

Transformed

**ISO**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

**ISO RECOMMENDATION  
R 263**

**ISO INCH SCREW THREADS**

**GENERAL PLAN AND SELECTION FOR SCREWS, BOLTS AND NUTS**  
(diameter range 0.06 to 6 in)

1st EDITION  
July 1962

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## BRIEF HISTORY

The ISO Recommendation R 263, *ISO Inch Screw Threads. General Plan and Selection for Screws, Bolts and Nuts. (diameter range 0.06 to 6 in)*, was drawn up by Technical Committee ISO/TC 1, *Screw Threads*, the Secretariat of which is held by the Sveriges Standardiseringskommission (SIS).

Work on this question by the Technical Committee began in 1957 and led, in 1959, to the adoption of a Draft ISO Recommendation.

In May 1960, this Draft ISO Recommendation (No. 362) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Argentina	France	New Zealand
Australia	Germany	Norway
Austria	Greece	Poland
Canada	Hungary	Spain
Chile	India	Switzerland
Colombia	Israel	United Kingdom
Czechoslovakia	Italy	U.S.A.
Denmark	Japan	
Finland	Netherlands	

Three Member Bodies opposed the approval of the Draft:

Bulgaria	Sweden	U.S.S.R.
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The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in July 1962, to accept it as an ISO RECOMMENDATION.

## FOREWORD

This ISO Recommendation is one of a number of ISO Recommendations determining internationally interchangeable triangular screw threads.

It is intended that the complete set of these ISO Recommendations will cover the following specifications:

Basic Profile for ISO Triangular Screw Threads (except for pipe threads) and design profiles for nut and bolt	(ISO Recommendation R 68, section 2)
ISO Metric Screw Threads. General Plan (diameter range 0.25 to 300 mm)	(ISO Recommendation R 261)
ISO Metric Screw Threads for screws, bolts and nuts (a) diameter range 0.25 to 5 mm	(ISO Recommendation R 68, section 3)
(b) diameter range 6 to 39 mm	(ISO Recommendation R 262)
ISO Inch Screw Threads. General Plan (diameter range 0.06 to 6 in) and selection for screws, bolts and nuts	(ISO Recommendation R 263)
ISO Selected Screw Threads for screws, bolts and nuts	(Under study)

All these ISO Recommendations on screw threads will utilize the Basic Profile for ISO Triangular Screw Threads set out in ISO Recommendation R 68, *Screw Threads*.

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## ISO INCH SCREW THREADS

### GENERAL PLAN AND SELECTION FOR SCREWS, BOLTS AND NUTS

(diameter range 0.06 to 6 in)

#### 1. INTRODUCTION

This ISO Recommendation tabulates ISO Inch Screw Threads (except for pipe threads) having the Basic Profile for ISO Triangular Screw Threads.

It comprises both a General Plan of the ISO Inch Screw Threads and the ISO Inch Screw Threads for screws, bolts and nuts, the latter being a selection from the former.

The ISO Recommendation contains sizes in the diameter range 0.06 to 6 in, comprising a number of series of diameter-pitch combinations, together with a system of thread designations.

It remains for each industry to choose for itself, by means of selection among the screw threads of this ISO Recommendation, the diameter-pitch combinations appropriate to its own needs.

#### 2. THREAD SERIES

The General Plan is characterized by a number of thread series, i. e. groups of diameter-pitch combinations distinguished from each other by the number of threads per inch associated with specific diameters of threads. These thread series are shown in Table 1.

##### 2.1 Diameters

Columns 1 and 2 of Table 1 give primary and secondary sizes which should suffice to meet the common needs of design. Column 3 gives the decimal equivalents of these sizes

##### 2.2 Number of threads per inch

Columns 4 to 14 (inclusive) of Table 1 give the number of threads per inch which are recommended for association with the sizes in columns 1 and 2. These columns of threads per inch are divided into two groups:

Series with graded pitches : columns 4, 5 and 6,  
Series with constant (uniform) pitches: columns 7 to 14.

##### 2.2.1. Series with graded pitches

There are three series with graded pitches. They are headed "coarse", "fine" and "extra-fine", in compliance with present practice.

These terms denote the relative magnitudes of the pitches of the three series for any given diameter of thread and do not imply any difference in the quality of the threads in the series.

**The coarse and fine thread series should be the first choice for general engineering applications, and they form the selected series for the commercial production of screws, bolts and nuts.**

##### 2.2.2. Series with constant (uniform) pitches

In addition to the three series of graded pitches, Table 1 includes columns of constant pitches which have been selected from the range 4 to 32 threads per inch. Each of these series is limited to an appropriate range of diameters.

