IS : 1481 - 1970
(Reaffirmed 1998)
Edition 2.2
(1990-03)

Indian Standard

SPECIFICATION FOR METRIC STEEL SCALES FOR ENGINEERS

(First Revision)

(Incorporating Amendment Nos. 1 & 2)

UDC 531.716.1

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Group 3

Indian Standard

SPECIFICATION FOR METRIC STEEL SCALES FOR ENGINEERS

(First Revision)

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Indian Standard

SPECIFICATION FOR METRIC STEEL SCALES FOR ENGINEERS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 11 May 1970, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 This standard was first published in 1961 and is now being revised for metricization due to complete changeover to metric system in India.

0.3 In this revision the scales have been classified as end-measuring and edge-measuring scales and five different types have been included.

0.4 This edition 2.2 incorporates Amendment No. 1 (March 1983) and Amendment No. 2 (March 1990). Side bar indicates modification of the text as the result of incorporation of the amendments.

0.5 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, shall be rounded off in accordance with IS : 2 - 1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for metric scales made of steel for the use of engineers.

2. TYPES

2.1 Metric scales for engineers shall be of following types:

a) Type A — End measuring scale, graduated on one edge in millimetres, every cm graduation marked (*see* Fig. 1).

b) Type AA— End measuring scale, graduated on both edges in millimetres, on same face, every cm graduation marked (*see* Fig. 1).

*Rules for rounding off numerical values (*revised*).

c) Type B — End measuring scale, graduated on one edge in millimetres, 0 to 5 cm graduated in ½ mm, every cm graduation marked (*see* Fig. 2).

d) Type BB— End measuring scale, graduated on both edges in millimetres on same face, 0 to 5 cm graduated in ½ mm, every cm graduation marked (*see* Fig. 2).

e) Type CC — Edge measuring scale, graduated on both edges in millimetres on same face, 0 to 5 cm graduated in ½ mm, every cm graduation marked (nominal size 100 only) (*see* Fig. 3).

3. MATERIAL

3.1 The scale shall be made of good quality rust-resistant spring steel or manganese spring steel having 0.55 to 0.65 percent carbon and 0.60 percent manganese, minimum or suitable grade of stainless steel. The coefficient of expansion of steel shall be $(11.0 \pm 1.5) \times 10^{-6}$ mm per degree Celsius within the range 0 to 60°C.

3.2 The blanks shall be cut from sheets or strips and shall be free from seams, flaws, scales, burrs or other defects. They shall be uniform in thickness and width throughout the entire length. They shall be suitably hardened and tempered.

4. DIMENSIONS AND GRADUATIONS

4.1 The principal dimensions of the scales shall be as given in Table 1.

TABLE 1 DIMENSIONS FOR BLANKS FOR SCALES

(*Clause* 4.1, and *Fig.* 1, 2 *and* 3)

All dimensions in millimetres.

NOMINAL SIZE cm	l	l_1		b		t
		Max	*Min*	*Max*	*Min*	
10	100	110	105	15	14	0.8 ± 0.1
15	150	165	160	15	14	0.8 ± 0.1
20	200	215	210	20	19	0.8 ± 0.1
30	300	320	315	30	29	1.0 ± 0.2
50	500	520	515	30	29	1.5 ± 0.3
100	1 000	1 030	1 025	40	39	1.5 ± 0.3

4.2 When kept in horizontal position, end measuring scales shall have graduation starting from left to right on both edges.

4.3 When kept in horizontal position, edge measuring scales (Type CC) shall have graduation from left to right on top edge and in reverse direction on bottom edge.

