ANNEX

1.   **Definitions**

1.1.   Weight

A physical measure of mass, whose constructional and metrological characteristics are determined by shape, size, material, finish, nominal value and maximum permissible error.

1.2.   Sets of weights

Series of weights generally presented in a box, in such a combination as to allow weighings of all loads from the smallest nominal weight up to the sum of all the weights in the set, in a sequence of which the smallest nominal weight in the set is the unit.

The sequence in a set of weights is generally as follows:

$(1; 1; 2; 5) \times 10^n$ kg

$(1; 1; 1; 2; 5) \times 10^n$ kg

$(1; 2; 2; 5) \times 10^n$ kg

$(1; 1; 2; 2; 5) \times 10^n$ kg

In these expressions, n represents either zero, or a positive or negative whole number.

1.3.   Standard weights

Weights used in the inspection of weighing machines and weights are known as standard weights.

2.   **Nominal values of the weights**

The nominal value of the weights must be equal to 1×10^n kg, or 2×10^n kg, or 5×10^n kg; in these expressions n represents either zero or a positive or negative whole number.

3.   **Conventional mass**

3.1.   For a weight taken at 20° C, the conventional mass is the mass of a reference weight of a density of 8 000 kg/m^3 which it balances in air of a density of 1·2 kg/m^3.

3.2   The maximum permissible errors, mentioned in point 4, relate to the conventional mass.

4.   **Maximum permissible errors for EEC initial verification**

4.1.   The maximum permissible error, plus or minus, for each individual weight is given in milligrammes in the table below:

Nominal Values	Class E_1	Class E_2	Class F_1	Class F_2	Class M_1
50 kg	25	75	250	750	2 500
20 kg	10	30	100	300	1 000
10 kg	5	15	50	150	500

5 kg	2·5	7·5	25	75	250
2 kg	1·0	3·0	10	30	
1 kg	0·50	1·5	5	15	50
500 g	0·25	0·75	2·5	7·5	25
200 g	0·10	0·30	1·0	3·0	10
100 g	0·05	0·15	0·5	1·5	5
50 g	0·030	0·10	0·30	1·0	3·0
20 g	0·025	0·080	0·25	0·8	2·5
10 g	0·020	0·060	0·20	0·6	2·0
5 g	0·015	0·050	0·15	0·5	1·5
2 g	0·012	0·040	0·12	0·4	1·2
1 g	0·010	0·030	0·10	0·3	1·0
500 mg	0·008	0·025	0·08	0·25	0·8
200 mg	0·006	0·020	0·06	0·20	0·6
100 mg	0·005	0·015	0·05	0·15	0·5
50 mg	0·004	0·012	0·04	0·12	0·4
20 mg	0·003	0·010	0·03	0·10	0·3
10 mg	0·002	0·008	0·025	0·08	0·25
5 mg	0·002	0·006	0·020	0·06	0·20
2 mg	0·002	0·006	0·020	0·06	0·20
1 mg	0·002	0·006	0·020	0·06	0·20

5.   **General shape of weights**

A one-gramme weight may have the shape of multiples of one gramme or the shape of the sub-multiples.

5.1.   Weights of one gramme and multiple gramme weights.

5.1.1.   Grade M_1 weights should have the shape of weights of the medium accuracy class.

5.1.2.   Weights of the other accuracy classes may have the external dimensions of weights of the medium accuracy class. 10 kg to 1 gramme weights may also be cylindrical or in the shape of a slightly truncated cone surmounted by a knob.

5.1.2.1.   The height of the body shall be roughly equal to the mean diameter, the permissible difference between the mean diameter and the height being between 3/4 and 5/4 of this diameter.

5.1.2.2.   On all weights the height of the knob should lie between the mean diameter and the mean half-diameter of the body.

5.1.3.   Class E_1, E_2 and F_1 weights do not have to have a knob; they may consist of a single cylindrical body.

5.1.4.   Class E_1 and E_2 weights must be cast in one piece; other weights may have an adjustment cavity closed by the knob or any other suitable device. The volume of the adjustment cavity shall not exceed 1/5 of the total volume of the weights.

5.2.   Weights of one gramme and sub-multiple weights of the gramme. Weights of one gramme and sub-multiple weights of the gramme shall be polygonal laminated strips or wires suitably shaped to permit easy handling.

The shapes of the weights shall give an indication of their nominal value.

