BUREAU OF INDIAN STANDARDS
DRAFT FOR COMMENTS ONLY

Doc: PGD 26 (25939) WC
June 2024

भारतीय मानक मसौदा

व्यावसायिक कैरट बाट — विशिष्टि

(IS 1057 *का चौथा पुनरीक्षण*)

Draft Indian Standard

Commercial Carat Weights — Specification

(*Fourth Revision of* IS 1057)

ICS 01.060 ; 39.060

Weights and Measures Sectional Committee, PGD 26	Last date of Comment: **19/09/2024**

FOREWORD

(*Formal clauses will be added later on***)**

This standard was first published in 1958 and was subsequently revised in 1968, 1993 and 2004. This fourth revision has been taken up to keep pace with the latest technological developments and international practices. In this revision following major changes have been made:

a) Figures have been updated;
b) References have been updated; and
c) Reference to OIML classification for MPEs has been added.

Although technically 'mass' is more precise term, keeping in view the need of the trade, 'weight' is used in place of 'mass'.

This standard confine itself to commercial carat weights which are used in the pearl, diamond and other precious stones trade.

The basic series of weights, adopted in this standard is 5,2,2,1, and therefore, for making complete sets one additional weight of relevant decimal multiple of two will be necessary in addition to the denominations of different series prescribed under **3**. Indenters should bear this in mind when placing orders.

For ease of calculation and convenience in use, a carat is usually sub-divided into 100 parts called cents. Thus, a cent equals to 2 mg. For the denominations of the commercial carat weights in fractions, the fraction is denoted as so many parts per 100 cents; for example 0.5 carat is denoted as 50/100 carat.

When the difference in the specific gravity of the material for the weights (say, brass, bronze, nickel, silver, non-magnetic nickel chromium alloy and austenitic stainless steel) and the material weighed (say, diamonds, sapphires, rubies or pearls) is quite considerable and permissible errors have to be

of a very small order (*see* **4.4**), the buoyancy effect can be comparable to the permissible errors. This standard, however, ignores this effect and this is in accordance with existing trade usage. In case it is desired to take this buoyancy effect into consideration, there shall be prior agreement on method of weighment and the permissible buoyancy effect, taking into account the specific gravities of the material for the weights and of the weighed material. The National Physical Laboratory of India maybe consulted for guidance.

The composition of the Committee, responsible for the formulation of this standard will be given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*).' The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

COMMERCIAL CARAT WEIGHTS — SPECIFICATION

(*Fourth Revision of* IS 1057)

1 SCOPE

This standard prescribes the requirements for commercial carat weights intended for use in weighing pearls, diamonds and other precious stones.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS / Other publication	*Title*
306 : 1983	Specification for tin bronze ingots and castings (*third revision*)
319 : 2007	Free cutting brass bars, rods and sections — Specification (*fifth revision*)
737 : 2008	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes — Specification (*fourth revision*)
2283 : 2000	Nickel silver sheet, strip and foil — Specification (*second revision*)
OIML R 111-1 : 2004	Weights of classes E1, E2, F1, F2, M1, $M_{1–2}$, M2, $M_{2–3}$ and M3 Part 1: Metrological and technical requirements

3 DENOMINATIONS

3.1 The denominations of the carat weights shall be as given below (the gram and milligram equivalents are shown against each for ready reference).

3.1.1 *Knob Weights*

Denomination (Carat)	Equivalent (g)
500	100
200	40
100	20
50	10
20	4
10	2
5	1

3.1.2 *Sheet Metal Weights*

Denomination (Carat)	Equivalent (mg)

2	400
1	200
0.5	100
0.2	40
0.1	20
0.05	10
0.02	4
0.01	2
0.005	1

4 KNOB WEIGHTS

4.1 Denominations

For denominations, *see* **3.1.1**.

