INTERNATIONAL STANDARD

ISO 228-1

Third edition
1994-05-15

Pipe threads where pressure-tight joints are not made on the threads —

Part 1:
Dimensions, tolerances and designation

Filetages de tuyauterie pour raccordement sans étanchéité dans le filet —

Partie 1: Dimensions, tolérances et désignation

Reference number
ISO 228-1:1994(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 228-1 was prepared by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*, Subcommittee SC 5, *Threaded or plain end butt-welding fittings, threads, gauging of threads.*

This third edition cancels and replaces the second edition (ISO 228-1:1982), which has been technically revised.

ISO 228 consists of the following parts, under the general title *Pipe threads where pressure-tight joints are not made on the threads*:

— *Part 1: Dimensions, tolerances and designation*

— *Part 2: Verification by means of limit gauges*

Annex A of this part of ISO 228 is for information only.

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Pipe threads where pressure-tight joints are not made on the threads —

Part 1:
Dimensions, tolerances and designation

1 Scope

This part of ISO 228 specifies the requirements for thread form, dimensions, tolerances and designation for fastening pipe threads, thread sizes 1/16 to 6 inclusive. Both internal and external threads are parallel threads and intended for the mechanical assembly of the component parts of fittings, cocks and valves, accessories, etc.

These threads are not suitable as jointing threads where a pressure-tight joint is made on the thread. If assemblies with such threads must be made pressure-tight, this should be effected by compressing two tightening surfaces outside the threads, and by interposing an appropriate seal.

NOTES

1 For pipe threads where pressure-tight joints are made on the threads, see ISO 7-1.

2 ISO 228-2 gives details of methods of verification of fastening thread dimensions and form, and recommended gauging systems.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 228. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 228 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation.*

3 Symbols

G	Pipe thread where pressure-tight joints are not made on the threads
A	Tighter class of tolerance of external pipe threads where pressure-tight joints are not made on the threads
B	Wider class of tolerance of external pipe threads where pressure-tight joints are not made on the threads
H	Height of the triangle of the thread profile
h	Height of the thread profile with rounded crests and roots
r	Radius of rounded crests and roots
P	Pitch
D	$= d$; major diameter of the internal thread
D_1	$= D - 1{,}280\ 654\ P = d_1$; minor diameter of the internal thread
D_2	$= D - 0{,}640\ 327\ P = d_2$; pitch diameter of the internal thread
d	Major diameter of the external thread

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

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

T_{D1} Tolerance on the minor diameter of the internal thread

T_{D2} Tolerance on the pitch diameter of the internal thread

T_d Tolerance on the major diameter of the external thread

T_{d2} Tolerance on the pitch diameter of the external thread

4 Dimensions

The profile of these threads is identical with that of the parallel thread specified in ISO 7-1. The internal and external threads covered by this part of ISO 228 are both parallel.

Unless otherwise specified, the thread in accordance with this part of ISO 228 is a right-hand thread. (See also 5.4.)

Threads are normally of the truncated form, with crests truncated to the limits of tolerance as given in columns 14 and 15 of table 1, except on internal threads when they are likely to be assembled with external threads in accordance with ISO 7-1, in which case the thread length shall be equal to or greater than that specified in ISO 7-1.

The tolerances on the pitch diameter of the internal threads correspond to the positive deviation of the diameter tolerances in ISO 7-1, with the exception of those for thread sizes 1/16, 1/8, 1/4 and 3/8, for which slightly higher values have been specified.

For external threads, two classes of tolerances on the pitch diameter have been specified (see table 1):

Class A (column 10): entirely negative, equivalent in value to the tolerance for the internal thread.

Class B (column 11): entirely negative, value twice that of class A.

The choice between class A and class B depends on the conditions of application and shall be made in product standards where threads in accordance with this part of ISO 228 are specified.

Pipe thread dimensions, in millimetres, are given in table 1.

Figure 1 shows fastening threads with full form profiles and their tolerances, figure 2 shows fastening threads with truncated profiles and their tolerances.

5 Designation

The designation of threads according to this part of ISO 228 shall consist of the following elements in the sequence given:

5.1 The description block shall be:

Pipe thread

5.2 The International Standard number block shall be:

ISO 228

5.3 The individual item block shall be one of the following:

— the letter G followed by the designation of the thread size from column 1 of table 1 for internal threads (one class of tolerance only);

— the letter G followed by the designation of the thread size from column 1 of table 1 and the letter A for class A external threads;

— the letter G followed by the designation of the thread size from column 1 of table 1 and the letter B for class B external threads.

