

**Multiple Dimension Measuring Device Work Group
May 8-9, 2018
Meeting Summary**

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Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
NIST	National Institute of Standards and Technology	NTEP	National Type Evaluation Program
MDMD	Multiple Dimension Measuring Device	OIML	International Organization of Legal Metrology
MC	Measurement Canada	OWM	Office of Weights and Measures
MRA	Mutual Recognition Arrangement	R	Recommendation
NCWM	National Conference on Weights and Measures	WG	Work Group

Introduction and Welcome

i. Introductions and Welcome

Mr. Robert Kennington, (Quantronix, Inc. and WG Chair) welcomed everyone to the 2018 Work Group (WG) Meeting. Introductions were made around the room and the meeting was called to order.

ii. Reiteration of NTEP MDMD Work Group Mission

Discussion: Mr. Darrell Flocken (NTEP) reviewed the mission of the WG which is to deal with specific issues concerning MDMDs related to the requirements in NIST Handbook 44, NTEP type evaluation checklist in Publication 14, and maintaining the NTEP/MC Requirements Comparison Document.

iii. Report – 2018 NCWM Interim Meeting

During the January 2018 NCWM₇ Interim Meeting, the following proposal was given a Developing status. Members of this Work Group should track the activity of this proposal.

S.1.11. Provision for Sealing. - For devices and 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. For parameters adjusted using other means, the following applies:

- (a) **A The device or system** shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity ~~of the device~~ can be made to any measuring element.

Discussion: Mr. Richard Harshman (NIST-OWM) presented background information on this proposal. Note: this proposal accompanies a recommendation to adopt a new paragraph in the General Code. This proposed paragraph is G-S.8.2.; please refer to Appendix A, of this Summary Report, for more information on this item. Additional information on this item is also available in *NCWM Publication 16*, Specifications and Tolerances (S&T) Committee 2018 Interim Meeting Report currently available using the following link: <http://www.ncwm.net/meetings/annual/publication-16>

iv. **Report – Recent Measurement Canada Type Evaluation Activity**

Discussion: Mr. Pascal Turgeon (Measurement Canada) reported the following evaluation activity occurred since the May 2017 WG Meeting.

- 7 assignments were received having 3 for palletized freight static systems, 2 static system, and 2 for dynamic systems.

Mr. Turgeon informed the WG members that there is no current backlog for evaluation.

v. **Report – Recent NTEP MDMD Type Evaluation Activity**

Discussion: Mr. Tom Buck (Ohio, NTEP Laboratory) reported the following evaluation activity occurred since the May 2017 WG Meeting.

- 12 assignments were received having 5 for static systems, 3 for dynamic systems, 3 in-motion, drive thru systems, and 1 handheld system.
- The evaluations were received from 6 manufacturers and resulted in the issuing of 8 new and 4 amended CCs.

Carry Over Items

1. Review meeting summary from May 2017 meeting

A copy of the May 2017 Meeting Summary can be downloaded at www.ncwm.net/ntep/sectors/mdmd/archive. Please bring a copy of the summary with you to the meeting.

Discussion: Mr. Robert Kennington asked if there were any comments, corrections, or changes for the meeting minutes from the 2017 WG Meeting.

Mr. Kennington commented that it was agreed to during the 2017 meeting to add the statement to Publication 14, developed by the Software Sector (SS), regarding software separation. This statement could not be found in the 2018 edition of the publication. Mr. Flocken explained that the addition was withheld as the SS has asked the NTEP Committee for the creation of a separate checklist in Publication 14 dedicated to software issues. The outcome of the decision by the NTEP Committee, will determine if the additional will be added to the MDMD Checklist or become part of the software checklist.

Hearing no other comments, a call for approval of the minutes was made and a positive vote was received from all voting members of the WG.

2. Review changes to NIST, Handbook 44, MDMD code since last meeting

During the NCWM, Annual Meeting in July 2017, the following proposals were adopted into Handbook 44.

S.1.7. Minimum Measurement Lengths. – Except for entries of tare, the minimum measurement length to be measured by a device is 12 d divisions. The manufacturer may specify a longer minimum measurement length. **For multi-interval devices, this applies only to the first measuring segment.**

S.1.8. Indications Below Minimum and Above Maximum. – When objects are smaller than the minimum dimensions identified in paragraph S.1.7. Minimum Measurement Lengths or larger than any of the maximum dimensions plus 9 d, and/or maximum volume marked on the device plus 9 d, or when a combination of dimensions, **including tare**, for the object being measured exceeds the measurement capability of the device, the indicating or recording element shall either:

Discussion: Mr. Darrell Flocken reviewed the proposal, shown above, that was voted on during the July 2017 NCWM Annual Meeting. The proposal was adopted and the changes were incorporated into the 2018 edition of NIST Handbook 44.

3. Review changes to NCWM, Publication 14, MDMD Checklist

The following change, as agreed to during the May 2017 MDMD Work Group meeting, was made to the MDMD Checklist in the 2018 edition of Publication 14:

Removed reference to a requirement involving a “live” display in sentence 3.5.

No other changes were made.

Discussion: Mr. Darrell Flocken (NCWM NTEP Specialist) reviewed the single change made to the 2018 edition of Publication 14. Refer to the 2017, MDMD WG Meeting Summary for more details on this change.

4. Review changes to Measurement Canada MDMD Code, and Terms and Conditions Documents

Discussion, as needed, regarding any changes to the Canadian MDMD Code since the Work Group’s May 2017 meeting.

- 4.1. MC's decision to allow Cubetape PRO and Cubetape POS from Parcel Tools to be used in trade without being approved;
- 4.2. MC's decision on printed information required when requested by the Customer; and
- 4.3. Status on external consultation on MDMD Terms and Conditions.

