



Marc Buttler
Director
Application Innovation.
Micro Motion Inc.

Emerson
7070 Winchester Circle
Boulder, CO 80301 U.S.A.

T 1 (303) 581-1970
F 1 (303) 530-8459
marc.buttler@Emerson.com

Emerson Micro Motion Comments on WWMA S&T Items GEN-19.1 and Block 7 Items (B7): CLM-22.1, CDL-22.1, and HGM-22.1.

The equation for Reduced MPE referenced from OIML R117-2: 2019 that is stated in the paragraphs listed below as:

$$\text{Reduced MPE} = (4/3 \times \text{MPE} - U)$$

has the opposite effect as is desired for this purpose. In this form the equation actually results in a tighter tolerance for the device under test if the uncertainty of the Type 2 Transfer Standard is greater than 1/3 of the MPE. As an extreme case, consider the example where a Transfer Standard Meter has a 95% confidence level uncertainty (U) that is 2/3 MPE (or 2 time greater uncertainty than the 1/3 MPE maximum recommended in the Fundamental Considerations for a field standard). As the equation is formulated in the proposed items, it would result in a Reduced MPE of $4/3 \times \text{MPE} - U$ or $4/3 \text{ MPE} - 2/3 \text{ MPE} = 2/3 \text{ MPE}$. As such the tolerance applied would only be 2/3 the normal tolerance for when the reference standard does meet the 1/3 MPE convention.

While applying this approach would ensure that a commercial device would always be as least as accurate after testing with a Type 2 Transfer Standard Meter as it would have been after testing with a field reference standard that met the 1/3 MPE convention, it would do so by placing the burden on the device under test to be more accurate and precise as the reference standard used to test has higher uncertainty. This contradicts the principle that has previously been applied in the Fundamental Considerations to INCREASE the tolerance if the reference standard uncertainty is greater than 1/3 in order to “give the device being tested as nearly as practicable the full benefit of its own tolerance.”

I recommend altering the equation to this version:

$$\text{Increased MPE} = (2/3 \times \text{MPE} + U)$$

This variant of the equation for Reduced MPE from OIML R117 would have the intended effect of increasing the tolerance that is applied so as to avoid placing additional burden in the form of a tighter tolerance on the device being tested when it becomes necessary or practical for a jurisdiction to employ a Transfer Standard that cannot meet the normal 1/3 MPE convention. In this form, the tolerance would preserve the “full benefit of its own tolerance” that is 2/3 of the MPE when the reference standard is allowed to occupy up to the remaining 1/3 of the MPE, and would add increased tolerance to that equal to the uncertainty (U) of the Transfer Standard.

Respectfully submitted.

Marc Buttler
Director, Application Innovation

September 27, 2021