4.2 Materials

4.2.1 The weights shall be made from rolled, drawn or extruded material and shall not be cast.

4.2.2 The weights shall be made from brass bronze, nickel silver, non-magnetic nickel chromium or non-magnetic stainless steel, which may preferably conform to the following:

a) Brass as per IS 319
b) Bronze as per IS 306
c) Nickel silver of any grade as per IS 2283
d) Non-magnetic nickel chromium:

Constituent	**Percent**
Carbon, *Max*	0.10
Manganese, *Max*	0.50
Chromium	19.0 to 21.0
Silicon, *Max*	0.80
Copper, *Max*	0.20
Iron, *Max*	1.20
Nickel (small amounts of cobalt to be counted as nickel)	Remainder

e) Austenitic stainless steel:

Constituent	**Percent**
Carbon, *Max*	0.08
Silicon, *Min*	0.20
Manganese, *Max*	2.00
Nickel	8.0 to 11.0
Chromium	17.5 to 20.0
Sulphur, *Max*	0.045
Phosphorus, *Max*	0.045

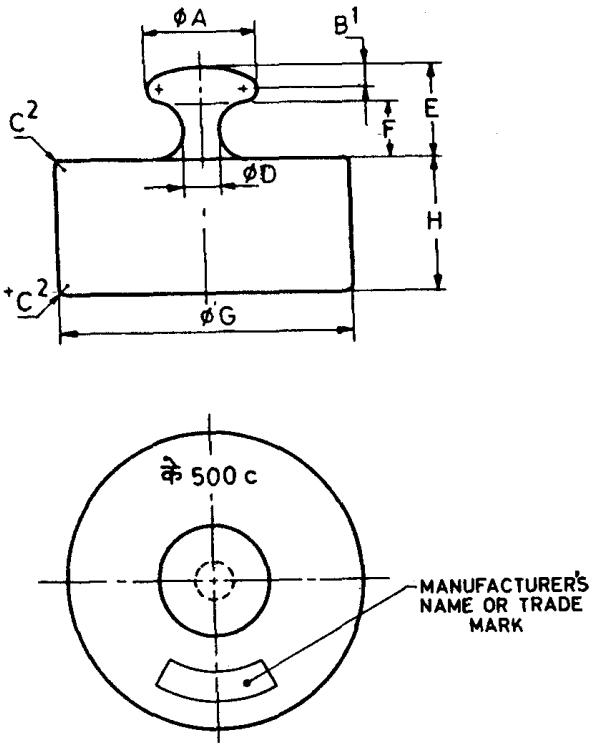
4.3 Shape and Dimensions

The shape and dimensions of the weights shall be as shown in Table 1.

Table 1 Nominal Dimensions for Knob Carat Weights

(*Clause* 4.3)

All dimensions are in millimetres.



Denomination Carat	A	C[2)]	D	E	F	G	H
500	12.0	0.4	4.0	10.0	6.0	32.0	14.2
200	10.0	0.4	3.0	8.5	5.0	23.0	10.8
100	8.0	0.4	2.5	7.0	4.0	19.0	7.9
50	6.0	0.3	2.0	5.5	3.0	15.0	6.4
20	5.0	0.3	2.0	4.0	2.0	11.0	4.6
10	4.0	0.3	1.5	3.0	1.5	9.0	3.5
5	3.0	0.2	1.5	2.5	1.5	7.0	2.9

NOTE— With a material of density 8.4 g/cm^3 (exactly the above dimensions will give weights which possess masses to within the required tolerance limits on the plus side (this ensures a longer life for the weights), However, as the density of the material may vary considerably as also the manufacturing techniques, a tolerance of ± 5 percent is allowed on all obligatory dimensions (that is those other than C). Final values of masses can be adjusted by controlling the dimensions H.

[1] The cross-section of the top of the knob is elliptical. For all weights, major axis being twice the minor axis (therefore for all weights $B = ¼ A$),
[2] This is a recommended dimension.

4.4 Permissible Errors

The errors in excess for new weight shall not exceed the following limits. No errors in deficiency shall be permitted:

Denomination Carat	Denomination g [1)]	Permissible Error in Excess mg [2)]
500	100	5.0
200	40	3.0
100	20	2.5
50	10	2.0
20	4	1.5
10	2	1.2
5	1	1.0

1) Conversion from 'Carat' to 'g'; 1 ct = 200 mg
2) Equivalent to class M_1 as defined in OIML R 111-1

NOTE — The maximum permissible errors in deficiency for weights in use shall not be more than the values prescribed for permissible errors in excess. It should be noted the deficiency figures are only for the information of users of weights and that the permissible errors on new weights shall only be on the excess side.

