SCL-23.3 V Verification Scale Division e: Multiple Sections Including, T.N.1.3., Table 6., T.N.3., T.N.4., T.N.6., T.N.8., T.N.9., T.1., T.2., S.1.1.1., T.N.1.2., Table S.6.3.a., Table S.3.6.b., Appendix D, S.1.2.2., Table 3., S.5.4., UR.3., Table 8.

(This item was adopted.)

Source:
NCWM Verification Scale Division e Task Group

Purpose:
The mission of the task group, as defined by the S&T Committee, was to review Handbook 44, Section 2.20. Scales and relevant portions of OIML R76, using the items included in S&T Agenda Items: Block 2 as a reference point, and recommend changes as necessary to:

1. Clarify how the error is determined in relation to the verification scale division (e) and the scale division (d)
2. Clarify which is the proper reference; the verification scale division (e) or the scale division (d) throughout this section
3. Ensure proper selection of a scale in reference to the verification scale division (e) and the scale division (d)
4. Clarify the relationship between the verification scale division (e) or the scale division (d)

Item under Consideration:
Amend Handbook 44 Scales Code and Appendix D, Definitions as follows:

Changes proposed to Appendix D. Definitions

auxiliary indication – a means to increase the displayed resolution of a weighing device, such as a rider or vernier on an analog device, or a differentiated least significant digit to the right of the decimal point on a digital device. [2.20]

(Added 20XX)

extended display–mode. – a means to temporarily change the scale division (d) to a value less than the verification scale interval (e), following a manual command. [2.20]

(Added 20XX)

n_{max} (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 n_{max} marked on the scale indicating element, weighing element, or load cell. [2.20]

(Added 20XX)

n_{max} (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 n_{max} marked on the scale indicating element, weighing element, or load cell. [~~**2.20,**~~ 2.21, 2.24]

(Added 1997) **(Amended 20XX)**

scale division, number of (n). – See "verification scale interval, number of (n)." ~~**Quotient of the capacity divided by the value of the verification scale division.**~~ [2.20]

(Amended 20XX)

verification scale ~~division~~interval, value of (e). – A value, expressed in units of weight (mass) and specified by the manufacturer of a device, by which the tolerance values and the accuracy class applicable to the device are determined. The verification scale **~~division~~interval** is applied to all scales, in particular to ungraduated devices since they have no graduations. **~~The verification scale division (e) may be different from the displayed scale division (d) for certain other devices used for weight classifying or weighing in pre-determined amounts, and certain other Class I and II scales.~~**[2.20]

(Amended 20XX)

verification scale interval, number of (n). – Quotient of the capacity divided by the value of the verification scale interval. [2.20]

$$n = \frac{Capacity}{e}$$

(Added 20XX)

weight classifier. – A digital scale that rounds weight values up to the next scale division. These scales usually have a verification scale **~~division~~interval** (e) that is smaller than the displayed scale division **(d)**. [2.20]

(Added 1987) **(Amended 20XX)**

Changes proposed to Section 2.20. Scales Code

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**.

(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.

[Nonretroactive as of January 1, 20XX]

~~(b)~~(c) ~~A digital indicating device shall either automatically maintain a "center-of-zero" condition to ± ¼ scale division or less, or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero-balance condition to ± ¼ of a scale division or less. A "center-of-zero" indication may operate when zero is indicated for gross and/or net mode(s).~~ 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. 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.

[Nonretroactive as of January 1, 1993]

~~(c)~~(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, **~~and~~** 2019**, and 20XX**)

S.1.2. Value of Scale ~~Division~~ Units. *– Except for batching scales and weighing systems used exclusively for weighing in predetermined amounts, the value of a scale division "d" **and the verification scale interval "e"** 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; or

Examples: scale divisions may be 10, 20, 50, 100; or 0.01, 0.02, 0.05; or 0.1, 0.2, 0.5, etc.

(c) a binary submultiple of a specific unit of weight.

Examples: scale divisions may be ½, ¼, 1/8, 1/16, etc.

