



SCREW THREADS - GENERAL (METRIC)

1.0 SCOPE:

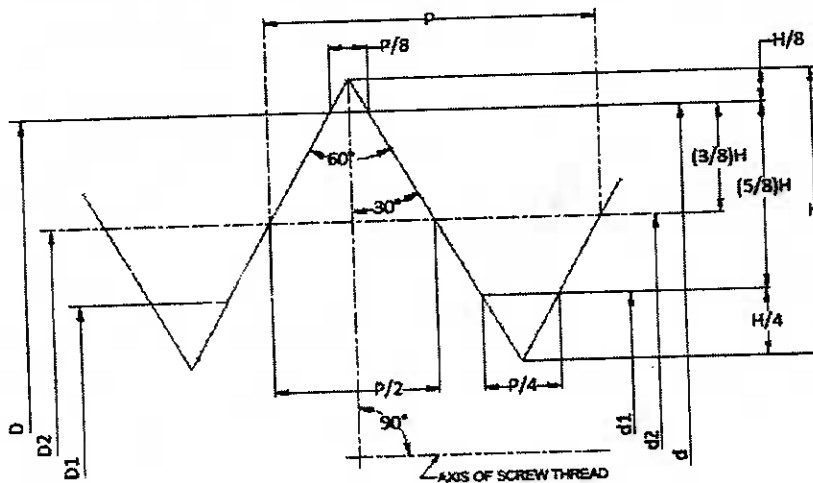
This standard gives information about metric screw threads with ISO (International Organization for Standardization) profile

2.0 COMPLIANCE WITH STANDARDS:

This standard is based on IS: 4218, Part 1-2001, IS: 4218, Part 2-2001, IS: 4218, Part 4-2001

3.0 BASIC PROFILE:

The basic profile of threads shall be as shown below



FOR DETAILS, REFER CLAUSE-9

- $H = \frac{5}{8}P = 0.866025P$
- $\frac{5}{8}H = 0.541266P$
- $\frac{3}{8}H = 0.324760P$
- $H/4 = 0.216506P$
- $H/8 = 0.108253P$

4.0 THREADED SERIES:

The following are the threaded series existing in the metric system.

4.1 Coarse Threaded Series

In coarse threaded series the pitch varies with the change in diameter and is coarser than fine threaded series (see also 6.2.1)

4.2 Fine thread series

In fine threaded series also the pitch varies with the change in diameter but is finer than the coarse series (see also 6.2.2)

Revisions: As per Clause 18.7 of 18th MOM of PGC-DOP+BES

APPROVED:
PROCEDURAL GUIDELINES COMMITTEE - PGC(DOP+BES)

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4.3 Constant Pitch Threaded Series

In constant pitch threaded series the pitch remains constant irrespective of change in diameter (see also 6.2.3)

5.0 DESIGNATION:

5.1 The complete designation of screw thread comprises a designation for the threaded system, size and a designation for the thread tolerance class.

5.2 Thread System and Sizes: The size of the screw thread shall be designated by the letter 'M' followed by the diameter and the pitch, the two being separated by sign 'X'

For example: M64 x 4

Where M signifies metric thread of ISO profile, 64 is the nominal diameter and 4 represents the pitch.

Where there is no indication of pitch, it shall mean that a coarse pitch is to be used.

5.2.1 Thread tolerance: The tolerance class designation includes a class designation for the pitch diameter tolerance.

Each class designation consists of:

- a) A figure indicating the tolerance grade.
- b) A letter indicating the tolerance position, capital letters for nut (internal) threads and small letters for bolt (external) threads.

EXAMPLES:

i) Nut (Internal) Threads: M64 - 6H

Which identifies as internal thread of 64 mm nominal diameter in the coarse thread series having 6H as the tolerance class

M24 x 2 - 6H

Which identifies as internal thread of 24 mm nominal diameter in the fine thread series having 2 mm as the pitch and 6H as the tolerance class

ii) Bolt (External) Threads: M64 - 6g

Which identifies external threads of 64 mm nominal diameter in the coarse thread having 6g as the tolerance class

M24 x 2 - 6g

Which identifies as external thread of 24 mm nominal diameter in the fine thread series having 2 mm as the pitch and 6g as the tolerance class

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6.0 SELECTION AND APPLICATION

6.1 Selection

6.1.1 In the interest of economy, designers should preferably select metric threads having either coarse or fine pitch series such that only these pitches are used for which tools and gauges stocked in various divisions.