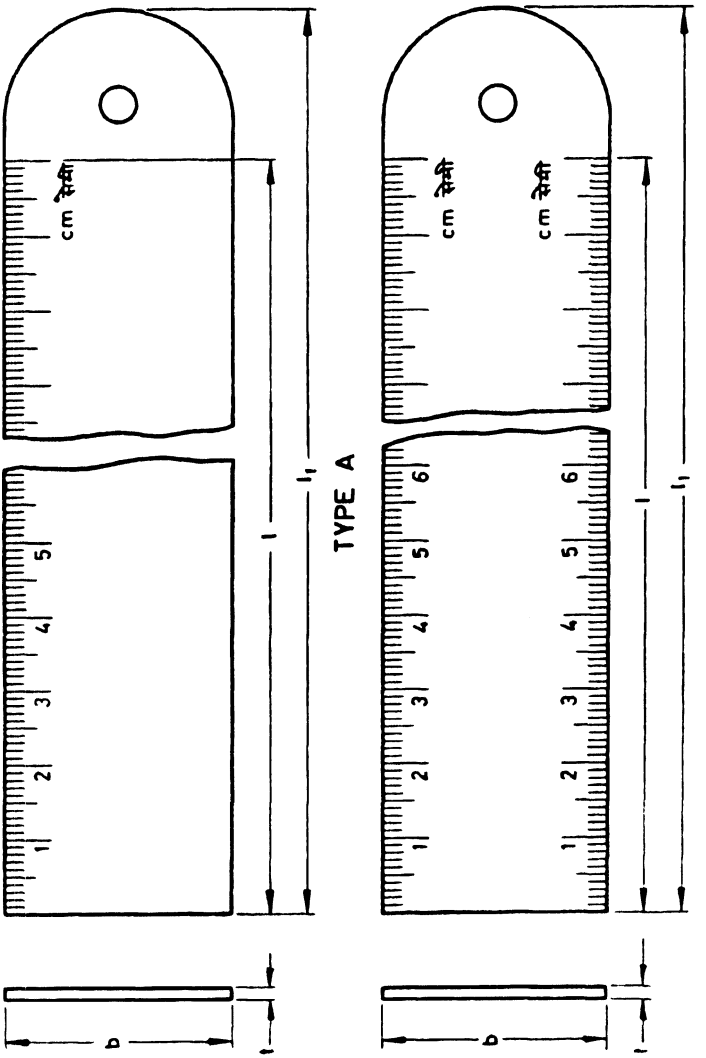

FIG. 1

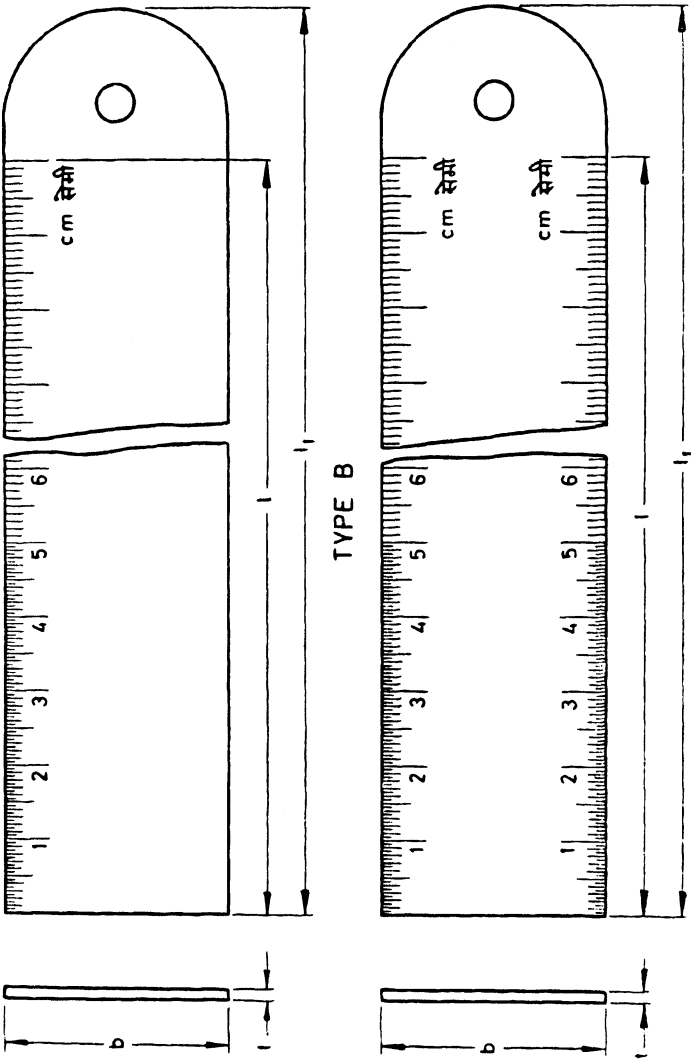

FIG. 2

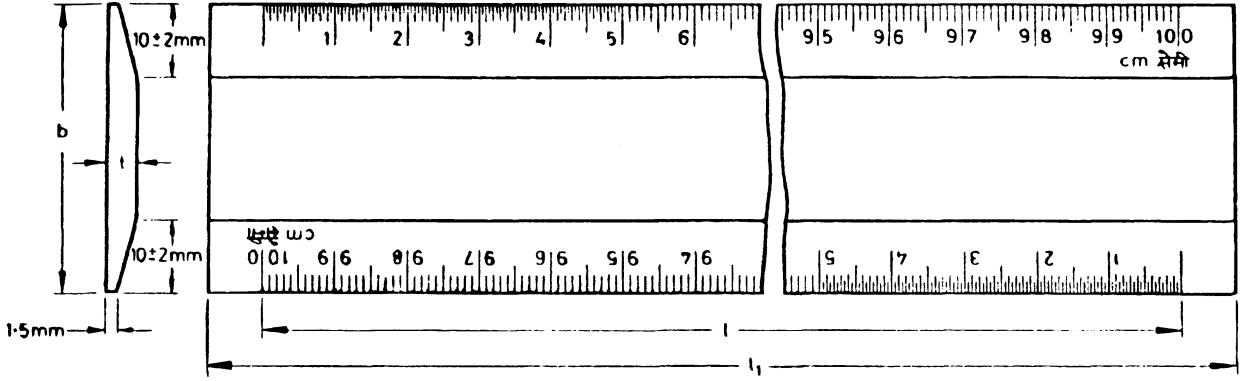

FIG. 3

4.4 Graduation lines shall be fine, clear and of uniform thickness of not more than 0.1 mm. The line shall be of sufficient depth to maintain legibility and indelibility. The length of the graduation lines shall be as follows:

	For Sizes 10 and 20	*For Sizes 30 and Above*
	mm	mm
cm scale mark	5	6
5 mm scale mark	3.5	4
mm scale mark	2.5	2.5
0.5 mm scale mark	1.5	1.5

5. DESIGNATION

5.1 The designation of the scale shall include the type, nominal size and the number of the standard, for example:

Scale of type BB of nominal size 30 cm shall be designated as:

Scale BB 30 — IS : 1481

6. ACCURACY

6.1 When compared against a certified metal scale at 27°C tolerance on the various graduations of the scale shall not exceed the following limits:

a) Between any two adjacent scale marks or contiguous centimetre scale marks	± 0.02 mm
b) Between any two scale marks, more than one centimetre apart up to and including full length of the scale	± 0.05 mm

7. GENERAL REQUIREMENTS

7.1 End measuring scales shall have the zero mark replaced by the square end and the extra length over the maximum scale mark shall be rounded.

7.2 Edge measuring scales shall have both ends finished square.

7.3 The edges of the scales shall not deviate from a straight line by more than 0.1 mm and their plane surfaces shall not vary from a plane by more than 0.5 mm at any point.

