375
S.1.~~7~~8. Extras. 375
S.1.~~8~~9. Protection of Indications. 376
S.1.~~9~~10. Recorded Representation. 376
S.1.~~10~~11. Non-fare Information. 376
S.1.12. Electronic Receipt Required. 377
S.2. Basis of Fare Calculations. 377

S.2.1. Initial Time and Distance Intervals..... 377
S.3. Design of Operating Control..... 377
S.3.1. Positions of Control..... 377
S.3.2. Control for Extras Mechanism..... 377
S.4. Interference..... 377
S.5. Provision for Security Seals..... 378
S.5.1. Taximeter Connected to Networked Systems..... 379
S.5.2. Taximeters Calibrated to Specific Vehicles..... 379
S.6. Power Interruption, Electronic Taximeters..... 379
S.7. Measurement Signal Loss..... 380
S.7.1. Intermittent Trip Data Loss..... 380
S.7.2. Significant Trip Data Loss..... 380
S.8. Anti-Fraud Provisions, Electronic Taximeters..... 380
N. Notes..... 380
N.1. Distance Tests..... 380
N.1.1. Test Methods..... 380
N.1.2. Test Procedures..... 381
N.1.3. Test Conditions..... 381
N.2. Time Test..... 382
N.3. Interference Test..... 382
T. Tolerances..... 382
T.1. Tolerance Values..... 382
T.1.1. On Distance Tests..... 382
T.1.2. On Time Tests..... 382
T.1.3. On Interference Tests..... 383
T.2. Tests Using Transfer Standards..... 383
UR. User Requirements..... 383
UR.1. Inflation of Vehicle Tires..... 383
UR.2. Position and Illumination of Taximeter..... 383
UR.3. Statement of Rates..... 383

Section 5.54. ~~Taximeters~~Transportation-for-Hire-Systems

A. Application

A.1. General. – This code applies to ~~taximeters; that is, to~~ devices **and systems** that ~~automatically~~ calculate ~~at a predetermined rate or rates and indicate~~**fare charges for transportation services when those charges are based on** the ~~charge for hire of a vehicle~~**distance traveled and/or time elapsed during the transport of passenger(s). This code applies to systems using single or multiple sources of data used to determine distance and/or time during transportation service for the purpose of calculating fees charged to passengers and/or payment for drivers.**

Except where expressly stated as applicable only to specific types of systems:

(a) the requirements for transportation-for-hire systems in this code will apply to those systems using the data input used for calculation of charges from sources that are physically connected to the vehicle, systems using data input from external sources, or a combination of these sources; and

(b) requirements in this code apply to systems that provide periodic updates of fare charges accumulated during a trip and those systems that supply a good faith estimate of the total fare charges prior to a trip.

(Amended 20XX)

A.2. Exceptions. – This code does not apply to the following:

(a) any system that charges a flat rate or fixed charge which does not use a dynamic measurement of time elapsed, or distance travelled to calculate a fare for transportation services;

~~(a)~~**(b)** odometers on vehicles that are rented **or hired** on a distance basis. (Also see Section 5.53. Code for Odometers.)

~~(b)~~**(c)** devices ~~that only display a flat rate~~ or ~~negotiated rate;~~ **systems used to determine shipping** or **freight charges.**

~~(c) Transportation Network Measurement Systems. (Also see Section 5.60. Transportation Network Measurement Systems.)~~

(Amended 1977, 2016, ~~and~~ 2017**, and 20XX**)

A.3. Additional Code Requirements. – In addition to the requirements of this code, ~~Taximeters~~**transportation-for-hire systems** shall meet the requirements of Section 1.10. General Code.

(Amended 20XX)

S. Specifications

S.1. Design of Indicating and Recording Elements. – Indicating and recording elements shall provide indications and recorded representations that are clear, definite, accurate, and easily read under any conditions of normal operation of the device(s).

For transportation-for-hire systems operating using application software provided by a transportation network company and installed on a user's computing device (i.e., transportation network measurement systems), the indicating and recording elements shall provide an appropriate digital platform (i.e., operating system) for the online-enabled application software allowing the system to operate as designed. Any additional features or functions installed on the user's indicating/recording element shall not interfere with the proper operation of the transportation-for-hire application software.

(Amended 20XX)

S.1.1. General. ~~– A taximeter shall be equipped with a primary indicating element.~~

(Amended 1988~~ and,~~ 2015**, and 20XX**)

S.1.1.1. For Systems Including a Built-for-Purpose Device Installed in the Vehicle. – A built-for-purpose device (e.g., taximeter) shall be equipped with a primary indicating element. The indicating element shall be installed and positioned in the vehicle so that all relevant indications are readily observable by a driver and passengers.

(Added 20XX)

S.1.1.2. For Systems Consisting of Application Software Installed on Not Built-for-Purpose Devices. – The indicating element(s) in systems for transportation network measurement systems using not built-for-purpose devices on which an application software has been installed shall operate as follows.

(a) An indicating element used by a transportation network company driver shall:

- **receive data input used to compute distance traveled and/or time elapsed;**
- **display trip information;**
- **provide a means of communications between system components; and**
- **provide a trip summary at the conclusion of all network-arranged transportation services.**

The device used by the driver shall perform only those functions necessary to facilitate transportation-for-hire service during the period of time when that service is being provided.

(b) An optional device operated by a rider or consumer shall provide the user with all required information on a rider/consumer's receipt of the transaction and may also provide a means for making payment for the transportation service.

(Added 20XX)

S.1.~~1~~2.~~1.~~Recording Elements, General. – A **transportation-for-hire service shall be capable of making available a** receipt ~~providing~~**(in printed or electronic format) including** information as required in S.1.~~9~~**10**. Recorded Representations ~~shall be available from a taximeter or taximeter system~~ through an integral or separate recording element for all transactions conducted.

~~*[Nonretroactive January 1, 2016]*~~

(Added 2015) **(Amended 20XX)**

S.1.~~2~~3. Advancement of Indicating Elements. – ~~Except when a taximeter is being cleared, t~~**T**he primary indicating and recording elements shall be susceptible of advancement only by the movement of the vehicle or by the time mechanism **except where an advancement of analog indications occurs on a taximeter when being cleared.**

(Amended 20XX)

S.1.3.1. For Systems Using a Built-for-Purpose Device Installed in the Vehicle. –

(a) *At the conclusion of a transaction (e.g., following the totalizing of all accrued charges and having a customer receipt made available), no other advancement of fare, extras, or other charges shall occur until the taximeter has been cleared.*

[Nonretroactive as of January 1, 2017]

(b) Where permitted, a flat rate or negotiated rate shall be displayed in the "fare" indicating mechanism, provided that once a flat rate or negotiated rate is entered the fare may no longer be advanced by movement of the vehicle or the time mechanism.

(Amended 1988~~ and,~~ 2016 **and 20XX**)

**S.1.~~2~~3.~~1~~2. Time and Distance Mechanisms.~~ Means shall be provided on all taximeters designed to calculate fares based on a combination of time elapsed and distance traveled, to enable the vehicle~~

~~operator to render the time mechanism either operative or inoperative with respect to the fare-indicating mechanism.~~ **A transportation-for-hire system shall include either of the following:**

~~*S.1.2.2. Distance Mechanism.*~~ **(a)** ~~*Means shall be provided on all taximeters designed to calculate fare based on a combination of time elapsed and/or distance traveled to enable*~~***a "time off" mechanism and a "distance off" mechanism for*** *the vehicle operator to render the* ***measurement of time and/or*** *distance* ~~*mechanism either operative or*~~ *inoperative* ~~*with respect to the fare-indicating mechanism*~~***during a ride. Each use of these mechanisms shall be reflected in the calculation of total charges and recorded on the passenger's receipt; or***

[Nonretroactive as of January 1, ~~*2020*~~***20XX****]*

(Amended 2018 **and 20XX**)

(b) for systems not equipped with a "time off" and/or "distance off" mechanism, the system shall be equipped with means to make post-transaction fare adjustments to reduce the amount of the fare, provided the system creates a record of all location and time data from the initiation of the transportation service.
(Added 20XX)

(Added 2017) **(Amended 20XX)**

S.1.~~3~~4. Visibility of Indications. – Primary indications displayed on indicating elements shall be clear, definite, accurate, and easily read under any conditions of normal operation.
(Amended 20XX)

S.1.~~3~~4.1. – ~~Taximeter~~ Indications For Built-for-Purpose Devices Installed in the Vehicle. – The indications of fare, including extras, and the mode of operation, such as "time" or "hired," shall be constantly displayed whenever the meter is in operation. All indications of passenger interest shall be easily read from a distance of 1.2 m (4 ft) under any condition of normal operation. This includes any necessary lighting, shading, or other means necessary to make displayed indications clearly visible to operator and passenger.

(Amended 1977, 1986, 1988, ~~and~~ 2017**, and 20XX**)

S.1.~~3~~4.~~2~~1.1. Minimum Height of Figures, Words, and Symbols. – The minimum height of the figures used to indicate the fare shall be 10 mm and for extras, 8 mm. The minimum height of the figures, words, or symbols used for other indications, including those used to identify or define, shall be 3.5 mm.

(Added 1986)

S.1.~~3~~4.~~3~~1.2. Passenger's Indications. *– A supplementary indicating element installed in a taxi to provide information regarding the taxi service to the passenger (i.e., Passenger Information Monitor or PIM), shall clearly display the current total of all charges incurred for the transaction. The accruing total of all charges must remain clearly visible on the passenger's display (unless disabled by the passenger) at all times during the transaction.*

[Nonretroactive as of January 1, 2016]

(Added 2015) (Amended 2017)

S.1.~~3~~4.~~3~~1.2.1. Additional Information. *– Additional information shall be displayed or made available through a passenger's indicating element (as described in S.1.~~3~~4.~~3~~1.2 Passenger's Indications) and shall be current and reflect any charges that have accrued. This additional information shall include:*

(a) an itemized account of all charges incurred including fare, extras, and other additional charges; and

(b) the rate(s) in use at which any fare is calculated.

*Any additional information made available must not obscure the accruing total of charges for the taxi service. This additional information may be made accessible through clearly identified operational controls (e.g., keypad, button, menu, **~~touch screen~~touchscreen**).*

[Nonretroactive as of January 1, 2016]

(Added 2015) **(Amended 20XX)**

S.1.~~3~~4.~~3~~1.~~2~~3. Fare and Extras Charges. *– The indication of fare and extras charges on a passenger's indicating element shall agree with similar indications displayed on all other indicating elements in the system.*

[Nonretroactive as of January 1, 2016]

(Added 2015)

S.1.4~~5~~. Actuation of Fare Indicating Mechanism. – When a **~~taximeter~~built-for-purpose device installed in the vehicle** designed to calculate fares upon the basis of a combination of distance traveled and time elapsed, but not both time and distance used concurrently to calculate fare, is operative with respect to fare indication, the fare indicating mechanism shall be actuated by the distance mechanism whenever the vehicle is in motion at such a speed that the rate of distance revenue equals or exceeds the time rate, and may be actuated by the time mechanism whenever the vehicle speed is less than this and when the vehicle is not in motion.

(Amended 1977 **~~and~~** 2017**, and 20XX**)

S.1.~~5~~6. Operating Condition.

S.1.~~5~~6.1. General. – When a **~~taximeter~~built-for-purpose device installed in the vehicle** is cleared, the indication "Not Registering," "Vacant," or an equivalent expression shall be shown. Whenever a **~~taximeter~~built-for-purpose device installed in the vehicle** is set to register charges, it shall indicate "Registering," "Hired," or an equivalent expression and the rate at which it is set shall be automatically indicated (Rate 1 or Rate A, for example).

(Amended 1988 **and 20XX**)

S.1.~~5~~6.2. Time not Recording. – When a **~~taximeter~~built-for-purpose device installed in the vehicle** is set for fare registration with the time mechanism inoperative, it shall indicate "Time Not Recording" or an equivalent expression.

(Amended 1988 **and 20XX**)

S.1.~~5~~6.3. Distance Not Recording. *– When a **~~taximeter~~built-for-purpose device installed in the vehicle** is set for fare registration with the distance mechanism inoperative, it shall indicate "Distance Not Recording" or an equivalent expression.*

[Nonretroactive as of January 1, 2020]

(Added 2017) (Amended 2018 **and 20XX**)

S.1.~~6~~7. Fare Identification. – Fare indications shall be identified by the word "Fare" or by an equivalent expression. Values shall be defined by suitable words or monetary signs.

S.1.~~7~~8. Extras. – Extras shall be indicated as a separate item and shall not be included in the fare indication. They shall be identified by the word "Extras" or by an equivalent expression. Values shall be defined by suitable words or monetary signs. Means may be provided to totalize the fare and extras if the totalized amount returns to separate indications of fare and extras within 5 seconds or less.

(Amended 1988)

S.1.~~7~~8.1. Nonuse of Extras. – If and when **~~taximeter~~** extras are prohibited by legal authority or are discontinued by a vehicle operator, the extras mechanisms shall be rendered inoperable, or the extras indications shall be effectively obscured by permanent means.

(Amended 20XX)

S.1.~~8~~9. Protection of Indications. – All indications of fare and extras shall be protected from unauthorized alteration or manipulation.

(Amended 2015)

S.1.9~~10~~. Recorded Representation. *– A printed or electronic receipt issued from a* ~~***taximeter***~~***built-for-purpose device installed in the vehicle****, whether through an integral or separate recording element, shall include as a minimum, the following information when processed through the taximeter system:*

(a) date;

*(b) unique vehicle identification number, such as the medallion number, taxi number, vehicle identification number (VIN), permit number, or other identifying information as specified by the statutory authority;**

*(c) start and end time of the trip;**

*(d) distance traveled, maximum increment of 0.1 km (0.1 mi);**

(e) fare in $;

*(f) each rate at which the fare was computed and the associated fare at that rate;**

*(g) additional charges (in $) where permitted such as extras, any surcharges, telecommunication charges, and taxes shall be identified and itemized;**

*(h) total charge for service in $ (inclusive of fare, extras, and all additional charges);**

*(i) trip number, if available;***

*(j) telephone number (or other contract information) for customer assistance;*** ~~***and***~~

*(k) a statement of chargeable time and chargeable distance for taximeters that calculate fare using time and distance concurrently~~.~~**;***** ***and***

(l) for software-based systems, the software version identification number *.***
(Added 20XX)

Note: When processed through the taximeter or taximeter system, any adjustments (in $) to the total charge for service including discounts, credits, and tips shall also be included on the receipt.**

[Nonretroactive as of January 1, 1989]

**[Nonretroactive as of January 1, 2000]*

***[Nonretroactive as of January 1, 2016]*

****[Nonretroactive as of January 1, 2018]*

*******[Nonretroactive as of January 1, 20XX]***

(Added 1988) (Amended 1999, 2015, ~~**and**~~ 2017**, and 20XX**)

S.1.9~~10~~.1. Multiple Recorded Representations - Duplicate Receipts. – *A recording element may produce a duplicate receipt for the previous transaction provided the information printed is identical to the original with the exception of time issued. The duplicate receipt shall include the words "duplicate" or "copy." The feature to print a duplicate receipt shall be deactivated at the time the meter is hired for the next fare.*

[Nonretroactive as of January 1, 2000]

(Added 1999)

S.1.~~10~~11. Non-fare Information. *– The fare and extras displays may be used to display auxiliary information, provided the meter is in the ~~v~~Vacant condition, and such information is only displayed for10 seconds, or less. If the*

information consists of a list of information, the list may be displayed one item after another, provided that each item is displayed for 10 seconds, or less.

[Nonretroactive as of January 1, 2002]

(Added 2000) **(Amended 20XX)**

S.1.12. Electronic Receipt Required. – An electronic receipt shall be provided to the customer from software and application-based meters, when the payment transaction is completed electronically via the businesses application or software program.

(Added 20XX)

S.2. Basis of Fare Calculations. – A ~~taximeter~~**transportation-for-hire system** shall calculate fares only upon the basis of:

(a) distance traveled;

(b) time elapsed; or

(c) a combination of distance traveled and time elapsed.

A ~~taximeter~~**transportation-for-hire system** may utilize more than one rate to calculate the fare during a trip. Any change in the applied rate must occur at the completion of the current interval.

(Amended 1977~~ and,~~ 2016**, and 20XX**)

S.2.1. Initial Time and Distance Intervals. – The time and distance intervals of a ~~taximeter~~**built-for-purpose device installed in the vehicle** that does not calculate fares based on distance traveled and time elapsed used concurrently shall be directly proportional as expressed in the following formula:

$$\frac{\textit{Seconds of Initial Time Interval}}{\textit{Seconds per Non} - \textit{Initial Time Interval}} = \frac{\textit{Distance of Initial Mileage Interval}}{\textit{Distance per Non} - \textit{Initial Mileage Interval}}$$

(Added 1990) (Amended 2017)

S.3. Design of Operating Control.

S.3.1. Positions of Control. – The several positions of the operating controls shall be clearly defined and shall be so constructed that accidental or inadvertent changing of the operating condition of the ~~taximeter~~**built-for-purpose device installed in the vehicle** is improbable. Movement of the operating controls to an operating position immediately following movement to the cleared position shall be delayed enough to permit the ~~taximeter~~**device's display** to come to a complete rest in the cleared position.

(Amended 1988 **and 20XX**)

S.3.2. Control for Extras Mechanism. – The knob, handle, or other means provided to actuate the extras mechanism shall be inoperable whenever the ~~taximeter~~**built-for-purpose device installed in the vehicle** is cleared.

(Amended 20XX)

S.4. Interference. – The design of a ~~taximeter~~**built-for-purpose device installed in the vehicle** shall be such that when a fare is calculated by using time and/or by using distance (but not used concurrently) there will be no interference between the time and the distance portions of the mechanism device at any speed of operation.

