

# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 2901

ISO/TC 1

Secretariat: SAC

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## ISO metric trapezoidal screw threads — Basic and design profiles

*Filetages métriques trapézoïdaux ISO — Profils de base et nominal*

ICS: 21.040.10

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Reference number  
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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 2901 was prepared by Technical Committee ISO/TC 1, *Screw Threads*.

This third edition cancels and replaces the second edition (ISO 2901:1993), **Clauses 1, 2, 3, 4, 6 and 7, Figures 2 and 3** of which have been technically revised.

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# ISO metric trapezoidal screw threads — Basic and **design** profiles

## 1 Scope

This international standard specifies the basic and **design** profiles of ISO metric trapezoidal screw threads.

This international standard is chiefly applicable to traversing threads for traversing motion on machines, tools, etc. It can also be used for fastening threads.

## 2 Normative reference

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5408, *Screw threads — Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5408 apply.

## 4 Symbols

For the purposes of this document, the following symbols apply.

$D$	major diameter of internal thread <b>on basic profile</b>
$D_4$	<b>major diameter of internal thread on design profile</b>
$d$	major diameter of external thread (nominal diameter)
$D_2$	pitch diameter of internal thread
$d_2$	pitch diameter of external thread
$D_1$	minor diameter of internal thread
$d_1$	minor diameter of external thread <b>on basic profile</b>
$d_3$	<b>minor diameter of external thread on design profile</b>
$P$	pitch
$H$	fundamental triangle height
$H_2$	thread height on basic profile
$H_0$	<b>thread overlap on design profile</b>

- $H_4$  thread height of internal thread on design profile
- $h_3$  thread height of external thread on design profile
- $a_c$  clearances at major and minor diameters on design profile
- $w$  width of flat crest or root on basic profile
- $R_1$  crest radius of external thread on design profile
- $R_2$  root radius of internal and external threads on design profile

**5 Basic profile**

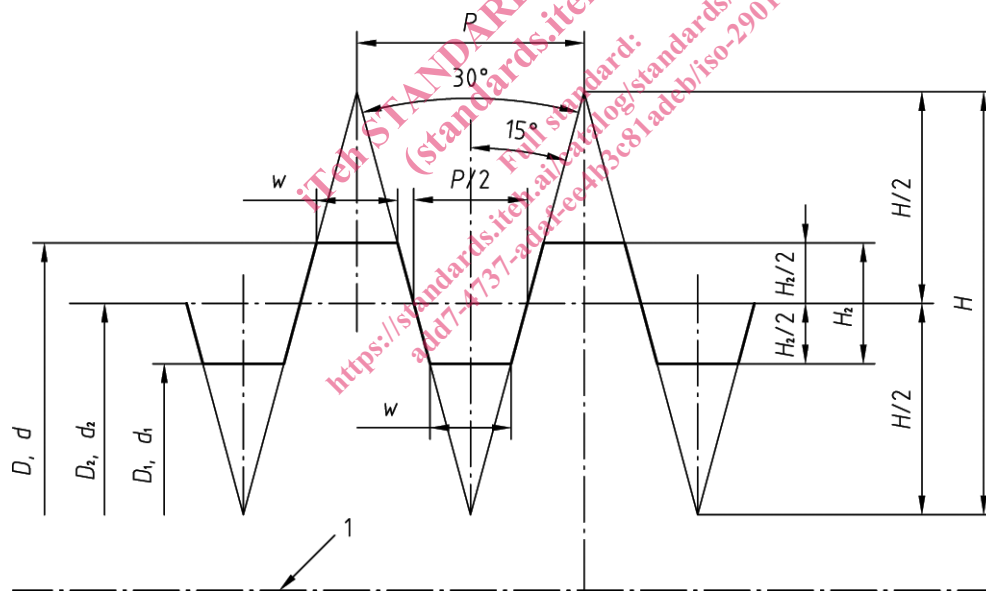
The basic profile is shown as a thick line in Figure 1. It is common to internal and external threads.

The dimensions of the basic profile are given in Table 1.

$$H = P / (2 \tan 15^\circ) = 1,866\ 025\ 404\ P$$

$$H_2 = 0,5\ P$$

$$w = (H - H_2) P / (2H) = 0,366\ P$$



Key

- 1 axis of screw thread

**Figure 1 — Basic profile**

Table 1 — Basic profile dimensions

Dimensions in millimetres

Pitch $P$	$H$	$H/2$	$H_2$	$w$
1,5	2,799	1,400	0,75	0,549
2	3,732	1,866	1	0,732
3	5,598	2,799	1,5	1,098
4	7,464	3,732	2	1,464
5	9,330	4,665	2,5	1,830
6	11,196	5,598	3	2,196
7	13,062	6,531	3,5	2,562
8	14,928	7,464	4	2,928
9	16,794	8,397	4,5	3,294
10	18,660	9,330	5	3,660
12	22,392	11,196	6	4,392
14	26,124	13,062	7	5,124
16	29,856	14,928	8	5,856
18	33,588	16,794	9	6,588
20	37,320	18,660	10	7,320
22	41,052	20,526	11	8,052
24	44,784	22,392	12	8,784
28	52,248	26,124	14	10,248
32	59,712	29,856	16	11,712
36	67,176	33,588	18	13,176
40	74,640	37,320	20	14,640
44	82,104	41,052	22	16,104

## 6 Design profile

The two design profiles are shown as a thick line in Figure 2. They are different between internal and external threads. The limit deviations are applied to the design profiles.

