International Standard 7/1

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Pipe threads where pressure-tight joints are made on the threads —
Part 1 : Designation, dimensions and tolerances

Filetages de tuyauterie pour raccordement avec étanchéité dans le filet — Partie 1 : Désignation, dimensions et tolérances

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 7/1 was developed by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*, and was circulated to the member bodies in January 1981.

It has been approved by the member bodies of the following countries :

Australia	India	Poland
Austria	Iraq	Romania
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Brazil	Israel	Spain
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The member bodies of the following countries expressed disapproval of the document of technical grounds :

Canada
France
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This second edition cancels and replaces the first edition (i.e. ISO 7/1-1978).

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Pipe threads where pressure-tight joints are made on the threads — Part 1 : Designation, dimensions and tolerances

1 Scope and field of application

This Part of ISO 7 specifies the designation and lays down the dimensions and tolerances of pipe threads where pressure-tight joints are made on the threads.

These threads are intended for tubes suitable for screwing, and for cocks, valves and any fittings to be connected to screwed tubes. If considered necessary, an appropriate jointing medium may be used on the thread to ensure pressure-tight joints.

The 1/16 size is given solely for connector threads (see ISO 1179); it is not intended that there should be a size of tube to match this thread.

ISO 7/2 deals with the inspection of these threads.

For pipe threads where pressure-tight joints are not made on the threads, see ISO 228/1.

2 References

ISO 7/2, *Pipe threads where pressure-tight joints are made on the threads — Part 2 : Verification by means of limit gauges.*

ISO 228/1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1 : Designation, dimensions and tolerances.*

ISO 1179, *Pipe connections, threaded to ISO 228/1, for plain end steel and other metal tubes in industrial applications.*

3 Definitions

The following terms relate to pipe threads.

3.1 gauge diameter : The basic major diameter of the thread, whether external or internal.

3.2 gauge plane : The plane, perpendicular to the axis, at which the major cone has the gauge diameter.

NOTE — When there is a chamfer at the start of the thread not exceeding one pitch in length (see 3.4) the gauge plane is theoretically located for internal threads at the face of the thread, and for external threads at a distance equal to the basic gauge length from the small end of the thread.

3.3 gauge length : On an external thread, the distance from the gauge plane to the small end of the thread.

3.4 complete thread : That part of the thread which is fully formed at both crest and root.

NOTE — When there is a chamfer at the start of the thread not exceeding one pitch in length, it is included in the length of complete thread.

3.5 incomplete thread : That part of the thread which is fully formed at the root, but truncated at the crest by its intersection with the cylindrical surface of the product.

3.6 washout thread; vanish thread : That part of the thread which is not fully formed at the root.

NOTE — The washout thread is produced by the bevel at the start of the threading tool.

3.7 major cone : An imaginary cone which just touches the crests of a taper external thread or the roots of a taper internal thread.

3.8 useful thread : The complete thread and the incomplete thread, excluding the washout thread.

3.9 fitting allowance : The length of useful thread beyond the gauge plane of an external thread required to provide for assembly with an internal thread at the upper limit of the tolerance.

3.10 wrenching allowance : The length of useful thread which is provided for wrenching beyond the position of hand-tight engagement with an internal thread at the upper limit of the tolerance.

4 Symbols and explanations

Rp Parallel internal pipe thread where pressure-tight joints are made on the threads

Rc Taper internal pipe thread where pressure-tight joints are made on the threads

R Taper external pipe thread where pressure-tight joints are made on the threads

H Height of the triangle of the thread profile perpendicular to the thread axis

h Height of the thread profile between rounded crests and roots perpendicular to the thread axis

r Radius of rounded crests and roots

P Pitch

d Basic major diameter of the thread

$d_1 = d - 1{,}280\,654\,P$; basic minor diameter of the thread

$d_2 = d - 0{,}640\,327\,P$; basic pitch diameter of the thread

T_1 Tolerance for the distance of the gauge plane from pipe end

T_2 Tolerance for the position of the gauge plane of a 1 in 16 plug gauge on internal threads.

5 Dimensions

Dimensions in millimetres are given in table 2.