[Nonretroactive as of January 1, 1986]

(Amended 20XX)

S.1.2.1. Digital Indicating Scales, Units. *– Except for postal scales, a digital-indicating scale shall indicate weight values using only a single unit of measure. Weight values shall be presented in a decimal format with the value of the scale division* ***"d"*** *expressed as 1, 2, or 5, or a decimal multiple or submultiple of 1, 2, or 5.*

The requirement that the value of the scale division ***"d"*** *be expressed only as 1, 2, or 5, or a decimal multiple or submultiple of only 1, 2, or 5 does not apply to net weight indications and recorded representations that are calculated from gross and tare weight indications where the scale division* ***"d"*** *of the gross weight is different from the scale division* ***"d"*** *of the tare weight(s) on multi-interval or multiple range scales. For example, a multiple range or multi-interval scale may indicate and record tare weights in a lower weighing range (WR) or weighing segment (WS), gross weights in the higher weighing range or weighing segment, and net weights*

as follows:

55 kg	*Gross Weight (WR2 d = 5 kg)*	*10.05 lb*	*Gross Weight (WS2 d = 0.05 lb)*
– 4 kg	*Tare Weight (WR1 d = 2 kg)*	*– 0.06 lb*	*Tare Weight (WS1 d = 0.02 lb)*
= 51 kg	*Net Weight (Mathematically Correct)*	*= 9.99 lb*	*Net Weight (Mathematically Correct)*

[Nonretroactive as of January 1, 1989]

(Added 1987) (Amended 2008 **and 20XX**)

S.1.2.2. Verification Scale Interval "e".

S.1.2.2.1. Class I and II Scales and Dynamic Monorail Scales. ~~**If e ≠ d, the verification scale interval "e" shall be determined by the expression:**~~

~~**d < e ≤ 10 d**~~

~~**If the displayed division (d) is less than the verification division (e), then the verification division shall less than or equal to 10 times the displayed division.**~~

~~**The value of e must satisfy the relationship, e = 10^k of the unit of measure, where k is a positive or negative whole number or zero. This requirement does not apply to a Class I device with d < 1 mg where e = 1 mg. If e ≠ d, the value of "d" shall be a decimal submultiple of "e," and the ratio shall not be more than 10:1. If e ≠ d, and both "e" and "d" are continuously displayed during normal operation, then "d" shall be differentiated from "e" by size, shape, color, etc. throughout the range of weights displayed as "d."**~~

~~**(Added 1999)**~~

Scales Equipped with an Auxiliary Indication. – Only a Class I or II scale or a dynamic monorail may be equipped with an auxiliary indication. The auxiliary indication may be either a rider or vernier on an analog device, or a scale division "d" to the right of the decimal point on a digital device that is differentiated, for example by size, shape, or color.

A scale with an auxiliary indication shall not be equipped with an extended display mode.

The verification scale interval "e" on a scale equipped with an auxiliary indication shall be determined as follows:

(a) The value of "e" shall be greater than "d" and less than or equal to 10 "d" (d < e < 10 d), and

(b) The value of "e" must satisfy the relationship, $e = 10^k$ of the unit of measure, where k is a positive or negative whole number or zero.

Examples:

10^{-2}=0.01, 10^{-1}=0.1, 10^0=1, 10^1=10, 10^2=100, etc.

The requirement in subpart (a) does not apply to a Class I devices with e = 1 mg, where d shall be less than "e" (d < e).

Examples:

If e = 1 g for Class I or II, then "d" may only be 0.5 g, 0.2 g, or 0.1 g

If e = 1 mg for Class I, then "d" may be 0.5 mg, 0.2 mg, 0.1 mg, 0.05 mg, 0.02 mg, etc.

(Added 1999) (Amended 20XX)

S.1.2.2.2. Class III, III L, and IIII Scales. – The value of "e" is specified by the manufacturer as marked on the device. Except for dynamic monorail scales **and weight classifiers**, "e" must be ~~less than or~~ equal to "d."

(Added 1999) **(Amended 20XX)**

S.1.2.2.2.1. Dynamic Monorail Scales. – On a dynamic monorail scale the value of "e" shall be equal to or greater than "d".

S.1.2.2.2.2. Weight Classifiers. – On a weight classifier, such as a postal or shipping scale that rounds up and is marked for special use, the value of "e" shall be equal to or less than "d".

