

**Multiple Dimension Measuring Device Work Group
(2nd Day - Combined meeting with Software Sector)
May 2-3, 2017 - Columbus, Ohio
Meeting Summary – Final**

Contents

i.	Introduction and Welcome	2
ii.	Reiteration of NTEP MDMD Work Group Mission	2
iii.	Goal of this Meeting.....	2
iv.	Report – 2016 NCWM Interim Meeting.....	2
v.	Report – Recent Measurement Canada Type Evaluation Activity	2
vi.	Report - Recent NTEP MDMD Type Evaluation Activity.....	2
1.	Review meeting summary from April 2016 meeting	3
2.	Review changes to NIST, Handbook 44, MDMD code since last meeting	3
3.	Review changes to NCWM, Publication 14, MDMD Checklist	3
4.	Review changes to Measurement Canada MDMD Code, and Terms and Conditions Documents	3
5.	Review OIML Activity Related to R129 CD2	4
6.	Review update to NTEP / MC Requirements Comparison Document	4
7.	Publication 14, MDMD Checklist.....	4
8.	Report on progress from multi-interval operation requirements subgroup	4
9.	Proposal to revise paragraph 3.5. of the Publication 15 Checklist for Multiple Dimensions Measuring Devices	4
10.	Proposal to Remove Paragraph S.1.5.2. of HB44 and Paragraph 7.5. of Pub 14	5
11.	Rounding of a calculation from a volume measurement in one unit of measure to a higher unit of measure	6
12.	Outcome of joint meeting with the Software Sector.....	6
13.	Review meeting activities and conclusions.....	7
14.	Define next steps (if needed)	7
15.	Chairman’s discussion	7
16.	Next meeting.....	7

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

i. Introduction and Welcome

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, and maintaining the NTEP/MC Requirements Comparison Document.

iii. Goal of this Meeting

Discussion: The goal for this meeting was to review and update both the MC / NTEP Specification Comparisons document and the NCWM Publication 14 Checklist. In addition, the WG also discussed several new proposals for possible changes to NIST Handbook 44 and/or NCWM Publication 14.

iv. Report – 2016 NCWM Interim Meeting

Discussion: Mr. Rick Harshman (OWM) reported that all three proposals submitted from the WG’s September 2015 meeting were adopted during the NCWM’s Annual Meeting in July 2016. Mr. Darrell Flocken (NTEP) reported that there are two proposals on this year’s Specification and Tolerance Committee agenda. The first proposal (S&T Agenda Item 3508-1) was submitted by the MDMD Work Group and has a status of “voting” going into the July 2017 meeting. The second proposal (3508-2) was submitted by Mr. Ross Andersen (NY retired) and the S&T Committee recommended this item be withdrawn.

v. Report – Recent Measurement Canada Type Evaluation Activity

Discussion: Ms. Paige Vinten (MC) reported that in 2016, MC conducted type evaluations on two devices, one of which passed and the other failed. In the current year (2017) there are five applications pending; two of which are for new devices, and the remaining three for revisions of existing Notice of Approvals (NoAs).

vi. Report - Recent NTEP MDMD Type Evaluation Activity

Discussion: Mr. Tom Buck (OH) reported that the Ohio NTEP Laboratory had received 14 evaluation assignments since last year’s meeting; 7 assignments were for new devices and 7 assignments were for revisions to existing certificates. Of

these 14 applications, Mr. Buck reported that 6 were dynamic operation, 5 were static devices, and 3 were handheld devices.

1. Review meeting summary from April 2016 meeting

Discussion: Chairman Mr. Robert Kennington (Quantronix, Inc.) asked if there were any changes or additions to the September 2016 MDMD Meeting Summary. Hearing none, he asked for the adoption of the summary. It was adopted by unanimous vote.

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

Discussion: Mr. Rick Harshman (OWM) reported that the three proposals submitted to the NCWM S&T Committee by the MDMD WG in 2015 were adopted at the 2016 NCWM Annual Meeting and resulted in changes being made to the 2017 version of NIST Handbook 44 MDMD Code. Mr. Harshman reviewed the adopted proposals with members of the WG. A brief description of the three proposals is as follows: (See the S&T Committee's 2016 Final Report for more details concerning these items.)

