



ISO 9001:2008, 14001:2004,
50001:2011 & OHSAS 18000
MAHARATNA COMPANY

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Sub: Tender Enquiry for supply of Engineer Try Square, Vernier height Gauge, Stainless Steel Measuring Scale.

Dear Sir,

We are pleased to invite offer in **E-Tender** as per enclosed specifications & terms and conditions for the under mentioned items.

Sl. No	Tender No	Description of Material	Qty	Date & Time Of Opening
01	201904041, Event ID: 38997	As Per Annexure J	As Per Annexure J	25/01/2020 at 2.00 PM

Delivery Schedule: For Indigenous vendors: Within 30 days from Po date.

For Foreign Vendors: Within 20 days from BL date.

For New Vendor who are not registered with CFFP:

New Vendor who are not registered with CFFP are required to fill the Supplier Registration Form (SRF). The SRF can be filled online through <https://supplier.bhel.in/>. Please ensure to fill the SRF and it is requested to submit the Acknowledgement No./ Application no. of filled SRF along with the offer. Kindly read terms and conditions, offer not in accordance with the instructions is liable to be disqualified or ignored.

Please send the following along with the Offer:

1. **Company Name and Address Proof.**
2. **GST Number (Scan Copy of Acknowledgement)**
3. **PAN Copy**
4. **MSME Certificate (if Any)**

All the above documents should be signed and stamped.

Please visit <https://bhel.abcprocure.com/EPROC/>; www.bhel.com or www.bhelhwr.co.in for more details & corrigendum if any for the tender enquiry. **Offers are to be submitted online in E-tender portal at <https://bhel.abcprocure.com/EPROC/>**

Offer to be submitted only on e-procurement portal. Hard copy of offer is not required to be submitted to CFFP. Any offers received in Hard copy shall not be accepted and straightaway rejected by CFFP. Before proceeding for submitting quotation in e-portal, supplier to ensure that they are having a valid Digital Signature Certificate (DSC). Valid DSC refers to an Active Signing and Encryption Certificate (both), with specification Class III SHA2 2048 bit

Thanking You,

Yours Faithfully,

For & On behalf of CFFP, BHEL, Hardwar

(Vinay K Singh)

Sr. Engineer (Purchase)

Note: Corrigendum if any shall not be published, kindly refer <https://bhel.abcprocure.com/EPROC/> for any changes.

Pre-Qualification Criteria for Engineers Try Square & Other Instruments

01. Vendor should be original manufacturer or its authorized trader of measuring instruments like Engineers Try Square, Straight edge, Venire Height Gauge, Steel measuring scale etc.
Documentary evidence for supporting the original manufacturer of instrument should be submitted along with offer. Traders should submit authorization certificate from its principal manufacturer along with offer.
02. Vendor must have supplied at least 20 no's of Measuring instruments (either of above instruments or all in total) in last 3 years from date of present tender opening. Copy of Two no's of purchase order for proof of successful execution in last 3 years to be submitted.



Indian Standard

SPECIFICATION FOR ENGINEER'S SQUARES

(Second Revision)

1. Scope — Covers the requirements of engineer's squares of three grades of accuracy, namely, Grades A, B and C.

1.1 Engineer's squares of sizes 500 mm and above may be provided with a flange as shown in Table 1.

1.2 It does not apply to adjustable blade squares.

2. Nomenclature and Definitions — The nomenclature indicated in Fig. 1 along with the definitions given in 2.1 to 2.3 shall apply.

2.1 Tolerance on Straightness — The maximum permissible distance separating two imaginary parallel planes within which the surface under consideration can just be enclosed.

2.2 Tolerance on Parallelism — The maximum permissible distance separating the two imaginary parallel planes within which the surfaces under consideration can just be enclosed. The imaginary parallel planes are parallel to the datum face in question.

2.3 Tolerance on Squareness — The maximum permissible distance separating two imaginary parallel planes within which the surfaces under consideration can just be enclosed. The imaginary parallel planes are perpendicular to the datum face in question.