Discussion: Beyond changes to Canadian MDMD terms and Conditions, Mr. Pascal Turgeon (MC) wanted to inform the group on 3 other topics related to MDMDs:

- 4.1. Mr. Turgeon distributed a letter informing each member of the group that Cubetape PRO and Cubetape POS, manufactured by Parcel Tools, when used with a tape that displays measurement values (numbers) and barcodes, are to be considered as Linear Static Measures and are exempt from approval, examination and certification (Weights and Measures Regulations, paragraph 4(1)(o)). Consequently, in Canada, these Linear Static Measures can be used in trade just like a regular tape measure would be. It was also mentioned to be careful because some very similar measuring tools, depending on how they operate, are not Linear Static Measures and are not exempt from approval and must be certified by Measurement Canada before using it in trade. It was reiterated that in case of doubt, contact Measurement Canada for clarification;

- 4.2. On a few occasions, it was brought to Pascal’s attention that some device owners did not provide complete information to customers. For this reason, Pascal wanted to clarify the requirement.

In section 3.0 of the current [*Terms and conditions for the approval of multiple dimension measuring device*](#), it states that when a customer is not present for the transaction, the trader must provide (in printed or in any other form (i.e. email)) to the customer, dimensions and/or volume, with units of measurement. What is meant by dimensions and/or volume is the values given by the MDMD. If your MDMD measures by 0.1 inch, then all measurements shall be by 0.1 in. For example, a box measuring 13.1 inches x 13.4 inches x 13.9 inches shall not be rounded to 13 inches x 13.5 inches x 14 inches. If the trader uses these values to provide a dimensional weight, it is acceptable but the customer must be able, within a period of 30 days, to get the original values given by the MDMD.

- 4.3. A new Terms and Conditions document is in the developing process. External consultation on the document is the next step and Pascal will keep the group inform when the document is ready for consultation.

Mr. Turgeon provided the following information to the manufacturers regarding changes in the evaluation process.

In the past, both in-motion and palletized freight devices have typically been regarded as being too large to test in the laboratory. A new policy is that all testing of these devices will be performed in the Measurement Canada laboratory.

For palletized freight this means that the device must be able to be installed in our high bay. It will require a self-supporting structure. These tests will be full sized tests of the device. In exchange for this, manufacturers can have the temperature tests done in the MC chamber. The chamber may require a scaled down version of the device. Manufacturers will continue to have the option of having the evaluation performed off-site; however, this will then require the temperature testing be done on a full-size device.

For in-motion devices the manufacturer can supply a portable belt which will be tested in the MC temperature chamber. In this situation, MC will allow some scaling of the device. However, for test conducted out side the temperature chamber (e.g. maximum belt speed and object size) scaling is not permitted.

5. Review OIML Activity Related to R129 CD2

Discussion, as needed, regarding activity of the OIML Committee responsible for revising the International Recommendation 129 for MDMD instruments

Discussion: Mr. Richard Harshman (NIST OWM) and Mr. Pascal Turgeon (MC) both reported that progress on the revision to OIML R 129 is slow; however, the 3rd Committee Draft document is expected for distribution to the OIML committee members in July 2018.

6. Review update to NTEP / MC Requirements Comparison Document

Source: Work Group

Status: The NTEP / Measurement Canada Requirements Comparison document is unchanged since the Work Group's September 2015 meeting. A copy of the document is available on the NCWM website in the MDMD Work Groups, Meeting Archives.

Recommendation: Review and determine if any NTEP or Measurement Canada changes to regulations or requirements impact the contents of this document.

Discussion: Mr. Pascal Turgeon reported that no change has occurred to the Measurement Canada regulations that would require a change to this document. Mr. Darrell Flocken reported that no change has occurred to NIST Handbook 44 or NCWM Publication 14 that would require a change to this document. Based on this information, a review of the document was postponed until the next WG meeting.

7. Publication 14, MDMD Checklist

7.1. At the May 2017 meeting, a work group was created to review and make any recommendations for changes to Publication 14 based on the adopted changes to Handbook 44 at the NCWM's, 2016 annual meeting. The work group was also charged with developing a recommendation for any changes to Publication 14 based on the adoption of a proposal for a change to Handbook 44, up for adoption during the NCWM's, 2017 annual meeting. Note: the proposed item was adopted during the NCWM's, 2017 annual meeting.

7.1.1.a. Item 1 - as adopted:

S.1.5. Value of Dimension /Volume Division Units. – The value of a device division “d” expressed in a unit of dimension 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:

....

The subgroup reviewed the contents of Publication 14, 2017 edition and found the current wording.

3. Indicating and Recording Elements – General

....

Code Reference S.1.5.

....

3.10 Displayed and printed values of length, width, and height must be in the same unit of measure.

While this statement does not specifically mention the value of “d”, the requirement that all measurement values must be in the same unit of measure implies that “d” must satisfy this specification.

Recommendation:

The subgroup recommends modifying sentence 3.10 by adding examples of units of measures as shown below.

3.10 Displayed and printed values of length, width, and height must be in the same unit of measure **(e.g. cm, in, etc).**

Discussion: Mr. Darrell Flocken reviewed the changes to paragraph S.1.5. of the MDMD Code of NIST Handbook 44 that had been adopted at the 2016 NCWM Annual Meeting. In addition, he presented the recommendation from the MDMD subgroup to amend NCWM Publication 14 to align it with the HB 44 MDMD Code changes. The members of the WG agreed with the recommendation. Upon approval of the NTEP Committee, the adopted wording will be added into the 2019 edition of Publication.

7.1.1.b. Item 2 - as adopted:

Table S.4.1.a. Marking Requirements for Multiple Dimension Measuring System				
To Be Marked With	Multiple Dimension Measuring Equipment			
	Multiple Dimensions Measuring Device and Indicating Element in Same Housing	Indicating Element Not Permanently Attached to Multiple Dimension Measuring Element	Multiple Dimension 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 for 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 Speed (5)(9)	X	X	X	
Special Application (6)(9)	X	X	X	
Limitation of Use (7)(9)	X	X	X	

(Amended 2016)

Table S.4.1.b. Multiple Dimension Measuring Systems Notes for Table S.4.a.
<p>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.)</p> <p>2. Modules without "intelligence" on a modular system (e.g., printer, keyboard module, etc.) are not required to have serial numbers.</p> <p>3. The minimum and maximum dimensions and measuring division (using upper and lower case type) shall be marked. For example: Length: min ___ max ___ d ___ Width: min ___ max ___ d ___ Height: min ___ max ___ d ___</p> <p>4. Required if the range is other than -10 °C to 40 °C (14 °F to 104 °F.)</p> <p>5. Multiple dimension measuring devices, 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.</p> <p>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.</p> <p>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.</p> <p>8. Required only if a Certificate of Conformance has been issued for the equipment.</p> <p>9. <u>This marking information may be readily accessible via the display. Instructions for displaying the information shall be described in the NTEP CC.</u> (Amended 2016)</p>

The subgroup reviewed the contents of Publication 14, 2017 edition and found that Table S.4.1.a. contains much the same information as that appearing in Table S.4.1.a. of NIST Handbook 44 except the footnote reference numbers do

not match those in Table S.4.1.a. of HB 44. In addition, the corresponding footnotes in Table S.4.1.a. of Publication 14 are not expressed in tabular format as they are in NIST Handbook 44 (Table S.4.1.b.).

