3.11 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 M1 weight) it is fairly obvious that F2 should be the lowest class of weight used when calibrating an M1 weight, preferably the reference standard should be F1 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 website at www.oiml.org/publications