(Added 20XX)

S.1.2.2.3. Extended Display Mode. – A scale with an auxiliary indication shall not be equipped with an extended display mode. When a scale is equipped with an extended display mode, displaying an indication with a scale division "d" smaller than "e" shall be possible only:

(a) while pressing a key; or

(b) for a period not exceeding 5 seconds after a manual command.

Printing or transferring data via interface shall not be possible while the extended display mode is in operation.

(Added 20XX)

(Amended 2021 **and 20XX)**

S.5.4. Relationship of Minimum Load Cell Verification Interval Value to the Verification Scale ~~Division~~Interval. *– The relationship of the value for the minimum load cell verification scale interval, v_{min}, to the **verification** scale **~~division~~interval ~~d~~ e**, for a specific scale using National Type Evaluation Program (NTEP) certified load cells shall*

comply with the following formulae where N is the number of load cells in a single independent[1] weighing/load-receiving element (such as hopper, railroad track, or vehicle scale weighing/load-receiving elements):

(a) $v_{min} \leq \frac{d*e}{\sqrt{N}}$ *for scales without lever systems; and*

(b) $v_{min} \leq \frac{d*e}{\sqrt{N} \times (\textbf{scale multiple})}$ *for scales with lever system*

[1]"Independent" means with a weighing/load-receiving element not attached to adjacent elements and with its own A/D conversion circuitry and displayed weight.

~~***[*When the value of the scale division, d, is different from the verification scale division, e, for the scale, the value of e must be used in the formulae above.]***~~

This requirement does not apply to complete weighing/load-receiving elements or scales, which satisfy all the following criteria:

- *the complete weighing/load-receiving element or scale has been evaluated for compliance with T.N.8.1. Temperature under the NTEP;*
- *the complete weighing/load-receiving element or scale has received an NTEP Certificate of Conformance; and*
- *the complete weighing/load-receiving element or scale is equipped with an automatic zero-tracking mechanism which cannot be made inoperative in the normal weighing mode. (A test mode which permits the disabling of the automatic zero-tracking mechanism is permissible, provided the scale cannot function normally while in this mode.*

[Nonretroactive as of January 1, 1994]

(Added 1993) (Amended 1996**,** 2016 **and 20XX**)

Table 3.
Parameters for Accuracy Classes

Class	***Value of the Verification Scale ~~Division~~Interval (~~d or~~ e[1])***	***Number of Verification Scale[43] ~~Divisions~~Intervals (n)***	
		Minimum	***Maximum***
SI Units			
I	*equal to or greater than 1 mg*	*50 000*	*--*
II	*1 to 50 mg, inclusive*	*100*	*100 000*
	equal to or greater than 100 mg	*5 000*	*100 000*
III[21,54]	*0.1 to 2 g, inclusive*	*100*	*10 000*
	equal to or greater than 5 g	*500*	*10 000*
III L[32]	*equal to or greater than 2 kg*	*2 000*	*10 000*
IIII	*equal to or greater than 5 g*	*100*	*1 200*

~~1~~ ***~~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 division "e" is the value of the scale division immediately preceding the auxiliary means.~~***

[21] *A Class III scale marked "For prescription weighing only" may have a verification scale* ***~~division~~interval*** *(e) not less than 0.01 g.*

(Added 1986) (Amended 2003)

[32] *The value of a* ***verification*** *scale* ***~~division~~interval (e)*** *for crane and hopper (other than grain hopper) scales shall be not less than 0.2 kg (0.5 lb). The minimum number of* ***verification*** *scale* ***~~divisions~~intervals (n)*** *shall be not less than 1000.*

(Amended 20XX)

[43] *On a multiple range or multi-interval scale, the number of divisions for each range independently shall not exceed the maximum specified for the accuracy class. The number of* ***verification*** *scale* ***~~divisions~~intervals****, (n), for each weighing range is determined by dividing the scale capacity for each range by the verification scale* ***~~division~~interval****, (e), for each range. On a scale system with multiple load-receiving elements and multiple indications, each element considered shall not independently exceed the maximum specified for the accuracy class. If the system has a summing indicator, the* n_{max} *for the summed indication shall not exceed the maximum specified for the accuracy class.*