(Amended 1977, 1988, ~~and~~ 2017**, and 20XX**)

S.5. Provision for Security Seals. – Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that requires the security seal to be broken before an adjustment or interchange can be made of:

(a) any metrological parameter affecting the metrological integrity of the ~~taximeter~~**transportation-for-hire systems** and associated equipment; or

(b) any metrological parameter controlled by software residing in the ~~taximeter~~**built-for-purpose device installed in the vehicle** or an associated external computer network.

When applicable, the adjusting mechanism shall be readily accessible for ~~purposes~~**the purpose** of affixing a security seal.

(Audit trails shall use the format set forth in Table S.5. Categories of Device and Methods of Sealing)

(Amended 1988, 2000, ~~and~~ 2017**, and 20XX**)

Table S.5.

Categories of Device and Methods of Sealing

Categories of Device	*Methods of Sealing*
Category 1: *No remote configuration capability.*	*Seal by physical seal or* ~~*two event counters: one*~~**,** *for* ~~*calibration parameters*~~***components that may be removed from the vehicle, a combination of physical seals*** *and* ~~*one for configuration parameters*~~***a physical or electronic link as described in S.5.2. Taximeters Calibrated to Specific Vehicles****.*
Category 2: *Remote configuration capability, but access is controlled by physical hardware.* *The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode. The device shall not operate as normal when in the remote configuration mode.*	*The hardware enabling access for remote access to calibration functions must be at the device and sealed using a physical seal and the device shall include an event logger.* *An event logger must be used to record changes to configuration parameters made through remote access.* *The event logger must include event counters (000 to 999 with a minimum count of 1000 events), the parameter ID, the date and time of the change, and the new value of the parameter. A printed or electronic copy of the information must be available through the device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required.* *(Note: Does not require 1000 changes to be stored for each parameter.*

Table S.5. *Categories of Device and Methods of Sealing*	
Category 3: *Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).* *The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode. The device shall not operate as normal when in the remote configuration mode.*	*An event logger must be used to record changes to adjustable parameters that are made through remote access, and which is accessible only by authorized persons (using an Internet web browser or other such secure software.* *The event logger shall include event counters, the date and time of the change, the parameter ID, and the new value of the parameter. A printed or electronic copy of the information must be available through the device. The event loggers shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required.* *(Note: Does not require 1000 change to be stored for each parameter.)* *The device shall become inoperable when access to the system's metrological parameters is made through unapproved or unauthorized means. The device shall remain inoperable until cleared by the official having statutory authority.*

[Nonretroactive as of January 1, 2018]

(Table Added 2017) (Amended 2022 **and 20XX**)

S.5.1. Taximeter Connected to Networked Systems. – Metrological features that are not located on the taximeter device installed in the vehicle (i.e., accessed through a computer network, server, or "cloud") shall be secured by means that will:

(a) protect the integrity of metrological data and algorithms used to compute fares from such data against unauthorized modifications; and

(b) use software-based access controls or equivalent technological protections that limit access to metrological data and algorithms used to compute fares from such data only to authorized persons.

(Added 2017)

S.5.2. Taximeters Calibrated to Specific Vehicles. – In the case of taximeters where the proper performance and calibration of the device has been verified when used in a specific vehicle and which may be removed from the vehicle (e.g., slide mounting the taximeter), means shall be provided through a physical seal or electronic link between components affecting accuracy or indications of the device to ensure that its performance is not affected and operation is permitted only with those components having the same unique properties.

(Added 2017)

S.6. Power Interruption, Electronic Taximeters.

(a) After a power interruption of three seconds or less, the fare and extras indications shall return to the previously displayed indications and may be susceptible to advancement without the taximeter being cleared.

(b) After a power interruption exceeding three seconds, the fare and extras indications shall return to the previously displayed indications and shall not be susceptible to advancement until the taximeter is cleared.

*After restoration of power following an interruption exceeding three seconds, the previously displayed fare shall be displayed for a maximum of one minute at which time the fare shall automatically clear, and the taximeter shall return to the vacant condition.**

*[*Nonretroactive as of January 1, 2002]*

(Added 1988) (Amended 1989, 1990, and 2000)

S.7. Measurement Signal Loss. – If the measurement signal is interrupted, the taximeter shall be capable of determining any information needed to complete a transaction in progress at the time of signal loss/interruption.

Note: If the meter ceases to increment fare based on distance, the taximeter may continue to increment fare based on elapsed time provided the time mechanism is not affected by signal loss.

(Added 2017)

S.7.1. Intermittent Trip Data Loss. – When the measurement signal is lost intermittently during a trip (e.g., traveling through a tunnel), but recovered prior to the end of the trip, the taximeter shall be capable of calculating an accurate fare in accordance with T.1. Tolerance Values.

(Added 2017)

S.7.2. Significant Trip Data Loss. – When the signal is lost for a significant portion of the trip, the taximeter shall calculate the total charge utilizing recorded time and distance measurements and other charges (e.g., tolls and airport fees), and may also include other means in accordance with the terms of service (or other agreement) the passenger has agreed to.

Note: Significant trip data loss refers to instances when the measurement signal is lost to the extent that the taximeter cannot perform an accurate measurement or when the signal is not regained by the end of the trip.

(Added 2017)

S.8. Anti-Fraud Provisions, Electronic Taximeters. – An electronic taximeter may have provisions to detect and eliminate distance input that is inconsistent with the taximeter's source(s) of distance measurement data. When a taximeter equipped with this feature detects input inconsistent with the distance measurement data source(s):

(a) the meter shall either filter out the inconsistent distance input signals or cease to increment fare based on distance until the distance input signal is restored to normal operation. If the meter ceases to increment fare based on distance, the taximeter may continue to increment fare based on elapsed time when (1) permitted by the statutory authority; and (2) the time mechanism is not affected by inconsistent signals;

(b) the taximeter shall provide a visible or audible signal that inconsistent input signals are being detected; and

(c) the taximeter shall record the occurrence in an event logger. The event logger shall include an event counter, the date, and the time of at least the last 1000 occurrences.

(Added 2001) (Amended 2017)

N. Notes

N.1. Distance Tests.

N.1.1. Test Methods. – To determine compliance with distance tolerances, a distance test of a taximeter shall be conducted utilizing one or more of the following test methods:

(a) **Road Test.** – A road test consists of driving the vehicle over a precisely measured road course.

(b) **Fifth Wheel Test.** – A fifth wheel test consists of driving the vehicle over any reasonable road course and determining the distance actually traveled through the use of a mechanism known as a "fifth wheel" that is attached to the vehicle and independently measures and indicates the distance.

(c) **Simulated Road Test.*** – A simulated road test consists of determining the distance traveled by use of a roller device, or by computation from rolling circumference and wheel turn data.

*Simulated-road testing is not appropriate for taximeters using measurement data from sources other than signal(s) generated by rotation of the wheels of the vehicle.

Note: Field examinations of transportation network measurement systems need not include testing of all individual devices used as driver/passenger indicating elements in connection with the service provided. It is considered sufficient that a representative sample of various indicating elements be incorporated in testing to verify proper operation of the system.

(Amended 1977 ~~and~~ 2017**, and 20XX**)

N.1.2. Test Procedures. – The distance test of a taximeter, whether a road test, a simulated road test, or a fifth wheel test, shall include at least duplicate runs of sufficient length to cover at least the third money drop or 1 mi, whichever is greater, and shall be at a speed approximating the average speed traveled by the vehicle in normal service. In the case of metric calibrated taximeters, the test should cover at least the third money drop or 2 km, whichever is greater.

(Amended 1977)

N.1.2.1. Taximeters Using Measurement Data Sources from Other Than Rotation of the Wheels.

N.1.2.1.1. Testing, General. – Testing of taximeters with metrologically significant parameters that do not completely reside within the taximeter device shall include tests performed under variable conditions to verify that any non-compliant issue is generated from a network system rather than a single taximeter device. The variability tests shall include a minimum of three consecutive tests of varying lengths, locations, and/or ~~environment~~**environmental** conditions.

(Added 2017) **(Amended 20XX)**

N.1.2.1.2. Repeatability Testing, Taximeters Using Measurement Data Sources From Other Than Rotation of the Wheels. – Repeatability testing shall be conducted if, during testing, a taximeter registers a distance measurement that does not comply with the tolerance values in T.1.1. Distance Tests. A minimum of three additional tests shall be conducted at the same location and where all test variables are reduced to the greatest extent practicable to verify the system's ability to repeat transaction indications. Repeatability testing performed in excess of these three additional tests is done at the discretion of the official with statutory authority.

(Added 2017)

N.1.3. Test Conditions.

N.1.3.1. Measurement Data Based on the Rotation of the Vehicle's Wheels. – For taximeters that receive input of measurement data generated (directly or indirectly) from rotation of the vehicle's wheels, the test of the taximeter shall be performed under the following conditions.

(Added 2017)

N.1.3.1.1. Vehicle Lading. – During the distance test of a taximeter, the vehicle shall carry two persons, or in the case of a simulated road test, 70 kg or 150 lb of test weights may be substituted in lieu of the second person.

N.1.3.1.2. Tire Pressure. – At the completion of test run or runs, the tires of the vehicle under test shall be checked to determine that the tire pressure is that operating tire pressure posted in the vehicle. If not, the tire pressure should be adjusted to the posted tire pressure and further tests may be conducted to determine the operating characteristics of the taximeter.

(Amended 1977)

N.1.3.2. Taximeters Using Other Measurement Data Sources. – Except during type evaluation, all tests shall be performed under conditions that are considered usual and customary for the location(s) where the system is normally operated and as deemed necessary by the statutory authority.
(Added 2017)

N.1.3.2.1. Testing for Environmental Influences. – During type evaluation, the distance test may be performed on a route traveled by the vehicle that exposes the system to conditions possibly contributing to the loss of, or interference with, the signal(s) providing measurement data. This may include:

(a) objects that may obstruct or reflect signals such as tall buildings/structures, forestation, tunnels, etc.;

(b) routes that do not follow a straight-line path;

(c) significant changes in altitude; and

(d) any other relevant environmental conditions.
(Added 2017)

N.2. Time Test. – If a taximeter is equipped with a timing device through which charges are made for time intervals, the timer shall be tested at the initial interval, four separate subsequent intervals, and an average time test of at least four consecutive subsequent time intervals.
(Amended 1988)

N.3. Interference Test. – For taximeters that calculate fares based on time and/or distance but not simultaneously, a test shall be conducted to determine whether there is interference between the time and distance elements. During the interference test, the vehicle's operating speed shall be 3 km/h or 4 km/h (2 mi/h or 3 mi/h) faster, and then 3 km/h or 4 km/h (2 mi/h or 3 mi/h) slower than the speed at which the basic distance rate equals the basic time rate. The basic rate per hour divided by the basic rate per mile is the speed (km/h or mi/h) at which the basic time rate and basic distance rate are equal.

Note: Performance of the interference test may not be considered appropriate as a field test while travelling in a vehicle equipped with a taximeter. This test may be performed during type evaluation under controlled conditions for practicality and for safety concerns.
(Amended 1988 and 2017)

T. Tolerances

T.1. Tolerance Values.

T.1.1. On Distance Tests. – Maintenance and acceptance tolerances for taximeters shall be as follows:

(a) On Overregistration: 1 % of the interval under test.

(b) On Underregistration: 4 % of the interval under test, with an added tolerance of 30 m or 100 ft whenever the initial interval is included in the interval under test.

T.1.2. On Time Tests.

T.1.2.1. On Individual Time Intervals. – Maintenance and acceptance tolerances on individual time intervals shall be as follows:

(a) On Overregistration: 3 seconds per minute (5 %).

(b) On Underregistration: 9 seconds per minute (15 %) on the initial interval, and 6 seconds per minute (10 %) on subsequent intervals.

T.1.2.2. On Average Time Interval Computed After the Initial Interval. – Except for the initial interval, maintenance and acceptance tolerances on the average time interval shall be as follows:

(a) On Overregistration: 0.2 second per minute (0.33 %).

(b) On Underregistration: 3 seconds per minute (5 %).

(Amended 1991)

T.1.3. On Interference Tests. – For taximeters designed to calculate fares upon the basis of a combination of distance traveled and time elapsed (but not using both simultaneously), the distance registration of a taximeter in the "time on" position shall agree within 1 % of its distance registration in the "time off" position.

(Added 1988) (Amended 2017)

T.2. Tests Using Transfer Standards. – To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard (i.e., fifth wheel) when compared to the basic reference standard.

(Added 2017)

UR. User Requirements

UR.1. Inflation of Vehicle Tires. – For taximeters that receive input of measurement data generated (directly or indirectly) from rotation of the vehicle's wheels, the operational tire pressure of passenger vehicles and truck tires shall be posted in the vehicle and shall be maintained at the posted pressure.

(Amended 1977 and 2017)

UR.2. Position and Illumination of Taximeter. – A taximeter shall be so positioned and illuminated that its indications, operational markings, and controls of passenger interest can be conveniently read by a passenger seated in a position of up to 1.2 m (4 ft) away from the taximeter under any condition of normal operation.

Note: Software and application-based systems are exempt from this user requirement if all transaction related information is readily accessible, clear, and verifiable by customers through their digital interface.

(Amended 1985, 1986, ~~and~~ 2017**, and 20XX**)

UR.3. Statement of Rates. – The distance and time rates for which a taximeter is set, including the initial distance interval and the initial time interval, the local tax rate, and the schedule of extras when an extras indication is provided shall be conspicuously displayed inside the front and rear passenger compartments. The words "Rate," "Rates," or "Rates of Fare" shall precede the rate statement. The rate statement shall be fully informative, self-explanatory, and readily understandable by the ordinary passenger, and shall either be of a permanent character or be protected by glass or other suitable transparent material.

Note: Software and application-based systems are exempt from this user requirement if all transaction related information is readily accessible, clear, and verifiable by customers through their digital interface.

(Amended 1977, 1988, 1990, ~~and~~ 1999**, and 20XX**)

Previous Status:
2025: Informational

Original Justification:
A unified code is needed because these devices and systems exist across a spectrum. Traditional taxicab companies can now use fully app-based fare calculating measurement and payment systems. Some systems blend in vehicle app-based

GPS measurement systems with traditional in person ride pick-ups, while others can utilize physical metering inside the vehicle with electronic ride acquisitions.

A unified code will standardize the specifications, tolerances, test procedures, and user requirements for all types of these systems, as much as possible, bringing equity to the industry.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Louisiana Department of Agriculture supports this item as it is fully developed.
- 2026 Interim: A representative from Transportation-For-Hire Systems Task Group, The block was designed to bring all the disparate codes under one umbrella. The new code would allow the regulation of all transportation-for-hire systems and bring some equity to the marketplace. Due to technological evolution, the code is as developed as it can be at this time and recommends a voting status. In response to a question from the floor: Uber did participate but left task group when they felt the proposal was finished. Ride-share companies should be regulated equitably but not necessarily the same way as taxis. This proposal would not change the way industry operates.
- 2026 Interim: A representative from Louisiana Department of Agriculture supports a voting status.
- 2026 Interim: A representative from Orange County Weights & Measures, Supports the proposal. There is a level of ambiguity around exemptions for flat rate charges, when, and how to regulate them. Language around quoted price verse fee rate needs refinement.

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Comments Against:

Regulatory:

- 2026 Annual: None
- 2026 Interim: None

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Annual: A Representative from California Division of Measurement Standards provided comments at interim and should be assigned to the task group to address those comments.
- 2026 Interim: A representative from LA County Agricultural Commissioner/Weights & Measures, believes this item has merit and recognizes the hard work the committee has done. They recommend an assigned status because there are few items that will require additional clarification. They have three concerns that require additional clarification due to opportunities for exploitation. 1. Good Faith Estimates. 'Good Faith' is subjected to change when circumstances arise. 2. Surge pricing exploitation. 3. The testing of the

application will be based on random sampling. Additional clarification is needed to provide guardrails to prevent software exploits.

- 2026 Interim: A representative from San Diego County Department of Agriculture, Weights & Measures, this is an important proposal, as increasingly taxis are turning to new technology that is imperfectly covered by the code as it is written. There is still room for editing and refinement. Modern Rideshare systems provide customers a price up front, which fall into the first exemption, but how would the new code apply in the cases where the price changes due to conditions or route. This proposal also includes a note that allows jurisdictions to test a sample of Transport Network System devices in their jurisdiction rather than all of them. More details are needed around this section of the item. This proposal is needed, and the Task Group has made great progress, but fundamental question of scope and the implications of sample-based inspections need to be resolved before moving forward. Recommend this item remain assigned to the Task Group.
- 2026 Interim: A representative from California Division of Measurement Standards, Appreciates the work done by the task group, but supports CA county comments. Not fully developed and recommends assigned status.
- 2026 Interim: A representative from San Diego County Department of Agriculture, Weights & Measures, Question: Did the participates feel that this code would apply to them?

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- Interim 2026: A representative from NCWM, once members of the task group thought the work was done, they began dropping off, so maybe the full group should be reconvened.

Item Development:

2026 NCWM Annual Meeting: The Committee chose to retain Informational status for this item to receive specific recommendations for language development. If there are no specific suggestions the item may be assigned a Voting status.

2026 NCWM Interim Meeting: Upon receiving comments during open hearings the committee addressed two concerns by providing updated language in 5.54 Transportation for Hire Systems A.1. (b) to clarify application of good faith estimates. Additional updates to language include clarification of jurisdictional authority on appropriate representative sample size determination. The committee assigned this item Informational status to receive additional comments during the annual meeting

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remains informational.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comment was received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Recommends that this block be assigned to the Transportation-For-Hire Systems Task Group. While he is generally supportive of the item and the intent, he does not believe the item is fully developed. He questioned whether an app-based taxi falls under S.1.1.1. or S.1.1.2.? Or if this can vary based on design? S.1.1.1. speaks to "built for purpose" devices, while S.1.1.2. states in the title "Application Software Installed on Not Built-for-Purpose Devices" which seems to fit the description of an App-based taxi). The language speaks to "transportation network measurement systems". He also commented on S.1.10 regarding recorded representations – these requirements seem to only apply to a "built-for-purpose device installed in the vehicle", while S.1.12 speaks to electronic representations being required, it does not speak to the required content of the recorded

representation. This seems to imply that only built for purpose devices will need to provide the content identified in S.1.10.