3. Dimensions — The dimensions of squares shall be as specified in Table 1.

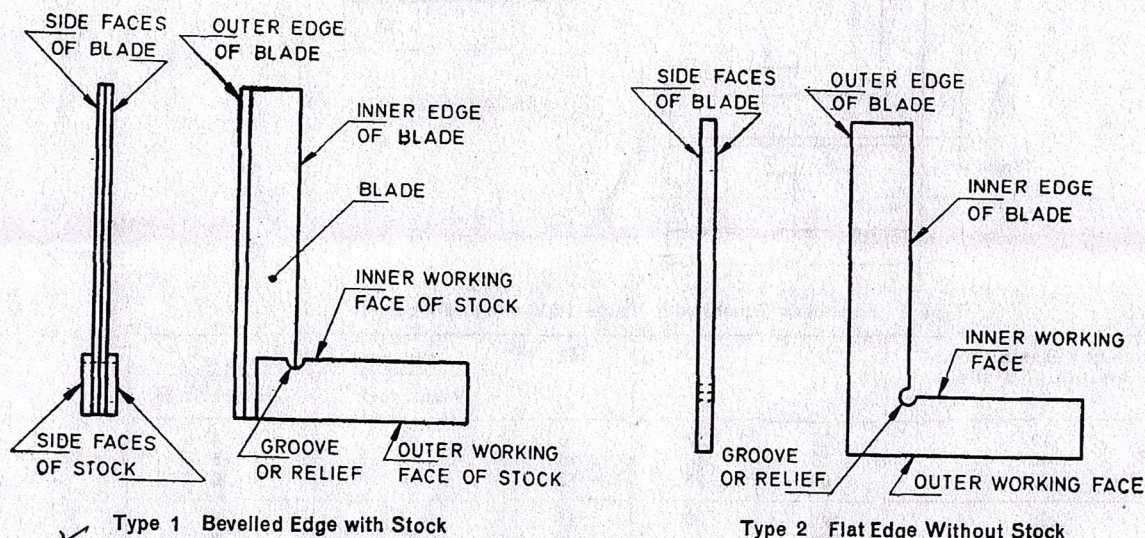


FIG. 1 NOMENCLATURE FOR ENGINEER'S SQUARES

Adopted 29 September 1980

© February 1981, ISI

Price Rs. 8.00

Gr 4

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

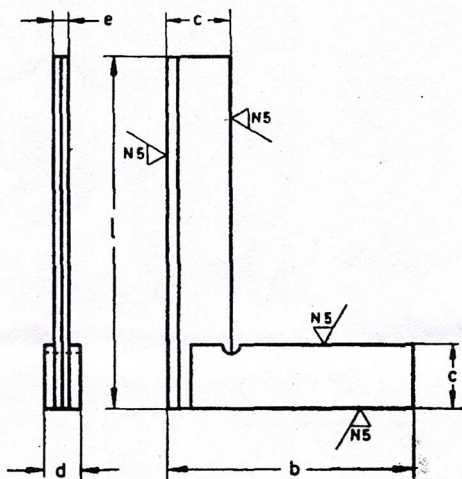
IS : 2103 - 1980

TABLE 1 DIMENSIONS FOR ENGINEER'S SQUARES

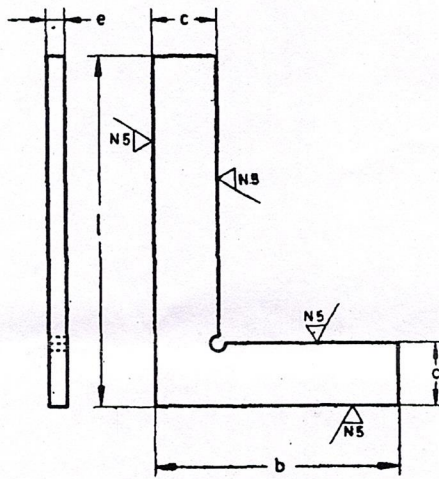
[Clauses 1.1, 3, 5.1(a) and 7.1]

All dimensions in millimetres.