EXAMPLES

The complete designation for right-hand thread size 1 1/2 is as follows:

Internal thread	(one tolerance class only)	**Pipe thread ISO 228 - G 1 1/2**
External thread	tolerance class A	**Pipe thread ISO 228 - G 1 1/2 A**
External thread	tolerance class B	**Pipe thread ISO 228 - G 1 1/2 B**

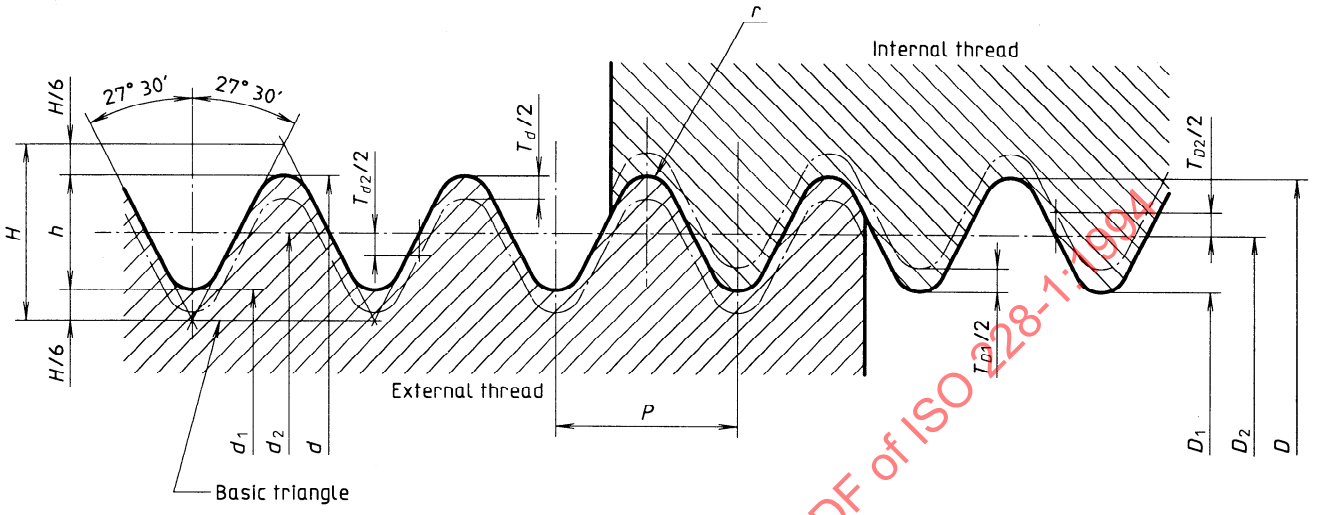
5.4 For left-hand threads, the letters LH shall be added to the designation. Right-hand threads require no special designation.

6 Combination with jointing thread

The combination of an external parallel thread G, tolerance class A or B, in accordance with ISO 228-1 with an internal parallel thread Rp in accordance with ISO 7-1 needs special consideration.

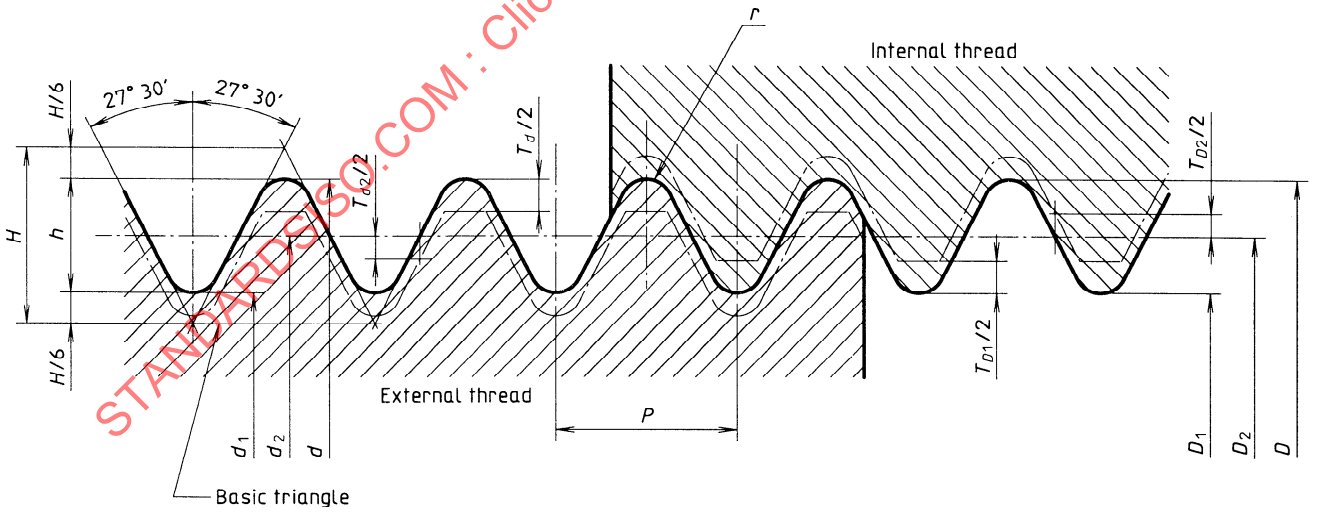
When it is necessary to have this combination, the tolerance of the internal thread in accordance with ISO 7-1 shall be considered in the relevant product standards, where external parallel threads G are used.