The 2026 S&T Committee recommends that the item be assigned back to the Transportation for Hire Systems Task Group based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representatives from New Jersey Weights & Measures and NYS Weights & Measures support a voting status.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Louisiana Department of Agriculture and Forestry stated the task group has been dissolved; this group was put together at the request of NCWM. This code provides an equitable code for transportation for hire for measurement of time and distance.

A representative from NIST shared concerns that were brought forward that are not HB 44 related items. He believes this is fully developed.

A representative from Maryland Department of Agriculture supports Voting status.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ITEM BLOCK 2 (B2) – ELECTRIC VEHICLE SUPPLY EQUIPMENT

B2: EVS-26.2a A EVSE Indicating Element

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

S.1.2. EVSE Indicating Elements. ~~**An EVSE used to charge electric vehicles shall include an indicating element that accumulates continuously and displays, for a minimum of 15 seconds at the activation by the user and at the start and end of the transaction, the correct measurement results relative to quantity and total price. Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the device. All indications and representations of electricity sold shall be clearly identified and separate from other time-based fees indicated by an EVSE that is used for both the sale of electricity as vehicle fuel and the sale of other separate time-based services (e.g., vehicle parking).**~~

(a) **An EVSE** ~~**used to charge electric vehicle**~~ **placed in service prior to January 1, 20XX** shall include an indicating element that accumulates continuously and displays, for a minimum of 15 seconds at the ~~**activation**~~**authorization** by the user and at the start and end of the transaction, the correct measurement results relative to quantity and total price.

(b) An EVSE placed in service on or after January 1, 20XX shall include an indicating element that accumulates continuously and, when activated by the user, displays the quantity and

total price for a minimum of one minute. The correct measurement results relative to quantity, unit price, total price, and any other fees shall be displayed for a minimum of one minute following the EVSE being disconnected from the vehicle, or until the next transaction is initiated, or until other consumer-initiated controls clear the information.

Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the device. All indications and representations of electricity sold shall be clearly identified and separate from other time-based fees indicated by an EVSE that is used for both the sale of electricity as vehicle fuel and the sale of other separate time-based services (e.g., vehicle parking).

(Amended 20XX)

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers'

flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.

S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.

S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.

S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

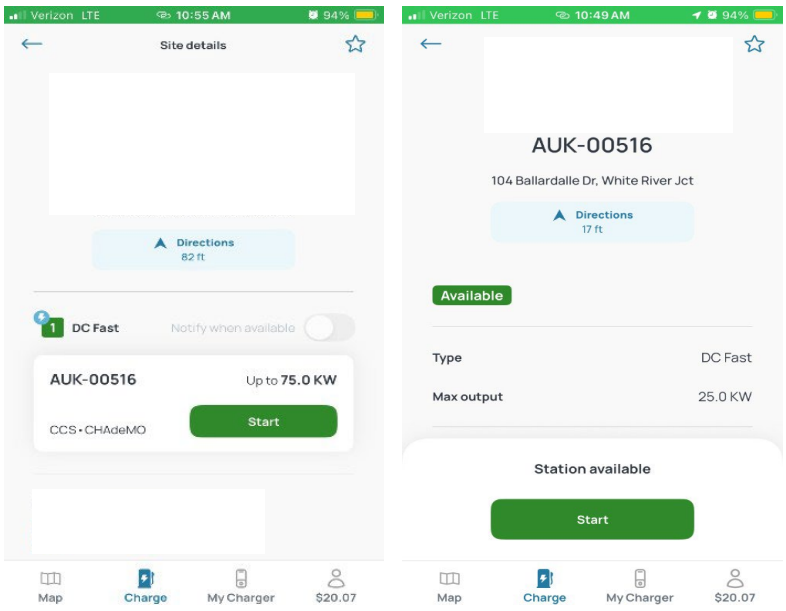


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remains assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California): Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland is in support of this item and appreciates the amount of work that has gone into it. Maryland recommends a voting status with the following additions to the item verbiage and would like it to be non retroactive.

B2:EVS-26.2a

S.1. Primary Indicating and Recording Elements.

S.1.X. General. – Electric Vehicle Supply Equipment (EVSE).

(a) shall be equipped with a primary indicating element as part of the device; and

(b) may be equipped with a primary recording element

[Nonretroactive as of January 1, 20XX]

Representatives from Arkansas Department of Agriculture, Delaware and Texas echoed Maryland.

A representative from Louisiana Department of Agriculture and Forestry support this item, but adds it needs an integral indicating element.

The committee recommends Voting on this item with the inclusion of the updated recommended verbiage.

B2: EVS-26.2b A Decimal Standardization

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

S.1.3.2. EVSE Value of Smallest Unit. – The value of the smallest unit of indicated delivery by an EVSE, and recorded delivery ~~**if the EVSE is equipped to record**~~:

(a) ~~**for AC systems shall not exceed 0.0001 kWh;**~~

(b) ~~**for DC systems**~~ shall not exceed 0.00**0**1 kWh; and

(c) the value of the kWh shall be expressed only as a decimal submultiple of 1 ~~**that satisfy (a) and**~~

~~**(b)**~~.

(Amended 20XX)

S.2.4.4. Agreement Between Indications. – All quantity, unit price, and total price indications within a ~~**measuring**~~ system shall agree for each transaction.

(Amended 20XX)

S.2.5.1. Money-Value Divisions Digital. – An EVSE with digital indications shall comply with the requirements of paragraph G-S.5.5. Money-Values, Mathematical Agreement, and the total price computation at the end of the transaction shall be based on ~~**quantities not exceeding 0.01**~~ **the quantity indicated as required by S.1.3.2. EVSE Value of Smallest Unit**.

(Amended 20XX)
Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.
S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.
S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

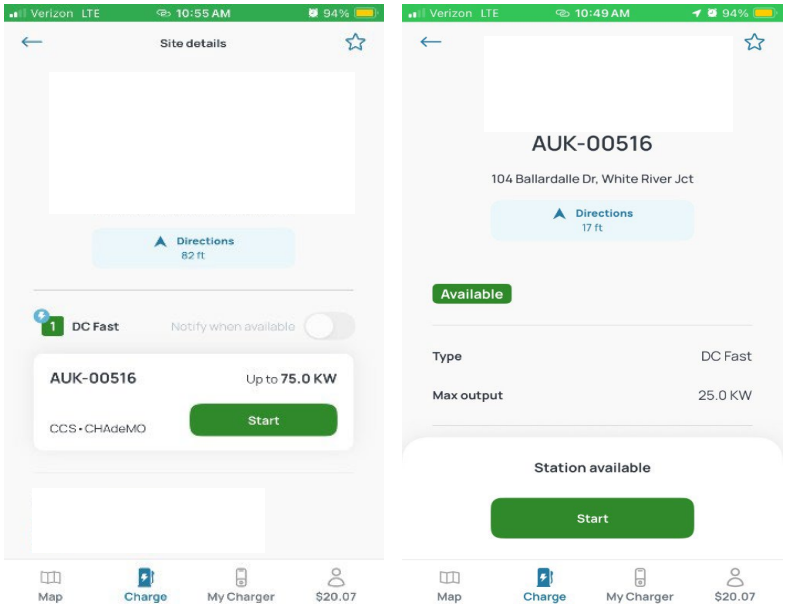


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.

2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on b:

The committee recommends Voting on this item.

B2: EVS-26.2c A Totalizer Availability

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

S.7. Totalizers for EVSE Systems. – EVSE systems shall be designed with a non-resettable totalizer for the quantity delivered through each separate measuring device. Totalizer information shall be adequately protected and unalterable. **The system shall provide** ~~**T**~~**t**otalizer information ~~**shall be provided by the system and**~~ **that is** readily available ~~**on site or via on site internet access**~~**at the time of inspection**.

(Amended 20XX)
Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, “using EVSE should be the same experience as using a gas pump.”

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation “y,” while another operates under assumption “x,” and compliance jurisdictions take actions based on interpretation “z.” This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word “used” is ambiguous and lends itself to multiple interpretations. “Used” could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is “using” the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn’t explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across

all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.

S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.

S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to

power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco

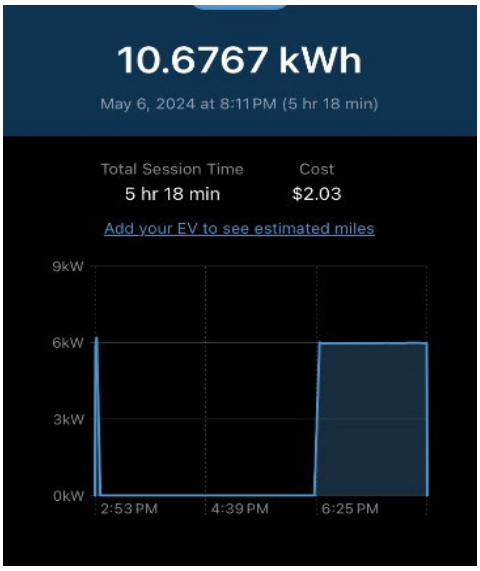


Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.
S.2.4.4

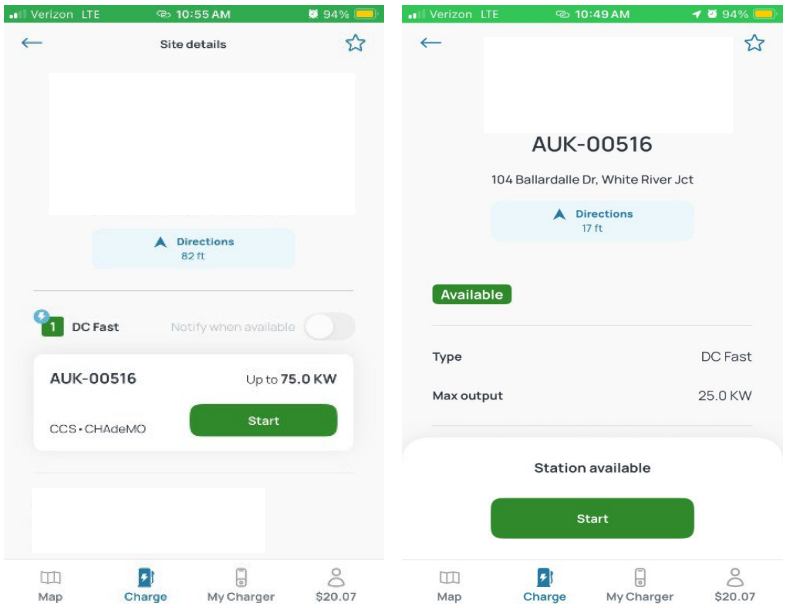


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.

S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.

N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland is in support of this item and appreciates the amount of work that has gone into it. Maryland recommends a voting status with the following additions to the item verbiage would like it to be non retroactive.

B2: EVS-26.2c Totalizer Availability

S.7. Totalizers for EVSE Systems. – EVSE systems shall be designed with a non-resettable totalizer for the quantity delivered through each separate measuring device. Totalizer information shall be adequately protected and unalterable. The system shall provide Totalizer information shall be provided by the system and that is readily available through the device or approved application on site or via on site internet accessat the time of inspection.

(Amended 20XX)

Representatives from Arkansas Department of Agriculture, Delaware and Texas echoed Maryland.

A representative from Louisiana Department of Agriculture and Forestry supports this item, but adds it needs an integral indicating element.

The committee recommends Voting on this item with the inclusion of the updated recommend verbiage.

B2: EVS-26.2d A Removal of NTEP Language

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

~~**N.3.2. Type Evaluation Testing of a DC EVSE. – Tests shall be performed at the following voltage points one between 350 VDC and 450 VDC and if supported by the EVSE a second at between 700 VDC and 900 VDC:**~~

~~**Accuracy tests shall be performed at the following current levels:**~~
~~**A point between 10 % and 20 % of the MDA, but not less than 30 A;**~~
~~**A point between 40 % and 60 % of the MDA; and**~~
~~**A point between 70 % and 100 % of the MDA.**~~

~~**(Amended 2024)**~~

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should <u>not</u> be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers.

While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.
S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.
S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco

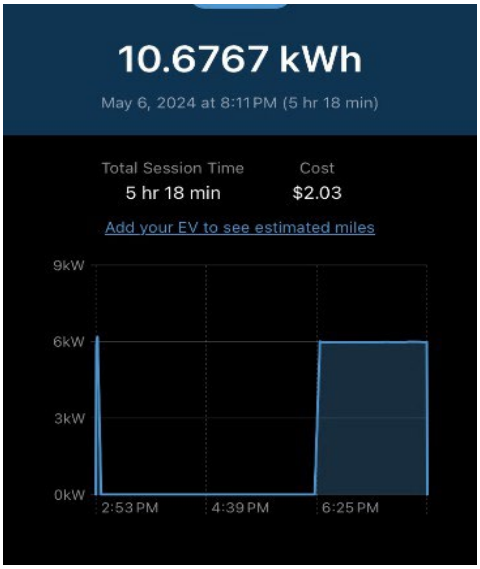


Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

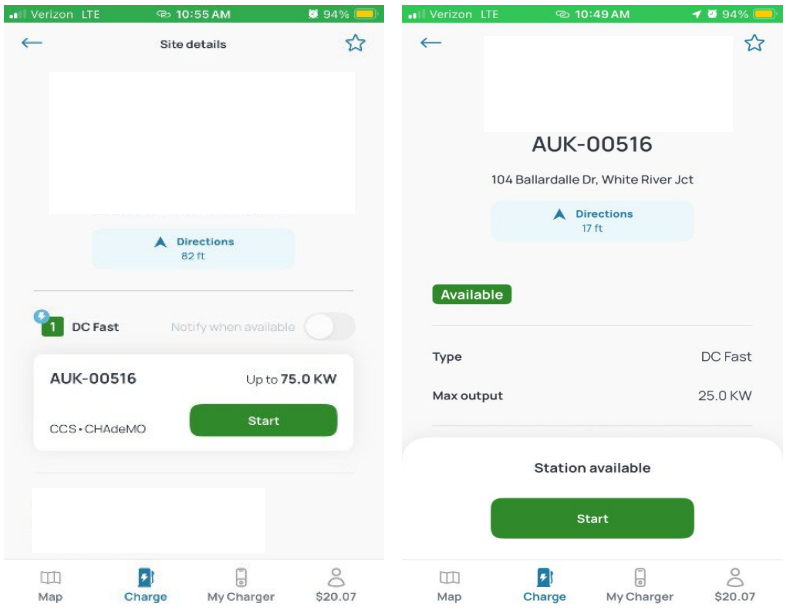


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for

S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on d:

The committee recommends Voting on this item.

B2: EVS-26.2e A Consistent Language between AC and DC Testing

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

N.3.3. ~~Performance Verification in the Field~~ Testing of a DC EVSE. – Accuracy tests shall be performed at any voltage and the following current levels:

(Amended 20XX)

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, “using EVSE should be the same experience as using a gas pump.”

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation “y,” while another operates under assumption “x,” and compliance jurisdictions take actions based on interpretation “z.” This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.
S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.
S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.
S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.
S.2.4.4

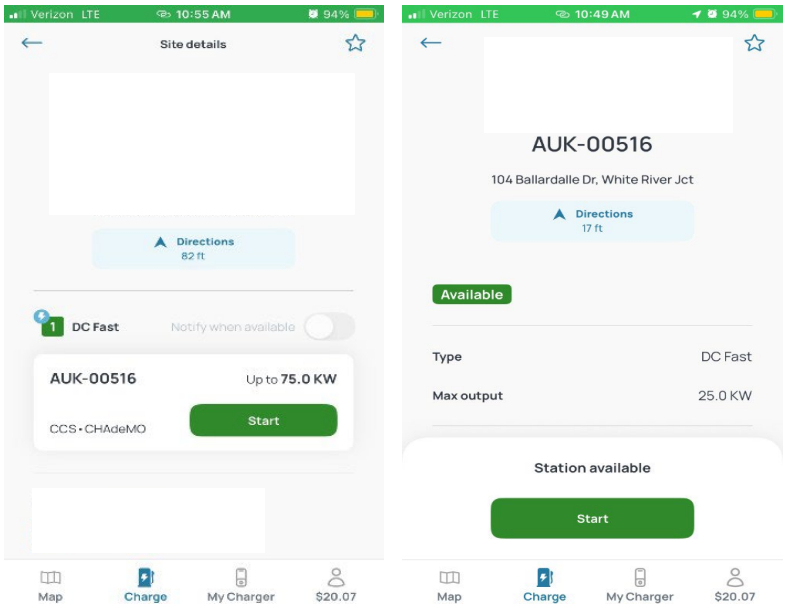


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.

S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.

N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on e:

The committee recommends Voting on this item.

B2: EVS-26.2f A Exceptions

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

A.2. Exceptions. – This code does not apply to:

(a) The use of any measure or measuring device **that is otherwise subject to the jurisdiction of a** ~~**owned, maintained, and used by a public utility or municipality only in connection with measuring electricity subject to the authority having jurisdiction such as the**~~ Public Utilities Commission **or other local governing bodies regulating utilities.**

~~**(b) Electric Vehicle Supply Equipment (EVSEs) used solely for dispensing electrical energy in connection with operations in which the amount dispensed does not affect customer charges or compensation.**~~

(c) The wholesale delivery of electricity.