Recommendation:

The subgroup recommends that Table S.4.1.a. and all its corresponding footnotes located on page MDMD-6 of NCWM Publication 14, 2017 edition, be replaced with the two tables shown above to include adding the six new references to note 9 in Table S.4.1.a. and adding new note 9 to Table S.4.1.b.

In addition, the subgroup recommends removing the “Editor’s Note” located directly after the current table in Pub 14.

Discussion: Mr. Darrell Flocken reviewed the changes to Table S.4.1.a. and Table S.4.1.b. of the MDMD Code in NIST Handbook 44 (HB 44) that had been adopted at the 2016 NCWM Annual Meeting. In addition, he presented the recommendation from the MDMD subgroup to amend NCWM Publication 14 to align it with the HB 44 MDMD Code changes. The members of the WG agreed with the recommendation. Upon approval of the NTEP Committee, the adopted wording will be added into the 2019 edition of NCWM Publication 14.

7.1.1.c. Item 3 - as adopted:

S.2.2. Tare. – The tare function...

S.2.2.1. Maximum Value of Tare for Multi-Interval (Variable Division-Value) Devices. – **A multi-interval device shall not accept any tare value greater than the maximum capacity of the lowest range of the axis for which the tare is being entered.**

(Added 2016)

S.2.2.2. Net Values, Mathematical Agreement. - **All net values resulting from a device subtracting a tare entry from a gross value indication shall be indicated and recorded, if so equipped, to the nearest division of the measuring range in which the net value occurs. In instances where the tare value entered on a multi-interval device is in a lower partial measuring range (or segment) than the gross indication, the system shall either alter the tare entered or round the net result after subtraction of the tare in order to achieve correct mathematical agreement.**

The following example (of a multi-interval device having two partial measuring ranges for the “x” axis) and accompanying two tables are provided to further clarify the two acceptable methods a device can use to achieve mathematical agreement when tare has been entered in a lower partial measuring range than the gross indication:

Example multi-interval device having two partial measuring ranges for the “x” axis:

- **Partial measuring range 1: 0 – 100 inches by 0.2 inch**
- **Partial measuring range 2: 100 – 300 inches by 0.5 inch**

Table 1: Examples of Acceptable Altering of Tare to Achieve Accurate Net Indication

<u>Gross Indication of Item Being Measured</u>	<u>Tare Entered</u>	<u>Value of Tare after Being Altered by the Device</u>	<u>Acceptable Net Indication</u>
<u>154.5 inches</u>	<u>41.2 inches</u>	<u>41.0 inches</u>	<u>113.5 inches</u>
<u>154.5 inches</u>	<u>41.4 inches</u>	<u>41.5 inches</u>	<u>113.0 inches</u>

Table 2: Examples of Acceptable Rounding of the Net Result (Following the Subtraction of Tare) to Achieve Accurate Net Indication

<u>Gross Indication of Item Being Measured</u>	<u>Tare Entered</u>	<u>Net Result Before Rounding</u> <i>(Gross Indication Minus Tare Entered)</i>	<u>Acceptable Net Indication Rounded to Nearest 0.5 inch</u>
<u>154.5 inches</u>	<u>41.2 inches</u>	<u>113.3 inches</u>	<u>113.5 inches</u>
<u>154.5 inches</u>	<u>41.4 inches</u>	<u>113.1 inches</u>	<u>113.0 inches</u>

(Added 2016)

Amend Table S.4.1.a. Marking Requirements for Multiple Dimension Measuring Equipment as follows:

Table S.4.1.a. Marking Requirements for Multiple Dimension Measuring Systems				
To Be Marked With ↓	Multiple Dimension Measuring Equipment			
	Multiple Dimension Measuring Device and Indicating Element in Same Housing	Indicating Element Not Permanently Attached to Multiple Dimension Measuring Element	Multiple Dimension 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 for Each Axis for Each Range in Each Axis (3)	x	x	x	
Value of Measuring Division, d (for each axis and range)	x	x	x	
Temperature Limits (4)	x	x	x	
Minimum & Maximum speed (5)	x	x	x	
Special Application (6)	x	x	x	
Limitation of Use (7)	x	x	x	

(Amended 2016)

Amend paragraph T.2.3. Multi-Interval (Variable Division-Value) Devices and add a new paragraph T.2.4. Mixed-interval Devices. as follows:

T.2.3. Multi-interval (Variable Division-Value) Devices. – ~~For multi-interval (variable division value) devices,~~ When there exists two or more partial measuring ranges (or segments) specified for any of the “dimensioning” axes (length (x), width (y), or height (z)) and the division values corresponding to those partial measuring ranges (or segments) within the same “dimensioning” axis differ, the tolerance values ~~are~~ shall be based on the value of the ~~device~~ device division of the range in use.

(Amended 2016)

T.2.4. Mixed-interval Devices. - For devices that measure to a different division value in at least one dimensioning axes and all axes are single range, the tolerance values shall be based on the value of the division of the axis in use.

(Added 2016)

The subgroup reviewed the contents of NCWM Publication 14, 2017 edition and recommends the following four additions/changes:

Note: The recommended changes follow the format of the item as presented in the 2017 edition of NIST Handbook 44, which is slightly different than that shown in the 2016 edition of NCWM Publication 16.

Recommendation 1: Add the wording adopted in paragraph S.2.2.1. as a new paragraph numbered 8.6.

8.6. Maximum Value of Tare for Multi-Interval (Variable Division-Value) Devices. – A multi-interval device shall not accept any tare value greater than the maximum capacity of the lowest range of the axis for which the tare is being entered.