5 SHEET METAL WEIGHTS

5.1 Denominations

For denominations, *see* **3.1.2.**

5.2 Materials

Weights of denominations 0.02 carat and below shall be made of aluminum sheet, which may preferably conform to Designation 64330 condition O of IS 737. Weights of higher denominations shall be made of sheets of brass, aluminum, nickel silver, nickel chromium or bronze, which may preferably conform to the following:

a) Brass – Alloy designation CuZn40 of IS 410.
b) Bronze – As given in **4.2.2(b)**.
c) Nickel silver – As given in **4.2.2(c)**.
d) Non-magnetic nickel chromium – As given in **4.2.2(d)**.
e) Austenitic stainless steel – As given in **4.2.2(e)**.
f) Aluminium designation 64430 condition O of IS 737.

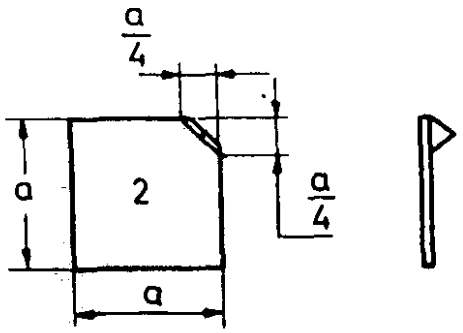
5.3 Shape and Dimensions

Sheet metal weights shall be square with a raised corner of facilitate manipulation (*see* figure in Table 2). They shall have the dimensions as given in Table 2.

Table 2 Nominal Dimensions for Sheet Metal Carat Weights

(*Clause* 5.3)

All dimensions are in millimetres



Denominations (Carat)	Denominations (mg)	Size a (mm)
2	400	12
1	200	10
0.5	100	9
0.2	40	8
0.1	20	7
0.05	10	6
0.02	4	5
0.01	2	4
0.005	1	3

NOTE — Tolerance on dimensions, ± 10 percent

5.4 Permissible Errors

The errors in excess for new weights shall not exceed the values given below. No errors in deficiency shall be permitted.

Denominations Carat	Denominations mg [1)]	Permissible Error in Excess mg [2)]
2	400	0.8
1	200	0.6
0.5	100	0.5
0.2	40	0.4
0.1	20	0.3

0.05	10	0.25
0.02	4	0.20
0.01	2	0.20
0.005	1	0.20

[1] Conversion from 'Carat' to 'mg'; 1 Ct = 200 mg
[2] Equivalent to class M_1 as defined in OIML R 111-1

NOTE — The maximum permissible errors in deficiency for weights in use shall not be more than the values prescribed for permissible errors in excess. It should be noted that the deficiency figures are only for the information of users of weight; and that the permissible errors on new weights shall be only on the excess side.

6 MANUFACTURE AND FINISH

The surface of the weights shall be reasonably smooth. Sheet metal weights shall be smoothly sheared and shall be free from burrs.

7 MARKING

7.1 Every weight, except weights of 50 carat and lower denominations, shall have the manufacturer's name or trade-mark and the denomination indelibly stamped on it.

7.1.1 The denomination shall consist of the Hindu-Arabic numeral prefixed and suffixed by the letters 'क' and 'c', respectively, except that in the case of weights below 50 carat, only the numerals shall be marked. The size of numerals and letters indicating denominations of weights shall be at least twice the size of letters indicating the manufacturer's name or trade-mark.

7.2 The marking shall be legible and deep enough to ensure indelibility over a long period of use, but not so deep as to crack the weight itself.

7.3 BIS Certification Marking

The product may also be marked with the Standard Mark. If it is not possible to put the Standard Mark on the product then it may be marked on packing or packing box in which the product is packed.

7.3.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

8 PACKING

8.1 Each set of carat weights shall, in addition to the series of denominations specified under **3**, consist of an, additional piece of weight of the relevant decimal multiple of two.

8.2 The weights shall be supplied in a suitable velvet lined box. The small sheet metal weights shall be so housed and provided with a cover of glass or any other transparent material that they will not get dislodged from their proper places. The box shall also contain a pair of forceps for lifting the weights.