6 Designation

The designation of threads according to this Part of ISO 7 shall consist of the following elements in the sequence given :

6.1 The description block shall be

Pipe thread

6.2 The International Standard number block shall be

ISO 7/1

6.3 The individual item block shall be made up by

a) a letter symbol

— the letter R followed by the letter p for parallel internal threads;

— the letter R followed by the letter c for taper (conical) internal threads;

— the letter R for external threads (always taper);

b) these letter symbols are followed by the designation of the thread from column 1 of table 2.

Table 1 — Examples of the complete designation for a thread 1 1/2

Internal thread	parallel	Pipe thread ISO 7/1-Rp 1 1/2
	taper	Pipe thread ISO 7/1-Rc 1 1/2
External thread	always taper	Pipe thread ISO 7/1-R 1 1/2

Basic thread forms and terminology

$H = 0{,}960\ 491\ P$
$h = 0{,}640\ 327\ P$
$r = 0{,}137\ 329\ P$

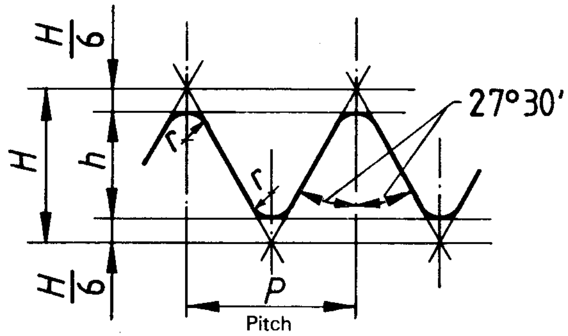

Figure 1 — Parallel thread

$H = 0{,}960\ 237\ P$
$h = 0{,}640\ 327\ P$
$r = 0{,}137\ 278\ P$

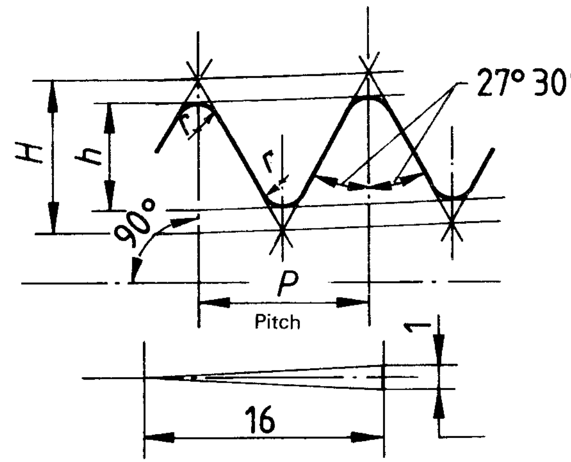

Figure 2 — Taper thread

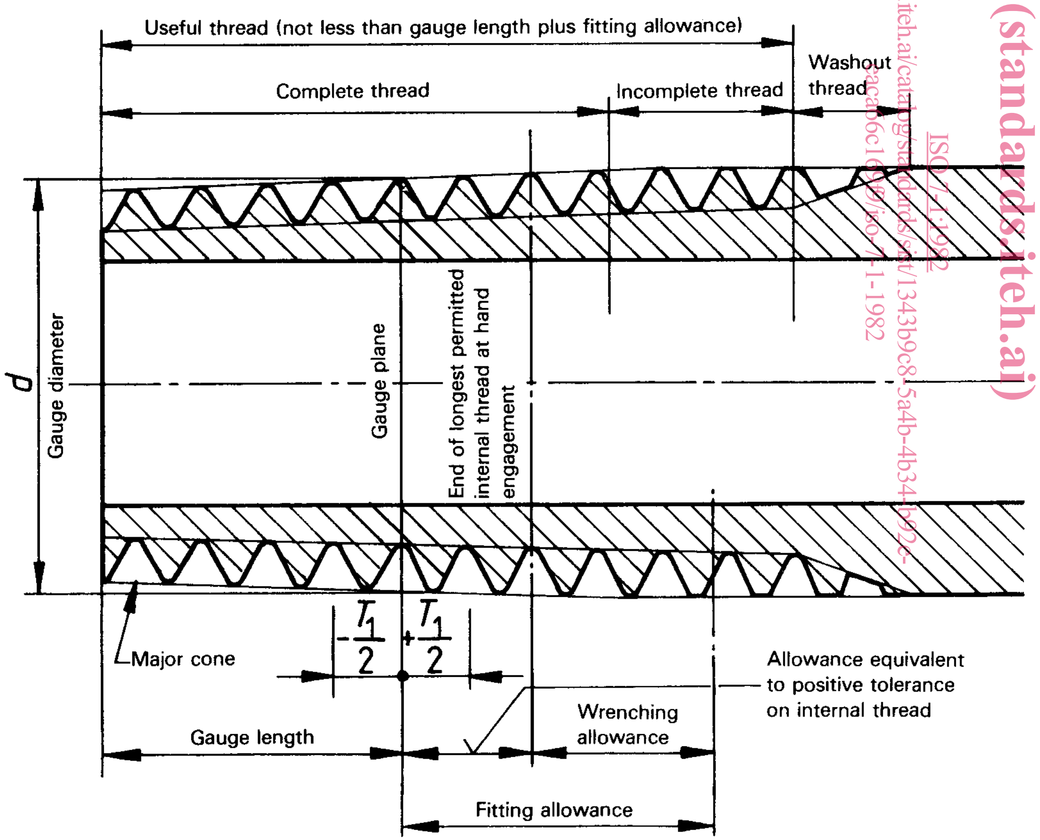

Figure 3 — Terms relating to pipe threads

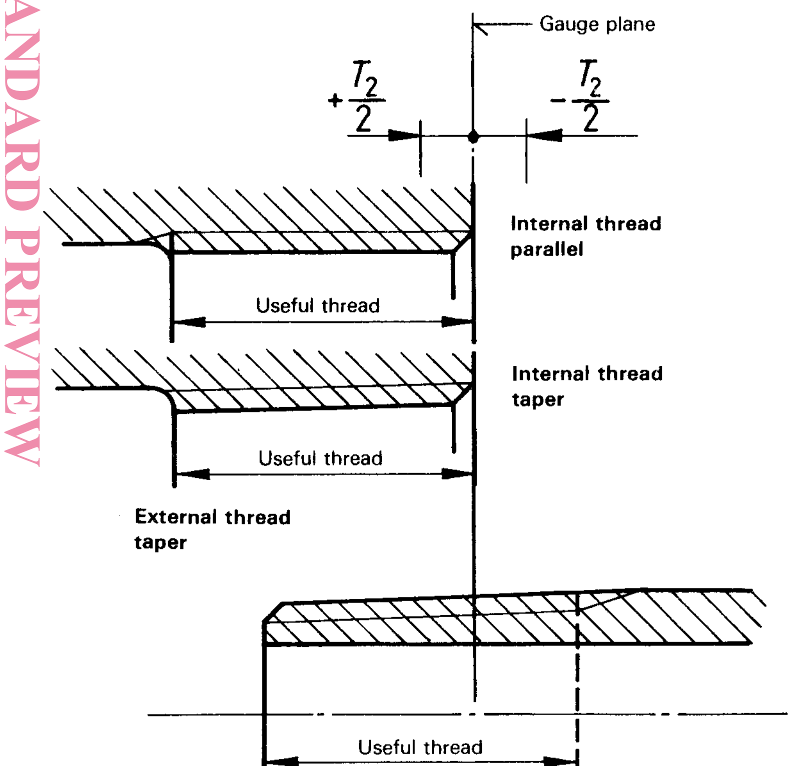

Figure 4 — Position of gauge plane, useful thread

Table 2 — Thread dimensions[1)]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Designation of thread	Number of threads in 25,4 mm	Pitch	Depth of thread	Basic diameters at gauge plane			Gauge length (distance of gauge plane from pipe end)					Position of gaugeplane on internal threads		Length of useful thread on pipe end[2)] not less than			Fitting allowance	