Recommendation 2: Add the wording adopted in paragraph S.2.2.2. as a new paragraph numbered 8.7.

8.7. Net Values, Mathematical Agreement. - All net values resulting from a device subtracting a tare entry from a gross value indication shall be indicated and recorded, if so equipped, to the nearest division of the measuring range in which the net value occurs. In instances where the tare value entered on a multi-interval device is in a lower partial measuring range (or segment) than the gross indication, the system shall either alter the tare entered or round the net result after subtraction of the tare in order to achieve correct mathematical agreement.

Consider a multi-interval device having two partial measuring ranges for the “x” axis:

- Partial measuring range 1: 0 – 100 inches by 0.2 inch
- Partial measuring range 2: 100 – 300 inches by 0.5 inch

The following examples clarify the two acceptable methods this device can use to achieve mathematical agreement when tare has been entered in a lower partial measuring range than the gross indication:

<u>Acceptable Example 1.</u>			
<u>Altering of a Tare Entry to Achieve Accurate Net Indication</u>			
<u>Gross Indication of Item Being Measured</u>	<u>Tare Entered</u>	<u>Value of Tare after Being Altered by the Device</u>	<u>Acceptable Net Indication</u>
<u>154.5 inches</u>	<u>41.2 inches</u>	<u>41.0 inches</u>	<u>113.5 inches</u>
<u>154.5 inches</u>	<u>41.4 inches</u>	<u>41.5 inches</u>	<u>113.0 inches</u>

<u>Acceptable Example 2.</u>			
<u>Rounding of the Net Result (Following the Subtraction of Tare) to Achieve Accurate Net Indication</u>			
<u>Gross Indication of Item Being Measured</u>	<u>Tare Entered</u>	<u>Net Result Before Rounding (Gross Indication Minus Tare Entered)</u>	<u>Acceptable Net Indication Rounded to Nearest 0.5 inch</u>
<u>154.5 inches</u>	<u>41.2 inches</u>	<u>113.3 inches</u>	<u>113.5 inches</u>
<u>154.5 inches</u>	<u>41.4 inches</u>	<u>113.1 inches</u>	<u>113.0 inches</u>

Recommendation 3: Amend Table S.4.1.a. Marking Requirements for Multiple Dimension Measuring Equipment:

Minimum and Maximum Dimensions for Each Axis for Each Range in Each Axis (3)	x	x	x	
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Recommendation 4: Amend the Checklist to align the new application of the tolerance value to Multi-Interval (Variable Division-Value) Devices and the new paragraph T.2.4. Mixed-interval Devices

Discussion: Mr. Darrell Flocken reviewed the adopted changes, as shown in agenda item 7.1.7.c, made to the MDMD Code in NIST Handbook from the NCWM, Annual Meeting in July 2016. In addition, he presented the 4 recommendations from the MDMD subgroup to change NCWM Publication 14 to align it with the code changes. The members of the WG agreed with the recommendation. Upon approval of the NTEP Committee, the adopted wording, as recommended in all 4 recommendations will be added into the 2019 edition of Publication.

It was noted during the subgroup’s review of NCWM Publication 14 that there is no reference of the tolerance value defined in Handbook 44 or how the tolerance is to be applied to single interval, multi-interval, or mixed Interval operation. The WG members agreed that the tolerance value, and how it should be applied to the instrument’s operation should be included in the checklist. Mr. Richard Harshman recommended that this information be included in the checklist as this would be consistent with the checklists for other device types. He also suggested that the WG look at the checklist for Digital Electronic Scales to see if the same, or similar, wording could be used. It was suggested and agreed to that the subgroup would remain intact and develop and present a recommendation on this subject at next year’s WG meeting. Mr. Harshman agreed to participate in the subgroup and Mr. Flocken agreed to chair the group.

Members of the subgroup are:

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> Mr. Sprague Ackley, Honeywell Mr. Tom Buck, OH Dept. of Agriculture, NTEP Laboratory Mr. Scott Davidson, Mettler-Toledo, LLC Mr. Darrell Flocken, NTEP (Chair) Mr. Richard Harshman, NIST-OWM | | <ul style="list-style-type: none"> Mr. Tony Romeo, Datalogic USA, Inc. Mr. Dick Suiter, Richard Suiter Consulting Mr. Pascal Turgeon, MC Mr. Scott Wigginton, United Parcel Services |
|---|--|--|

Information regarding the group’s first conference call will be announced at a later date.

7.1.2. During the 2017 NCWM Annual Meeting, the following proposal to revise Handbook 44 was adopted:

Amend NIST Handbook 44, Multiple Dimension Measuring Devices Code as follows:

S.1.7. Minimum ~~Measurement Lengths~~. – Except for entries of tare, the minimum measurement length ~~length to be measured~~ by a device is 12 ~~d~~ divisions. The manufacturer may specify a longer minimum measurement length.
For multi-interval devices, this applies only to the first measuring segment.

S.1.8. Indications Below Minimum and Above Maximum. – When objects are smaller than the minimum dimensions identified in paragraph S.1.7. Minimum ~~Measurement-Lengths~~ or larger than any of the maximum dimensions plus 9 d, and/or maximum volume marked on the device plus 9 d, or when a combination of dimensions, including tare, for the object being measured exceeds the measurement capability of the device, the indicating or recording element shall either:

...

The subgroup reviewed the contents of NCWM Publication 14, 2017 edition and found several places where the word “length” is used to define the measurement of the axes. The subgroup recommends the following changes:

Recommendation 1:

16. Measurement Speed Test

...

Test procedure:

...

10. Place a standard or test object with a length equal to the ~~maximum measurementlength~~ capacity on/in measurement area and observe, and print or record the results.
11. Place a standard or test object with a width equal to the ~~maximum measurementwidth~~ capacity on/in measurement area and observe, and print or record the results.
12. Place a standard or test object with a height equal to the ~~maximum measurementheight~~ capacity on/in measurement area and observe, and print or record the results.
13. Place a standard or test object with a length equal to the ~~minimum measurementlength~~ capacity on/in measurement area and observe, and print or record the results.
14. Place a standard or test object with a width equal to the ~~minimum measurementwidth~~ capacity on/in measurement area and observe, and print or record the results.
15. Place a standard or test object with a height equal to the ~~minimum measurementheight~~ capacity on/in measurement area and observe, and print or record the results.