(Added 1997)**(Amended 20XX)**

[54] *The minimum number of* ***verification*** *scale* ***~~divisions~~intervals (n)*** *for a Class III Hopper Scale used for weighing grain shall be 2000.~~)~~*

(Amended 20XX)

1 [*Nonretroactive as of January 1, 1986*]

(Amended 1986, 1987, 1997, 1998, 1999, 2003, ~~and~~ 2004**, and 20XX**)

Table S.6.3.a.
Marking Requirements

To Be Marked With ⇓	**Weighing Equipment**				
	Weighing, Load-Receiving, and Indicating Element in Same Housing or Covered on the Same CC[1]	**Indicating Element not Permanently Attached to Weighing and Load-Receiving Element or Covered by a Separate CC**	**Weighing and Load-Receiving Element Not Permanently Attached to Indicating Element or Covered by a Separate CC**	**Load Cell with CC (11)**	**Other Equipment or Device (10)**
Manufacturer's ID (1)	X	X	X	X	X
Model Designation and Prefix (1)	X	X	X	X	X
Serial Number and Prefix (2)	X	X	X	X	X (16)
Certificate of Conformance Number (CC) (23)	X	X	X	X	X (23)
Accuracy Class (17)	X	X (8)	X (19)	X	
Nominal Capacity (3)(18)(20)	X	X	X		
Value of Scale Division, "d" (3)**(4)**	X	X			
Value of **Verification Scale Interval,** "e" **(3)**(4)	X	X			
Temperature Limits (5)	X	X	X	X	
Concentrated Load Capacity (CLC) (12)(20)(22)					
Special Application (13)	X	X	X		
Maximum Number of **Verification** Scale ~~**Divisions**~~**Intervals** (n_{max}) (6)		X (8)	X (19)	X	

Many rows of the table are not included in this proposal for brevity.

(Added 1990) (Amended 1992, 1999, 2000, 2001, 2002, ~~and~~ 2004**, and 20XX**)

Table S.6.3.b.
Notes for Table S.6.3.a. Marking Requirements

3. The device shall be marked with the nominal capacity. **The nominal capacity may be prefaced by the terms "capacity" or "Max."** ***For any scale where the value of "e" is equal to the value of "d" (see S.1.2.2.),*** ~~***T***~~***the*** *nominal capacity shall be shown together with the value of the scale division* ***"d" or the verification scale interval "e"*** *(e.g., 15 × 0.005 kg,* ~~***30 × 0.01 lb,***~~ *or capacity = 15 kg*~~*,*~~ *d = 0.005 kg****, or Max 15 kg e = 0.005 kg****) in a clear and conspicuous manner and be readily apparent when viewing the reading face of the scale indicator unless already apparent by the design of the device.* ***On multiple range or multi-interval scales the value of the***~~***Each***~~ *scale division* ~~*value*~~ ***"d" or verification scale interval "e"*** ~~*or weight unit*~~ *shall be marked* ***together with its associated nominal capacity***~~***on multiple range or multi-interval scales***~~***.*** ***For any scale that has no "d" or any scale where "e" does not equal "d" refer to Note 4.***
[Nonretroactive as of January 1, 1983]
(Amended 2005 **and 20XX**)

4. ~~***Required only if different from "d."***~~ ***Exceptions to Note 3 regarding marking of "e" and "d.".***

(a) For an ungraduated scale such as an equal arm scale where the scale graduations do not represent a fixed weight quantity, the nominal capacity shall be shown together with the verification scale interval "e" (e.g. capacity 1,000 g e = 0.1 g, or Max 1,000 g e = 01 g). These devices have no "d."

(b) For a scale where e does not equal d, such as a scale equipped with an auxiliary indication or a weight classifier marked for special use, the nominal capacity shall be shown together with the scale division "d" and the verification scale interval "e," (e.g., capacity 1,000 g e = 0.1 g d = 0.01 g, or Max 1,000 g e = 0.1 g d = 0.01 g).