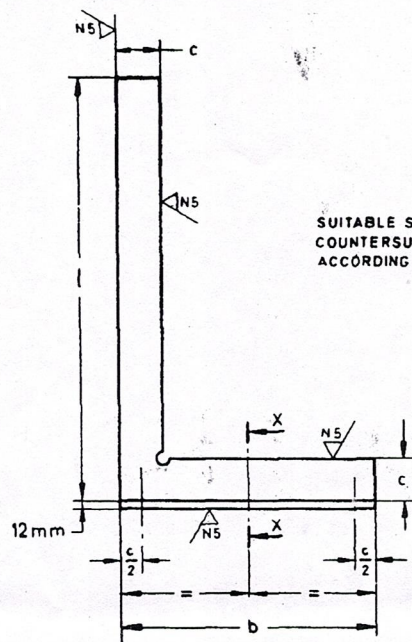
$\nabla N8$ ($\nabla N5$)



Type 1 Bevelled Edge with Stock

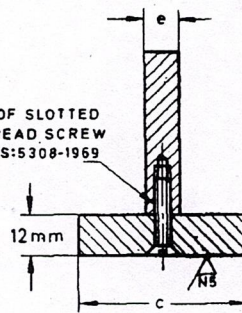


Type 2 Flat Edge Without Stock



Type 3 Engineer's Square with Flange (500 mm and Above)

SUITABLE SIZE OF SLOTTED
COUNTERSUNK HEAD SCREW
ACCORDING TO IS:5308-1959



ENLARGE SECTION XX

Size and Designation Length of Blade l	b	c	d*	Thickness of Blade e	
				With Stock	Without Stock
50	35	12	8	3	4
100	70	18	10	4	5
150	100	25	12	4	6
200	140	30	15	4	6
300	200	40	20	5	8
500	300	50	25	6	10
750	500	60	30	8	12
1 000	750	80	40	8	12

* These dimensions are applicable to engineer's squares with stock only.

7

IS:2103 - 1980

4. Accuracy

4.1 Perpendicularity Tolerance for Internal and External Angle Square (see Fig. 2) — The perpendicularity tolerance of inner and outer working faces to the inner and outer edge of blade respectively to be taken from the formulae given in Table 2. The length l to be taken in mm.

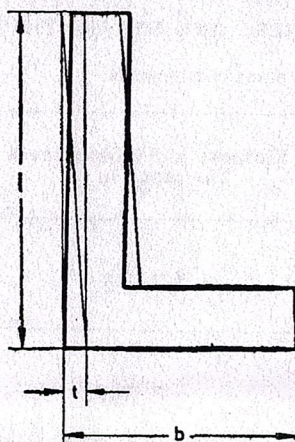


FIG. 2 TOLERANCE FOR INTERNAL AND EXTERNAL ANGLE SQUARES

TABLE 2 FORMULAE FOR PERPENDICULARITY TOLERANCE FOR WORKING FACE TO EDGE OF BLADE
(Clause 4.1 and Fig. 2)

Grade	Perpendicularity Tolerances t in μm
A	$2 + \frac{l}{100}$
B	$5 + \frac{l}{50}$
C	$10 + \frac{l}{20}$

Note — The rounded-off values calculated based on the formulae given in Table 2 are given in Table 3.

4.2 Parallelism Tolerance — Parallelity tolerance of edges of blade is three times the values given for the perpendicularity tolerance for working faces given in Table 3. The parallelity tolerance of side faces is three times the values of perpendicularity tolerance given for working faces in Table 3.

TABLE 3 PERPENDICULARITY TOLERANCE

Length l mm	Perpendicularity Tolerance t in μm		
	Grade A	Grade B	Grade C
50	3	—	—
100	3	7	15
150	4	8	18
200	4	9	20
300	5	11	25
500	—	15	35
750	—	20	43
1 000	—	35	85

Note — The perpendicularity tolerance of side face at blade to working face of small angle arm is three times the values given in Table 3.

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4.3 Flatness Tolerance or Straightness Tolerance on Bevel Edge — The flatness tolerance on working face and straightness tolerance on bevel edge is calculated according to the formulae given in Table 4. The dimensions of l_n (l and b) are in millimetres.

TABLE 4 FORMULAE FOR FLATNESS AND STRAIGHTNESS TOLERANCES

All dimensions in millimetre.