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should <u>not</u> be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.
S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.
S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

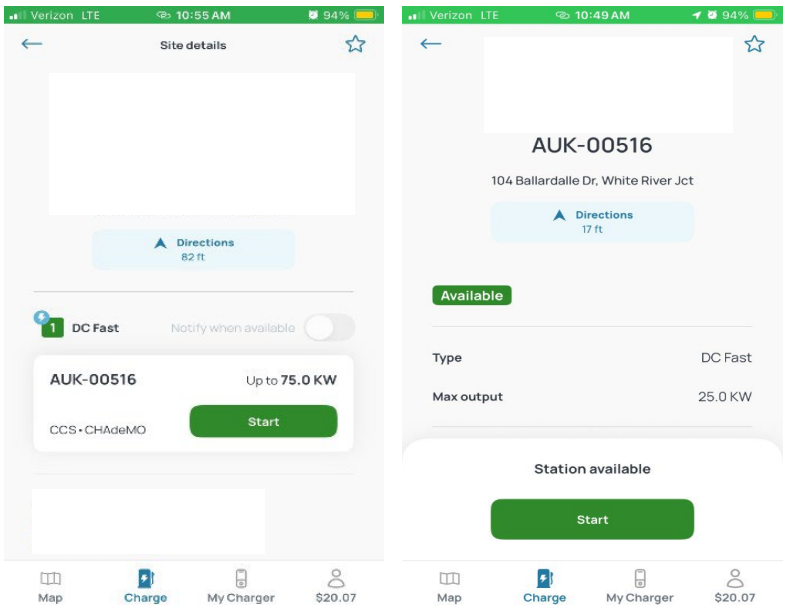


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for

S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on f:

The committee recommends Voting on this item.

B2: EVS-26.2g A Network Loss

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

S.2.3. EVSE Provision for Power or Network Loss.

S.2.3.1. Transaction Information. – In the event of a power loss ***or network loss, which causes an interruption to energy delivery*,*** the information needed to complete any transaction (i.e., delivery is complete and payment is settled) in progress at the time of the power loss ***or network loss, which causes an interruption to energy delivery*,*** (such as the quantity and unit price, or sales price) shall be determinable through one of the means listed below or the transaction shall be terminated without any charge for the electrical energy transfer to the vehicle:

(a) at the EVSE;

(b) at the console, if the console is accessible to the customer;

(c) via on site internet access; or

(d) through toll-free phone access.

For EVSEs in parking areas where vehicles are commonly left for extended periods, the information needed to complete any transaction in progress at the time of the power loss ***or network loss, which causes an interruption to energy delivery*,*** shall be determinable through one of the above means for at least eight hours.

[*Nonretroactive as of January 1, 20XX]

(Amended 20XX)

S.2.3.2. Transaction Termination. – In the event of a power loss ***or network loss, which causes an interruption to energy delivery**** either:

(a) the transaction shall terminate at the time of the power loss ***or network loss, which causes an interruption to energy delivery**;*** or

(b) the EVSE may continue charging without additional authorization if the EVSE is able to determine it is connected to the same vehicle before and after the ~~**supply**~~ power ~~**outage**~~**loss** ***or network loss, which causes an interruption to energy delivery**.***

In either case, there must be a clear indication on the receipt provided to the customer of the interruption, including the date and time of the interruption along with other information required under S.2.6. EVSE Recorded Representations.

[*Nonretroactive as of January 1, 20XX]

(Amended 20XX)

S.2.3.3. User Information. – The EVSE memory, or equipment on the network supporting the EVSE, shall retain information on the quantity of fuel dispensed and the sales price totals during power loss ***or network loss, which causes an interruption to energy delivery****.

[*Nonretroactive as of January 1, 20XX]

(Amended 20XX)

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated

language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.

S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.

S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.

S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

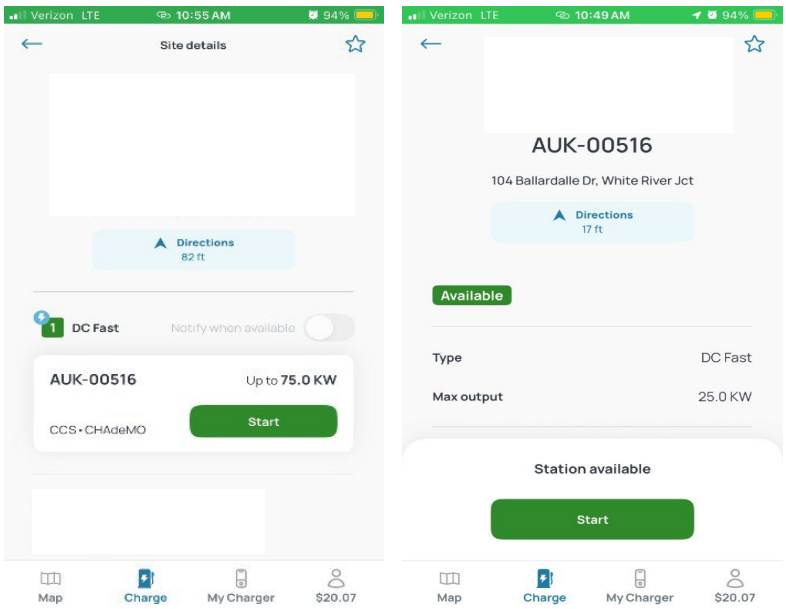


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends and assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on g:

The committee recommends Voting on this item.

B2: EVS-26.2h A Consumer Labeling

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

Option A:

S.2.4.2. Equipment Capacity and Type of Voltage.

S.2.4.2.1. – An **unrestricted/dedicated service** EVSE shall be able to conspicuously indicate on each face the ~~**maximum rate of energy transfer (i.e.,** maximum power**)**~~ and the type of current associated with each unit price offered (e.g., **Max** 7 kW AC, 25 kW DC **Max**, etc.).

S.2.4.2.2. – A restricted/variable service EVSE shall be able to conspicuously indicate on each face the range of power and the type of current associated with each unit price offered (e.g., 0 kW to 7 kW AC, 25 kW to 100 kW DC, etc.).

Appendix D Definitions

service, unrestricted/dedicated.

– Service that provides the maximum power available based on the conditions of installation and the conditions present during the charging session.

(Added 20XX)

service, restricted/variable.

– Service that restricts power by the configuration of the EVSE based on the conditions of installation and the conditions present during the charging session, which may result in periods of reduced, and/or interrupted transfer of electrical energy.

(Added 20XX)

maximum power. – The maximum rate of power transfer, based on the conditions of installation. Maximum power may differ from the rated power of an EVSE. [3.40]

(Added 20XX)

Option B:

S.2.4.2. Equipment Capacity and Type of Voltage. – An EVSE shall be able to conspicuously indicate on each face the maximum ~~**rate of energy**~~ **power** transfer ~~**(i.e., maximum power)**~~ **available based on the conditions of installation** and the type of current associated with each unit price offered (e.g., **Max** 7 kW AC, 25 kW DC **Max**, etc.)

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.





Example 1: EVSE behind a fence owned by a public utility for their exclusive use.

Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser

is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.

S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.

S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to power loss also apply to network loss.

S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

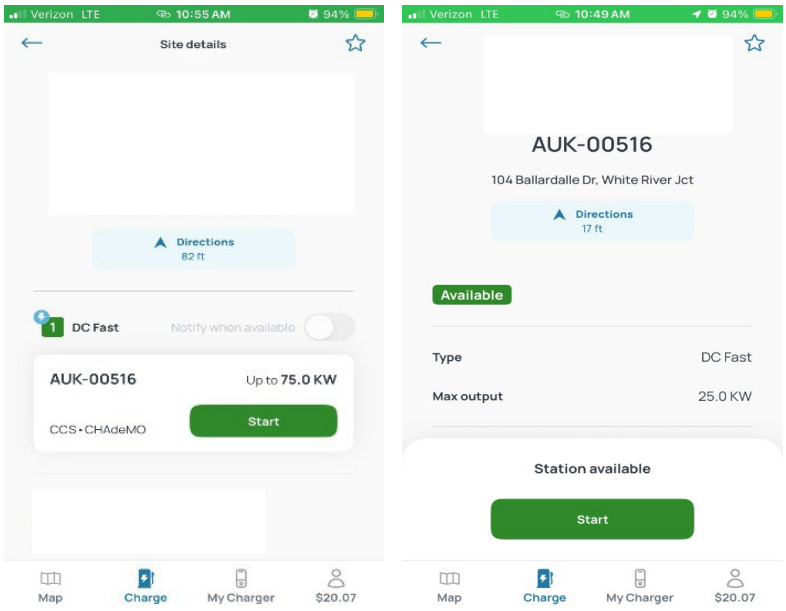


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.

S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.

N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Comments in Favor:

Regulatory:

- 2026 Annual: None
- 2026 Interim: A regulator from Maryland supports voting status. Stated they have concerns that this industry wants to dictate how they are regulated.
- 2026 Interim: Regulator from California recommend a developing status or assigned to a task group. They noted that some app-based indicators are currently NTEP-approved, but only the app listed on the device's evaluation may be used and is overall in support of the item.

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: A Representative from the EVSE Task Group reported the EVSE task group has divided EVF 26.2 into 9 sections and has agreed on the final language for 6 of those 9 sections. This language will be shared with the BOD and the S&T committees, so the information can be included in the report for this meeting. The language for the other sections should be agreed upon this fall to be presented to the body at the interim meeting in January 2027 with a recommendation that the entire block have a voting status for the annual meeting in 2027. The EVSE task group also formed 4 focus groups to look at and moving forward with forming a director's group, creating a database of state regulations and industry contacts, modernizing the handbook in relation to the EVSE code, and setting up a survey to collect and share EVSE inspection data in 2027.
- 2026 Interim: None

Comments Against:

Regulatory:

- 2026 Annual: None
- 2026 Interim: None

Industry:

- 2026 Annual: None

- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Annual: None
- 2026 Interim: A regulator from Colorado recommends this to be assigned to the EVSE task group.
- 2026 Interim: A regulator from Massachusetts recommends developing and suggested reviewing utilities and EVSE providers that offer free charging.
- 2026 Interim: A regulator from New Jersey recommends item to be developing or assigned to task group.
- 2026 Interim: A regulator from Orange County California is in support of item and recommends developing or assigned, and to remove any wording of device specific exceptions.
- 2026 Interim: Regulator from New York recommends item to be developing.
- 2026 Interim: Regulator from Louisiana wonders if the item should be broken up into multiple items.
- 2026 Interim: Regulator from Los Angeles County California supports comments made by California and recommends it be assigned to a task group and removal of the exceptions.
- 2026 Interim: Regulator from Iowa echoes Los Angeles County California and recommends developing

Industry:

- 2026 Annual: None
- 2026 Interim: An associate member from Tesla supports assigned status and stated that determining the maximum power that might be currently available is more technically complex than it sounds. Tesla equipment displays maximum rated power, as a static value. Power that may be available to a driver is a dynamic value and not something that can be reliably calculated or communicated to a driver ahead of time, causing confusion. Tesla does not support requirement of built-in screens as they are not used by drivers as the primary indicator for the EV charging devices.
- Requiring them may have the unintended consequence of diminishing customer experience by lowering reliability and increasing coast. Tesla supports language in Handbook 44 that has allows Tesla chargers to receive type evaluation with remote displays, such as the mobile app or vehicle dashboard, as the indicating element.
- 2026 Interim: An associate member from National Electrical Manufacturers Association recommends developing
- 2026 Interim: An associate member from Electrify America recommends developing and noted that requiring dynamic values may confuse and frustrate customers, as it does not reflect what they are receiving.
- 2026 Interim: An associate member from SWTCH recommended developing and suggested that greater uniformity would benefit the industry; however, they noted that the gas pump model is not comparable to electric vehicle charging.
- 2026 Interim: An associate member from ChargePoint recommends assigning to a task group.
- 2026 Interim: An associate member from EV Advisors, LLC supports developing status and emphasized the importance of allowing indications to be non-integral, best delivered through an app or vehicle screen. They advised against treating chargers like gas pumps and stressed giving consumers what they want.

Advisory:

- 2026 Annual: None
- 2026 Interim: A technical advisor from The National Institute of Technology, Office of Weights and Measures stated they have not analysis new language but supports developing due to number of changes. This version will make a whole class of devices obsolete and impact should be considered. Public utilities must be handled state by state.

Item Development:

NCWM 2026 Annual Meeting: The Committee adopted the most current language submitted in a block format by the EVSE Task Group and chose to retain an Assigned status for the EVSE task group to continue development.

NCWM 2026 Interim Meeting: The Committee adopted the most current language as presented in open hearings and recommends the item be assigned to the EVSE task group.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on h:

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

Mark Lovisa, Louisiana | Committee Chair
Brett Willhite, Minnesota | Vice-Chair
Scott Dolan, Vermont | Member
Nathaniel Waldron, Nevada | Member
Steve Timar, New York | Member
Mr. Éric Turcotte, Measurement Canada | Canadian Technical Advisor
Mr. Loren Minnich, NIST OWM | NIST Technical Advisor
Mr. Allen Katalinic, NCWM | NTEP Technical Advisor
Mr. Brian Terry, Arkansas | Committee Coordinator

Specifications and Tolerances Committee

2027 Interim Meeting Agenda
Professional Development Committee (PDC)

Shane Ireland, Committee Chair
Maine

INTRODUCTION

The PD Committee will address the following items in Table A during the Interim Meeting. Table A identifies the agenda items by reference key, title of item, page number and the appendices by appendix designations. The first four digits of an item's reference key are assigned from the Subject Series List. The acronyms for organizations and technical terms used throughout the agenda are identified in Table B. In some cases, background information will be provided for an item. The fact that an item appears on the agenda does not mean it will be presented to National Council on Weights and Measures (NCWM) for a vote. The Committee will review its agenda and may withdraw some items, present some items for information meant for additional study, issue interpretations, or make specific recommendations for change to the publications identified which will be presented for a vote at the Annual Meeting. The Committee may also take up routine or miscellaneous items brought to its attention after the preparation of this document. The Committee may decide to accept items for discussion that are not listed in this document, providing they meet the criteria for exceptions as presented in Section H of the introductions to *Handbook 44* and *Handbook 130*. The Committee has not determined whether the items presented will be Voting or Informational in nature; these determinations will result from their deliberations at the Interim Meeting

An "Item Under Consideration" is a statement of proposal and not necessarily a recommendation of the Committee. Suggested revisions are shown in **bold face print** by **~~striking out~~** information to be deleted and **<u>underlining</u>** information to be added. Requirements that are proposed to be nonretroactive are printed in ***bold faced italics***.

All sessions are open to registered attendees of the meeting. If the Committee must discuss any issue that involves proprietary information or other confidential material; that portion of the session dealing with the special issue may be closed if (1) NCWM Chairman or, in their absence, NCWM Chairman-Elect approves; (2) the Executive Director is notified; and (3) an announcement of the closed meeting is posted on or near the door to the meeting session and at the registration table. If possible, the posting will be done at least a day prior to the planned closed session.

Subject Series List

Education ..... EDU Series
Program Management ..... PMT Series
Other Items ..... OTH Series

Table A
Table of Contents

Reference Key		Title of Item	PDC Page
EDU – EDUCATION			**437**
EDU-1	I	Professional Certification Program	437
EDU-2	I	Training	441
EDU-3	I	Instructor Improvement	443
EDU-4	I	Recommended Topics for Conference Training	444
PMT – PROGRAM MANAGEMENT			**446**
PMT-1	I	Safety Awareness	446
PMT-2	I	Fraud Prevention and Education Task Group	448
PMT-3	I	Metrology Subcommittee	449
PMT- 4	I	Women in Weights and Measures (WWM)	450
PMT-5	I	Member Education and Mentorship Subcommittee (MEMS)	451

Table B
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
CWMA	Central Weights and Measures Association	OWM	Office of Weights and Measures
NCWM	National Council on Weights and Measures	PDC	Professional Development Committee
NEWMA	Northeastern Weights and Measures Association	SWMA	Southern Weights and Measures Association
NIST	National Institute of Standards and Technology	WWMA	Western Weights and Measures Association
WWM	Women in Weights and Measures	MEMS	Member Education and Mentorship Subcommittee
FPETG	Fraud Prevention and Education Task Group		

Details of All Items
(In order by Reference Key)

EDU – EDUCATION

EDU-1 I Professional Certification Program

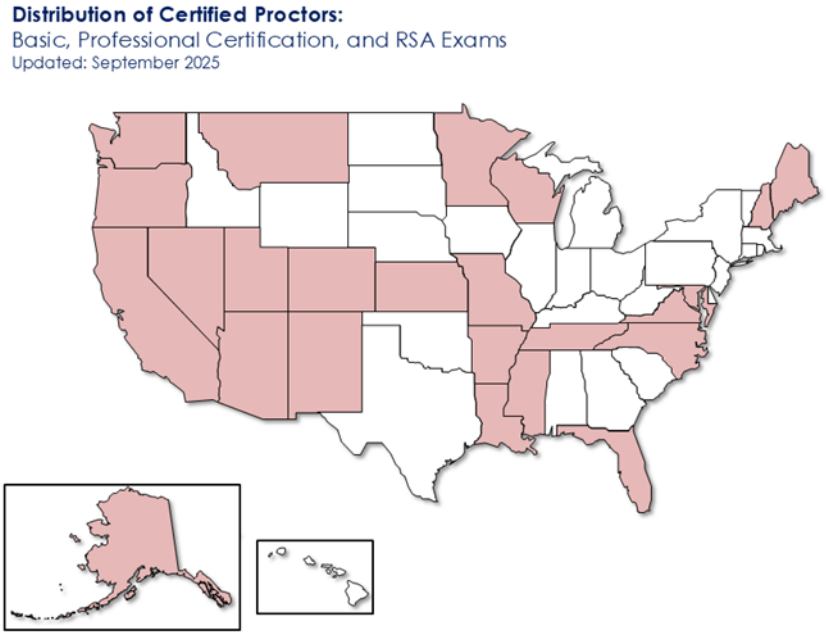
The NCWM offers eleven professional certification exams and two basic competency exams. The certification exams include Retail Motor Fuel Dispensers, Vehicle-Tank Meters, Small Capacity Scales, Medium Capacity Scales, Large Capacity Scales, Precision Scales, LPG and Anhydrous Ammonia, Price Verification, Basic Package Checking, Package and Labeling, and Method of Sale. The competency exams include Basic Weighing Devices and Basic Liquid-Measuring Devices. Professional certifications must be renewed every five years, and NCWM notifies candidates whose certificates have expired.

