

In-house calibration of test weights.

In general, in-house calibration of test weights can be an acceptable solution providing it is in accordance with the quality system of a company and fully traceable weights are used. However, this does require that the reference weights are of an appropriate tolerance class.

OIML Recommendation R111 - 1: 2004 (E) defines 9 classes or categories of weights. These are E₁, E₂, F₁, F₂, M₁, M₁₋₂, M₂, M₂₋₃, and M₃. E₁ is the most accurate and M₃ being the least accurate.

Of these we are concerned with Classes M₁ and higher. M₁ is the class that a Trading Standards Officers Working Standard weights would fall into and it is the class which members would normally have their test weights calibrated to for normal testing, calibration and verification of Class III and IIII non-automatic weighing instruments. The maximum tolerance on a 1kg M₁ weight is 50mg.

If we use an M₁ weight to calibrate an M₁ weight we can very quickly get well outside the maximum tolerance. Assume our M₁ reference standard is 40 mg below the nominal value of 1kg. If we then use this to calibrate our test weight which we find is 45mg below the nominal value, we would assume that our test weight is within the tolerance, because its error is less than 50mg, but the error on our reference weight of -40mg means in reality that the overall error on our test weight is -95mg, well outside the tolerance.

For that reason OIML R 111 -1: 2004 (E) requires that weights are calibrated against a higher class of weight, and as a rule of thumb it recommends that the uncertainty of the error of the reference weight should not exceed 1/3 of the tolerance on the weight being calibrated. As the tolerances between weight classes are generally in the ratio 3:1, (i.e. the tolerance on an F₂ weight is

approximately one third of the tolerance on an M_1 weight) it is fairly obvious that F_2 should be the lowest class of weight used when calibrating an M_1 weight, preferably the reference standard should be F_1 to reduce the margin of error as far as possible.

Copies of R111-1:2004(E) can be downloaded free of charge from the OIML web-site at www.oiml.org/publications

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