		P mm	h mm	Major (gauge diameter) d mm	Pitch d_2 mm	Minor d_1 mm	Basic mm	Tolerance + and − $T_1/2$ ≈ mm	Tolerance + and − $T_1/2$ Turns of thread	max. mm	min. mm	Tolerance[3)] + and − $T_2/2$ ≈ mm	Tolerance[3)] + and − $T_2/2$ Turns of thread	For basic gauge length mm	For maximum gauge length mm	For minimum gauge length mm	≈ mm	Turns of thread
1/16	28	0,907	0,581	7,723	7,142	6,561	4,0	0,9	1	4,9	3,1	1,1	1 1/4	6,5	7,4	5,6	2,5	2 3/4
1/8	28	0,907	0,581	9,728	9,147	8,566	4,0	0,9	1	4,9	3,1	1,1	1 1/4	6,5	7,4	5,6	2,5	2 3/4
1/4	19	1,337	0,856	13,157	12,301	11,445	6,0	1,3	1	7,3	4,7	1,7	1 1/4	9,7	11,0	8,4	3,7	2 3/4
3/8	19	1,337	0,856	16,662	15,806	14,950	6,4	1,3	1	7,7	5,1	1,7	1 1/4	10,1	11,4	8,8	3,7	2 3/4
1/2	14	1,814	1,162	20,955	19,793	18,631	8,2	1,8	1	10,0	6,4	2,3	1 1/4	13,2	15,0	11,4	5,0	2 3/4
3/4	14	1,814	1,162	26,441	25,279	24,117	9,5	1,8	1	11,3	7,7	2,3	1 1/4	14,5	16,3	12,7	5,0	2 3/4
1	11	2,309	1,479	33,249	31,770	30,291	10,4	2,3	1	12,7	8,1	2,9	1 1/4	16,8	19,1	14,5	6,4	2 3/4
1 1/4	11	2,309	1,479	41,910	40,431	38,952	12,7	2,3	1	15,0	10,4	2,9	1 1/4	19,1	21,4	16,8	6,4	2 3/4
1 1/2	11	2,309	1,479	47,803	46,324	44,845	12,7	2,3	1	15,0	10,4	2,9	1 1/4	19,1	21,4	16,8	6,4	2 3/4
2	11	2,309	1,479	59,614	58,135	56,656	15,9	2,3	1	18,2	13,6	2,9	1 1/4	23,4	25,7	21,1	7,5	3 1/4
2 1/2	11	2,309	1,479	75,184	73,705	72,226	17,5	3,5	1 1/2	21,0	14,0	3,5	1 1/2	26,7	30,2	23,2	9,2	4
3	11	2,309	1,479	87,884	86,405	84,926	20,6	3,5	1 1/2	24,1	17,1	3,5	1 1/2	29,8	33,3	26,3	9,2	4