7.4 Flexibility Test — The scales of Types A, AA, B and BB shall be subjected to the flexibility test. The scale shall be bent round the periphery of a wooden segment of the following radii (with depth not

less than the width of the scale) until the scale is in contact with the segment throughout its length. The scale shall show no sign of damage or permanent set on completion of the test:

Nominal Size of Scale	*Radius of Segment*
cm	mm
10	35
20	70
30	100
50	160

8. MARKING

8.1 Every centimetre scale mark shall be numbered clearly. The height of the figure shall be not less than 2 mm.

8.2 The abbreviation 'cm' and 'सेमी' shall be marked at the end of the scale.

8.3 Each scale shall be legibly and indelibly marked with the maker's name, initial or recognized trade mark.

8.3.1 Scales may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

9. PRESERVATIVE TREATMENT

9.1 The scales shall be smeared with a thin coating of mineral jelly or any other suitable preservative, and then wrapped in grease-proof paper.

10. PACKING

10.1 The packing of scales shall be as agreed upon between the manufacturer and the purchaser.

Bureau of Indian Standards

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Review of Indian Standards

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This Indian Standard has been developed by Technical Committee : EDC 36 and amended by LMD 20

Amendments Issued Since Publication

Amend No.	Date of Issue
Amd. No. 1	March 1983
Amd. No. 2	March 1990

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