Grade	Flatness and Straightness Tolerance in μm
A	$2 + \frac{l_n}{250}$
B	$2 + \frac{l_n}{100}$
C	$4 + \frac{l_n}{50}$

Note — The rounded-off values calculated based on the formulae in Table 4 are given in Table 5.

TABLE 5 FLATNESS TOLERANCE AND STRAIGHTNESS TOLERANCE VALUES

l and b mm	Flatness and Straightness Tolerances in μm		
	Grade A	Grade B	Grade C
50	2	3	5
100	2	3	6
150	3	4	7
200	3	4	8
300	3	5	10
500	—	7	14
750	—	10	19
1 000	—	12	24

Note — For the flatness tolerance of side faces, three times the values given in Table 5, for flatness of the working face shall be taken.

5. Designation

5.1 All squares shall be designated by:

- Nominal length of the blade in millimetres, measured from the outer working face of the stock to the end of the blade (dimension / in Table 1);
- Grade of accuracy A, B or C;
- Type 1, 2 or 3 representing bevelled edge with stock, flat edge without stock or engineer's square with flange respectively; and
- Number of this standard.

5.2 Grade — Unless otherwise specified, Grade A squares shall be supplied with bevelled edges and Grade B and C squares with flat edges.

Examples:

- Engineer's square of blade length 200 mm, Grade A and Type 1, that is, 'with stock' shall be designated as:

Engineer's Square 200 A-1 IS : 2103

- Engineer's square of blade length 300 mm, Grade B and Type 2, that is, 'without stock' shall be designated as:

Engineer's Square 300 B-2 IS : 2103

- Engineer's square of blade length 500 mm, Grade C and Type 3, that is, 'with flange' shall be designated as:

Engineer's Square 500 C-3 IS : 2103

6. Manufacture — The squares shall be of good quality tool or alloy steel suitably hardened and stabilized. The measuring surface shall have a minimum hardness of 660 HV [see IS : 1501-1968 Method of Vickers hardness test for steel (first revision)].

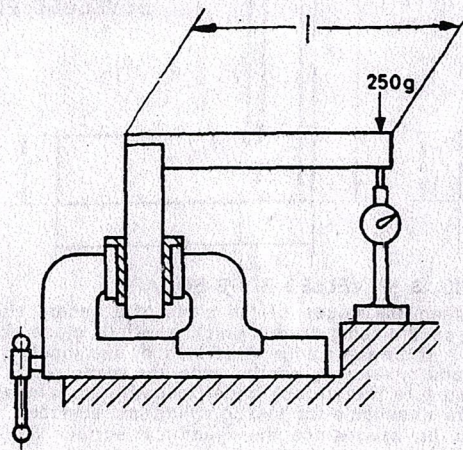
6.1 Suitable examples of steel from IS : 1570-1961 'Schedule for wrought steel for general engineering purposes' are given below:

Sl No.	Designation	Schedule for IS : 1570-1961
1	T215 Cr 12	Schedule VI
2	T150 Cr 1 Mn 60	
3	T105 Cr 1	
4	T 90 V 23	Schedule IV
5	17 Mn 1 Cr 95	
6	20 Mn Cr 1	

7. Workmanship and Finish

7.1 All working surfaces, edges and sides of the blades, stocks and flanges shall be carefully ground and lapped. The surface finish value shall be as indicated in Table 1.

