

**Multiple Dimension Measuring Device Work Group**  
**May 5, 2021**  
**On-line meeting**  
**Meeting Agenda**

**Schedule**

Wednesday, May 5, 2021

1:00 PM (EST)      *Meeting Call to Order*

- i. **Introductions and Welcome** (Chris Senneff)
- ii. **Reiteration of NTEP MDMD Work Group Mission** (D. Flocken)
- iii. **Sector secretary assignment** (D. Flocken / C. Senneff)

1:10 PM (EST)      *Status Reports*

- iv. **Report – 2021 NCWM Interim Meeting** (D. Flocken)
- v. **Report – Recent Measurement Canada Type Evaluation Activity** (P. Turgeon)
- vi. **Report – Recent NTEP MDMD Type Evaluation Activity** (T. Buck)

2:20 PM (EST)      *Carry Over Items*

- 1. **Review meeting summary from May 2019 meeting** (C. Senneff)
- 2. **Review changes to NIST, HB44 MDMD code since last meeting** (D. Flocken)
- 3. **Measurement Canada update** (P. Turgeon)
- 4. **Review OIML Activity Related to R129** (P. Turgeon / J. Barton)
- 5. **Review changes to 2021 edition of Publication 14, MDMD Checklist** (D. Flocken)
- 6. **In-motion Forklift Based Pallet Dimensioning – Work Group Report** (B. Budinger)
- 7. **Misc. Items for General Discussion** (All)

3:00 PM (EST)      *New Items*

- 8. **Listing Metric Equivalent “d” Values When Testing in Imperial Units (e.g. inches)** (D. Flocken)
- 9. **Object size during influence factor test** (C. Senneff)
- 10. **Addition definition Dimensional Offset to publication 14** (D. Flocken)
- 11. **Change the term Tare to Dimensional Offset at multiple places in publication 14** (D. Flocken)
- 12. **Correction section 27 of publication 14** (D. Flocken)
- 13. **Modification sentence 2.10 of publication 14** (D. Flocken)
- 14. **Change the maximum value indication for a MDMD from max + 9 d to max + 2 d** (T. Buck)

3:45 PM (EST)      *Closing Discussions*

- 15. **Review meeting activities and conclusions** (C. Senneff)
- 16. **Define next steps (if needed)** (C. Senneff)
- 17. **Next meeting** (C. Senneff)

4:00 PM (EST)      *Adjourn*

*Note: topic times are approximate and merely included as a rough guideline to aid in maintaining meeting pace; some issues will invariably involve more detailed discussion than others.*

## **Introduction and Welcome**

- i. Introductions and Welcome (C. Senneff)*
- ii. Reiteration of NTEP MDMD Work Group Mission (D. Flocken)*
- iii. Sector secretary assignment (D. Flocken / C. Senneff)*
- iv. Report – NCWM Interim Meeting (D. Flocken)*

During the 2020 NCWM, Interim Meeting in January 2020, the S&T Committee had 1 item dealing with MDMDs. There was no 2020 workgroup meeting to discuss this item.

During the 2021 NCWM, Interim Meeting in January 2021, the S&T Committee had no items dealing with MDMDs.

- v. Report – Recent Measurement Canada Type Evaluation Activity (P. Vinten)*
- vi. Report – Recent NTEP MDMD Type Evaluation Activity (T. Buck)*

## **Carry Over Items**

### **1. Review meeting summary from May 2019 meeting**

A copy of the May 2019 Meeting Summary can be downloaded at <https://www.ncwm.com/mdmd-wg> under Meeting Archive. Please bring a copy of the summary with you to the meeting.

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

During the 2019 NCWM, Annual Meeting in July 2019, no new items were adopted.

During the 2020 NCWM Annual Meeting, which was held virtually in January 2021. The membership adopted the proposal, from the MDMD Work Group, to include the definition of the term “Dimensional Offset”.

Due to the meeting being held in a virtual format, the voting needs to be ratified at the 2021 NCWM Annual Meeting.

### **3. 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 2019 meeting.

### **4. 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

**5. Review changes to 2020 and 2021 edition of NCWM, Publication 14, MDMD Checklist**

The following change(s), as agreed to during the May 2019 MDMD Work Group meeting, and approved by the NTEP Committee was made to the MDMD Checklist in the 2020 edition of Publication 14:

Section	Amendment	Pages
12	Added Device Tolerances and Code References paragraphs, renumbered all remaining paragraphs.	MDMD-16
Document	Please note that the Weighing Devices publication has been thoroughly reviewed by NCWM staff. Changes have been made, but none are to change intent of the policies, checklists or test procedures, thus considered editorial. Issues or concerns should be brought to the attention of NCWM staff.	Document

Since there was no 2020 MDMD meeting no changes have been made to the MDMD Checklist in the 2021 edition of Publication 14.