[Nonretroactive as of January 1, 1986]

(Amended 20XX)

5. *Required only on Class III, III L, and IIII devices if the temperature range on the NTEP CC is narrower than and within − 10 °C to 40 °C (14 °F to 104 °F).*
[Nonretroactive as of January 1, 1986]
(Amended 1999)

6. *This value may be stated on load cells in units of 1000; e.g., n: 10 is 10 000 divisions.*
[Nonretroactive as of January 1, 1988]

7. *Denotes compliance for single or multiple load cell applications. It is acceptable to use a load cell with the "S" or Single Cell designation in multiple load cell applications as long as all other parameters meet applicable requirements. A load cell with the "M" or Multiple Cell designation can be used only in multiple load cell applications.*
[Nonretroactive as of January 1, 1988]
(Amended 1999)

8. *An indicating element not permanently attached to a weighing element shall be clearly and permanently marked with the accuracy Class of I, II, III, III L, or IIII, as appropriate, and the maximum number of* ***verification*** *scale* ~~***divisions***~~***intervals****,* n_{max}*, for which the indicator complies with the applicable requirement. Indicating elements that qualify for use in both Class III and III L applications may be marked III/III L and shall be marked with the* ~~***maximum number of scale divisions***~~***n_{max}*** *for which the device complies with the applicable requirements for each accuracy class.*
[Nonretroactive as of January 1, 1988]

(Amended 20XX)

1 **Remainder of the table is omitted for brevity with this proposal.**

T.1. Tolerance Values.

T.1.1. General. – The tolerances applicable to devices not marked with an accuracy class shall have the tolerances applied as specified in Table T.1.1. Tolerances for Unmarked Scales.

Note: When Table T.1.1. refers to T.N. sections it shall be accepted that the scale division d on the unmarked scale always equals the verification scale interval e.

(Amended 1990 **and 20XX**)

T.2. Sensitivity Requirement (SR).

T.2.2. General. – Except for scales specified in paragraphs T.2.3. Prescription Scales through T.2.8. Railway Track Scales: 2 **(e)** ~~**d**~~, 0.2 % of the scale capacity, or 40 lb, whichever is least.

(Amended 20XX)

T.2.4. Jewelers' Scales.

T.2.4.2. With More Than One-Half Ounce Capacity. – 1 **(e)** ~~**d**~~ or 0.05 % of the scale capacity, whichever is less.

(Amended 20XX)

T.2.7. Vehicle, Axle-Load, Livestock, and Animal Scales.

T.2.7.1. Equipped With Balance Indicators. – 1 **(e)** ~~**d**~~.

(Amended 20XX)

T.2.7.2. Not Equipped With Balance Indicators. – 2 **(e)** ~~**d**~~ or 0.2 % of the scale capacity, whichever is less.

(Amended 20XX)

T.2.8. Railway Track Scales. – 3 **(e)** ~~d~~ or 100 lb, whichever is less.

(Amended 20XX)

T.N.1. Principles.

T.N.1.1. Design. – The tolerance for a weighing device is a performance requirement independent of the design principle used.

T.N.1.2. Accuracy Classes. – Weighing devices are divided into accuracy classes according to the number of **verification** scale ~~**divisions**~~**intervals** (n) and the value of the **verification** scale ~~**division**~~**interval** ~~**(d)**~~**(e)**.

(Amended 20XX)

T.N.1.3. Verification Scale ~~Division~~Interval. – The tolerance for a weighing device is related to the value of ~~**the scale division (d) or the value of**~~ the verification scale ~~**division**~~**interval** (e) and is ~~**generally**~~ expressed in terms of ~~**d or**~~ e.

(Amended 20XX)

T.N.3. Tolerance Values.

T.N.3.4. Crane and Hopper (Other than Grain Hopper) Scales. – The maintenance and acceptance tolerances shall be as specified in T.N.3.1. Maintenance Tolerance Values and T.N.3.2. Acceptance Tolerance Values for Class III L, except that the tolerance for crane and construction materials hopper scales shall not be less than 1 **e** ~~**d**~~ or 0.1 % of the scale capacity, whichever is less.