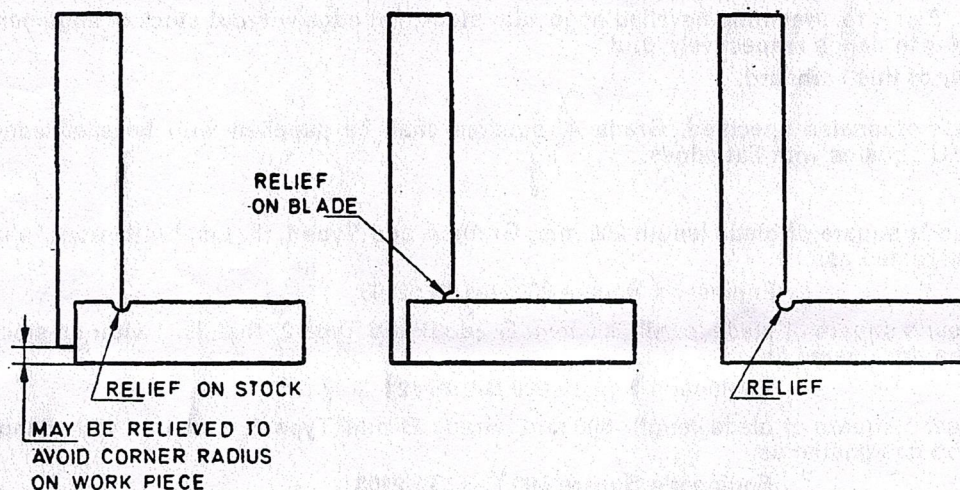
7.2 Rigidity — The blade shall be rigidly and permanently fixed in the stock or the flange by suitable means. When it is held rigidly as shown below, and a load of 250 g is applied to the end of the blade, the end of the blade shall not deflect by any amount greater than $0.7 \sqrt{l} \mu\text{m}$, where l is the length of the blade in millimetres.



IS: 2103-1980

7.3 The squares shall be free from cracks, pits and other flaws. All sharp edges shall be removed and surfaces shall be bright all over. The rivets and screws used for joining the stock or flange to blades shall be flush with faces or the working surfaces of the squares.

7.4 The stock or the blade shall be slightly relieved across the width at the junction of the inner faces of the stock and blade as shown below. The outer junction of the blade and the stock may also be relieved as shown in the figure to avoid corner radius on work-piece.



7.5 Bevelled Edges for Grade A Square—Grade A squares shall be supplied with both inner and outer edges of the blade bevelled, so that the approximate width of the bevelled edges is as follows. The included level angle size shall be a approximately 60 degrees (see Fig. 3):

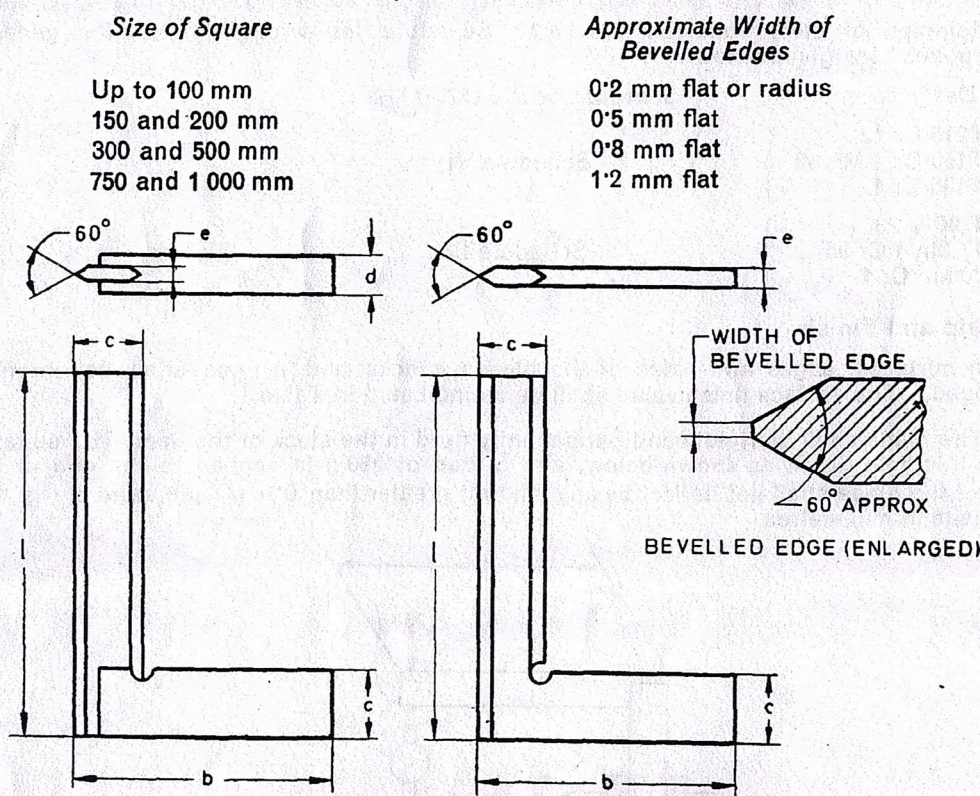
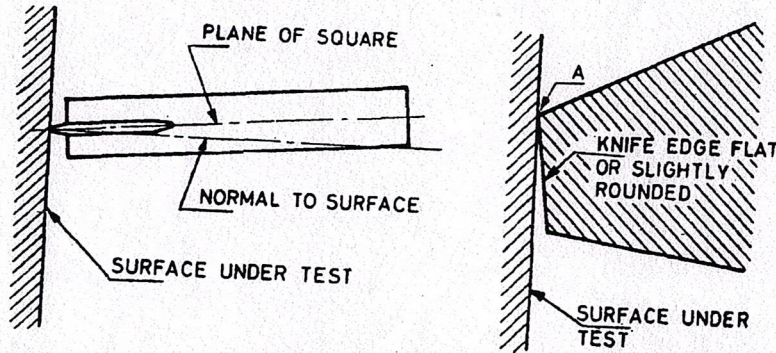


