

For Comments Only

Preliminary Draft

**Gauges-Thread Pitch Gauges for ISO Metric Screw Threads
(Pitch Range 0.4 To 6 Mm) — Specification**
(Second Revision of IS 4211)

ICS 17.040.10

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Engineering Metrology Sectional Committee, PGD 25

FOREWORD

(Formal clause will be added later)

The ISO metric screw thread pitch gauge is a tool used to measure the pitch of metric screw threads, ranging from 0.4 to 6 mm. It is a precision instrument designed to accurately determine the pitch of a screw thread, which is crucial for ensuring compatibility and proper functioning of threaded components.

These gauges typically consist of a set of blades or wires with calibrated notches that correspond to specific thread pitches. To use the gauge, the blades or wires are placed against the screw thread, and the one that fits snugly without gaps indicates the pitch of the thread.

This standard was originally published in 1967 and subsequently revised in 1993. This revision has been taken up to keep pace with latest technological developments. In this revision following major changes have been made:

- a) Calibration method of thread pitch gauges has been added;
- b) UDC number has been replaced by ICS number on first cover page; and
- c) Reference clause has been updated.

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 : 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.

Indian Standard

**GAUGES-THREAD PITCH GAUGES FOR ISO METRIC SCREW THREADS
(PITCH RANGE 0.4 TO 6 mm) — SPECIFICATION**

(Second Revision)

1 SCOPE

This standard covers the requirements for thread pitch gauges consisting of an assembly of blades used for identifying the nominal pitch P of ISO metric screw threads in the pitch range 0.4 to 6 mm and a blade having ISO thread profile 60° (included angle) as per IS 4218 (Part 1) assembled in a protective sheath.

2 REFERENCES

The standards listed below 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 listed below. In case the standards are to be referred in this clause they are to be listed as follows:

<i>IS No</i>	<i>Title</i>
4218 (Part 1) : 2001	ISO Metric screw thread: Part 1 basic and design profiles (<i>second revision</i>)
IS 1501 (Part 1) : 2020/ ISO 6507-1 : 2018	Metallic Materials — Vickers Hardness Test Part 1 Test Method (<i>fifth revision</i>)

3 MATERIAL

The blades shall be made from suitable quality steel preferably of one which does not corrode during use and shall be hardened and tempered to a hardness not less than 200 HV [*see* IS 1501 (Part 1)].

4 DIMENSIONS AND TOLERANCES

4.1 The minimum gauge length L of each gauge shall be as specified below (*see* Fig. 1):

<i>Pitch P, mm</i>	<i>Gauge Length, mm</i> <i>L (Min)</i>
0.4 to 1	8 mm
1.25 to 6	13mm

4.2 The gauges shall consist of thread pitches as specified below:

<i>No. of Gauges in the Set</i>	<i>P, mm</i>
20	0.4, 0.45, 0.5, 0.6, 0.7, 0.75 0.8, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6

4.3 The profile and dimensions of gauges shall be as given in Table 1.

5 GENERAL REQUIREMENTS

5.1 sheath

The sheath shall be so designed as to fully protect the blades when not in use.

5.2 The construction of the case for the blades should provide for easy replacement of each gauge and re-locking in the position for which it was set.

5.3 The gauges in the set should be assembled in the ascending order of the pitch of the thread.

5.4 Finish

The outer ends of the blades shall be approximately semicircular and the blades shall be free from sharp edges throughout their length.

6 CALIBRATION

Calibration of the thread pitch gauge shall be carried out as per Annex A or any standard/ established method.

7 DESIGNATION

The thread pitch gauges shall be designated by pitch, number of blades, ISO thread profile and IS number.

Example:

Thread Pitch Gauges 0.4 to 6 mm 20 blades ISO 60° IS 4211.

8 MARKING

8.1 Blades shall be legibly and permanently marked with pitch as shown in Fig. 1.

8.2 Sheath

The sheath shall be legibly and permanently marked with the range as well as ISO 60° as shown in Fig. 1 and the manufacturer's name or trade mark.