**6. In-motion Forklift based Pallet Dimensioning**

In the recent years, 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.

At the 2019 MDMD Meeting, the subgroup agreed that for now the test procedure as developed by the Ohio test lab should be used. An update on the progress of the sub-workgroup will be provided by Mr. Budinger.

**7. Misc. Items for General Discussion**

Discussion, as needed, regarding any miscellaneous items for general discussion.

**NEW ITEMS**

**8. Listing Metric Equivalent “d” Values When Testing in Imperial Units (e.g. inches)**

It was recently brought to NTEP’s attention that Certificates of Conformance (CC) for Multiple Dimension Measuring Devices have listed the incorrect metric equivalent when the evaluation was performed using test objects calibrated in imperial units.

**Example 1:** CC’s can be found that state in the Test Conditions that the evaluation was performed with a ‘d’ value of 0.2 inches and the For: box, it is indicated that d = 0.2 inch / 5 mm. This is an incorrect equivalent as 0.2 inch converts to 5.08 mm and NTEP Policy does not support the rounding down to a smaller value for “d”.

**Example 2:** CC’s can be found that state in the Test Conditions that the evaluation was performed with a ‘d’ value of 0.1 inches and the “For:” box, it is indicated that d = 0.1 inch / 2 mm. This is an incorrect equivalent as 0.1 inch converts to 2.54 mm and NTEP Policy does not support the rounding down to a smaller value for “d”.

Following NTEP Policy, supported by specifications in Handbook 44, the proper rounding, in this situation should be:

- 0.1 inch = 5 mm (Note, even a 2.5 mm value, which is permitted, cannot be used if proper rounding is applied.)
- 0.2 inch = 10 mm

Notes:

1. Devices evaluated by Measurement Canada, in conjunction, with an NTEP Evaluator, do not have this issue as the evaluation was performed using test objects calibrated in metric units.
2. Also, this issue would not apply to any device where the initial evaluation was done in imperial units and a subsequent evaluation, where the same “d” values in metric units were used.

With the help of Mike Kelly (Ohio Lab) all active CCs were reviewed, and the findings show that all active CCs, listing both imperial and metric units, where “d” was 0.1 or 0.2 inches have the incorrect metric equivalent values listed. This indicates that the error was made on the 1<sup>st</sup> CC issued and has been replicated on each one since. The discussion is, how does NTEP go forward with this issue? Points to consider.

1. What impact would it have if NTEP amends all CCs, with this issue, to list the proper metric equivalent values? (This would mean that potentially a device currently certified with a 2 mm “d” value could now have a 5 mm “d” value and a device currently certified with a 5 mm “d” value could now have a 10 mm “d” value.)
2. What impact would it have if all new CCs would list the proper metric equivalent values and all current CCs would remain unchanged?
3. What impact would it have if all new and amended CCs would list, or be changed to, the proper metric equivalent values?
4. What impact would it have if all current CCs were amended to correct the metric equivalent values and all new CCs follow the correct metric equivalent.
5. Is it an acceptable option to continue this practice?

Regardless of which direction we go in, one thing to consider would be for NTEP to evaluate all MDMD’s, wanting both imperial and metric listed on the CC, to use test objects calibrated in metric units as the metric to imperial conversion of the 2 mm and 5 mm values to inches works.

- 2 mm = 0.07874 inches, rounded to 0.1 inches
- 5 mm = 0.19685 inches, rounded to 0.2 inches

Discussion:

## 9. Object size during influence factor test

In Publication 14 the test procedure for the temperature test prescribes that the test shall be conducted with three or more test objects with dimensions within the range of each axis listed on the device.

This leaves a lot of room for interpretation. It would be better for all parties to have a better definition of the object sizes taking into account the height of the sensor in the temp chamber vs normal installation and operation.

Discussion:

## 10. Addition definition Dimensional Offset to publication 14

### Problem/justification:

During the 2020 NCWM Annual Meeting, which was held virtually in January 2021. The membership adopted the proposal, from the MDMD Work Group, to include the definition of the term “Dimensional Offset”.

Due to the meeting being held in a virtual format, the voting needs to be ratified at the 2021 NCWM Annual Meeting. This Work Group item defines the change needed to the Publication 14, Technical Policy to align with the change that

will be presented in the 2022 edition of Handbook 44.

I am asking the Work Group to review and ultimately agreed to the proposed change presented below for inclusion into the 2022 edition of Publication Checklist. (Note, if for some reason the items voting does not get ratified, the proposal will be held over for the 2022 Work Group Meeting.)