NCWM initiated a Registered Service Agent (RSA) testing program in 2024. The program was established to provide testing for RSAs that could be used to meet regulatory licensing and registration requirements across the United States. The exams would greatly reduce travel and out-of-service times for the RSAs. The NCWM programs also relieve states of the burden of maintaining a testing program. As of January 2026, the RSA program offers exams for Handbook 44, Small Capacity Scales, Retail Motor Fuel Dispensers, Vehicle Tank Meters, LPG and Anhydrous Meters, Large Capacity Weighing Devices, and Electric Vehicle Fueling Systems (EVSE). NCWM is also hosting the following state-specific exams: Nebraska, Ohio, Wisconsin, Minnesota, and New Hampshire.

Proctoring of exams was initiated in August 2018 and may be done virtually or in-person. Virtual proctoring was initiated in May 2021 and is offered at no cost to members. Guidance for virtual proctoring can be found on the same webpage, and more detailed information, including a helpful YouTube video on preparing for proctoring can be found on the ProctorU website at Gauge Test Taker Walkthrough. In-person proctoring is available through the state programs. The policy on proctoring was changed in August 2023 to allow individuals within a program to proctor exams. The prospective proctor and the state director must sign an agreement provided by NCWM, and the NCWM Executive Director must approve the proctor. Other government agencies, higher education institutions, and commercial testing services may be approved as proctors.

Number of States with Proctors

The map below shows the states that have proctors available as of September 2025. For more details visit the NCWM website.



The table below shows the number of virtual and in-person proctored exams completed in FY 25.

	In-person	Virtual
Professional Certification	154	37
Basic Competency Certification	33	5
Registered Service Agents	19	38

Status of Current Tests

The NCWM has issued 1588 professional certificates since program inception through September 30, 2025. Of the certificates issued, fifteen have been issued to individuals in the private sector.

NCWM Professional Certificates

The table below shows the number of certificates awarded over the past ten years and the cumulative total since program inception.

	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25
Certificates Awarded	140	142	257	53	56	60	56	80	158	83
Cumulative	643	785	1042	1095	1151	1211	1267	1347	1505	1588

The table below shows the states using the professional certification program and the number of certificates earned since program inception including expired certificates. The Committee applauds these states and encourages increased use of the certification program.

State	Certificates	State	Certificates	State	Certificates
Minnesota	233	Nevada	32	Vermont	9
Louisiana	201	Montana	29	Wyoming	7
Missouri	143	Maine	27	Delaware	6
Wisconsin	103	New Mexico	26	Alabama	4
Maryland	99	Colorado	19	Michigan	3
Virginia	86	New York	19	South Dakota	3
Alaska	65	Connecticut	15	Utah	2
North Carolina	57	Private	15	New Jersey	2
Mississippi	56	Ohio	14	Oregon	2
Washington	51	Indiana	13	Tennessee	2
Kansas	49	Massachusetts	12	Florida	1
Arizona	44	Idaho	11	Iowa	1
California	41	Arkansas	10	New Hampshire	1
Nebraska	33	Pennsylvania	10	West Virginia	1

NCWM Basic Competency Certificates

The table below shows the number of basic competency certificates awarded since program inception.

	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25	Cumulative
Basic - Measuring	0	40	14	5	7	3	4	6	69
Basic - Weighing	1	30	11	12	9	2	4	7	73
Total Awarded	1	70	25	17	16	5	8	13	142

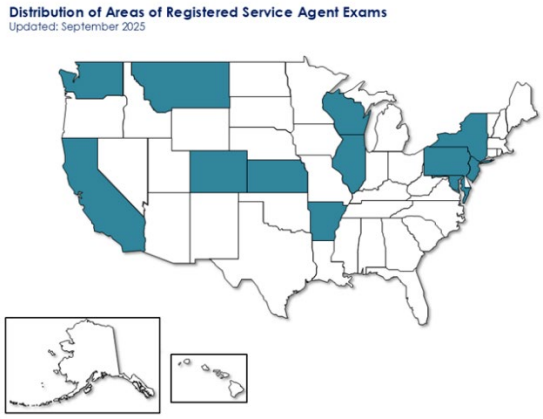
The table below shows those states with individuals holding a basic competency certificate. The Committee applauds these states and encourages increased use of the certification program nationwide

State	Certificates	State	Certificates
Louisiana	69	Arkansas	2
Tennessee	42	Nevada	2
Montana	16	Kansas	1
Alaska	7	Nebraska	1
Colorado	5	Private	1
Florida	3		

NCWM RSA Certificates

NCWM awarded 29 RSA certificates during FY 24-25.

The map below shows the states where an RSA exam was awarded.



The table below shows the number of RSA tests attempted and certificates awarded in FY 25.

	Small Capacity	Large Capacity	RMFD	VTM	LPG	Handbook 44	EVSE	Totals
Attempted	6	4	5	12	9	11	10	57
Awarded	1	1	2	6	3	10	6	29

NCWM Meeting Comments:

2026 Interim Meeting: Jerry Buendel (Washington - Retired), Professional Certification Program Coordinator, gave an update of the professional certification program. Mr. Buendel presented an update on the certification program and spoke about new Registered Service Agent (RSA) exams that are available. Scott Wagner, Colorado, thanked everyone for working on exams, encouraged other states to participate, and shared how Colorado operates the program. Scott mentioned that the cost of the program is minimal for service companies and accepted by multiple states. Kristin Walter, Arkansas, thanked everyone for their work. She has been tasked with finding a good training program for her staff and is thankful to have the modules available through NCWM. She mentioned the statements and objectives could be complex and take time to research. Matt Douglas, California, supports the program and is not deterred by the failure rate, the exams were not meant to be easy. They are qualified standards of professionalism. Alison Wilkinson, Maryland, Echoed the comments already heard.

Ms. Wilkinson shared how Maryland's program is run. In addition to twice a year exam, RSA's must sign an agreement stating that they understand Maryland laws. Maryland also uses the professional exams for staff development. Jason Flint, New Jersey, stated they would like to use the NCWM RSA exams in New Jersey and are looking towards industry for legislative support. Robbie Parke, Washington, commended Jerry for his work. Mr. Parke suggested CEP courses for experienced inspectors to know how to handle new codes and how they impact inspections. Don Onwiler, NCWM, shared that when he took the exams, he passed the first time because he understood the handbooks. Mr. Onwiler also shared where to find the RSA list on the NCWM website and said the intention is to have one set of tests to cover multiple states.

2026 Annual Meeting: Jerry Buendel (Washington - Retired), Professional Certification Program Coordinator, gave an update of the professional certification program. Mr. Buendel presented an update on the certification program and spoke about the new Registered Service Agent (RSA) exams that are available. Paul Floyd, Louisiana, expressed his support for the program. Louisiana uses the program for their inspectors. Alison Wilkinson, Maryland, expressed her support for the program and will use the program to test RSAs. Daniel Walker, Ohio, accepts the RSA exam for RSA licensing and accepts other state exams. Ohio laws and regulations allow them to accept the exam and he encourages other states to change their laws and regulations. Brian Terry, Arkansas, thanked the group for their efforts on the program Mr. Terry said Arkansas was changing their administrative rules to allow the use of the exams for licensing and registration. Ken Vehrkens, New Jersey, stated that he had helped with some of the exams and found it to be a valuable learning experience. Andrew Montanye, Nebraska, stated that he was pleased that the conference was writing a Mass Flow Meter Exam.

Regional Association Comments:

CWMA 2026 Interim Meeting:

No comments.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

WWMA: Mahesh Albuquerque, CO: Grateful for the certification exams. Exams provides an avenue for inspector advancement, but also great for RSA availability. Would like to have all the states recognize or accept the RSA exam certifications.

Paul Floyd, LA: Utilizes program for RSA's and for inspector advancement. Would like to note that there have been changes to the exams. Previously there was a combination of fill in the blank and multiple-choice questions, now only multiple choice, which makes them less difficult.

Scott Wagner, CO: As a member of the Mass Flow Meter Group, would like to note that they have been working on compiling the Mass Flow Meter exam and are almost done.

The committee recommends this remain an informational item.

NEWMA 2026 Interim Meeting:

No comments were heard. The committee recommends this item remain Informational.

SWMA 2026 Annual Meeting:

A representative from the state of Arkansas is currently training inspectors to be certified in NCWM and is also creating state-based training. Would like to see more training based on the current modules conducted by NCWM or NIST to promote continuity. Arkansas is promoting training for inspectors and RSAs

Louisiana has been using the exams for five years and supports the program as a whole.

The committee recommends this remain an informational item.

EDU-2 I Training

The purpose of this item is to share best practices and approaches to training in response to the broad training needs of weights and measures jurisdictions and to serve as a link to various training materials on the web. The NIST OWM PDC Liaison will regularly provide updates to the Committee on OWM's training resources and activities. Details of these updates can be found below and in prior Committee reports. **NCWM Meeting Comments:**

2026 Interim Meeting: Dave Sefcik, NIST OWM shared where NIST training is on their website and information on the changes and upcoming EPO's.

- EVSE Comprehensive Metrology Training program is in development. NIST OWM expects the training materials to be ready by the end of summer and the course to be fully developed in a year.
- Information Hours continue to be successful and popular. Seven sessions are planned for 2026. The dates for

the Info Hours sessions will be announced in February.

- EPO updates are still in progress. They estimate the updates will be complete by the end of April and plan to publish an updated version of NIST Handbook 112 by the end of May. The publication will feature new EPOs for Weigh-In-Motion, Grain Moisture Meters, and an annex to EPO 28 for guidance and selection of reference scales used in CNG testing.
- NIST OWM conducted a Loading Rack Meter/Vehicle Tank Meter Training in June 2025. The training was a hybrid format, with some of the training taking place via webinar and the in-person field training taking place in Springfield, IL.
- NIST OWM will conduct a Large Scale Field Training in 2026. Training will be a hybrid model with some training taking place via webinar. Dates and location of field training TBD.
- NIST provides National and Regional Short Course Training Seminars. Those interested are encouraged to please reach out to the OWM.
- NIST will continue to develop E-Learning Resources for their website.

David Sefcik acknowledged NLMP team for their work impacted by the government shutdown. Jason Flint, New Jersey, asked if the EPO's will be updated after the changes, and Dave stated yes. Joanna Cartee, Georgia, asked if there is a separate website for webinars or if they are all on NCWM. Dave stated yes NIST training is separate and located on NIST website. Matt Douglas, California, thanked everyone and for always being there to assist. Scott Wagner, Colorado, asked if large scales were offered hybrid training and Dave responded yes, they are trying to move to a hybrid model. Loren Minnich, NIST is working with Jason Glass, Kentucky, on organizing a large-scale training and video. The goal is to continue recording and post their webinars and to have them available for reference. Don Onwiler, NCWM showed where the link is on the website. John McGuire, NIST highlighted information hours. Scott Wagner, Colorado, encourages everyone to take advantage of their webinars. Mahesh Albuquerque, Colorado, Chair of the EVSE Planning Committee, provided EVSE training updates. The 2025 training in Denver was at full capacity, and he is looking forward to the 2026 training in Garden Grove California. He thanked the committee for their work and encouraged members to visit the website to sign up for training.

2026 Annual Meeting: David Sefcik, NIST, reported on the training NIST has accomplished and has planned for the future. He also briefed the conference about the progress NIST is making on updating the EPOs. In addition to updating them they will update the EPOs on a regular basis. Mr Sefcik also discussed changes to laboratory metrology training. OWM now has a "course in a box" that can be used by trainees. The box includes equipment NIST provides to the students to use during their training. The equipment is the same as that used for the NIST on site class. The regional metrology meetings will also be changed to meetings that have two regions meeting together to receive training and exchange best practices. Loren Minich, NIST, will be hosting an Information Hour program to provide training on very specific topics. Paul Floyd, Louisiana, asked how a state can request NIST Training. Mr. Sefcik responded that the jurisdiction should reach out to NIST with their request so that NIST can schedule the training and offer it to a wider audience. Mr Sefcik noted that putting classes together was a major undertaking and challenging for NIST in using their limited resources.

Chris Wagner, National Propane Gas Association, presented an overview of technical and safety training resources available to NCWM members. Educational materials are funded by industry and are available to all on Propane.com. Courses can be tailored to meet the needs of the user. Users can add materials and if they meet standards can be accredited to meet professional continuing education requirements. Mike Smith, New York, expressed his thanks for the information and said they had used the materials provided. He asked if Mr. Wagner could present the information at regional meetings. Tory Brewer, West Virginia, asked if there were opportunities for doing on-site training. Mr. Wagner responded that it was possible to reach out to PERC for further discussion. Mahesh Albuquerque, Colorado, thanked Mr. Wagner for the presentation. Mr. Albuquerque stated that Colorado has used the training and found that they are an excellent resource.

Regional Association Comments:

CWMA 2026 Interim Meeting:

Sherry Turvery, KS, The body always talks about training and getting it back into the states. We should utilize our experts on the subject. Someone was hired for a state and the trainer was not up to date on the subject and use the resources already built.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

WWMA: Mahesh Albuquerque, CO.: Has been encouraged by Jason Flint's introductory speech on giving PDC more latitude. Would like to see WWMA PDC to provide suggestions for trainings to be conducted at NCWM conferences.

Kevin Schnepp, CA: There is an opportunity for training. Suggested to have "training light" events, which would be 20-minute trainings to provide refreshers in topics such as safety, care and cleaning of field standards.

Miland Kofford, Utah: supports previous comments. Would like to see trainings scheduled during Committee work sessions for those not participating in or attending work sessions. Also, great opportunity to take the training back to your state.

The committee recommends this remain an informational item.

NEWMA 2026 Interim Meeting:

No comments were heard. The committee recommends this item remain Informational.

SWMA 2026 Annual Meeting:

An industry representative urged members to use the National Propane Gas Association, Propane Education and Research Council training resources. All resources are free and only two individuals have been enrolled from weights and measures. Reiterated that the resources is not related to just propane.

The committee recommends this item remain informational.

EDU-3 I Instructor Improvement

The Committee has reiterated multiple times in the past that the responsibility for training employees rests with individual organizations (weights and measures jurisdictions and industry alike). While NIST and other training providers offer excellent sources of training and training materials, organizations must develop and manage their own training programs, including developing trainers, establishing individual development plans for employees, and identifying strategies for continually assessing and responding to training needs. The Committee recognizes that NIST OWM cannot possibly train all weights and measures inspectors in the country. The state and municipal jurisdictions have ultimate responsibility for training and qualifying their personnel. To fulfill this responsibility, jurisdictions should be making individual plans to maintain or bolster their training efforts. NIST OWM should be viewed as one vital resource to support that effort. The Professional Development Committee is another resource. The Committee has created and posted on its website the "Body of Knowledge" to establish uniform learning objectives for weights and measures professionals. In addition, the Committee has posted a Model Field Training Program document on its website. This program outlines methods to evaluate and document training and offers guidance on training new inspectors and taking steps to ensure their ongoing development.

NIST OWM has also provided ongoing contributions to assist the community in the development of instructors. OWM has provided legal metrology training for weights and measures jurisdictions and industry for many years, but does not have the resources to respond to the numerous training requests it receives. OWM has long recognized that there are many individuals with extensive legal metrology experience who have the skills needed to provide this type of training. OWM hopes to continue to draw from this pool to develop trainers who can present schools with NIST, thus leveraging NIST resources; providing more timely classes; and providing a way to more broadly share the valuable expertise these individuals possess. In the past ten years, NIST OWM has taken on more field inspection classes than it would otherwise be able to do because of the co-instructors drawn from its current pool of trainers.

See the Committee's past reports for background information on this item, along with other details on available tools for trainer development and NIST OWM's efforts and partnership with the NCWM to continue this work.

NCWM Meeting Comments:

2026 Interim Meeting: Alison Wilkinson, Maryland, asked if there was a way NCWM could recognize subject matter experts who are willing to assist with training in the regions. Chris Wagoner, NPGA, they conduct a lot of training and look at established methodologies for training; there are resources nationally available. The Propane Education Resource Council (PERC) has developed training for instructors which is available at propane.com. There is a 6.5-hour course on trainer development and a 2.5-hour course on field training. Both courses are eligible for continuous education unit recognition, are free resources, and are accredited programs. Some information is LPG specific content that can be adapted and focuses on how to educate. NPGA identified a problem with seasoned employees conducting training; they are not educators and struggle with how to educate. The courses are all online and they can provide a link on NCWM website. Scott Wagner, Colorado, suggests a mentoring program within NCWM for meeting attendees to take home to staff.

2026 Annual Meeting: No comments were received.

Regional Association Comments:

CWMA 2026 Interim Meeting:

No comments.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

No comments were heard.

The committee recommends this remain an informational item.

NEWMA 2026 Interim Meeting:

Ken Vehrkens (New Jersey) inquired about instructor resources for training. It was explained that local trainers are available to assist with the administration of NIST training modules. The committee recommends the item remain Informational.

SWMA 2026 Annual Meeting:

No comments heard.

The committee recommends this item remain informational.

EDU-4 I Recommended Topics for Conference Training

The Board of Directors has charged the Committee with recommending appropriate topics for the technical sessions at future annual meetings. The Board of Directors asks the PDC to review and prioritize possible presentation topics and to submit those to the NCWM Chairman. The Chairman will coordinate with NCWM staff to secure presenters.