Recommendation 2: Revise Footnote 6 in Table S.4.1.a. by removing the word “length”

⁶ Multiple dimension measuring devices, which require that the object or device be moved relative to one another, shall be marked with the ~~length~~ minimum and maximum speeds at which the device is capable of making measurements that are within the applicable tolerances.

Discussion: Mr. Darrell Flocken reviewed the adopted changes, as shown in agenda item 7.1.2, made to the MDMD Code in NIST Handbook from the NCWM, Annual Meeting in July 2017. In addition, he presented the recommendation from the MDMD subgroup to change Publication 14 to align it with the code changes. The members of the WG agreed with the recommendation. Upon approval of the NTEP Committee, the adopted wording will be added into the 2019 edition of Publication.

8. Report on progress from multi-interval operation requirements subgroup

Source: Multi-Interval Operation Requirements Subgroup

Background /Discussion: During the October 2014 meeting the work group agreed to form a small subgroup charged with the task to develop requirements that address multi-interval operation for inclusion into both HB-44 and Pub 14. Members of the subgroup are as follows: Mr. Darrell Flocken, Mr. Rick Harshman, Mr. Scott Davidson, Mr. Justin Rae, and Mr. Scott Wigginton.

Recommendation: The Work Group will be updated on their progress.

Discussion: Mr. Richard Harshman (Chair of the subgroup) informed the members that based on the adoption of the information discussed in agenda item 7, the work of this subgroup is complete and the subgroup has been disbanded. This item will not appear in the WG's 2019 agenda.

New Items

9. In-motion Forklift based Pallet Dimensioning

Recently, several NTEP Certificates of Conformance have been issued to devices designed to measure palletized freight while being transported (in-motion) on a forklift truck. The Ohio Lab, in conjunction with the device manufacturer, has created a series of tests used during the evaluation. Mike Kelly will lead a discussion on these test procedures and the Work Group members are asked to consider if these tests are appropriate and if they should be added to the Publication 14 Checklist.

Discussion: Mr. Mike Kelly (Ohio, NTEP Laboratory) lead a discussion regarding the test procedures to evaluate a dimensioning system used to measure palletized freight while being transported (in-motion) by a lift truck. Mr. Kelly has worked with 3 separate manufacturers in the evaluation of this device type and as a result of this, has developed some tests specific to these devices. A brief overview of the new tests along with the interpretation of the results was presented. While all WG members agreed that additional tests are needed, some WG members felt that some of the proposed tests could be incorporated into existing test procedures. One example of this was a shift test; for devices that measure an object statically this test consists of placing the object at various locations within the measuring field. One of the tests proposed for the device under discussion was a positioning test where the fork truck was to be run thru the measuring area at different positions across the measuring field. Some members felt that a revision and, possibly, a renaming of the existing shift test, could provide the same intent. A copy of Mr. Kelly's presentation slides used in the discussion of this item can be found in Appendix B of this Summary Report. (Note: the attached presentation is not to be considered a recommendation to the WG but only information used by Mr. Kelly during the open discussion.)

After some discussion, it was mentioned that it may be in the best interest of the WG to form a subgroup focused on this topic. WG members agreed and a subgroup was formed. Mr. Bruce Budinger (Northrop Grumman / AOA Xinetics) volunteered to Chair the group.

Mr. Kelly offered to share illustrations/explanations of his test procedures with the subgroup as a starting point. It was agreed that the subgroup would try to have a completed draft proposal for consideration by the WG at the 2019 MDMD WG meeting.

Members of the subgroup are:

Mr. Sprague Ackley, Honeywell	Mr. Robert Kennington, Quantronix, Inc.
Mr. Mike Kelly, OH Dept. of Agriculture, NTEP Laboratory	Mr. Don Newell, NMFTA
Mr. Bruce Budinger, Northrop Grumman / AOA Xinetics (Chair)	Mr. Chris Senneff, Rice Lake Weighing Systems
Mr. Tom Buck, OH Dept. of Agriculture, NTEP Laboratory	Mr. Dick Suiter, Richard Suiter Consulting
Mr. Scott Davidson, Mettler-Toledo, LLC	Mr. Pascal Turgeon, Measurement Canada
Mr. Darrell Flocken, NTEP	Mr. Scott Wigginton, United Parcel Services
Mr. Richard Harshman, NIST-OWM	Mr. Scott Henry, Zebra Technologies Corp.

Information regarding the group's first conference call will be communicated at a later date.

10. Misc Items for General Discussion

During recent NTEP evaluations, the Ohio Lab has been asked to evaluate a few device features and /or functions. These included:

1. Handheld Device.
2. Manual entry of a measurement value.
3. Tare value entry.

Mike Kelly will lead a discussion on these tests with the Work Group Members regarding these items.

Discussion: Mr. Mike Kelly (Ohio, NTEP Laboratory) led a discussion on the 3 items mentioned in the agenda. The summary of the discussion is provided below.

1. The discussion involved an example of a handheld device where a photo of the object to be measured was taken and then the object to be measured was manually adjusted to fit inside a box shaped outline on the screen of the device. This was then used to determine the objects dimensions. The result of the discussion was that some manufacturers and users seemed okay with the operator adjusting box size on the screen; however, regulators and NIST did not.
2. The result of the discussion on this item was that a device where the measurements are hand entered would not need an NTEP CC. While this was the majority opinion, it was not the overall consensus of the WG.
3. This discussion involved the thought that the tare value could be entered into the device in a smaller size than the "d" value for the axis and that a tare value could only be entered for the horizontal axis. The result of the discussion was that, the tare value must be in the same unit of measurement and to the same resolution as "d." Additionally, it was agreed that while there seems to be no need for entering a manual tare in either the length or width axes, there was no consensus to define this limitation. It was also suggested that the height of the skid, for which a manual tare will be entered during testing should be a multiple of the value of the height resolution (d) of the device.