1. S&T Agenda Item 358-1: Create a new specification in the Multiple Dimensioning Measuring Device Code to require that the measurement result of all axes being displayed, printed or recorded, in the same unit of measure.
2. S&T Agenda Item 358-2: Incorporate the ability to permit some required marking information to be accessible via the display providing instructions for displaying the information is specified on the NTEP CC.
3. S&T Agenda Item 358-3: Provide requirements pertaining to the use of multi-intervals on an MDMD.

Mr. Darrell Flocken (NTEP) noted that there are two MDMD proposals on the S&T Committee's 2017 agenda. They are:

S&T Agenda Item 3508-1: This item originated from the MDMD Work Group. The proposal recommends three changes:

1. identified that when a device is operating in a multiple range mode, the 12 d minimum only applies to the first range.
2. replacing the work 'length' with 'measurements' in paragraphs S.1.7. and S.1.8.
3. Adding a tare value, if used, in the measurement to determine if the measurement exceeds capacity plus 9 d.

This item was recommended as a voting item at the upcoming NCWM Annual Meeting to be held July 2017.

S&T Agenda Item 3508-2: This item proposed adding wording to paragraph T.3. Tolerance Values which would clarify that a tolerance value shall be applied in both an underregistration and overregistration from the displayed or recorded value. The S&T Committee recommended that this proposal be withdrawn.

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

Discussion: Mr. Darrell Flocken (NTEP) reported that there have been no changes to the Checklist since the last WG Meeting.

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

Discussion: Mr. Pascal Turgeon (MC) reported that recent changes to the MC Terms and Conditions document has created the need to update the paragraph references in the NTEP/MC Requirements Comparison document. Mr. Turgeon mentioned that the changes to the Terms and Conditions document are not yet complete; however, when they are, he will develop recommended changes to the comparison document. These changes will be presented at the 2018 MDMD WG meeting.

5. Review OIML Activity Related to R129 CD2

Discussion: Mr. Pascal Turgeon (MC) reported that the R129 OIML WG (TC5 SC2) distributed the 2nd committee draft (2CD) and has ask participating countries for an acceptance vote. Mr. Turgeon reported that he is aware of several countries that have provided additional comments and therefore believes there will be a 3rd committee draft developed and made available later this year.

Several members of the MDMD WG requested copies of the comments submitted by Canada and the USA. A copy of these documents will be provided under separate cover.

6. Review update to NTEP / MC Requirements Comparison Document

Discussion: No updates to the document were made during this meeting. See the comment in Item 4 of this Summary for future changes to the document.

7. Publication 14, MDMD Checklist

Discussion: No changes were presented at this meeting. However, WG members agreed to form a small sub-work group to review and develop changes to NCWM Publication 14, if necessary, based on the adoption of the three proposals at the July 2016 NCWM Annual Meeting. Refer to Item 2 of this summary Report for more details on the three adopted proposals.

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

Discussion: Subgroup chair, Mr. Rick Harshman (OWM) reported that the subgroup completed its assigned task and there being no additional assignments provided by the MDMD WG, the subgroup has disbanded. Mr. Harshman reminded members of the WG that the changes made to the MDMD Code in NIST Handbook 44 (HB 44) in 2017 due to the adoption of the proposals submitted by the WG in 2016, needed to be reviewed to determine if changes are now needed to NCWM Publication 14. Mr. Darrell Flocken (NTEP) agreed to chair a small subgroup to review the HB 44 MDMD Code requirements that were adopted and develop suggested changes to NCWM Publication 14. It was agreed that the suggested changes will be presented at the next MDMD WG meeting.

Members of the subgroup are:

Mr. Sprague Ackley, Honeywell	Mr. Tony Romeo, Datalogic USA, Inc.
Mr. Tom Buck, Ohio Dept. of Agriculture, NTEP Laboratory	Mr. Dick Suiter, Richard Suiter Consulting
Mr. Scott Davidson, Mettler-Toledo, LLC	Mr. Pascal Turgeon, MC
Mr. Darrell Flocken, NTEP (Chair)	Mr. Scott Wigginton, United Parcel Services

Mr. Flocken agreed to create some beginning documents and distribute to the subgroup members followed by scheduling a conference call.