The following is a list of technical presentations made at the NCWM 2017, which are available at www.ncwm.com/annual-archive.

- Planning and Coordinating a National Market Place Survey (Ms. Rachelle Miller, WI, 2017)
- The Life Cycle of Petroleum from Well to Retail (Mr. Prentiss Searles, API 2017)
- The United States Mint at Denver – Gold, Coins and Embezzlement (Mr. Thomas Fesing, 2016)
- Understanding Transportation Network Systems (Ms. Andrea Ambrose Lobato, Lyft and Mr. Bob O' Leary, Uber 2016)
- Regulatory Consideration for Legalized Marijuana (Ms. Julie Quinn, MN, and Mr. Nick Brechun, CO, 2016)

- Motor Oil Quality Violations (Mr. Tom Glenn, Petroleum Quality Institute of America, 2014)
- Making Sense of Electronic Receipts (Mr. Justin Hotard, Vice President and General Manager, NCR Corporation, 2014)
- LNG & CNG Motor Fuel – A Technical Briefing from Industry (Mr. Doug Horne, President CVEF, Mr. Zack Wester, Blu, Mr. Jeff Clarke, NGVA, 2014)
- Taximeter Technology Advancements (Mr. Matt Daus, International Association of Transportation Regulators, 2013)
- Advanced Vehicles and Fuel Quality (Mr. John M Cabaniss, Jr., Association of Global Automakers, 2013)
- Economic Justification and Demonstrating Value of Weights and Measures (Mr. Tim Chesser, Arkansas Bureau of Standards, 2012)
- Conducting Effective Marketplace Surveys and Investigations (Ms. Judy Cardin, Wisconsin Weights and Measures, 2012)
- Public Relations and Customer Service as Regulators (Mr. Doug Deiman, Alaska Division of Measurement Standards/CVE, 2012)
- An Overview of Unit Pricing in the United States (Mr. David Sefcik, NIST OWM, 2011)
- Grocery Unit Pricing in Australia (Mr. Ian Jarratt, Queensland Consumers Association, 2011)
- Grocery Unit Pricing in Canada (Mr. Ian Jarratt, Queensland Consumers Association, 2011)
- The U.S. Hydrogen Measuring System: The Turning Point? (Ms. Kristin Macey, California Division of Measurement Standards, 2011)
- Corrosion in Ultra Low Sulfur Diesel Underground Storage Systems (Mr. Prentiss Searles and Ms. Lorri Gainawi, American Petroleum Institute, 2010)
- Risk-Based Inspection Schemes (Mr. Henry Oppermann, Weights and Measures Consulting, LLC, 2010)
- Diesel Exhaust Fluid (DEF) (Mr. Gordon Johnson, Gilbarco, Inc., and Mr. Randy Moses, Wayne, 2009)
- Fuel Volatility and Ethanol Blending (Mr. Jim McGetrick, BP Products, 2009)
- Investigative Techniques (Mr. Michael Cleary, Retired, 2009)

NCWM Meeting Comments:

2026 Interim Meeting: No comments

2026 Annual Meeting: Alison Wilkinson, Maryland, asked that the conference provide another training session on Multiple Dimenson Measuring Devices (MDMD). Jason Flint, New Jersey, asked for training on inspecting software. Alison Wilkinson, Maryland, followed by saying that software has an impact on transactions. Training on what is a significant metrological change and how regulations deal with metrological changes. Michael Smith, New York, asked if the conference could make the training information more readily available on the website. Training is conducted at the national and at regional meetings, but the PowerPoints and videos are difficult to locate. Aaron Yonkers, Colorado, asked for training on device testing, specifically dynamic monorail scales and mass flow meters.

The committee noted that training conducted prior to 2017 is no longer available. When the website maintenance was changed over to a new contractor, topics prior to 2017 were not migrated. The committee reached out to NCWM to find out if the material could be added.

Regional Association Comments:

CWMA 2026 Interim Meeting:

Sherry Turvey, KS. Going back to the list of topics and rework them. The links are broken. Highlighted investigative reporting and risk-based inspection schemes.

Joel Lavicky, NE, Same comments as KS, wants to be on record and follow through. Wants to add training into the CWMA as well to support our conference.

Sherry Turvey, KS, many topics in the list are by CWMA members and to send out surveys to our fellow states to help develop.

Mike Harrington, IA, loves the idea and echoes the idea that KS and NE brought up. Wants to communicate to fellow states that if we know other states are bringing equipment and we can go out and do a training demo, a lot like what happened with the EVSE charging at the annual CWMA.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

WWMA: David Aguayo, San Luis Obispo County, CA: Noted that the list is old. Suggests PDC bring training to the annual meetings. In past meetings, training, such as retail motor fuel meters, took place at the same time during the conference. This provides an opportunity for inspectors to attend the training sessions and experience the conference.

Miland Kofford, Utah: Suggested for PDC to work with host to get trainings to the conferences.

Scott Wagner, CO: Encouraged PDC to review the topic list. Additional topics to consider that are not technical but necessary for professional development are: Time management, HR, and field safety awareness.

Matt Douglass: Suggested training on Roberts Rules of Order.

The committee recommends this remain an informational item.

NEWMA 2026 Interim Meeting:

Steve Timar (New York) led a discussion on regional training opportunities. The committee recommends this item remain Informational.

SWMA 2026 Annual Meeting:

A representative of Maryland believes there are significant gaps in training. Asked for a Director specific training focused on software that communicates with the weighing and measuring devices. Stated that many states are not verifying that the software is traceable the NTEP CC, and that software deviations can have significant impact on transactions. Not reviewing traceability to the NTEP CC could make the weights and measures obsolete if they only continue to focus on mechanical devices.

Tory Brewer thanked Lisa Corn for help with the Metrology Beyond the Lab training and her part in creation and presentation. He asked for feedback from the group on the training. The PDC chair commented that all feedback received was positive, with the only issue noted that some of the material was too technical.

The committee recommends this item remain informational.

PMT – PROGRAM MANAGEMENT

PMT-1 I Safety Awareness

One of the goals of the PDC is to educate jurisdictions on safety issues and to provide resources to help them implement effective safety and health management programs. The Committee intends to use the safety page at www.ncwm.com/safety as a place for states to share information and resources to help them address each of the major steps in creating and maintaining an effective safety program.

The Safety Program Toolbox is there to help your organization create or improve your current safety program. The toolbox is posted on the NCWM website at www.ncwm.com/safety. The Safety Subcommittee will assume responsibility for:

- Maintaining and updating the safety toolkit.
- Writing and deploying the NCWM annual safety survey, as well as reporting on the results each year.
- Finding resources and/or developing weights-and-measures-focused materials relating to the top hazards identified through the safety survey or through developing the toolkit.
- Building a safety culture and developing safety leadership within the NCWM through participation on the Safety Subcommittee
- Maintain the annual safety survey

The Committee expresses appreciation to the members of the Safety Subcommittee for their willingness to volunteer for this important work.

Safety Subcommittee Members		
Chair	John Satterlee	Illinois
Public Sector	Michael Peeler	New Jersey
Public Sector	John Bell	Missouri
Public Sector	David Fraser	Montana
Private Sector	Bill Callaway	Owl Services
Private Sector	Christopher Wagner	National Propane Gas Association
Private Sector	Robert LaGasse	Mulch and Soil Council

The NCWM safety page houses the list of regional safety liaisons and an archive of past safety articles.

Regional Safety Liaisons:

Central Weights and Measures Association (CWMA)
Mr. John Bell, Missouri Department of Agriculture

Northeastern Weights and Measures Association (NEWMA)
Mr. Michael Peeler, New Jersey Weights and Measures

Southern Weights and Measures Association (SWMA)
Mr. Christopher Wagner, National Propane Gas Association

Western Weights and Measures Association (WWMA)
Mr. David Fraser, Montana Weights & Measures

Each region is responsible for providing a safety article for the NCWM newsletter according to the following schedule:

Safety Article Schedule		
Issue Date	**Source**	**Article Deadline**
Issue 2 (May 2026)	NEWMA	April 15, 2026
Issue 3 (September 2026)	CWMA	August 13, 2026
Issue 1 (February 2027)	WWMA	January 15, 2027
Issue 2 (May 2027)	SWMA	April 15, 2027

NCWM Meeting Comments:

2026 Interim Meeting: Christopher Wagner of the National Propane Gas Association shared the committee updates and invited all to attend. The Safety Subcommittee has started meeting monthly to remain on target for the subcommittee goals. He encouraged anyone interested in participating to please contact John Satterlee. The subcommittee will revive the safety surveys. Past surveys were difficult and time-consuming, resulting in limited participation. The subcommittee has revised the survey into a simpler format that will take less time and hopefully result in increased participation. Mr. Wagner expressed the effectiveness of safety surveys, explaining that the data collected will generate future articles and resources by the committee. The survey will be sent out to the state directors in two to three weeks. He asked that the jurisdictions make sure their directors are on the email list.

2026 Annual Meeting:

Mike Peeler, New Jersey, reported that the Safety Committee sent out a survey and that there was a low rate of return. The survey will be sent out again and he asked that members complete them so the committee can report results at the Interim.

Regional Association Comments:

CWMA 2026 Interim Meeting:

Sherry Turvey, KS, John Satterlee is no longer with the state of Illinois and is the private sector.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

Kevin Schnepp, CA: Safety is another item that can be included in the technical trainings. It is vital to add to the conferences. Tenfold return to train someone to not get hurt.

The committee recommends this remain an informational item.

NEWMA 2026 Interim Meeting:

Mike Peeler (New Jersey) provided an update of the groups work. Cheryl Ayer (New Hampshire) suggested using the results from the safety survey to tailor training specific to the needs of membership. The committee recommends this item remain Informational.

SWMA 2026 Annual Meeting:

The Safety committee representative reported that safety surveys had been sent out with little response. He will re-issue the surveys with additional edits in the future.

The committee recommends this item remain informational.

PMT-2 I Fraud Prevention and Education Task Group

The Fraud Prevention and Education Task Group (FPETG) was formed in 2024. The FPETG was previously recognized as the Skimmer Education Task Group (SETG). The group expanded its scope from the primary focus of credit card skimming devices to now include any type of fraud that affects the weights and measures community.

The FPETG is charged with researching both existing and emerging issues regarding fraudulent practices. The group has been formed to develop educational outreach strategies and materials to educate regulators, retailers, industry members, and consumers in identifying and addressing fraudulent practices encountered by weights and measures programs. The FPETG will actively solicit topics from membership and industry and select topics to develop into a presentation to be given as needed during the NCWM Annual Meeting.

Fraud Prevention Education Task Group Members		
Co-Chair	Alan Walker	Florida
Co-Chair	Matthew Williams	Texas
Public Sector	Paul Floyd	Louisiana
Public Sector	John Larkin	California
Public Sector	Mike Harrington	Iowa
Public Sector	Robert Huff	Delaware
Public Sector	Michael Peeler	New Jersey
Public Sector	Michael Kelly	Westchester County, New York
Public Sector	John McGuire	NIST, Office of Weights and Measures
Private Sector	Brent Price	Gilbarco, Inc.
Private Sector	Mike Roach	PDI
Private Sector	Scott Boorse	PEI
Private Sector	Scott Schober	Berkley Varitronics Systems

NCWM Meeting Comments:

2026 Interim Meeting: Alan Walker (Florida), FPETG Chair, provided an update to membership. Alan shared the concerns with skimmers and pulsers. This group is seeking members.

2026 Annual Meeting: Matthew Williams, Texas, reported that the committee did not meet and did not have any updates.

Regional Association Comments:

CWMA 2026 Interim Meeting:

Sherry Turvey, KS, Fraud Prevention and Education Task Group provides training during their meetings at the NCWM.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

No comments were heard.

The committee recommends this remain an informational item.

NEWMA 2026 Interim Meeting:

Mike Peeler (New Jersey) provided an update. Mr. Peeler discussed the emerging scam of "juice jacking" at public charging stations for electronic devices. Jim Willis (New York) stated a local county recently found a layover skimmer device. Mr. Willis mentioned internet personalities spreading misinformation regarding retail weights and measures issues such as short weight packages. The committee recommends this item remain Informational.

SWMA 2026 Annual Meeting:

The Fraud Prevention committee chair reported that he would be stepping down and the current NCWM chairman was asked to assign the co-chair to the chairman position. The NCWM chairman agreed to make this change.

The committee recommends this item remain informational.

PMT-3 I Metrology Subcommittee

The Metrology Subcommittee was formed in 2024. The mission is to recognize, advocate, and promote better integration between field weights and measures and metrology. The subcommittee's primary focus is metrological progress and aimed at strengthening communication, training, and support across the legal metrology community as well as the following four initiatives:

1. Create a standard form that will be used to submit proposed changes to NIST SOPs and Handbook 105 series documents. This form is intended to streamline the feedback process and ensure that suggestions from the labs are formally documented and submitted in a consistent, structured manner.
2. Develop an On-the-Job Training (OJT) framework that will serve as the foundation for a broader OJT resource library. This library will feature SME developed training modules to support new metrologists and assist labs in standardizing their training approaches across regions.
3. Create a training resource geared toward directors and administrators who may not have a metrology background. The goal is to provide them with a better understanding of metrology lab operations, including staffing, standards, maintenance, and compliance requirements, so they can better support their teams.
4. Create a mentorship framework to facilitate training between labs.

The Metrology Subcommittee will actively solicit topics from membership and industry, and select topics to develop into a presentation to be given as needed during the NCWM Annual Meetings.

NCWM Meeting Comments:

2026 Interim Meeting: Frank Greene, Connecticut, Chair, they are looking to educate folks. He stated they are looking to promote smaller metrology labs for succession planning, training, and maintenance, specifically to educate program directors on the metrology lab. Frank also mentioned a mentor program for new metrology people. Lisa Corn, Texas, Co-Chair, stated they are accepting suggestions on training for the field and support staff.

2026 Annual Meeting: Lisa Corn, Texas, reported that the subcommittee has developed a standardized form that members can use to submit suggested revisions or updates to NIST OWM for the SOPs and the 105 Series publications. Our goal is to provide a consistent process for gathering feedback and communicating recommendations to OWM. She reported that they have made great progress on the On-the-Job Training Library. The committee now has a substantial collection of training resources that are developed and are ready to share with the community.

In the coming months, the Metrology Subcommittee will be reaching out to the Professional Development Committee with recommendations for webpage layouts and organization to make these resources and tools easily accessible to the metrology and weights and measures community.

The subcommittee has a special session planned for the 2027 Interim that will feature a presentation on Metrology for directors.

The subcommittee is developing a survey to gather feedback from the community. The survey will help us identify additional training needs, resources, and other areas where the subcommittee can provide support and better serve both the metrology and broader weights and measures community.

Regional Association Comments:

CWMA 2026 Interim Meeting:

No comments.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

No comments heard.

The committee recommends this remain an informational item.

NEWMA 2026 Interim Meeting:

Frank Green Connecticut) provided an update of the group's work. The group is developing a survey to collect information that could be used to develop a core curriculum. Scott Dolan (Vermont) updated that the group has posted its first deliverable. A resource document has recently been posted on the NCWM website which summarizes the requirements for lab recognition. The committee recommends this item remain Informational.

SWMA 2026 Annual Meeting:

The Metrology committee representative provided an update about the Metrology Resource Library that has been created on the NCWM website. The representative also asked for more ideas on presentations that could be useful in the future.

The committee recommends this item remain informational.

PMT- 4 I Women in Weights and Measures (WWM)

The Women in Weights and Measure Subcommittee formed in 2024. The mission is to empower women in developing their natural abilities, fullest potential, and equip them to excel as leaders in weights and measures. The subcommittees primary focus is to raise awareness that women are valuable contributors in the field of weights and measures and to provide training and opportunities for leadership advancement.

At the 2023 NCWM Annual Meeting, we held a special panel discussion session to celebrate the accomplishments and highlight the challenges women face in the weights and measures field.

NCWM Meeting Comments:

2026 Interim: Cheryl Ayer, New Hampshire, Chair stated the NCWM session on "Building a Satisfying Life" was a success and encourages all to attend future sessions.

2026 Annual: This is a new item and a report was not given during the meeting. Reports will commence in 2027. The WWM met during the 2026 Annual and held a successful training session on Confidence Carries Weight.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

No comments were heard.

The committee recommends this item remain informational.

NEWMA 2026 Interim Meeting:

Cheryl Ayer (New Hampshire) provided an update of the groups work. Ms. Ayer provided an overview of the group's mission, and the overall philosophy of inclusiveness. Ms. Ayer discussed spreading the message of the importance of meeting preparation and willingness to collaborate. The committee recommends this item remain Informational.

SWMA 2026 Annual Meeting:

No comments heard.

The committee recommends this item remain informational.

PMT-5 I Member Education and Mentorship Subcommittee (MEMS)

The Member Education and Mentorship Subcommittee (MEMS) was formed in 2024. The scope is to educate the body (with an emphasis on new membership) of the National Council on Weights and Measures processes and procedures. This Subcommittee provides education and mentorship on the processes and procedures of the NCWM to new and existing members to promote knowledge, foster participation, and increase membership engagement within the NCWM.

Subcommittee membership consists of up to 3 members from each region and up to 6 Associate Members. The Subcommittee will report to the PDC and will meet at least every national meeting.

The Subcommittee will develop educational products and/or programs to educate the members on the processes, procedures, and policies of the NCWM. The Subcommittee members will mentor new members as appropriate, as well as answer questions from membership.