11. Removal of the "Provisional" (P) Status on the NTEP Certificates of Conformance

During the May 2017 MDMD WG meeting, the question was raised regarding the removal of the "Provisional" (P) status on existing NTEP Certificates of Conformance (CC). Specifically, what is the determining factor(s) necessary to end the issuing of provisional certificates and what impact would its removal have on current NTEP Certificates of Conformance?

Removal of the Provisional Status is based on the completeness of the Publication 14, checklist for the device; once the WG and the NTEP Administrator agree that the evaluation checklist addresses all requirements as mentioned in the most recent edition of *NIST, Handbook 44*, for the device type, NTEP will begin issuing certificates without the provisional status.

Additional, when the decision is made to stop issuing provisional certificates, NTEP will review all certificates with a provisional status: the review will consist of comparing the features, options, and test conditions, shown on the certificate, to the requirements in the most recent edition of the published checklist. The review would identify any new or changed requirements that were adopted after the issuance of each CC. Any new or changed requirement identified could result in the need for additional testing. The provisional status will be removed after any identified additional testing is successfully completed. If no additional testing is identified, the provisional status will be removed and NTEP will reissue the CC.

For additional information related to provisional certificates, refer to Publication 14, Administrative Policy, Section 12.3 and Section 14.

Discussion: During last year's meeting, the WG members asked about the process of removing the Provisional Status for existing and future NTEP Certificates of Conformance (CC.) During this year's meeting, Mr. Darrell Flocken provided the WG member with the following information:

1. Provisional Status will be removed when either the WG or the NTEP Administrator feels the evaluation checklist in Publication 14 has addresses all current requirements as defined in the most recent edition of NIST Handbook 44.
2. Once agreed to stop issuing Provisional Certificates of Conformance, NTEP will review all "Active" CCs to compare the test criteria used to issue the CC to the test criteria listed in the most current edition of the Publication 14 Checklist. The intent is to identify all devices that may require additional testing based on new or revised test criteria developed after the CC was issued and deemed to be applicable to the model listed on the CC.
3. Upon completion of the CC review, the manufacturer will be informed, by email or letter, that additional testing is or is not required.
 - a. If no additional testing is required, NTEP will reissue the CC with the Provisional Status removed.
 - b. If additional testing is deemed necessary, the manufacturer will be informed and given 90 days to schedule the additional tests. When all additional tests are successfully completed, NTEP will reissue the CC with the Provisional Status removed.

Note: in either case, the manufacturer will not be required to submit an application and will not be charged an application or certificate revision fee. The manufacturer will be responsible for any and all NTEP Lab fees associated with performing the required tests.

The WG members were informed that the decision to remove the Provisional status was made and NTEP will begin the CC review process. Manufacturers are not required to take any actions until they receive the letter informing them of the results of the CC review process.

Closing Discussion

12. Review meeting activities and conclusions

Discussion: Nothing specific to report.

13. Define next steps (if needed)

Discussion: The assigned action items from this meeting are:

- a. The continuation of the subgroup tasked with developing proposed changes to the MDMD Checklist in NCWM Publication 14 to include the device tolerance value and an explanation of how the tolerance value is to be applied during the evaluation of the different modes of operation, e.g., single interval, multi-interval, etc. The subgroup is tasked with developing a draft proposal for possible consideration by members at the WG's 2019 meeting.
- b. A new subgroup will form to develop proposed changes to the MDMD Checklist for the evaluation of measuring palletized freight being transported (in-motion) on a lift truck. The subgroup is tasked with developing a draft proposal for possible consideration by members at the WG's 2019 meeting.
- c. NTEP will begin the CC review and notification to manufacturers of the need for any additional testing for the intent of removing the Provisional status from all "Active" CCs.

14. Chairman's discussion

Discussion: Mr. Robert Kennington (WG Chair) informed the WG members that he will be resigning the Chair position at the end of this meeting. Mr. Flocken took the opportunity to explain the process to locate the WG's next Chair. In short, the process is:

1. All WG members will receive an email from Mr. Darrell Flocken, asking for nominations for the position. The member can nominate another WG member or they can nominate themselves.
2. Once the nomination deadline is reached, each nominee will be contacted to see if they wish to be considered for the position.
3. An email, including the name of each nominee will be sent to the WG members asking for their selection/vote.
4. Once the voting deadline is reached, the individual with the most votes will be informed after which an email will be sent out informing all WG Members of the new Chair.

The deadline for the process will be no later than mid-December 2018 as the new Chair must be “officially” appointed by the NCWM, Interim Meeting scheduled for January 2019.

Mr. Flocken also took the opportunity to remind the WG members that the WG is charged with appointing a WG member with the responsibilities of developing the meeting agenda and the meeting summary/minutes. This individual can be appointed by the WG members or the Chair. NTEP will assist in the transition of this responsibility and be available to provide ongoing support for the meeting and the documents.

15. Next meeting

The work group is encouraged to recommend a date and location for the next work group meeting. The recommendation will be presented to the NTEP Committee for review and approval. The work group should maintain, at a minimum, a yearly meeting schedule.

Discussion: The members agreed that the 2019 meeting will Tuesday, May 7th from 1:00 pm to 5:00 pm and Wednesday, May 8th from 8:00 am to 5:00 pm. The meeting will be held at the Ohio Department of Agriculture, Administration Building, Conference room 129. (Alternative dates of May 14th and 15th were agreed to if needed.)

Appendix A, Meeting Agenda Item iii

2018 MDMD Work Group Agenda Item iii.: OWM's proposals to address weighing and measuring equipment in which the configuration or calibration parameters can be changed using a removable digital storage device, such as an SD card, USB flash drive, etc., that must remain in the device for the device to be operational.

The OWM proposals are contained in Block 7 of the 2018 Specifications and Tolerances (S&T) Committee's Interim Report (NCWM Publication 16). The following is a link to that report:

http://www.ncwm.net/_resources/e30d:p74t7a-1x8/files/76035627zccf278df/_fn/4-ST-Web.pdf

There are 19 items in Block 7. The main item is a proposal to add a new General Code paragraph G-S.8.2. as follows:

B7: GEN-2D G-S.8.2. Devices and Systems Adjusted Using Removable Digital Device Storage

Item Under Consideration:

Modify the General Code as follows

G-S.8.2. Devices and Systems Adjusted Using Removable Digital Storage Device. - For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, such as a secure digital (SD) card, USB flash drive, etc., security shall be provided for those parameters using either (1) an event logger in the device; or (2) a physical seal that must be broken in order to remove the digital storage device from the device (or system). If security is provided using an event logger, the event logger shall include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available on demand through the device or through another on-site device. In addition to providing a printed copy of the information, the information may be made available electronically. 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.)