9. Proposal to revise paragraph 3.5. of the Publication 15 Checklist for Multiple Dimensions Measuring Devices

Discussion: Mr. Scott Henry (Zebra Technologies) proposed changing paragraph 3.5 of the MDMD Checklist of 2017 edition of NCWM Publication 14. The justification for this recommendation is that a “Live Display” is not required for Multiple Dimensioning Measuring Devices while in the measuring mode.

3.5. If an indicator or a video display terminal gives the only indication for the dimensioning system, when in measuring mode, the ~~dimension, volume, and~~ weight values, if applicable, must be live and displayed

continuously. The displayed values must be located in an area dedicated, clearly distinguished and separated from the other information on the display. (If the video display is an addition to another primary display the operator's display need not be a "Live" display, but the values displayed must be in a dedicated area and separated from the other information on the display.)

The WG discussed this item and agreed that a live display is not required and in some cases, not possible on measuring devices. While supporting the intent of the proposed change, the discussion lead to the idea that the problem was not the fact that dimension and volume values were included in this requirement, but that the requirements defines these values as being live values. The WG reviewed NIST Handbook 44 (HB 44) and the MC requirements and found no requirement for a "Live Value." In addition, a quick review of the current wording found that this paragraph was originally borrowed from NCWM Publication 14, DES paragraph 11.6. and modified to fit the MDMD Checklist. Based on this and additional discussions, the WG suggested the following change to the paragraph:

3.5. If an indicator or a ~~video~~ display ~~terminal~~ gives the only indication for the dimensioning system, when in measuring mode, the dimension, volume, and weight values, if applicable, must be ~~live and~~ displayed and readable continuously. The displayed values must be located in an area dedicated, clearly distinguished and separated from the other information on the display. ~~(If the video display is an addition to another primary display the operator's display need not be a "Live" display, but the values displayed must be in a dedicated area and separated from the other information on the display.)~~

The WG members agreed that this change is in alignment with the intent of the original proposal and agreed to recommend that this change be made in the MDMD Checklist in the 2018 edition of Pub 14.

10. Proposal to Remove Paragraph S.1.5.2. of HB44 and Paragraph 7.5. of Pub 14

Discussion: Mr. Scott Henry (Zebra Technologies) proposed removing paragraph 7.5. in the MDMD Checklist of NCWM Publication 14 and submitting a proposal to the NCWM S&T Committee to remove paragraph S.1.5.2. of NIST Handbook 44 (HB 44) MDMD Code, as shown below. His justification for removing paragraph S.1.5.2. was that the requirement does not allow for multi-interval devices (i.e., devices with 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) to be used to measure Irregular shaped objects. Multi-interval devices will determine the smallest hexahedron for an irregular shaped object. No need to restrict the L & W axis to the same (d) value.

NIST Handbook 44 recommendation:

~~S.1.5.2. Devices Capable of Measuring Irregularly Shaped Objects. — For devices capable of measuring irregularly shaped objects, the value of the division size (d) shall be the same for the length axis (x) and the width axis (y) and may be different for the height axis (z), provided that electronic rotation of the object to determine the smallest hexahedron is calculated in only a two dimension horizontal plane, retaining the stable side plane as the bottom of the hexahedron.
(Added 2008)~~

NCWM Publication 14 Recommendation:

~~Code Reference: S.1.5.2.~~

~~7.5. The devices capable of measuring irregular shaped object, the value of division size (d) shall be the same for the length axis (x) and the width and the width axis (y) and may be different for the height axis (z), provided that electronic rotation of the object to determine the smallest hexahedron is calculated in only a two dimension horizontal plane, retaining the stable side plane as the bottom of the hexahedron~~

The WG reviewed this proposal and member consensus was to oppose the recommended changes. Several members stated that this information was needed for devices that develop measurements based on a two-sided horizontal plane. In this type of operation both the X, and Y axis must have the same “d” value because of possible object rotation. When the object is rotated, components of both the X and Y axis are used to calculate the length and width. Allowing different “d” values, would introduce error into these calculations. When an object is positioned with its most stable side down and rotated 45°, the X and Y axis change places, which could also lead to incorrect length and width calculations. As a result of these discussions, the submitter agreed to withdraw the proposal.

11. Rounding of a calculation from a volume measurement in one unit of measure to a higher unit of measure

During a recent discussion with MC, a question was raised regarding the rounding of a volume measurement in one unit of measure to a higher unit of measure. The example given was if a measuring device measured the X, Y, and Z axes in cm and the measurements was converted to cubic centimeters and then converted to cubic meters. Could the rounding from cubic centimeters to cubic meters effect the measurement enough where the charge based on the measurement could be different.