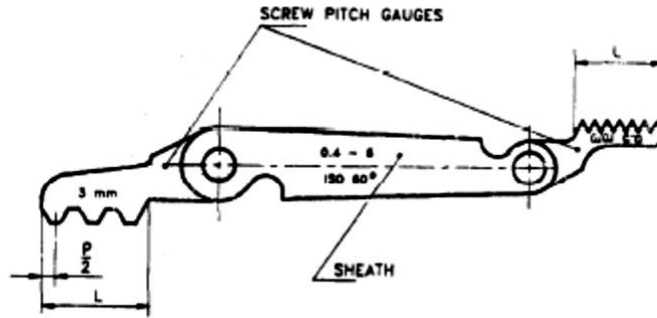
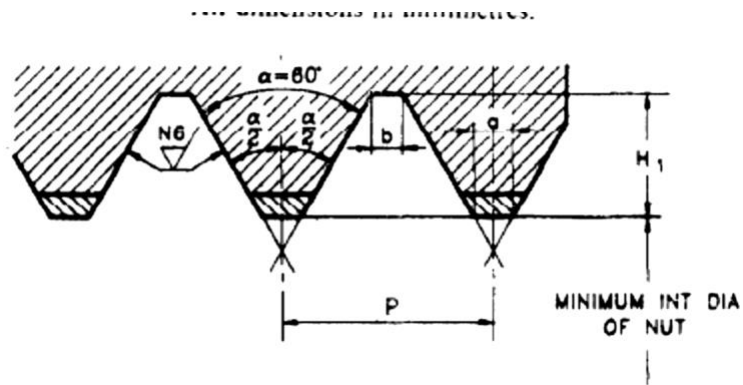


Fig 1 THREAD PITCH GAUGES

Table 1

TABLE 1 DIMENSIONS AND TOLERANCES FOR THREAD PITCH GAUGES FOR ISO METRIC SCREW THREADS

(Clause 4.3)



Pitch p	Tolerance on P	H_1	Width of Flat Portion			Tolerance on Half Angle α 2 in Minutes
			a		b	
			Min	Max	Max	
0.4		0.217	0.10	0.12	0.05	± 60
0.45		0.244	0.11	0.13	0.06	
0.5		0.271	0.12	0.14	0.07	± 50
0.6		0.325	0.15	0.18	0.08	
0.7		0.379	0.17	0.20	0.09	

0.75	±0.010	0.406	0.18	0.21	0.09	±40
0.8		0.433	0.20	0.23	0.10	
1		0.541	0.25	0.28	0.13	
1.25		0.677	0.31	0.35	0.16	±35
1.5	±0.010	0.812	0.37	0.41	0.19	±30
1.75		0.947	0.44	0.48	0.22	
2		1.083	0.50	0.54	0.25	
2.5		1.353	0.62	0.66	0.31	
3	±0.010	1.624	0.75	0.80	0.38	±25
3.5		1.894	0.87	0.92	0.44	
4		2.165	1.00	1.05	0.50	
4.5		2.436	1.13	1.18	0.56	±20
5		2.706	1.25	1.32	0.63	
5.5		2.977	1.37	1.44	0.69	
6	3.248	1.50	1.57	0.75		

ANNEX – A

(Clause 6)

CALIBRATION OF THREAD PITCH GAUGES

A-1 GENERAL

This Annex gives information on the recommended method for the calibration of thread pitch gauges.

A-2 ENVIRONMENTAL CONDITIONS

The calibration environment shall be maintained at a temperature of 20 ± 2 deg C.

A-3 EQUIPMENT

Calibration shall be performed using a profile projector or vision measuring system with a resolution of 0.01mm and 1 minute.

A-4 PRINCIPLE, PARAMETER AND METHOD

A-4.1 Principle — Comparison with pitch and flank angle readings as per master.

A-4.2 Parameter — Pitch and Flank angle shall be checked.

A-4.3 Method

A-4.3.1 *Measurement of Pitch*

Measure the distance between the adjacent flanks which gives the pitch error, repeat this pitch measurement at least for two or three pitches by covering the length of the thread pitch gauge and report the average of the readings.

A-4.3.2 *Measurement of flank angle*

Measure the angle between the left flank and right flank of thread pitch gauge which gives included angle, repeat this angle measurement at least for two or three angles by covering the length of the thread pitch gauge and report the average of the readings.

A-5 ACCEPTANCE CRITERIA

As per the applicable tolerance given in Table 1.