#### 3. DESIGNATIONS

The screw threads in this General Plan are designated as shown in the column headings of Table 1, i. e. as follows:

##### 3.1 Series with graded pitches

Coarse thread series	Designation UNC; e. g. $\frac{1}{4}$ -20 UNC;	No. 4-40 UNC;
Fine thread series	Designation UNF; e. g. $\frac{1}{4}$ -28 UNF;	No. 4-48 UNF;
Extra-fine thread series	Designation UNEF; e. g. $\frac{1}{4}$ -32 UNEF.	

##### 3.2 Series with constant (uniform) pitches

All of the diameter-pitch combinations of the threads in these constant-pitch series are designated UN; e. g. 1-16 UN.

4. SCREW THREADS  
TABLE 1.

Sizes		Basic Major diameter  in	Number of threads per inch										
			Series with graded pitches			Series with constant (uniform) pitches							
			Coarse thread series *	Fine thread series *	Extra- fine thread series	4-thread series	6-thread series	8-thread series	12- thread series	16- thread series	20- thread series	28- thread series	32- thread series
Pri- mary	Secun- dary		UNC	UNF	UNEF	UN	UN	UN	UN	UN	UN	UN	UN
1	2	3	4	5	6	7	8	9	10	11	12	13	14
No.0		0.060 0		80									
	No.1	0.073 0	64	72									
No.2		0.086 0	56	64									
	No.3	0.099 0	48	56									
No.4		0.112 0	40	48									
No.5		0.125 0	40	44									
No.6		0.138 0	32	40									UNC
No.8		0.164 0	32	36									UNC
No.10		0.190 0	24	32									UNF
	No.12	0.216 0	24	28	32							UNF	UNEF
1/4		0.250 0	20	28	32						UNC	UNF	UNEF
5/16		0.312 5	18	24	32						20	28	UNEF
3/8		0.375 0	16	24	32					UNC	20	28	UNEF
7/16		0.437 5	14	20	28					16	UNF	UNEF	32
1/2		0.500 0	13	20	28					16	UNF	UNEF	32
9/16		0.562 5	12	18	24				UNC	16	20	28	32
5/8		0.625 0	11	18	24				12	16	20	28	32
	11/16	0.687 5			24				12	16	20	28	32
3/4		0.750 0	10	16	20				12	UNF	UNEF	28	32
	13/16	0.812 5			20				12	16	UNEF	28	32
7/8		0.875 0	9	14	20				12	16	UNEF	28	32
	15/16	0.937 5			20				12	16	UNEF	28	32
1		1.000 0	8	12	20			UNC	UNF	16	UNEF	28	32
	1 1/16	1.062 5			18			8	12	16	20	28	
1 1/8		1.125 0	7	12	18			8	UNF	16	20	28	
	1 3/16	1.187 5			18			8	12	16	20	28	
1 1/4		1.250 0	7	12	18			8	UNF	16	20	28	
	1 5/16	1.312 5			18			8	12	16	20	28	
1 3/8		1.375 0	6	12	18		UNC	8	UNF	16	20	28	
	1 7/16	1.437 5			18		6	8	12	16	20	28	
1 1/2		1.500 0	6	12	18		UNC	8	UNF	16	20	28	
	1 9/16	1.562 5			18		6	8	12	16	20		
1 5/8		1.625 0			18		6	8	12	16	20		
	1 11/16	1.687 5			18		6	8	12	16	20		
1 3/4		1.750 0	5				6	8	12	16	20		
	1 13/16	1.812 5					6	8	12	16	20		
1 7/8		1.875 0					6	8	12	16	20		

\* Selected series for screws, bolts and nuts, and first choice for general engineering applications.

(continued)

TABLE 1. - (concluded)