Such a combination of threads may not necessarily achieve a leaktight joint.



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

Figure 1 — Full form thread profile and tolerance zones



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

Figure 2 — Truncated form thread profile and tolerance zones

Table 1 — Thread dimensions

Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Designation of thread size	Number of threads in 25,4 mm	Pitch	Height of thread	Diameters			Tolerances on pitch diameter[1]					Tolerance on the minor diameter		Tolerance on the major diameter	
							Internal thread T_{D2}		External thread T_{d2}			Internal thread T_{D1}		External thread T_d	
				Major	Pitch	Minor	Lower deviation	Upper deviation	Lower deviation class A	Lower deviation class B	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation
		P	h	$d = D$	$d_2 = D_2$	$d_1 = D_1$									
1/16	28	0,907	0,581	7,723	7,142	6,561	0	+ 0,107	− 0,107	− 0,214	0	0	+ 0,282	− 0,214	0
1/8	28	0,907	0,581	9,728	9,147	8,566	0	+ 0,107	− 0,107	− 0,214	0	0	+ 0,282	− 0,214	0
1/4	19	1,337	0,856	13,157	12,301	11,445	0	+ 0,125	− 0,125	− 0,250	0	0	+ 0,445	− 0,250	0
3/8	19	1,337	0,856	16,662	15,806	14,950	0	+ 0,125	− 0,125	− 0,250	0	0	+ 0,445	− 0,250	0
1/2	14	1,814	1,162	20,955	19,793	18,631	0	+ 0,142	− 0,142	− 0,284	0	0	+ 0,541	− 0,284	0
5/8	14	1,814	1,162	22,911	21,749	20,587	0	+ 0,142	− 0,142	− 0,284	0	0	+ 0,541	− 0,284	0
3/4	14	1,814	1,162	26,441	25,279	24,117	0	+ 0,142	− 0,142	− 0,284	0	0	+ 0,541	− 0,284	0
7/8	14	1,814	1,162	30,201	29,039	27,877	0	+ 0,142	− 0,142	− 0,284	0	0	+ 0,541	− 0,284	0
1	11	2,309	1,479	33,249	31,770	30,291	0	+ 0,180	− 0,180	− 0,360	0	0	+ 0,640	− 0,360	0
1 1/8	11	2,309	1,479	37,897	36,418	34,939	0	+ 0,180	− 0,180	− 0,360	0	0	+ 0,640	− 0,360	0
1 1/4	11	2,309	1,479	41,910	40,431	38,952	0	+ 0,180	− 0,180	− 0,360	0	0	+ 0,640	− 0,360	0
1 1/2	11	2,309	1,479	47,803	46,324	44,845	0	+ 0,180	− 0,180	− 0,360	0	0	+ 0,640	− 0,360	0
1 3/4	11	2,309	1,479	53,746	52,267	50,788	0	+ 0,180	− 0,180	− 0,360	0	0	+ 0,640	− 0,360	0
2	11	2,309	1,479	59,614	58,135	56,656	0	+ 0,180	− 0,180	− 0,360	0	0	+ 0,640	− 0,360	0
2 1/4	11	2,309	1,479	65,710	64,231	62,752	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
2 1/2	11	2,309	1,479	75,184	73,705	72,226	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
2 3/4	11	2,309	1,479	81,534	80,055	78,576	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
3	11	2,309	1,479	87,884	86,405	84,926	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
3 1/2	11	2,309	1,479	100,330	98,851	97,372	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
4	11	2,309	1,479	113,030	111,551	110,072	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
4 1/2	11	2,309	1,479	125,730	124,251	122,772	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
5	11	2,309	1,479	138,430	136,951	135,472	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
5 1/2	11	2,309	1,479	151,130	149,651	148,172	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0
6	11	2,309	1,479	163,830	162,351	160,872	0	+ 0,217	− 0,217	− 0,434	0	0	+ 0,640	− 0,434	0

1) For thin-walled parts, the tolerances apply to the mean pitch diameter, which is the arithmetical mean of two diameters measured at right angles to each other.