**Proposal:**

Add the new definition to the MDMD Technical Policy, Section D. Terms and Definitions used in this Checklist, Page MDMD-2 of the 2021 edition of Publication 14, Weighing Devices

**D. Terms and Definitions used in this Checklist**

The following terms and definitions are used in the Checklist and Test Procedures Sections. The definitions are provided to assist in understanding the terms use related to the test procedures for Multiple Dimensioning Measuring Devices.

- Longitudinal – The orientation in which the longest axis of the test object is aligned in the horizontal plane and parallel to the direction of travel for dynamic devices, or front to back for static devices.
- Transverse – The orientation in which the longest axis of the test object is aligned in the horizontal plane and perpendicular to the direction of travel for dynamic devices, or side to side for static devices.
- Vertical – The orientation in which the longest axis of the test object is aligned perpendicular to the horizontal plane.
- **Dimensional Offset – The effect of eliminating the conveyance material on a measurement made by a multiple dimension measuring device resulting in only the object intended to be measured being measured.**

Discussion:

**11. Change the term Tare to Dimensional Offset at multiple places in publication 14**

**Problem/justification:**

During the 2020 NCWM Annual Meeting, which was held virtually in January 2021. The membership adopted the proposal, from the MDMD Work Group, Replace the use of the word “Tare” with the term “Dimensional Offset”. Due to the meeting being held in a virtual format, the voting needs to be ratified at the 2021 NCWM Annual Meeting. This Work Group item defines the changes needed to the Publication 14 Checklist to align with the changes that will be presented in the 2022 edition of Handbook 44.

I am asking the Work Group to review and ultimately agreed to the proposed changes presented below for inclusion into the 2022 edition of Publication Checklist. (Note, if for some reason the items voting does not get ratified, the proposal will be held over for the 2022 Work Group Meeting.)

**Proposal:**

**Recommendation 1. Page MDMD-8, Table 1.**

**Table 1.**

**Multiple Dimensions Measuring Device (MDMD) Features and Parameters**

Typical MDMD Features to Be Sealed	Typical MDMD Features and Parameters NOT Required to Be Sealed
<ul style="list-style-type: none"> <li>• Zero</li> <li>• Initial Zero-Setting Mechanism (IZSM)</li> <li>• Span (minimum and maximum)</li> </ul>	<ul style="list-style-type: none"> <li>• Display Update Rate</li> <li>• Stored Tare <u><b>Dimensional Offset</b></u> Capability (per axis)</li> </ul>

<ul style="list-style-type: none"> <li>• Minimum and Maximum Speed (dynamic systems)</li> <li>• Linearity Correction Values</li> <li>• Calibration Coefficient</li> <li>• Motion Detection (on/off) (static systems)</li> <li>• Motion Detection (update rate) (static systems)</li> <li>• Number of Samples Averaged for Dimension Readings</li> <li>• Averaging Time</li> <li>• Selection of Measurement Units (if internally switched and not automatically displayed on the indicator)</li> <li>• Division Value, d</li> <li>• Minimum and Maximum Dimensions (per axis)</li> <li>• Range of Over Capacity Indications (if it can be set to extend beyond regulatory limits)</li> </ul>	<ul style="list-style-type: none"> <li>• Selection of Tare <b>Dimensional Offset</b> Feature Operation (per axis)</li> <li>• Product Codes</li> <li>• Rate Charges</li> <li>• Discounts</li> <li>• Electronic Data Transfer Parameters (e.g., check sums baud rates, protocol, etc.)</li> </ul>
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**Recommendation 2. Page MDMD-10, Code Reference S.1.3.**

**Code Reference: S.1.3.**

Except when in the tare **dimensional offset** mode, negative values are not indicated or recorded.  Yes  No  N/A

**Recommendation 3. Page MDMD-12, Section 5. Tare**

**4. Dimensional Offset**

- 5.1. The tare **dimensional offset** mechanism shall operate only in a backward direction (under-registration).  Yes  No  N/A
- 5.2. On a device designed to automatically clear any tare **dimensional offset** value entered, means shall be provided to prevent the clearing of **dimensional offset** until a complete transaction has been indicated.  Yes  No  N/A

**Recommendation 4. Page MDMD-12, Section 6. Tare Operation – Facilitation of Fraud**

5.2.1. Tare **Dimensional Offset** Operation – Facilitation of Fraud

**Recommendation 5. Page MDMD-12, Code References: G-S.5.6., G-S.5.1. and G-S.5.2.5.**

All recorded values must be permanent, legible, and printed in a digital format. Although *NIST Handbook 44* does not require the printing of gross, tare **dimensional offset**, and net values, some States may require the printing of all three values.