Member Education and Mentorship Subcommittee (MEMS) Members		
Chair	Brian Fuller	Iowa
Vice-Chair	Christina Osborn	Texas
Public Sector Members	Cheryl Ayer	New Hampshire
	Ethan Bogren	Westchester County, NY
	Joanna Cartee	Georgia
	Scott Ferguson	Michigan
	Dave Finck	Ohio
	Valerie Forbes	Delaware
	Miland Kofford	Utah
	Brent Ricks	Montana
	Brian Terry	Arkansas
	Jim Willis	New York
Private Sector Members	Jerry Buendel	Retired
	Chuck Corr	Retired
	Scott Fenwick	Clean Fuels Alliance America
	Bob Murnane	Seraphin Test Measure

NCWM Meeting Comments:

2026 Interim: Brain Fuller, Iowa, Chair reported that the committee holds monthly meetings on mentorship and new member orientation. They have created a new member brochure. They are currently working on creating a FAQ document and other educational materials for new members.

2026 Annual: This is a new item, and a report was not given during the meeting. Reports will commence in 2027.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

Brian Fuller, IA, MEMS Chair, MEMS committee is focused on mentorship, and they had a table at the national where they passed out new membership ribbons and mentor badges as well as new membership brochures. They created a FAQs under the "about" tab on the national site. They are also working on the best practices for the Form 15 on the website and best practices.

The committee recommends this remain an informational item.

WWMA 2026 Annual Meeting:

Paul Floyd, LA: Does not have an update to report. However, would like to note that they are meeting monthly working on a presentation for the NCWM conferences. He attended Matt Douglass's presentation this morning and he thought it was perfect.

The committee recommends this item remain informational.

NEWMA 2026 Interim Meeting:

Jim Willis (New York) provided an update of the committee's work. Mr. Willis noted the success of some of the groups initiatives at the NCWM Annual Meeting. The committee recommends this item remain Informational.

SWMA 2026 Annual Meeting:

A MEMS committee representative shared that MEMS gave two presentations on Saturday. Asked for comments on the presentations and for additional training that could be provided.

The committee recommends this item remain informational.

Shane Ireland, Maine | Committee Chair
Leanne Garner, Kansas | Vice-Chair
Valerie Forbes, Delaware | Member
Brent Ricks, Montana | Member
Konrad Crockford, North Dakota | Member
Perry Lawton, TESCO | AMC Representative
Marie-Paul Vanasse, Measurement Canada | Canadian Technical Advisor
John Satterlee, Illinois | Safety Liaison
Vacant | NIST Liaison
Jerry Buendel, Retired | Committee & Exam Coordinator

Professional Development Committee

1

National Type Evaluation Program (NTEP) Committee
2027 Interim Meeting Agenda

Mr. Kevin Schnepp, Committee Chair
California

INTRODUCTION

The NTEP Committee (hereinafter referred to as the "Committee") will address the following items in Table A during the Interim Meeting. Table A identifies the agenda items by reference key, title of item, page number and the appendices by appendix designations. The first four digits of an item's reference key are assigned from the Subject Series List. The acronyms for organizations and technical terms used throughout the agenda are identified in Table

B. In some cases, background information will be provided for an item. The fact that an item appears on the agenda does not mean it will be presented to the National Council on Weights and Measures (NCWM) for a vote. The Committee will review its agenda and may withdraw some items, present some items for information meant for additional study, issue interpretations, or make specific recommendations for change to the publications *NCWM Publication 14, Administrative Policy* and *NCWM Publication 14, Technical Policy, Checklists, Test Procedures*. Changes to *NCWM Publication 14, Administrative Policy* are by recommendation of the Committee and a majority vote of the Board of Directors. Changes to *NCWM Publication 14, Technical Policy, Checklists, Test Procedures* are by recommendation of the National Type Evaluation Committee (NTEP) sectors and a majority vote of the NTEP Committee. The Committee may also take up routine or miscellaneous items brought to its attention after the preparation of this document. The Committee may decide to accept items for discussion that are not listed in this document, providing they meet the criteria for exceptions as presented in *NCWM Policy 3.1.4. Handbooks, Procedures to Modify Handbooks*. The Committee has not determined whether the items presented will be Voting or Informational in nature; these determinations will result from their deliberations at the Interim Meeting.

An "Item Under Consideration" is a statement of proposal and not necessarily a recommendation of the Committee. Suggested revisions are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in ***bold faced italics***. Additional letters, presentations and data may have been part of the committee's consideration. Please refer to www.ncwm.com/publication-15 to review these documents.

All sessions are open to registered attendees of the meeting. If the Committee must discuss any issue that involves proprietary information or other confidential material, that portion of the session dealing with the special issue may be closed if (1) NCWM Chairman or, in their absence, NCWM Chairman-Elect approves; (2) the Executive Director is notified; and (3) an announcement of the closed meeting is posted on or near the door to the meeting session and at the registration table. If possible, the posting will be done at least a day prior to the planned closed session.

Note: *It is policy to use metric units of measurement in publications; however, recommendations received by NCWM technical committees and regional weights and measures associations have been printed in this publication as submitted. Therefore, the report may contain references to inch-pound units.*

Subject Series List

International.....INT Series
Activity Reports..... ACT Series
Conformity Assessment Program.....CAP Series
NCWM Publication 14, Administrative Policy..... ADM Series
Other Items..... OTH Series

Table A
Table of Contents

Reference Key		Title of Item	NTEP Page
INT – INTERNATIONAL			**457**
INT-1	I	Mutual Recognition Arrangement (MRA)	457
INT-2	I	OIML-Certification System (CS)	458
ACT – ACTIVITY REPORTS			**458**
ACT-1	I	NTEP Participating Laboratories and Evaluations Reports	458
ACT-2	I	NTEP Sector Reports	459
CAP – CONFORMITY ASSESSMENT PROGRAM			**460**
CAP-1	I	Conformity Assessment Program	460
ADM – NCWM PUBLICATION 14, ADMINISTRATIVE POLICY			**462**
ADM-25.1	I	Addition of Water Meters to the Verified Conformity Assessment Program	462
OTH – OTHER, A PLACE TO CAPTURE NON-TECHNICAL COMMENTS OR SUGGESTIONS INTENDED TO IMPROVE THE NATIONAL TYPE EVALUATION PROGRAM.			**470**

Table B
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
CC	Certificate of Conformance	NCWM	National Council on Weights and Measures
CIML	International Committee of Legal Metrology	NIST	National Institute of Standards and Technology
DoMC	Declaration of Mutual Confidence	NTEP	National Type Evaluation Program
IV	Initial Verification	OIML	International Organization of Legal Metrology
MAA	Mutual Acceptance Arrangement	OIML-CS	International Organization of Legal Metrology – Certificate System
MC	Measurement Canada	OWM	Office of Weights and Measures
MDMD	Multiple Dimension Measuring Devices	R	Recommendation
MRA	Mutual Recognition Arrangement	VCAP	Verification Conformity Assessment Program

Details of All Items
(In order by Reference Key)

INT – INTERNATIONAL

INT-1 I Mutual Recognition Arrangement (MRA)

The MRA between Measurement Canada (MC) and NTEP labs originated April 1, 1994. Since that time, the original MRA has expanded, and a second MRA covering measuring devices was developed. On July 20, 2021, NCWM Chair Hal Prince and Measurement Canada Acting President Nathalie Campeau signed a renewal MRA that provides for continued cooperation between the two organizations and continuation of the beneficial partnership. The new MRA will be effective for 5 years.

The scope of the current MRA includes:

- gasoline and diesel dispensers.
- high-speed dispensers.
- gasoline and diesel meters intended to be used in fuel dispensers and truck refuelers;
- electronic computing and non-computing bench, counter, floor, and platform scales with a capacity up to 13 1000 kg (2000 lb);
- weighing/load receiving elements with a capacity of up to 1000 kg (2000 lb);
- electronic weight indicating elements (except those that are software based, i.e., programmed by downloading parameters); and
- mechanical scales up to 10 000 kg (20 000 lb).

MC, NTEP, and all our mutual stakeholders agree that the MRA is a benefit for the North American weights and measures industry. The NTEP Committee appreciates the efforts and cooperation of Measurement Canada and is working with MC to continue the cooperative arrangement.

The current agreement was renewed on July 26th, 2026, and expires on July 26, 2031.

INT-2 I OIML-Certification System (CS)

Implementation of the (new) International Organization of Legal Metrology – Certification System (OIML-CS) officially began in January 2018, replacing the previous OIML MAA and basic certificate systems. NCWM signed the OIML MAA Declaration of Mutual Confidence (DoMC) for Recommendation (R) 60 "Load Cells" as a Utilizing Participant in 2006 and NCWM signed the OIML-CS Utilizer Declaration for R 60 in January 2018. A Utilizer is a participant in the system that does not issue any OIML Certificates of Conformance (CC) or OIML Test Reports but does utilize the reports issued by OIML-CS Issuing Authorities and Authorized Testing Laboratories.

Dr. Ehrlich serves on the Management Committee of the OIML-CS, and Mr. Gibson serves on the OIML-CS Review Committee. The US (NTEP) supports the OIML-CS process and has agreed to continue accepting OIML-CS R 60 test data for load cells with the provision that any use of manufacturer test data is clearly identified on the test report section of the certificate because NTEP cannot use manufacturer test data towards issuance of an NTEP certificate. The OIML-CS criteria align with the NTEP Committee's recommendations, and the instructions provided by the NCWM Board of Directors.

Dr. Ehrlich has requested, on multiple occasions, that NCWM review its policy regarding participation in the OIML-CS (and previously participation in the OIML-MAA) for R76 (Non-Automatic Weighing Instruments). The NCWM has continued to follow a policy that was established in 2006 to not participate in R76 until NCWM can do so as an Issuing Authority. In 2016, the Board revisited the 2006 discussions leading to that decision, including considerations for NTEP labs' workload, potential lost expertise, concerns with quality of evaluations at some foreign labs, etc. Since there were no new developments to affect its decision, the NCWM Board of Directors agreed to maintain existing policy. Dr. Ehrlich suggested that if there was no possibility in sight that the NCWM could become an Issuing Authority, then it should consider becoming a Utilizer for OIML R76 under the OIML-CS. Some U.S. manufacturers support current NCWM policy on this, but others would prefer a change.

The instruments under what is called "Scheme A", where accreditation or peer review is required of the Issuing Authority and its Test Labs. In addition to R60 and R76, some of the instruments and systems in the OIML-CS that are probably of the most interest to NCWM members include: OIML R21 (Taximeters), R46 (Active Electrical Energy Meters), R49 (Water meters), R51 (Automatic catch-weighers), R59 (Moisture meters for cereal grains and oilseeds), R61 (Automatic gravimetric filling instruments), R85 (Level gauges for stationary storage tanks), R106 (Automatic rail-weighbridges), R117 (fuel dispensers and other liquid flow systems), OIML R129 (Multi-dimensional measuring instruments), and R137 (Gas meters).

With Dr. Ehrlich retirement Katya Delak has replaced him as the Program Leader for International Legal Metrology at NIST OWM with Isabel Chavez Baucom taking the role of the OIML Management Committee contact.

Information regarding the OIML-CS can be found at www.oiml.org. Katya Delak and Isabel Chavez Baucom represent the U.S. interests in this work and regularly provides updates to the NCWM Board of Directors on these activities.

ACT – ACTIVITY REPORTS

ACT-1 I NTEP Participating Laboratories and Evaluations Reports

The NTEP laboratories/evaluators meeting was held in March of 2026 at the NTEP Laboratory in Columbus, Ohio.

NTEP continues to routinely survey customers pertaining to NTEP administration and laboratories customer service. The survey is released to active Certificate of Conformance (CC) holders. The NCWM Board of Directors routinely reviews the results of the survey to form a continuous improvement plan for NTEP. With any survey, the challenge is to develop a document that is concise enough that customers will respond, while also providing a meaningful set of data. To date, the NCWM Board of Directors is finding general approval of NTEP services.

The Committee reviewed NTEP statistics through September 2026. The review of statistics shows that incoming

applications have increased over previous years, creating a manageable but increased evaluation backlog. While the backlog is larger than in previous years, the application processing, evaluation times, and certificate issuing is consistent with previous years. See Appendix A for NTEP statistics.

ACT-2 I NTEP Sector Reports

All NTEP Sector Reports are available to members at the time *NCWM Publication 15* is published. The NTEP Committee is committed to ensuring electronic versions of sector reports are available with *NCWM Publication* 15. Please note the sector summary reports will only be available in the electronic version of *NCWM Publication 15* and at www.ncwm.com/interim-archive; they will not be available in printed versions of *NCWM Publication 15*.

NTEP Weighing Sector:
The NTEP Weighing Sector met on August 18th and 19th 2026, see the Sectors web page for a copy of the meeting summary. The next meeting is scheduled for August 17th and 18th. Refer to the Sectors web page for additional details. For questions on the status of sector work or to propose items for a future meeting, please contact either the Chair and/or the NTEP Administrator.

Sector Chair	**NTEP Administrator**
Ms. Jessica Ferree	Mr. Jeff Gibson
Metter-Toledo, LLC	Ph: 740-507-6343
jessica.ferree@mt.com	jeff.gibson@ncwm.com

NTEP Grain Moisture Meter and NIR Protein Analyzer Sectors:
The Grain Moisture Sector met on August 11th, 2026, see the Sectors web page for a copy of the meeting summary. The 2027 meeting is scheduled for Tuesday, August 10, 2027, at the FGIS facility in Kansas City Missouri. For questions on the status of sector work or to propose items for a future meeting, please contact the sector Chair and/or the NTEP Administrator.

Sector Chair	**NTEP Administrator**
Mr. Jimmy Williams	Mr. Jeff Gibson
Missouri	Ph: 740-507-6343
jimmy.williams@mda.mo.gov	jeff.gibson@ncwm.com

NTEP Measuring Sector:
The Measuring Sector met on September 15th and 16th 202, see the Sectors web page for a copy of the meeting summary . The 2027 Measuring Sector Meeting is scheduled for September 14th and 15th, 2026. Refer to the Sectors web page for additional details. For questions on the status of sector work or to propose items for a future meeting, please contact the sector Chair and/or the NTEP Administrator.

Sector Chair	**NTEP Administrator**
Mr. Brent Price	Mr. Jeff Gibson
Gilbarco Inc	Ph: 740-507-6343
brent.price@gilbarco.com	jeff.gibson@ncwm.com

NTEP Software Sector:
A joint meeting of the Software and the Measuring Sector was held on September 16th and 17th, 2026 refer to the Sectors web page for a copy of the meeting summary. The next meeting for the Software Sector is scheduled in conjunction with the Measuring Sector on September 16-17, 2026. Refer to the Sectors web page for additional details. For questions on the status of sector work or proposed items for a future meeting, please contact the sector Chair and/or the NTEP Administrator:

Sector Chair	NTEP Administrator
Mr. James Pettinato Guidant Measurement jim.pettinato@guidantmeasurement.com	Mr. Jeff Gibson Ph: 740-507-6343 jeff.gibson@ncwm.com

NTEP Multiple Dimension Measuring Devices (MDMD) Work Group:
The NTEP MDMD Work Group meeting was held on May 6th, 2026, refer to the Sectors web page for a copy of the meeting summary. The 2027 meeting is scheduled for May 12th. Refer to the Sectors web page for additional details. For questions on the status of work group or to propose items for a future meeting, please contact the sector Chair and/or the NTEP Administrator.

Workgroup Chair	NTEP Administrator
Mr. Chris Senneff Avery Weigh-Tronix csenneff@awtx-itw.com	Mr. Jeff Gibson Ph: 740-507-6343 jeff.gibson@ncwm.com

NTEP Electric Vehicle Supply Equipment (EVSE) Work Group:
The NTEP EVSE Work Group has not met in several years. At the conclusion of the 2027 NCWM Annual Meeting it is anticipated that the Work Group will need to schedule a meeting to update the NTEP Publication 14 EVSE Checklist to include any items adopted during the Annual Meetings. As the Work Group Meeting is not yet scheduled, please contact the Work Groups Chair and/or the NTEP Administrator for additional information:

Workgroup Chair	NTEP Administrator
Mr. Andrei Moldoveanu NEMA And_Moldoveanu@nema.org	Mr. Jeff Gibson Ph: 740-507-6343 jeff.gibson@ncwm.com

CAP – CONFORMITY ASSESSMENT PROGRAM

CAP-1 I Conformity Assessment Program

The Conformity Assessment Program was established to ensure devices produced after the device has been type evaluated and certified by NTEP continue to meet the same requirements. This program has three major elements: 1) Certificate Review (administrative); 2) Initial Verification (inspection and performance testing); and 3) Verified Conformity Assessment (influence factors). This item is included on the Committee's agenda to provide an update on these elements.

Certificate Review:
Certificates are constantly under review by NTEP staff and laboratories. Many active certificates are amended annually because of manufacturer submission for evaluation or issues reported by the states pertaining to information on the certificate. When the devices are re-evaluated and certificates are amended, all information is reviewed, and necessary steps are taken to ensure compliance and that accurate, thorough information is reported on the certificate to keep certificate information up to date, the Committee continues to offer an opportunity for active certificate holders to update contact information that is contained in the "Submitted By" box on certificates. This is offered during the payment period of their annual maintenance fee. Many CC holders have taken advantage of the opportunity for hundreds of NTEP certificates.

Initial Verification (IV):
The IV initiative is ongoing. Field enforcement officials perform an initial inspection and test on new installations on a routine basis. The Committee recognized that the states do not want IV reporting to be cumbersome.

An IV report form was developed multiple years ago. The Committee desired a simple form, perhaps web-based for use by state and local regulators. The form was approved by the Committee and distributed to the states. A completed

form can be submitted via mail, e-mail, fax, or online. The forms are available on the Conformity Assessment Program web page at www.ncwm.com/conformity-assessment, or on the Forms web page at www.ncwm.com/helpful-forms, or by contacting the NCWM at info@ncwm.com or the NTEP Administrator at jeff.gibson@ncwm.com.

NTEP has acknowledged that the state, county, and city regulators have not bought into the IV report form. Industry representatives stated that IV is very important to ensure conformity assessment and the NCWM should push harder for reporting of non-compliance issues found during IV.