For example: $123 \text{ cm} \times 321 \text{ cm} \times 12 \text{ cm} = 473\,796 \text{ cm}^3 = 0.473\,796 \text{ m}^3$. Both values would calculate the same charges, however one might be more inclined to round off small decimal places but not whole numbers. Where you probably wouldn't round off the cm^3 because it is a whole number, one might round m^3 off to 0.47 because small decimal values are messy/appear way more accurate than they need.

Discussion: The WG members discussed this item and felt that developing a requirement for this was beyond the scope of this WG and suggested that the result of the calculation follow the rules of “Significant Figures.” Based on these rules, the answer could be limited to 3 digits (473 cm^3 or 0.47 m^3) as any additional numbers have no real impact on the result. One WG member pointed out that in most cases the device does not calculate a volume value so rounding of volume calculations is the responsibility of the user.

12. Outcome of joint meeting with the Software Sector

Discussion: Software Sector Chair Mr. Jim Pettinato (TechnipFMC plc) explained the idea of software separation into metrological and non-metrological sections and mentioned that this concept was discussed at other Sector meetings. The Weighing Sector agreed to place a paragraph into the Checklist of the Digital Electronic Scales portion of NCWM Publication 14. The wording agreed to is as follows:

The manufacturer must describe and possibly demonstrate how the version or revision identifier is directly and inseparably linked to the metrologically significant software. Where the version revision identifier is comprised of more than one part, the manufacturer shall describe which portion represents the metrological significant software and which does not. Yes ___ No ___ N/A ___

Note: Manufacturers may choose to separate metrologically significant software from non-metrologically significant software. Separation would allow the revision of the non-metrological portion without the need for further evaluation. In addition, non-metrologically significant software may be updated on devices without breaking a seal, if so designed. Separation of software requires that all software modules (programs, subroutines, objects, etc.) that perform metrologically significant functions or that contain metrologically significant data domains form the metrologically significant software part of a measuring instrument (device or sub-assembly). If the separation of the software is not possible or needed, then the software is metrologically significant as a whole.

Members of the MDMD WG agreed to add this same text to the MDMD Checklist in the 2018 edition of NCWM Publication 14 with an additional sentence added specifying that these requirements are voluntary until 2022. Mr. Darrell Flocken (NTEP) was granted editorial rights by the WG for determining the appropriate location in the MDMD Checklist to insert the new text.

13. Review meeting activities and conclusions

Nothing to report

14. Define next steps (if needed)

Discussion: The assigned action items from this meeting was the creation of a new subgroup tasked with developing proposed changes to the MDMD Checklist in NCWM Publication 14 based on the three WG proposals that were adopted by the NCWM in 2016, which resulted in changes being made to the MDMD Code of NIST Handbook 44 (HB 44) in 2017. It was also agreed that the new subgroup would develop proposed changes to the MDMD Checklist in consideration of the WG's current proposal that will likely be adopted by the NCWM at its Annual Meeting in July 2017.

A WG member asked at what point can the Provisional ("P") status of both new and existing NTEP Certificates of Conformance (CCs) be stopped? Mr. Jim Truex (NTEP Administrator) informed the WG that it is the responsibility of the WG to suggest to NTEP when to remove the Provisional status. This recommendation should come only after the WG agrees that the specification and performance requirements in Handbook 44 and the Checklist in NCWM Publication 14 are in a mature (fully developed) and working condition. Mr. Truex also reviewed the actions NTEP will take on existing CCs once the Provisional status is removed. WG members agreed to hold off on the recommendation until the next MDMD WG meeting, giving manufacturers ample time to evaluate the impact on their existing certificates.

15. Chairman's discussion

Discussion: MDMD WG Chairman Mr. Robert Kennington (Quantronix, Inc.) took this opportunity to comment that he has chaired the WG for close to 10 years and expressed interest in resigning from the position. He opened the discussion to others who would be interested in moving into the chair position. No one openly volunteered and the discussion was closed.

16. Next meeting

Discussion: The WG agreed to have the next meeting on Tuesday and Wednesday, May 9th & 10th, 2018. The meeting location will be determined later.