**Recommendation 6. Page MDMD-13, Code Reference: S.1.8.**

7.8. Except for entries of tare **dimensional offset**, when objects are smaller than the minimum dimensions 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 for the object being measured exceeds the measurement capability of the device, the indicating or recording element shall either:

**Recommendation 7. Page MDMD-14, Section 8. Design of Zero and Tare.**

**8. Design of Zero and ~~Tare~~ Dimensional Offset**

**Code Reference: S.2.**

8.1. The device shall be equipped with a means by which the zero reference or ready condition can be adjusted, or the zero reference or ready condition shall be automatically maintained.  Yes  No  N/A

*Note: Belt stopped is NOT a non-ready condition*

8.2. The zero reference or ready control circuits shall be interlocked so that their use is prohibited during measurement operations.  Yes  No  N/A

8.3. The ~~tare~~ **dimensional offset** function shall operate only in a backward direction (under-registration) with respect to the zero reference or ready condition of the device.  Yes  No  N/A

8.4. The value of the ~~tare~~ **dimensional offset** division or increment shall be equal to the division of its respective axis on the device.  Yes  No  N/A

8.5. There shall be a clear indication that ~~tare~~ **dimensional offset** has been taken.  Yes  No  N/A

8.6. Maximum Value of ~~Tare~~ **Dimensional Offset** for Multi-Interval (Variable Division-Value) Devices. – A multi-interval device shall not accept any ~~tare~~ **dimensional offset** value greater than the maximum capacity of the lowest range of the axis for which the ~~tare~~ **dimensional offset** is being entered.  Yes  No  N/A

8.7. Net Values, Mathematical Agreement. - All net values resulting from a device subtracting a ~~tare~~ **dimensional offset** 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~~ **dimensional offset** 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~~ **dimensional offset** entered or round the net result after subtraction of the ~~tare~~ **dimensional offset** 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~~ **dimensional offset** has been entered in a lower partial measuring range than the gross indication:

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

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

**Recommendation 8. Page MDMD-26, Code Reference S.1.18.**

Except for entries of ~~tare~~ **dimensional offset**, when objects are smaller than the minimum dimensions identified in paragraph S.1.7. or larger than any of the maximum dimensions plus 9 d and/or volume marked on the device plus 9 d, or when a combination of dimensions for the object being measured exceeds the measurement capability of the device, the indicating or recording element shall either:

Discussion:

**12. Correction section 27 of publication 14**

**Problem/justification:**

Incorrect 'step' reference in the 2021 edition of Publication 14, Weighing, Multiple Dimension Measuring Device Checklist, page MDMD-28, Section 27. Influence Factors.

**Proposal:**

Test Procedures: line 7. Currently reads "Repeat 10.4 to 10.5 three times."  
 It should read "Repeat steps 4 to 5 three times."

Discussion:

**13. Modification sentence 2.10 of publication 14**

**Problem/justification:**

Sentence 2.10. on page MDMD-10 of Publication 14 asks the question if the system is designed to attach a printer for the purpose of printing the contents of the audit trail.

*"2.10. The system is designed to attach a printer which can print the contents of the audit trail."*

This question is not consistent with the requirements stated in the MDMD Code in Handbook 44, page 5.86, Table S.1.11. Category 3, Methods of Sealing, which states:

*"A printed copy of the information must be available through the device or through another on-site device."*

This requirement implies that additional means other than an attached printer can be used to provide the printed copy of the audit trail contents.



**Proposal:**

Revise the wording of 2.10. similar to the wording of the first sentence used in the Digital Electronic Scales Checklist, Appendix B, *Event Loggers: Acceptable Form of Audit Trail for Category 3 Devices*, page DES-152 which reads:

*4. A hard-copy printout of the contents of the event logger shall be available upon demand from the device or an associated device on the site of the device installation.*

I propose the following wording to replace the current wording of 2.10.

**2.10. The system is designed to provide a printed copy of the audit trail contents either through the device or through another on-site device.**

Discussion:

**14. Change the maximum value indication for a MDMD from max + 9 d to max + 2 d**

The following proposal has been submitted for discussion only to get the opinion and/or support of the workgroup.

**Proposal:**

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 or larger than any of the maximum dimensions plus ~~9 d~~ **2 d**, and/or maximum volume marked on the device plus ~~9 d~~ **2 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:

- (a) not indicate or record any usable values; or
- (b) identify the indicated or recorded representation with an error indication.
- (c) **MDMD's shall not be used to dimension objects larger than the maximum measurement marked on the device.**

(Amended 2004, 2017 and 20XX)

**Problem/justification:**

No reason to allow anything beyond the marked maximum value in LFT applications. 2 d will cover the tolerance + 1. This seems to be a carryover from the scales code computing scale requirement, and it isn't necessary for a MDMD. Footnote c may be better suited as a User Requirement but wanted to add it here for discussion purposes.

Discussion:

**15. Review meeting activities and conclusions**

**16. Define next steps (if needed)**

**17. 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.

**Adjourn**