(Amended 1986 **and 20XX**)

Table 6. **Maintenance Tolerances** **(All values in this table are in verification scale ~~divisions~~intervals (e))**								
Tolerance ~~in Scale Divisions~~								
	1		**2**		**3**		**5**	
Class	**Test Load Applied**							
I	0 -	50 000	50 001 -	200 000	200 001 +			
II	0 -	5 000	5 001 -	20 000	20 001 +			
III	0 -	500	501 -	2 000	2 001 -	4 000	4 001 +	
IIII	0 -	50	51 -	200	201 -	400	401 +	
III L	0 -	500	501 -	1 000	(Add 1 ~~d~~ e for each additional 500 ~~d~~ e or fraction thereof)			

(Amended 20XX)

T.N.4. Agreement of Indications.

…

T.N.4.3. Single Indicating Element/Multiple Indications. – In the case of an analog indicating element equipped with two or more indicating means within the same element, the difference in the weight indications for any load other than zero shall not be greater than one-half the value of the **verification** scale **~~division~~interval (e)** **~~(d)~~** and be within tolerance limits.

(Amended 1986 **and 20XX**)

T.N.6. Sensitivity. – This section is applicable to all nonautomatic-indicating scales marked I, II, III, III L, or IIII.

T.N.6.1. Test Load.

(a) The test load for sensitivity for nonautomatic-indicating vehicle, axle-load, livestock, and animal scales shall be 1 **~~d~~e** for scales equipped with balance indicator, and 2 **~~d~~e** or 0.2 % of the scale capacity, whichever is less, for scales not equipped with balance indicators.

(b) For all other nonautomatic-indicating scales, the test load for sensitivity shall be 1 **~~d~~e** at zero and 2 **~~d~~e** at maximum test load.

(Amended 20XX)

T.N.8. Influence Factors.

…

T.N.8.1.3. Temperature Effect on Zero-Load Balance. – The zero-load indication shall not vary by more than:

(a) three **~~divisions~~e** per 5 °C (9 °F) change in temperature for Class III L devices; or

(b) one **~~division~~e** per 5 °C (9 °F) change in temperature for all other devices.

(Amended 1990 **and 20XX**)

T.N.9. 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 one **c~~scale division (d)~~**; or the equipment shall:

(a) blank the indication; or

(b) provide an error message; or

(c) the indication shall be so completely unstable that it cannot be interpreted, or transmitted into memory or to a recording element, as a correct measurement value.

The tolerance in T.N.9. Radio Frequency Interference (RFI) and Other Electromagnetic Interference Susceptibility is to be applied independently of other tolerances. For example, if indications are at allowable basic tolerance error limits when the disturbance occurs, then it is acceptable for the indication to exceed the applicable basic tolerances during the disturbance.

(Amended 1997 **and 20XX**)

Previous Action:
2023: Assigned to the Verification Scale Division (e) Task Group

Background:
This proposal is being brought forward because the HB44 Scales Code is confusing and contradictory in several respects. This is particularly related to e and d and this has been true since the code was created as a translation of OIML R76 into HB44 format and adopted in 1984. In the creation process, the translators made a few translation errors that changed meanings or simply left important things out. Even small changes can have significant effects. We have been struggling with the contradictions ever since. In some cases, we continue to apply the code in ways that do not follow the written text.

The original submitter (Ross Andersen, NY retired) compared each paragraph referring to d or e in HB44 to the corresponding sections of R76 and identified a number of translation errors that either changed the meaning or left out something important from R76. He also proposed fixes. The Task Group continued the work and has prepared this final proposal. The sheer number of changes makes the proposal appear complicated. The changes all flow from the initial translation errors. The Task Group believes the changes are absolutely necessary, and the changes will eliminate the known conflicts and contradictions in the Code. This will subsequently reduce confusion in enforcing it.

Proposed changes to Appendix D. Definitions are presented first. The proposed changes and additions to the Scales Code will be presented in order of appearance. For each change or group of changes there will be a brief justification. The translators made key errors in the translation of two paragraphs dealing with basic principles. The repair of each of these paragraphs has ripple effects requiring corresponding changes in multiple related paragraphs throughout the code.