(Added 20XX)

The purpose of all the remaining items in the block, including the proposed changes to MDMD code paragraph S.1.11. is to direct readers to the new General Code paragraph when they encounter a device or system that can be adjusted using a removable digital storage device.

B7: MDM-1 D S.1.11. Provision for Sealing.

Item Under Consideration:

Modify Multiple Dimension Measuring Devices Code as follows:

S.1.11. Provision for Sealing. - For devices and 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. For parameters adjusted using other means, the following applies:

- (a) **A The device or system** shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity **of ~~the device~~** can be made to any measuring element.
- (b) Audit trails shall use the format set forth in Table S.1.11. Categories of Devices and Methods of Sealing for Multiple Dimension Measuring Systems.

(Amended 20XX)

Appendix B, Presentation/Discussion on In-motion Palletized Freight, by Mr. Kelly

In- motion Palletized Freight

Checklists and Test Procedures

1. Marking - Complete DevicesError! Bookmark not defined.
2. Sealing.....Error! Bookmark not defined.
3. Indicating and Recording Elements – GeneralError! Bookmark not defined.
4. Values DefinedError! Bookmark not defined.
5. TareError! Bookmark not defined.
6. Tare Operation - Facilitation of Fraud.....Error! Bookmark not defined.
7. Recorded RepresentationsError! Bookmark not defined.
8. Design of Zero and Tare.....Error! Bookmark not defined.
9. Systems with Two or More Measuring ElementsError! Bookmark not defined.
10. Verification of Usage (Field Testing only)Error! Bookmark not defined.
11. Operating Temperature Verification of Warm-up Time (Accuracy After Cold Start)..Error! Bookmark not defined.
12. Performance Tests.....Error! Bookmark not defined.
13. Position Test.....Error! Bookmark not defined.
14. Conveyor Belt Seam Test.....Error! Bookmark not defined.
15. Variable Orientation Test.....Error! Bookmark not defined.
16. Measurement Speed TestError! Bookmark not defined.
17. Minimum Spacing Test.....Error! Bookmark not defined.
18. Touching Objects TestError! Bookmark not defined.
19. Irregularly Shaped Objects Test.....Error! Bookmark not defined.
20. Drag Test.....Error! Bookmark not defined.
21. Minimum and Maximum Measurement Capabilities.....Error! Bookmark not defined.
22. Power Voltage.....Error! Bookmark not defined.
23. Influence Factor

In- motion Palletized Freight

1. **Sensor / Emitter Obstruction Test:** (section 12 Performance test)

Block all sensors or emitters one at a time.

The purpose of this test is to verify the behavior of the DUT

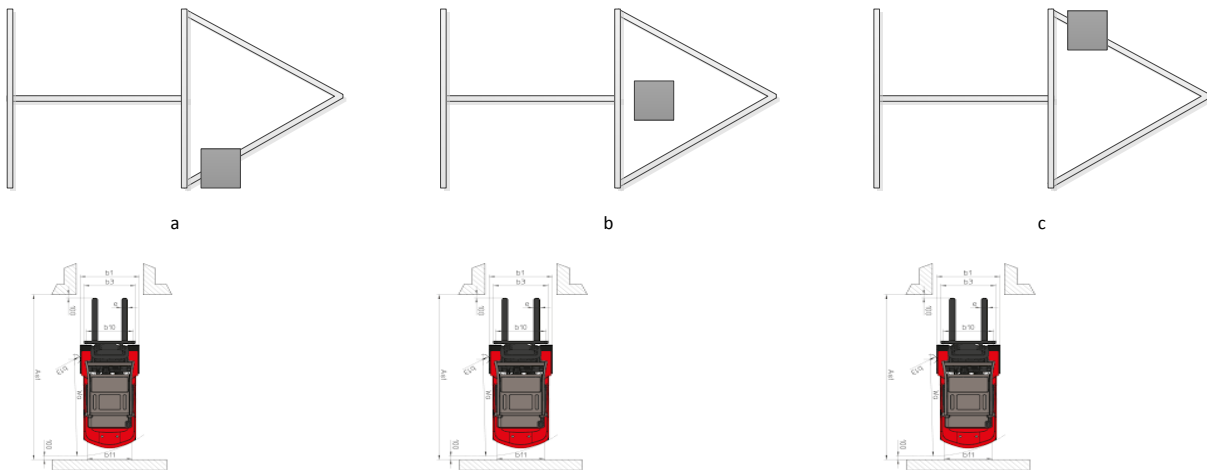
2. **Forklift Sensor Test :** (section 12 Performance test)

Block all sensors on the forklift one at a time.

The purpose of this test is to verify the behavior of the DUT

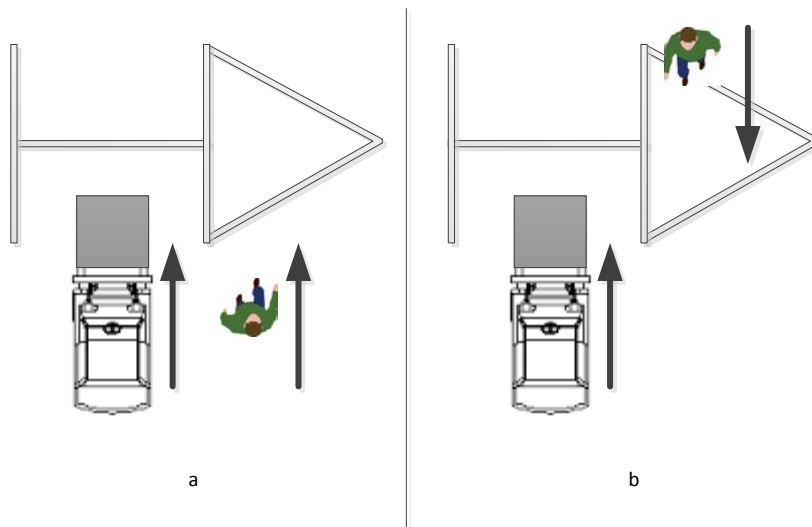
3. **Static Object in the Field of View:** (section 12 Performance test)

The purpose of this test is to verify the behavior of the DUT when a static object is placed in the field of view.