Polygonal laminated strips, their shape and values:
    triangle for 1 — 10 — 100 — 1 000 mg
    quadrilateral for 2 — 20 — 200 mg
    pentagon for 5 — 50 — 500 mg

Polygonal wire segments and their values:
    1 segment for 1 — 10—100 — 1 000 mg
    2 segments for 2 — 20 — 200 mg
    5 segments for 5 — 50 — 500 mg

Where two or three weights in the set are identical, they shall be distinguished by one or two asterisks or dots respectively in the case of laminated strips and one or two hooks respectively in the case of wires.

5.3.   Weights of 20 and 50 kg, other than those in class M_1 may have a shape suited to their method of handling.

6.   **Constituents of the weights**

6.1.   Weights shall be made of metal or metal alloy. Such metal or alloy shall be of such quality that under normal conditions of use the deterioriation of the weights shall be negligible in relation to the maximum permissible errors in their accuracy class.

6.1.1.   The density of the weight shall be such that a deviation of 10% of the air density in relation to that specified ($1 \cdot 2$ kg/m^3) will lead to an error of not more than 1/4 of the maximum permissible error.

6.1.2.   The metal or alloy of class E_1 E_2 and F_1 weights shall be virtually non-magnetic.

6.2.   The resistance to corrosion and flaking of the constituent metal or alloy of 5 to 50 kg class M_1 weights of parallelepiped shape shall be at least equal to that of grey cast iron.

6.3.   Class M_1 weights of cylindrical, shape having nominal values less than or equal to 10 kg shall be made of brass or of a material at least equal in quality to brass.

6.4.   The qualities set out in points 6.2. and 6.3 may be obtained by means of a suitable surface treatment.

7.   **Surface state**

7.1.   The surface of the weights, including their bases and edges, shall be entirely smooth. The surface of class E_1 E_2, F_1 and F_2 weights shall show no porosity when examined by the naked eye, and shall be carefully polished.

The surface of class M_1 10 kg to 1 kg cylindrical weights shall be polished, and shall show no porosity to the naked eye. The surface condition of class M_1 50, 20, 10 and 5 kg parallelepiped weights shall be comparable to that of grey cast iron carefully cast in a fine sand mould.

7.2.   The surface of class E_1 E_2, F_1 and F_2 weights of one gramme and multiples of a gramme may be protected by a metal coating.

7.3.   The surface of class M_1 weights of one gramme and multiples of a gramme may be protected by a suitable coating.

8.   Adjustment material

Weights of F_1 and F_2 accuracy classes with an adjustment cavity shall be adjusted either with the same material as that of which they are constituted, or with pure tin, or with molybdenum.

Class M_1 weights may be adjusted with lead.

9.   Inscriptions

9.1.   Laminated strip or wire weights having nominal values less than or equal to one gramme shall bear no indication of nominal value.

9.2.   Weights having nominal values equal to or more than one gramme:
—   in classes E_1 and E_2 shall bear no indication of their nominal value;
—   in class F_1 shall bear only the indication of nominal value as laid down in point 9.2.1.; this indication shall be burnished or engraved;
—   in class F_2 shall bear the inscriptions of class F_1 accompanied by the letter F;
—   in class M_1 shall bear the nominal value marked in figures followed by the symbol of the appropriate unit, either recessed or embossed, on the upper face of the body or knob of the weights.

     Cylindrical weights shall be marked with the letter M, either recessed or embossed; parallelepiped weights shall be marked with the letter M which need not be recessed or embossed.

9.2.1.   The nominal values of the weights shall be indicated in:
—   kilogrammes for weights of 1 kilogramme or more,
—   grammes for weights of 1 gramme to 500 grammes.

9.2.2.   Weights appearing two or three times in the sequences shall be distinguished by one or two asterisks or by one or two dots.

10.   EEC final verification mark

Boxes containing E_1, E_2, and F_1 class weights, and all boxes containing the gramme and sub-multiples of the gramme, shall be sealed with the EEC final verification mark.

For class F_2 weights the EEC final verification mark shall be affixed to the cover of the adjustment cavity, and where there is no adjustment cavity, upon the base of the weight. For class M_1 weights of one gramme to 50 kg the EEC final verification mark shall be placed upon the lead sealing the adjustment cavity opening, or upon the base in the case of weights having no adjustment cavity.

11.   Presentation

11.1.   Individual weights and series of weights of classes E_1, E_2, F_1 and F_2 shall be contained in boxes.

11.2.   For class M_1

—   individual weights or series of weights up to a value of 500 grammes shall be contained in boxes,

—   weights having a nominal value greater than 500 grammes may be contained in boxes, fitted in a stand or presente d individually, without protection.

11.3.   The lids of the boxes shall indicate the class of weights which they contain: E_1; E_2; F_1; F_2; M_1.