

9.62 Measuring Instruments, Appliances

(9.62 計量器・用器)

Change the following paragraph as follows:

Balances and weights (1) Chemical balances—Balances readable to the digit of 0.1 mg.

(2) Semimicrobalances—Balances readable to the digit of 10 μg .

(3) Microbalances—Balances readable to the digit of 1 μg .

(4) Ultramicrobalances—Balances readable to the digit of 0.1 μg .

(5) Balances should be calibrated to ensure traceability to the International System of Units (SI). In addition, they should have performance that meet the following requirements.

Requirements for Repeatability (Intra-assay precision)

Using the standard deviation s of the indicated value of a balance obtained by loading and unloading a weight 10 or more times, confirm the estimated minimum weight using equation (1). Also, using the standard deviation s , confirm that the precision of the minimum weighed amount obtained from equation (2) is 0.10% or less. The smallest net weight is the actual lower limit of the weighing which can ensure repeatability (intra-assay precision) in consideration of the minimum weight.

$$m_{\min} = 2000 \times s \quad (1)$$

$$\frac{2 \times s}{m_{\text{snw}}} \times 100 \leq 0.10 \quad (2)$$

m_{\min} : The minimum weight estimated

s : Standard deviation of the indicated value of the balance in 10 or more repeated weighings

m_{snw} : Smallest net weight

However, if $s < 0.41 \times d$, where d is the readability (scale interval) of the balance, replace s by $0.41 \times d$.

The minimum weight is confirmed as the temporary instrumental performance value of a balance, and should be checked periodically since it varies depending on the conditions when weighing is performed. When checking, the mass of the weight should be about 5% of the balance's capacity and 100 mg or more. The balance's capacity is the maximum mass that can be weighed on the balance.

Requirements for accuracy (trueness)

Accuracy (trueness) includes sensitivity error, linearity error, and eccentricity error. Among them, regarding the accuracy of sensitivity, the error obtained by the following equation from the indicated value of a balance obtained by loading

and unloading a weight once and the mass value of the weight should be less than or equal to 0.05%.

$$\frac{|I - m|}{m} \times 100 \leq 0.05$$

I : The indication of the balance for one weighing of the test load

m : Nominal weight of the test load (or its conventional mass)

Use the test load with the mass which is about the upper limit of weighing or from 5% to 100% of the balance's capacity.

(6) Exception for confirmation of eccentricity errors, weights used to confirm the accuracy (trueness) of a balance must be calibrated to ensure traceability to the International System of Units (SI). In addition, they must have the accuracy class that meets the requirements for use.