4	11	2,309	1,479	113,030	111,551	110,072	25,4	3,5	1 1/2	28,9	21,9	3,5	1 1/2	35,8	39,3	32,3	10,4	4 1/2
5	11	2,309	1,479	138,430	136,951	135,472	28,6	3,5	1 1/2	32,1	25,1	3,5	1 1/2	40,1	43,6	36,6	11,5	5
6	11	2,309	1,479	163,830	162,351	160,872	28,6	3,5	1 1/2	32,1	25,1	3,5	1 1/2	40,1	43,6	36,6	11,5	5

1) The basic dimensions were converted into millimetres on the basis of 1 in = 25,4 mm, beginning with the number of threads per inch, which determines the pitch P, the formula h = 0,640 327 P (the depth of thread) and the basic major diameter at the gauge plane. Pitch diameter and minor diameter were then compiled by subtracting once or twice respectively the depth of thread h from the basic major diameter.

The basic gauge length, the tolerances and the fitting allowance were directly computed. The remaining lengths given in the table were obtained by subtracting or adding the tolerances or fitting allowance respectively to the basic gauge length. Tolerances and fitting allowance are expressed in millimetres and in number of turns of thread.

2) The design of internally threaded parts shall make allowance for accommodating external pipe threads up to the maximum lengths of useful thread given in column 16. Internal threads with free run-out may have a reduced length of useful thread, but not less than 80 % of the values in column 17.

3) For parallel threaded parts diametral tolerances equivalent to the length tolerances in columns 13 and 14 will apply (1/16 of the length tolerances in column 13).