Other Issues Discussed by the Task Group:

1. Based on input from the Scale Manufacturers Association and discussion within the task group the decision was made to replace all references to the "verification scale division" with the term "verification scale interval". The intent of this change is to clearly differentiate between the verification scale interval (e) and the scale division (d)

2. For reference, the following specifications, tolerances, and user requirements are specific to the scale division (d).

Code Section	Applies to	Justification
G-S.5.2.2.(c)	d	Rounding is a function of instrument operation not accuracy
G-S.5.2.2.(d)	d	Requires "d" to be an indicated zero and all digits to the left of "d" to be zero when d<1. Requires "d" to be an indicated zero and all digits to the right of "d" to be zero when d>5.
S.1.1.1.(a)	d	Describes width of the zero division, also sets up the normal rounding half-up/half-down
S.1.2.1	d	Refers to rounded values of d.
S.1.7.(b)	e	This is a classification issue addressing maximum indication above capacity.
S.2.1.2.	d	They must be in terms of d since stability of zero setting applies to d.
S.2.1.3.(all)	d	These limit the window for action of AZT. They must be in terms of d since zero setting applies to d.
S.2.3.	d	Tare division must equal smallest increment displayed.
T.N.7.	d	Discrimination requires an instrument to discriminate to the displayed scale division (zone of uncertainty). This relates to the rounding of the smallest increment.

3. The following specifications, tolerances, and user requirements are specific to the verification scale interval (e). No changes are proposed for these sections.

Code Section	Applies to	Justification
S.1.2.3.	e	This is a classification issue. It ensures accuracy of the piece counts.
N.1.10.	e	Refers to test loads verifying piece count and must be e.
N.4.5.	e	Refers to tolerances in time dependence tests and must be e.
T.N.9.	e	This is a tolerance for reaction to a disturbance.
UR.3.10.	e	As written, this is clearly e. (See item 4 as this may need additional study)

4. The Task Group also observed that method of referencing the scale division and verification scale interval is inconsistent throughout the Code. In some cases, the paragraph only uses the abbreviation d or e, in other cases the name is stated without the abbreviation and in other cases the name is included with the abbreviation d or e in quotes or parentheses. Because the proposal only considers sections that needed change, this issue is not addressed formally in the proposal. The Task Group believes the change to a consistent method could be made editorially by OWM.

Request from the Task Group to the NCWM S&T Committee
The Task Group asks the S&T committee to replace the current S&T Block 2 items (B2) with our recommended changes to NIST HB44. We further ask the committee to make the new "Block 2" an assigned item and return it to the task group so we can consider comments and make changes as needed.

Comments in Favor:

Regulatory:
- 2024 Annual: A regulator from the State of California stated support for the item with or without the amendments to Table 8.

- 2024 Annual: A regulator from the State of Colorado expressed support for the item, stated agreement with NIST OWM's comments, and suggested the Verification Scale Division (e) Task Group work with SMA to address suitability issues.
- 2024 Annual: A regulator from the State of Oregon expressed support of the item however the committee chooses to move forward with it.
- 2024 Annual: A regulator from the State of New Jersey stated support of the item.
- 2024 Interim: A representative from the State of Oregon commented that they support the item as voting.
- 2024 Interim: A representative from the State of California commented that they support the item as voting in accordance with the task group's recommendation.

Industry:

- 2024 Annual: A representative of the Scale Manufacturers Association stated support for this item.
- 2024 Annual: A representative from Mettler Toledo expressed support for this item.
- 2024 Interim: The Scale Manufacturers Association commented that it supports the item as voting.

Advisory:

- 2024 Annual: The Chair of the Verification Scale Division (e) Task Group expressed support for the item in its entirety.
- 2024 Annual: A representative from NIST OWM stated support for the item, except for Table 8. They suggested the committee pull Table 8. out of the item and make it Informational, so that it can be updated in the future. Their presentation explained the background on how differences developed in the terms OIML and Handbook 44 use to refer to e and d such as "auxiliary indicating device" and "minimum capacity", as opposed to "minimum load" which was used in Handbook 44, then had editorial changes and became "recommended minimum load".
- 2024 Annual: A Co-Chair of the Cannabis Task Group stated that no one at their meeting was in opposition to this item and they support it.
- 2024 Interim: A representative from the Scale Verification Division Task Group, the submitter, commented that incorrect use of d and e leads to confusion, and that this will correct the terminology in the handbook. They stated that the group believes the item is ready for a vote.
- 2024 Interim: A representative from NIST OWM stressed the importance of this item, and that the current code contains contradictions and inconsistencies which lead to confusion. NIST OWM recommends voting on this item.