FIG. 3 BEVELLED EDGE SQUARE

Note—The operation of bevelling the edges of the blade of a square should be carried out with care, keeping in view the possibility of the square being used in practice with its plane slightly out of the normal to the surface under test as shown in Fig. 4. If the sharp edge A formed by the junction of the bevel and the reduced edge of the blade is not straight and/or laterally parallel with the plane of the square, the square will show erroneous results unless it is presented to the surface under test with its plane truly normal to that surface. Square with bevelled edge blades are unsuitable for testing cylindrical surfaces. For this purpose an ordinary square with flat-edged blade should be used since the cylindrical surface itself provides the necessary line contact.



ENLARGED VIEW OF CONTACT BETWEEN KNIFE EDGE AND SURFACE UNDER TEST
 FIG. 4 USE OF BEVELLED EDGE AND SQUARE

✓ **8. Marking** — The engineer's squares shall be legibly and permanently marked with the nominal length of the blade in millimetres, grade of accuracy, type, number of this specification and the manufacturer's name or trade-mark. The marking shall be done on a non-functional surface only.

8.1 ISI Certification Marking — Details available with the Indian Standards Institution.

9. Packing

9.1 Each square shall be protected against climatic conditions by coating with a suitable non-corrosive compound, wrapped in a non-absorbent paper and shall be supplied in suitable packings.

EXPLANATORY NOTE

This standard was first published in 1962 and subsequently revised in 1972. In the present revision most of the provisions given in the previous standard have been retained without change and only a few changes have been incorporated to bring it in line with BS 939-1962 'Engineer's squares including cylindrical and block squares' issued by the British Standards Institution and DIN 875-1975 'Squares 90°, dimensions, technical conditions and delivery' issued by Deutscher Normenausschuss.

Indian Standard

ENGINEERING METROLOGY — STEEL
STRAIGHTEDGES — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard covers the dimensions and requirements for steel straightedges, and provides four grades of accuracy, namely Grade 00, 0, 1 and 2.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	Title
7018 (Part 1) : 1983	Technical supply conditions for gauges: Part 1 General (first revision)
8000 (Part 1) : 1985	Geometrical tolerancing on technical drawings: Part 1 Tolerancing of form, orientation, location and run-out, and appropriate geometrical definitions (first revision)
8378 : 1987	Vocabulary for basic and general terms in dimensional metrology (first revision)
12937 : 1990	Engineering metrology — Methods of testing straightness, flatness and perpendicularity.

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 8378 : 1987 shall apply, in addition to the following.

3.1 Straightedge

Physical representation, to a given accuracy, of a straight reference line, with reference to which departure from straightness or flatness of a surface may be determined.

3.2 Straightness Tolerance

See 14.1 of IS 8000 (Part 1) : 1985.

3.3 Parallelism Tolerance

See 14.7 of IS 8000 (Part 1) : 1985.

3.4 Nominal Length

Total length of a straightedge.