6.1.2 Threads which are different from the standard graded pitch series (e.g.: coarse or fine) entail the design and manufacture of special threading tools and gauges with consequent increase in cost. Therefore first preference should always be given to the standard coarse or fine series before selecting one of the standard constant pitch series.

6.2 Application: The choice of coarse or fine thread series usually involves consideration of the following:

6.2.1 Coarse threads: The coarse thread gives a good resistance to stripping. It is suitable for threaded fasteners and for general use where the wall thickness can accommodate the thread dimensions.

It is particularly advantageous for use with the lower tensile strength materials such as cast iron, mild steel and other softer materials (Brass, Aluminium, plastics etc.), it is also suitable for applications involving rapid assembly, removal or situation subjected to slight corrosion or damage i.e. for rough use.

6.2.2 Fine threads: The fine thread is recommended for all applications where a finer pitch is required. It is suitable for threaded fasteners where in static applications. It is necessary to provide extra care/strength. The series is less resistant to stripping and to the effect of repeated tightening than the coarse series. However, this gives sufficient resistances to stripping provided the length of engagement is adequate.

6.2.3 Constant pitch threads: Constant pitch threads may be used for parts which are repeatedly assembled or dismantled and where it may be necessary to rethread the part in service. The fine pitches, makes the series suitable for adjusting collars, retaining nuts, thin nuts etc. on compact design work (also refer clause 6.1.2).

6.3 Diameter/ Pitch Combination:

6.3.1 Combinations of diameter/pitch recommended for use are given in Table-1.

6.4 Unless otherwise specified, threads to this standard shall be right handed. Whenever L.H. threads are required to be used, it should be done only consultation with standard cell of respective division.

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7.0 COATED THREADS:

7.1 For coated threads, the tolerances apply to the parts before coating if not otherwise stated. After coating, the thread shall not transgress the maximum material limits for position 'H' or 'h' respectively.

8.0 CLASS OF FIT:

8.1 Three classes of fit for metric screw threads; generally designated as fine, medium and coarse have been provided for in the ISO metric screw thread system.

The general rule for the choice of thread class can be stated as follows:-

Fine: For precision threads, when little variation of fit is required.

Medium: For general use (tolerance class 6H/6g)

Coarse: For cases where manufacturing difficulties can arise e.g. when threading hot rolled bars and long blind holes and to meet the requirement of dirty and corrosive condition. (Tolerance class 7H/8g), also applicable in case of production Grade 'C' bolts, screws and nuts)

8.2 IT IS RECOMMENDED TO USE MEDIUM CLASS FIT i.e. "Tol. class 6H/6g in general, other tolerance class may be used after approval of appropriate authority at respective divisions.

8.3 Where no tolerances are specified, tolerance class 6H and 6g will be applicable for nuts/bolt threads respectively.

9.0 DETAILS OF BASIC PROFILE [Ref. Clause 3]

Where

D is the basic major diameter of internal thread (nominal diameter)

d is the basic major diameter of external thread (nominal diameter)

D₂ is the basic pitch diameter of internal thread

d₂ is the basic pitch diameter of external thread

D₁ is the basic minor diameter of internal thread

d₁ is the basic minor diameter of external thread

H is the height of fundamental triangle

P is the pitch

10.0 REFERRED STANDARDS (Latest publications including amendment)

Nil

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TABLE-1

RECOMMENDED PITCH DIAMETER COMBINATIONS

Nom dia (mm)	PITCHES												
	Coarse	Fine											
		6	4	3	2	1.5	1.25	1	0.75	0.5	0.35	0.25	0.2
1	0.25												0.2
1.2	0.25												0.2
1.6	0.35												0.2
2	0.4											0.25	
2.5	0.45										0.35		
3	0.5										0.35		
4	0.7									0.5			
5	0.8									0.5			
6	1								0.75				
8	1.25							1	0.75				
10	1.5						1.25	1	0.75				
12	1.75					1.5	1.25	1					
16	2					1.5		1					
20	2.5				2	1.5		1					
24	3				2	1.5		1					
30	3.5				2	1.5		1					
36	4			3	2	1.5							
42	4.5		4	3	2	1.5							
48	5		4	3	2	1.5							
56	5.5		4	3	2	1.5							
64	6		4	3	2	1.5							
72		6	4	3	2	1.5							
80		6	4	3	2	1.5							
90		6	4	3	2								
100		6	4	3	2								
110		6	4	3	2								
125		6	4	3	2								
140		6	4	3	2								
160		6	4	3									
180		6	4	3									
200		6	4	3									
220		6	4	3									
250		6	4	3									
280		6	4	3									

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