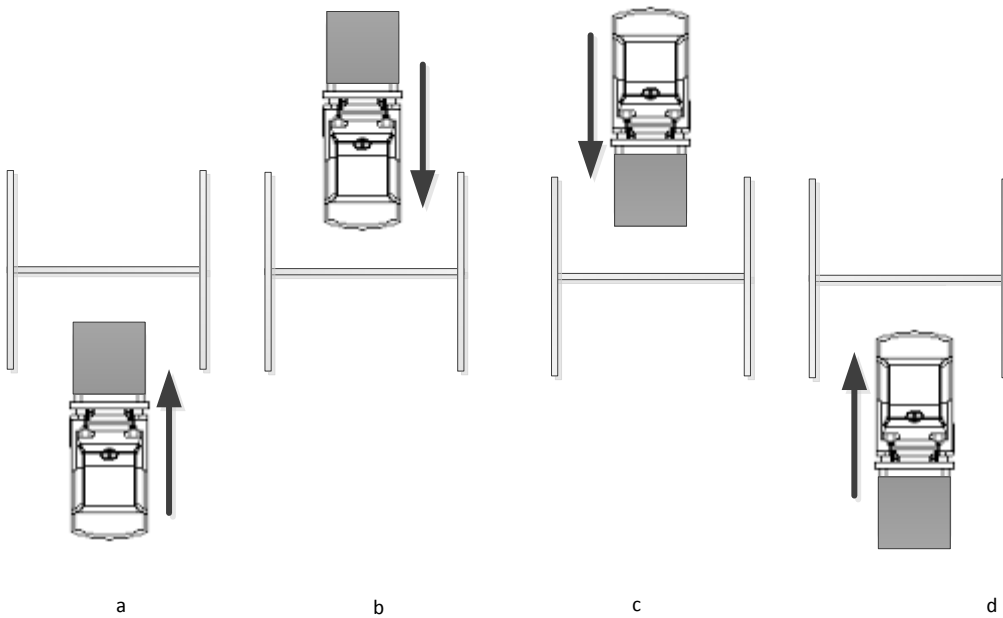
4. **Moving Secondary Object:** (section 12 Performance test)

The purpose of this test is to verify that appropriate feedback when a forklift and another moving object move through the field of view at the same time.



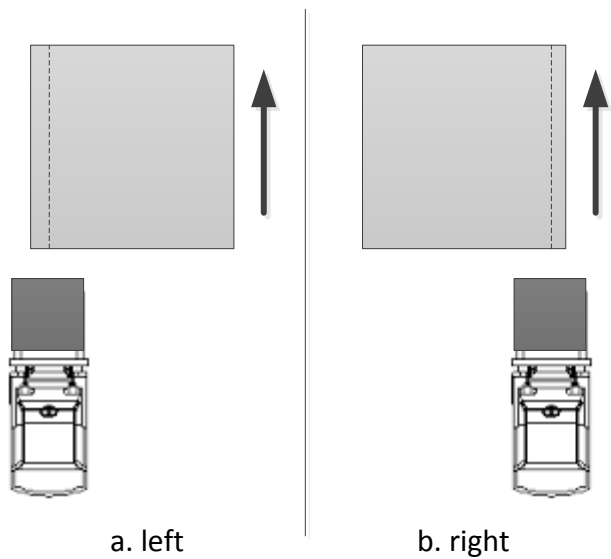
5. Forklift Orientation Test: (section 13 Performance test)

The purpose of this test is to verify that the system measures an object independent of the forklift orientation.



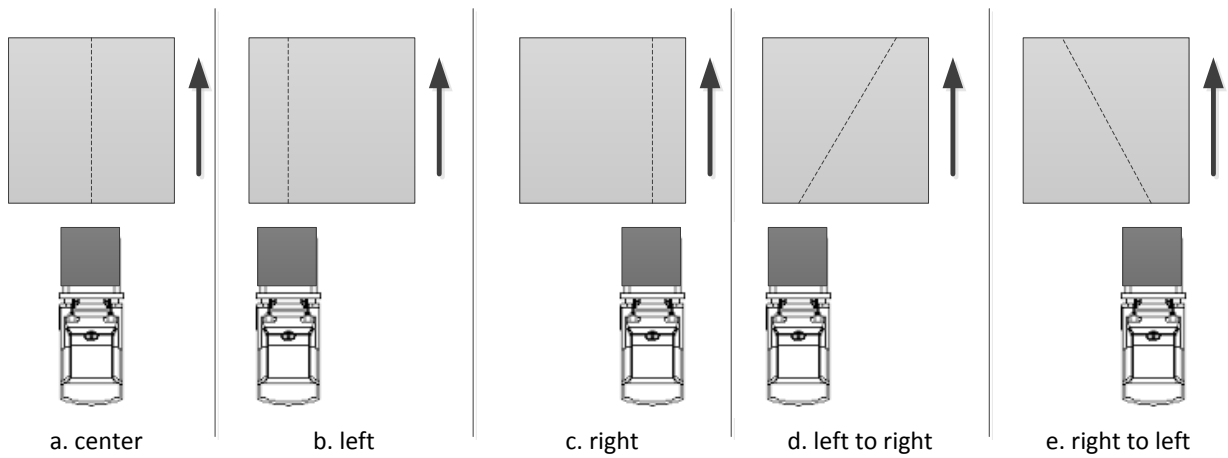
6. **OUT OF BOUNDS TEST** (SECTION 13 POSITION TEST)

The purpose of this test is to verify that the system will indicate an out of bounds error when an object travels outside the floor markings.



7. Shift Test Procedure: (section 13 Position test)

The purpose of this test is to verify that the system measures objects as they pass through the marked area on the floor.



8. **Minimum & Maximum (fork) Height from floor** (section 21 Min/Max test)

The purpose of this test is to verify that the system measures min. & max height off the floor.