Comments Against:

Regulatory:

- None

Industry:

- None

Advisory:

- None

Neutral Comments:

Regulatory:

- None

Industry:

- 2024 Annual: A representative from Richard Suiter Consulting stated that they agree with NIST OWM's proposal and think it's time to update Table 8. which is all about suitability, and suggested the committee remove "Recommended" and update as it sees fit.

Advisory:

- None

Item Development:

NCWM 2024 Annual Meeting: The Committee removed sections UR.3. and Table 8. from the item and will introduce it as a new Informational item in the 2024 Carryover Report. This item was voted on and adopted by the body.

NCWM 2024 Interim Meeting: The committee made no changes to this item, believes this item is fully developed, and has assigned it voting status.

NCWM 2023 Annual Meeting: The Chair of the Specifications and Tolerances Committee asked for a volunteer for chair of the task group.

NCWM 2023 Interim Meeting: The committee updated the item under consideration with the language the task group forwarded to the committee on January 9, 2023. The committee looks forward to further development from the task group this item is assigned to.

Regional Associations' Comments:

This item was submitted by an NCWM Task Group following the fall regional meetings in 2022.

CWMA 2024 Annual Meeting: A representative from NIST OWM commented that they support adoption of this item with the exception of proposed amendments to Table 8. They recommend separating the portion of this group of items that addresses UR.3.1. and Table 8 and assigning an Informational or Assigned status to allow for additional consideration. To be technically correct the Recommended Minimum Load should be based on "d" when "d" is less than "e". The remaining items can be adopted without this proposed change.

A representative of USDA P&S commented that they do not support this item. They recommend this item be further developed. They have concerns regarding static scale vs. dynamic scale applications.

A representative of the Scale Manufacturer's Association commented that the SMA supports this item and would like to move forward as voting.

The committee recommends that this item be updated to Assigned and returned to the task group to address the concerns with UR 3.1. and Table 8.

WWMA 2023 Annual Meeting: During the WWMA 2023 annual meeting the following comments were received:

Mr. Loren Minnich (NIST OWM): Stated that the NCWM Verification Scale Division e Task Group now has a chairman and has met to begin cleaning up the language in the item. The task group will make changes to Table 8 so that it only references "verification scale division" (e). Mr. Minnich requested that this item be assigned an Informational status to receive feedback from the body of the NCWM.

Mr. Cory Hainy (Representing the SMA): Supported further development of this item with the recommendation that all references to "verification scale division" be changed to "verification interval". Mr. Hainy stated that the SMA will reconvene in November 2023, and requested that this item continue to be further developed.

Mr. Kevin Schnepp (California Division of Measurement Standards): Echoed the SMA with the request that this item be assigned an Informational status.

The WWMA 2023 S&T Committee recommends that this item be assigned an Informational status to allow the body of the NCWM to provide feedback.

SWMA 2023 Annual Meeting: The committee heard no comments on this item during Open Hearings.

The committee recommends this item remain an Assigned item.

NEWMA 2024 Annual Meeting: Mr. Steve Timar (NY), representing the e vs d Task Group, commented the purpose of task group was to correct e and d usage. The task group believes they have succeeded in clarifying the roles of e and d and asks for support of this item. Ms. Brandi Harder (Rice Lake), representing the SMA, Mr. Michael Peeler (NJ), Ms. Cheryl Ayer (NH), and Mr. Lou Sakin (Holliston, MA) representing the Cannabis Task Group, spoke in support of this item. MR. John McGuire (NIST OWM) commented that NIST OWM supports the item, with exception of Table 8 and recommends removing that portion of the item from voting and assigning it back to the task group to allow for more work. The Committee recommended to maintain a Voting status and the body concurred.

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.