NTEP is open to suggestions on how to improve the reporting of non-compliant devices found during initial verification.

VCAP:
NCWM has been concerned about production meeting type and protecting the integrity of the NTEP Certificate of Conformance (CC) since the inception of NTEP. The NCWM Board of Directors has consistently reconfirmed its belief that conformity assessment is vital to NTEP's continued success.

Nine weighing device categories subject to influence factors, as defined in *Handbook 44*, were identified and are subject to VCAP audits. Certificate holders for these device types are required to have an on-site audit of the manufacturer's quality system and random on-site and/or review of a production device by an outside auditor to verify compliance with VCAP. The NTEP Committee and NCWM Board agreed not to include weighing/load receiving elements using NTEP load cells in the list of device categories subject to VCAP. However, the Board notified certificate holders that they have no intention of amending the table of devices subject to influence factor testing found in the Weighing Devices Section of *NCWM Publication 14*.

The Committee has received letters, questions, and many other inquiries pertaining to VCAP. The Committee has worked diligently to answer the questions submitted in a very timely manner. The Committee knows that additional questions will be posed as VCAP progresses. Certificate holders and other interested parties are encouraged to submit written questions to the NTEP Committee. The Committee is pleased to report that it has been successful in answering all the questions to date. Clerical changes and additions have been made to affected VCAP documents as deemed necessary.

Load cells traceable to NTEP certificates were selected for the initial assessment effort. NCWM elected to require a systems audit checklist that is to be completed by an outside auditor and submitted to NCWM per Section 21.3.3.3.5 of the VCAP requirements. A VCAP Systems Audit Checklist for Manufacturers and a VCAP Systems Audit Checklist for Private Label Certificate Holders have been developed and are available on the website at www.ncwm.com/vcap. Additionally, the Committee developed a new *NCWM Publication 14,* Administrative policy to distinguish between the requirements for parent NTEP certificate holders (21.3.2) and private label certificate holders. The requirements in 21.3.3.7 track the private label checklist requirements: traceability of the private label NTEP CC to its parent NTEP CC, traceability of the parent NTEP CC to a VCAP audit, purchase and sales records, plan to report non-conforming product and non-conforming product in stock, plan to conduct internal audits to verify non-compliance action, and internal audit records.

VCAP Audits:
The Committee had discussions about the required number of audits for facilities that manufacture multiple device types. For example, if a company had successful audits for two device types, they might submit a request for a delay from audit requirements for remaining device types, stating that they are all subjected to the same processes and will be audited in the next cycle. The Committee agreed to the request in principal and directed the NTEP Administrator propose a change to the VCAP Policy language. This change was adopted by the NCWM Board in 2013.

ADM – NCWM PUBLICATION 14, ADMINISTRATIVE POLICY

ADM-25.1 I Addition of Water Meters to the Verified Conformity Assessment Program

Source:
NTEP Administrator

Purpose:
Modify the current Verified Conformity Assessment Program Policy to include water meters in the list of covered devices.

Original Justification:
California has reported a high failure rate related to the performance of NTEP-certified water meters. The Verified Conformity Assessment Program is designed to require additional in-house testing and document verification to show proper control of design changes and component purchasing guidelines. By adding these devices to the Verified Conformity Assessment Program, NTEP would perform audits to ensure continued compliance. This will result in fewer failures during the initial verification inspection.

Item Under Consideration:
Amend Pub 14 Administrative Policy as follows.

21.1.3. NTEP Verified Conformity Assessment Program Procedures

Many NTEP-certified devices must meet *NIST Handbook 44* requirements for influence factors. It is not possible to verify these requirements during the Initial Verification in the field. Therefore, manufacturers of metrological devices (instruments) and/or components (modules) which are ~~**subject to influence factors, as defined in *NIST Handbook 44***~~**identified in paragraphs 21.1.3.1., and 21.1.3.7**, must have a Verified Conformity Assessment Program (VCAP) in place to ensure that these metrological devices and/or components are produced to perform at a level consistent with that of the device and/or component previously certified. The Verified Conformity Assessment Program audit will be at one or more sites as required to verify compliance.

For weighing devices that are subject to influence factors **and other devices identified in paragraphs 21.1.3.1., and 21.1.3.7**, NTEP will require an initial on-site audit of the manufacturer's quality system and on-site random testing and/or review of a production device(s) (instrument(s)) by the Registrar to verify that all items listed below are currently implemented and functioning to verify compliance to the appropriate sections of *NIST Handbook 44*.

…

21.1.3.1. Devices that Must Meet this Requirement are Limited to the List Below:

- Load Cell (T.N.8.)
- Indicating Elements (T.N.8.)
- Weighing/Load Receiving Elements 2000 lb capacity and less with non-NTEP Load Cells (T.N.8.)
- Complete Scales 2000 lb capacity and less (T.N.8.)
- Automatic Weighing Systems 2000 lb capacity and less (T.7.)
- Belt-Conveyor Scales (weigh-belt systems only) 2000 lb capacity and less (T.3)
- Automatic Bulk Weighing Systems 2000 lb capacity and less (T.7.)
- Multiple Dimension Measuring Devices (T.5.1.)
- Grain Test Scales (T.N.8)
- **Water Meters**

21.1.3.7. Devices that Must Meet this Requirement <u>are Limited</u> to the List Below:

- Load Cell (T.N.8.)
- Indicating Elements (T.N.8.)
- Weighing/Load Receiving Elements 2000 lb capacity and less with non-NTEP Load Cells (T.N.8.)
- Complete Scales 2000 lb capacity and less (T.N.8.)
- Automatic Weighing Systems 2000 lb capacity and less (T.7.)
- Belt-Conveyor Scales (weigh-belt systems only) 2000 lb capacity and less (T.3)
- Automatic Bulk Weighing Systems 2000 lb capacity and less (T.7.)
- Multiple Dimension Measuring Devices (T.5.1.)
- Grain Test Scales (T.N.8)
- **<u>Water Meters</u>**

Previous Status:

2025: Informational
2026: Informational

Comments in Favor:

Regulatory:

- 2026 Interim: Orange County, CA is collecting data, but some of the data is in different formats. They request refined data collection county by county. They want to see if there is an issue with new compared to old devices.
- 2026 Interim: San Diego County agreed, stating that it is hard to merge data from multiple jurisdictions. They stated that it is not an industry-wide problem. Utility companies don't all have the same processes. Submeters are only checked by weights and measures.
- 2026 Interim: The State of California agrees with the counties, and has concerns, not just for accuracy, but also specifications.
- 2026 Annual Meeting: The State of Maryland supported the item, stating that the purpose is to promote uniformity among manufacturers.
- California supported Maryland's comments, and emphasized that is is not only accuracy, but deviation if design of devices from what was evaluated by NTEP, including additional category of sealing. The state is not opposed to forming a task group to look into the issues.

Industry:

-

Advisory:

-

Comments Against:

Regulatory:

-

Industry:

- 2026 Interim: A representative of Guidant requested that the item be withdrawn, and questioned field testing is sufficient.
- 2026 Interim: A representative of AWWA requested that the item be withdrawn, stating that there is no data available to investigate the details. He provided written details.
- 2026 Interim: A representative of Endress + Hauser voiced surprise that this was under consideration. It is unsure whether VCAP will solve the problem. A group is needed to investigate and provide data. There are "sinners and saints" do brand identification is important.
- The Meter Manufacturers Association opposed the item.
- Badger Meter asked that the item be withdrawn and questions what is driving meters into VCAP.

- Murry Equipment stated that VCAP will not solve the problem and would like to see what the root cause is. We should follow data and review it with manufacturers before adding the meters to VCAP. It would be an increased load for manufacturers and NTEP.

Advisory:
•

Neutral Comments:
Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
The item remains Informational status.

ADM-27.1 21.1. Main Elements, part 3.1.. Devices that Must Meet this Requirement are Listed Below.

Source:
National Council on Weights and Measures

Purpose:
Remove the exemption for Weighing/Load Receiving Elements 2000 lb or less using NTEP Certified Load Cells.

Item under Consideration:
Amend NCWM Publication 14 Administrative Policy as follows:

3. NTEP Verified Conformity Assessment Program Procedures

Many NTEP certified devices must meet *NIST Handbook 44* requirements for influence factors. It is not possible to verify these requirements during the Initial Verification in the field. Therefore, manufacturers of metrological devices (instruments) and/or components (modules) which are subject to influence factors, as defined in *NIST Handbook 44*, must have a Verified Conformity Assessment Program (VCAP) in place to ensure that these metrological devices and/or components are produced to perform at a level consistent with that of the device and/or component previously certified. The Verified Conformity Assessment Program audit will be at one or more sites as required to verify compliance.

For weighing devices that are subject to influence factors, NTEP will require an initial on-site audit of the manufacturer's quality system and on-site random testing and/or review of a production device(s) (instrument(s)) by the Registrar to verify that all items listed below are currently implemented and functioning to verify compliance to the appropriate sections of *NIST Handbook 44*.

It is important for NTEP to know the types of devices included in the VCAP audit and it is for this reason that the certificate holder shall prepare a controlled quality management system (QMS) document listing the range of parameters that cover the devices included in the audit. The certificate holder shall include in this document all certificates and device parameters (For example: different models, capacities, e-min, n-max, sizes etc.) for the applicable device category. For example, in a load cell audit, a range of capacities of the load cells included in the audit shall be listed in the report. This document shall be available for the VCAP auditor and NTEP upon request and may be included as an annex to the audit report if desired.

3.1. Devices that Must Meet this Requirement are Limited to the List Below:

- Load Cell (T.N.8.)
- Indicating Elements (T.N.8.)
- Weighing/Load Receiving Elements 2000 lb capacity and less ~~**with non-NTEP Load Cells (T.N.8.)**~~
- Complete Scales 2000 lb capacity and less (T.N.8.)
- Automatic Weighing Systems 2000 lb capacity and less (T.7.)
- Belt-Conveyor Scales (weigh-belt systems only) 2000 lb capacity and less (T.3)
- Automatic Bulk Weighing Systems 2000 lb capacity and less (T.7.)
- Multiple Dimension Measuring Devices (T.5.)
- Grain Test Scales (T.N.8.)

Previous Status:

2027: New Proposal

Original Justification:

NCWM Publication 14 NTEP Administrative Policy requires influence testing for Weighing/Load Receiving elements less than 2000 lb. The use of NTEP certified load cells exempts the device from VCAP requirements. Using NTEP certified load cells should not exempt the device manufacturer from having the quality management system audited. This is the only remaining device type that has influence testing during evaluation that is then exempted from VCAP.

Manufacturers may oppose this proposal because it may add increased time and expense for this device type.

The submitter requests that this be an Informational Item in 2027.

Comments in Favor:

Regulatory:

•

Industry:

•

Advisory:

•

Comments Against:

Regulatory:

•

Industry:

•

Advisory:

•

Neutral Comments:

Regulatory:

•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ADM-27.2 21.1. Main Elements, part 3.1.. Devices that Must Meet this Requirement are Listed Below.

Source:
National Council on Weights and Measures

Purpose:
Add Digital Controller Elements to the list of items subject to VCAP due to influence testing.

Item under Consideration:
Amend NCWM Publication 14 Administrative Policy as follows:

4. NTEP Verified Conformity Assessment Program Procedures

Many NTEP certified devices must meet *NIST Handbook 44* requirements for influence factors. It is not possible to verify these requirements during the Initial Verification in the field. Therefore, manufacturers of metrological devices (instruments) and/or components (modules) which are subject to influence factors, as defined in *NIST Handbook 44*, must have a Verified Conformity Assessment Program (VCAP) in place to ensure that these metrological devices and/or components are produced to perform at a level consistent with that of the device and/or component previously certified. The Verified Conformity Assessment Program audit will be at one or more sites as required to verify compliance.

For weighing devices that are subject to influence factors, NTEP will require an initial on-site audit of the manufacturer's quality system and on-site random testing and/or review of a production device(s) (instrument(s)) by the Registrar to verify that all items listed below are currently implemented and functioning to verify compliance to the appropriate sections of *NIST Handbook 44*.

It is important for NTEP to know the types of devices included in the VCAP audit and it is for this reason that the certificate holder shall prepare a controlled quality management system (QMS) document listing the range of parameters that cover the devices included in the audit. The certificate holder shall include in this document all certificates and device parameters (For example: different models, capacities, e-min, n-max, sizes etc.) for the applicable device category. For example, in a load cell audit, a range of capacities of the load cells included in the audit shall be listed in the report. This document shall be available for the VCAP auditor and NTEP upon request and may be included as an annex to the audit report if desired.

4.1. Devices that Must Meet this Requirement are Limited to the List Below:

- Load Cell (T.N.8.)
- Indicating Elements (T.N.8.)

- Weighing/Load Receiving Elements 2000 lb capacity and less with non-NTEP Load Cells (T.N.8.)
- Complete Scales 2000 lb capacity and less (T.N.8.)
- Automatic Weighing Systems 2000 lb capacity and less (T.7.)
- Belt-Conveyor Scales (weigh-belt systems only) 2000 lb capacity and less (T.3)
- Automatic Bulk Weighing Systems 2000 lb capacity and less (T.7.)
- Multiple Dimension Measuring Devices (T.5.)
- Grain Test Scales (T.N.8.)
- **Digital Controller Elements (T.N.8.1.)**

Previous Status:

2027: New Proposal

Original Justification:

NTEP Publication 14 requires influence testing for Digital Controller Elements due to the Analog to digital converter in the device and should be part of VCAP.

Manufacturers may oppose this proposal because it may add increased time and expense for this device type.

The submitter requests that this be an Informational Item in 2027.

Comments in Favor:

Regulatory:

-

Industry:

-

Advisory:

-

Comments Against:

Regulatory:

-

Industry:

-

Advisory:

-

Neutral Comments:

Regulatory:

-

Industry:

-

Advisory:

-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ADM-27.3 21.1. Main Elements, part 3.2. Requirements, The CC Holder's Control Facility Requirements., 3.4. ~~Certification Body's Responsibilities and~~ NCWM Technical Employee Responsibilities:, and 3.9. ~~Certification Body's Responsibilities and~~ NCWM Technical Employee Responsibilities:

Source:
National Council on Weights and Measures

Purpose:
Remove the ability of an external accreditation body to perform VCAP audits.

Item under Consideration:
Amend NCWM Publication 14 NTEP Administrative Policy as follows:

3.2. Requirements, The NTEP CC Holder's Control Facility Responsibilities:

…

3.2.16.1. Audits shall be scheduled as a stand-alone audit; not part of ISO, FM, UL, etc. ~~**The audit may be in conjunction with but not part of these audits.**~~

…

3.4. ~~Certification Body's Responsibilities and~~ NCWM Technical Employee Responsibilities:

~~**3.4.1. The selected Certification Body is to be accredited by ANSI-ASQ National Accreditation Board (ANAB) or by a Signatory of the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition. The ANSI, ANAB and ILAC are accreditation bodies for management systems. ANAB and ILAC accredit certification bodies (CBs) for ISO 9001 quality management systems (QMS), ISO 17025 laboratory testing facilities and ISO 14001 environmental management systems (EMS).**~~

~~**The auditor representing the Certification Body shall have successfully completed the NCWM, Verified Conformity Assessment Program Training. (Effective January 1, 2026.)**~~

~~**3.4.2. Training by NCWM may be conducted in person, or via electronic format, at the trainer's discretion. A Train-the-Trainer method may be used by Certification Bodies that have an internal training program, however; all training performed through an internal training program must be conducted in person.**~~

~~**3.4.3. The selected Certification Body shall have international auditors available.**~~

3.4.4~~.~~**1.** The ~~**Certification Body or**~~ NCWM technical employee is required to notify NCWM when a major breakdown of the NTEP CC holder's VCAP program is found.

3.4.5~~.~~**2.** The ~~**Certification Body or**~~ NCWM technical employee shall submit a completed "Systems Audit

Checklist" to NCWM. Submitted documents must contain a clear statement of compliance because of the VCAP audit.

…

3.9. ~~Certification Body's Responsibilities and~~ NCWM Technical Employee Responsibilities:

~~**3.9.1. The selected Certification Body (auditor) shall be accredited to the ISO 9001:2018 standard for providing audits and certifications of management systems.**~~

3.9.~~**2.** .**1.**~~ The~~ **~~Certification Body or~~** NCWM Technical Employee is required to notify NCWM when a major breakdown of the NTEP private label CC holder's VCAP program is found.

3.9.~~**3.**~~**2.** The~~ **~~Certification Body or~~** NCWM Technical Employee shall submit a completed "VCAP Systems Audit Checklist for Private Label Certificate Holders" to NCWM. Submitted documentation must contain a clear statement of compliance as a result of the VCAP audit.

Previous Status:

2027: New Proposal

Original Justification:

The VCAP auditors of the NTEP program are uniquely suited for auditing as they have experience with the NTEP evaluation process and device types. In some cases, this could increase increased time and expense for audits. The submitter requests that this be an Informational Item in 2027.

Comments in Favor:

Regulatory:

-

Industry:

-

Advisory:

-

Comments Against:

Regulatory:

-

Industry:

-

Advisory:

-

Neutral Comments:

Regulatory:

-

Industry:

-

Advisory:

-

Item Development:
New Proposal in 2027

Regional Associations' Comments:
New Proposal in 2027

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH – OTHER, A PLACE TO CAPTURE NON-TECHNICAL COMMENTS OR SUGGESTIONS INTENDED TO IMPROVE THE NATIONAL TYPE EVALUATION PROGRAM.

1 Mr. Kevin Schnepp, California | NTEP Committee Chair
Mr. Jason Flint, New Jersey | NCWM Chair
Mr. Paul Floyd, Louisiana | NCWM Chair Elect
Mr. Daniel Walker, Ohio | Member
Mr. Jeff Gibson, NCWM | NTEP Administrator

National Type Evaluation Program Committee

2