3.5 Points of Best Support

Two points on the straightedge, which when used for supporting the straightedge, result in the minimum natural deflection. These points are at $\frac{2}{9}L$ from each end, where L is the total length of the straightedge (see Fig. 1).

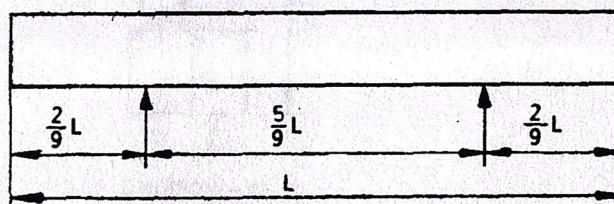


FIG. 1 STRAIGHTEDGE POINTS OF BEST SUPPORTS

4 DIMENSIONS AND GRADES

4.1 The dimensions of straightedges shall be as given in Table 1.

4.2 There shall be four grades of straightedges, namely Grade 00, Grade 0, Grade 1 and Grade 2. Grade 00 and Grade 0 shall be used for inspection purpose. Grade 1 and Grade 2 shall be used in workshops during manufacture.

5 MATERIAL AND MECHANICAL PROPERTIES

5.1 Straightedges shall be made from a suitable steel given in IS 7018 (Part 1) : 1983.

5.2 If required by the purchaser, straightedges may be hardened only on the working surfaces, unless specified otherwise. Such straightedges shall be properly heat-treated and stabilized. The hardness number of hardened straightedges shall be not less than 500 HV.

6 WORKMANSHIP AND FINISH

Straightedges shall be finished smooth, and sharp edges shall be rounded off. The working faces shall be properly machined and the side faces shall be relieved to reduce weight. 2 000 to 5 000 mm straightedges may be provided with holes/slots to reduce weight.

10 MARKING

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10.1 Each straightedge shall have legibly and permanently engraved upon it the nominal size, the grade and the indication of the source of manufacture.

10.2 The straightedges may also be marked

with Standard Mark, details of which may be obtained from the Bureau of Indian Standards.

11 PACKING

11.1 All finished surfaces of straightedges shall be protected against climatic conditions by a suitable protective coating, Each straightedge shall be supplied in a protective case.

Table 2 Accuracy of Straightedges
(Clauses 8.1 and 8.2)

Nominal Length mm	Error in Straightness in μm			
	Grade 00	Grade 0	Grade 1	Grade 2
300	4	7	12	21
500	4	7	12	21
750	6	9.5	17	27
1 000	8	12	21	33
1 500	—	17	29	46
2 000	—	22	37	58
2 500	—	27	46	71
3 000	—	32	54	83
4 000	—	42	71	108
5 000	—	—	87	133

Annexure J

Item Description	Quantity	Unit
1 FF6616199029 ENGINEER TRY SQUARE AS PER IS: 2103-1980 "A" GRADE (STEEL) SIZE: 0-300 MM DIM.: S	10	NO
2 FF6616199045 ENGINEER TRY SQUARE AS PER IS: 2103-1980 "A" GRADE (STEEL) SIZE: 0-1000 MM DIM.: S	4	NO
3 FF6616199053 ENGINEER TRY SQUARE AS PER IS: 2103-1980 "A" GRADE (STEEL) SIZE: 0-1500 MM DIM.: S	4	NO
4 FF6616199037 ENGINEER TRY SQUARE AS PER IS: 2103-1980 "A" GRADE (STEEL) SIZE: 0-600 MM DIM.: S	4	NO
5 FF6616398021 STRAIGHT EDGE (HARDENED STEEL) "A" GRADE AS PER IS-2220-1990 SIZE: 0-2000MM DIM.: S	6	NO
6 FF6616197050 STAINLESS STEEL MEASURING SCALE SIZE: 0-2000MM DIM.: S	2	NO
7 AA6611811036 VERNIER HEIGHT GAUGE LC=0.02 MM SIZE: 1000 MM	4	NO
8 AA6611811044 VERNIER HEIGHT GAUGE LC=0.02 MM SIZE: 600 MM	4	NO
9 AA6611811605 VERNIER HEIGHT GAUGE LC=0.02 MM SIZE: 1500 MM	4	NO