

4.2 Terminology

Load

The total weight acting, after counterbalancing, upon the terminal bearing which carries the object being weighed.

Precision of indication

The standard deviation of the instrument indication, i , for a stated load.

Value of a division

This is the reciprocal of the sensitivity and, like the latter, usually varies with the load. It is determined by empirical calibration.

Instrumental indication, i

The observed deflection or rest point multiplied by the value of the division for the load in question.

No load indication, i_0

The deflection or rest point (no-load reading) multiplied by the value for the division for zero load (rider at zero).

Deflection (in terms of divisions of the pointer scale)

The other point of reversal of an ideal (undamped) swing starting at the zero point of the pointer scale. Since the points of reversal of an ideal swing are located symmetrically about the rest point, the deflection is equal to twice the rest point.

Restpoint

The position of the pointer with respect to the pointer scale when the motion of the beam has ceased.

Zero point of the scale

The rest point of the properly adjusted balance with no load on the pans and the rider (or chain) in the zero position.

Sensitivity (for a stated load)

The response per unit mass in terms of the pointer scale per unit of mass.

Readability

The smallest fraction of a division to which the index scale can be read with ease either by estimation or by the use of a vernier. It should normally be expressed in divisions of the pointer scale.

Milligram equivalent of readability

The product of readability and the value of the scale division (in milligrams per division).

Precision of a balance

The precision is expressed by the standard deviation of the instrument for a stated load (e.g., s_{20} for a 20 g load). A statement of the procedure, conditions, and experience of the observer should be included.

Range of applicability of a balance

This is a function of its capacity and precision as shown in Table 4.2.1.

TABLE 4.2.1 Range of Applicability of a Balance as a Function of Capacity and Precision

Type of Balance	Capacity/g	Precision, mg
Analytical balance	50-200	0.01-0.05

Microchemical balance	5- 20	0.001-0.005
Assay balance	1- 5	0.0005-0.002

Precision of weighing

This depends upon the method of weighing and upon the precision of indication, l , for the load in question, as shown in Table 4.2.2.

TABLE 4.2.2 Precision of a Weighing by Various Weighing Procedures

Procedure	$\pm (s^2 + s_0^2)^{1/2}$
Direct weighing	$1.4 s_0$
For small loads	$1.4 s$
Substitution	$s / 1.4$

Correction of direct weighings

Direct weighings are corrected by subtracting the no-load indication. Direct weighings to be used for the determination of the arm ratio must be corrected for the no-load indication.