Sizes		Basic major diameter in	Number of threads per inch										
			Series with graded pitches			Series with constant (uniform) pitches							
			Coarse thread series *	Fine thread series *	Extra-fine thread series	4-thread series	6-thread series	8-thread series	12-thread series	16-thread series	20-thread series	28-thread series	32-thread series
Pri- mary	Sec- ondary		UNC	UNF	UNEF	UN	UN	UN	UN	UN	UN	UN	UN
1	2	3	4	5	6	7	8	9	10	11	12	13	14
2	1 <sup>15</sup> / <sub>16</sub>	1.937 5	4 <sup>1</sup> / <sub>2</sub>				6	8	12	16	20		
		2.000 0					6	8	12	16	20		
	2 <sup>1</sup> / <sub>8</sub>	2.125 0					6	8	12	16	20		
2 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>8</sub>	2.250 0	4 <sup>1</sup> / <sub>2</sub>				6	8	12	16	20		
		2.375 0					6	8	12	16	20		
2 <sup>1</sup> / <sub>2</sub>		2.500 0	4			UNC	6	8	12	16	20		
2 <sup>3</sup> / <sub>4</sub>	2 <sup>5</sup> / <sub>8</sub>	2.625 0	4			4	6	8	12	16	20		
		2.750 0				UNC	6	8	12	16	20		
	2 <sup>7</sup> / <sub>8</sub>	2.875 0				4	6	8	12	16	20		
3	3 <sup>1</sup> / <sub>8</sub>	3.000 0	4			UNC	6	8	12	16	20		
		3.125 0				4	6	8	12	16			
		3.250 0	4			UNC	6	8	12	16			
3 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>8</sub>	3.375 0	4			4	6	8	12	16			
		3.500 0				UNC	6	8	12	16			
	3 <sup>5</sup> / <sub>8</sub>	3.625 0				4	6	8	12	16			
3 <sup>3</sup> / <sub>4</sub>	3 <sup>7</sup> / <sub>8</sub>	3.750 0	4			UNC	6	8	12	16			
		3.875 0				4	6	8	12	16			
		4.000 0	4			UNC	6	8	12	16			
4 <sup>1</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>8</sub>	4.125 0				4	6	8	12	16			
		4.250 0				4	6	8	12	16			
	4 <sup>3</sup> / <sub>8</sub>	4.375 0				4	6	8	12	16			
4 <sup>1</sup> / <sub>2</sub>	4 <sup>5</sup> / <sub>8</sub>	4.500 0				4	6	8	12	16			
		4.625 0				4	6	8	12	16			
		4.750 0				4	6	8	12	16			
5	4 <sup>7</sup> / <sub>8</sub>	4.875 0				4	6	8	12	16			
		5.000 0				4	6	8	12	16			
	5 <sup>1</sup> / <sub>8</sub>	5.125 0				4	6	8	12	16			
5 <sup>1</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>8</sub>	5.250 0				4	6	8	12	16			
		5.375 0				4	6	8	12	16			
		5.500 0				4	6	8	12	16			
5 <sup>3</sup> / <sub>4</sub>	5 <sup>5</sup> / <sub>8</sub>	5.625 0				4	6	8	12	16			
		5.750 0				4	6	8	12	16			
	5 <sup>7</sup> / <sub>8</sub>	5.875 0				4	6	8	12	16			
6		6.000 0				4	6	8	12	16			

\* Selected series for screws, bolts and nuts, and first choice for general engineering applications.

## APPENDIX

### A1. APPLICATION OF THREAD SERIES

#### Coarse thread series

This series, which extends up to 4 in diameter, is generally utilized for the bulk production of bolts, screws and nuts and for other general engineering applications. It is used in general applications for threading into lower tensile strength materials, such as cast iron, mild steel and soft materials, to obtain the optimum resistance to stripping of the internal thread. It is applicable for rapid assembly or disassembly, or if corrosion or slight damage is possible.

#### Fine thread series

This series, which extends up to  $1\frac{1}{2}$  in diameter, is suitable for the production of bolts, screws and nuts and for other applications where the coarse series is not applicable. External threads of this series have greater tensile stress area than comparable sizes of the coarse series. The fine series is suitable when the resistance to stripping of both external and mating internal threads equals or exceeds the tensile load-carrying capacity of the externally threaded member. It is also used where the length of engagement is short, where a smaller lead angle is desired, or where the wall thickness demands a fine pitch. It may also be used for threading into lower-strength materials where maximum strength of the external thread is not required; otherwise the length of engagement must be selected to meet the above-required strength conditions.

#### Extra-fine thread series

This series, which extends up to  $1\frac{1}{16}$  in diameter, is applicable where even finer pitches of threads are desirable for short lengths of engagement and for thin-walled tubes, nuts, ferrules or couplings. It is also generally applicable under the conditions stated above for the fine thread series.

#### Constant-pitch series

The various constant-pitch series with 4, 6, 8, 12, 16, 20, 28 and 32 threads per inch, given in Table 1, offer a comprehensive range of diameter-pitch combinations for those purposes where the threads in the coarse, fine and extra-fine series do not meet the particular requirements of the design.

When selecting threads from these constant-pitch series, preference should be given, wherever possible, to those tabulated in the 8, 12 or 16 thread series.