The dimensions of the design profiles are given in Table 2.

$$H_0 = H_2 = 0,5P$$

$$h_3 = H_4 = H_0 + a_c = 0,5P + a_c$$

$$D_1 = d - 2H_0 = d - P$$

$$d_2 = D_2 = d - H_0 = d - 0,5P$$

$$d_3 = d - 2h_3 = d - 2(0,5P + a_c)$$

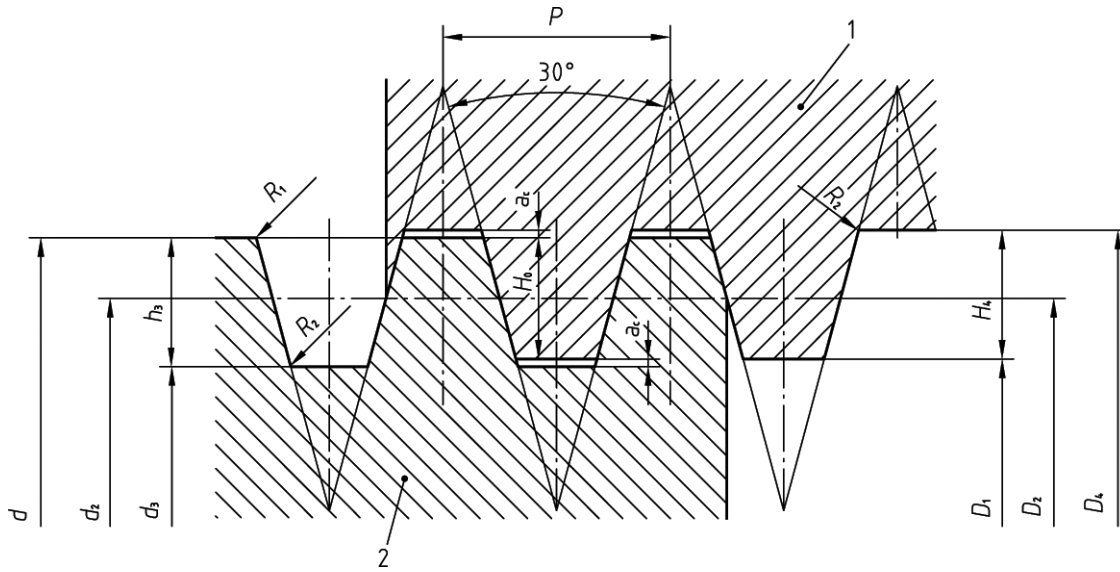
$$D_4 = d + 2a_c$$

$$R_{1 \max} = 0,5a_c$$

$$R_{2 \max} = a_c$$

In the case of manufacture by rolling, the profile at the minor diameter can be modified in order to obtain a larger rounding on the root of the external thread. The minor diameter  $d_3$  of the external thread may in this case be reduced by  $0,15P$ .

If the modification of the profile becomes necessary, due to the particular methods of manufacture, it shall be agreed between the customer and the manufacturer.



Key

- 1 internal thread
- 2 external thread

Figure 2 — Design profiles

Table 2 — Design profile dimensions

Dimensions in millimetres

Pitch $P$	$a_c$	$H_4 = h_3$	$R_1$ max	$R_2$ max
1,5	0,15	0,9	0,075	0,15
2	0,25	1,25	0,125	0,25
3	0,25	1,75	0,125	0,25
4	0,25	2,25	0,125	0,25
5	0,25	2,75	0,125	0,25
6	0,5	3,5	0,25	0,5
7	0,5	4	0,25	0,5
8	0,5	4,5	0,25	0,5
9	0,5	5	0,25	0,5
10	0,5	5,5	0,25	0,5
12	0,5	6,5	0,25	0,5
14	1	8	0,5	1
16	1	9	0,5	1
18	1	10	0,5	1
20	1	11	0,5	1
22	1	12	0,5	1
24	1	13	0,5	1
28	1	15	0,5	1
32	1	17	0,5	1
36	1	19	0,5	1
40	1	21	0,5	1
44	1	23	0,5	1



The structure relation and main changes between ISO/DIS 2901:2015 and ISO 2901:1993

ISO/DIS 2901:2015	ISO 2901:1993
<b>Title</b>	<b>Title</b>
<b>"maximum material profiles" is replaced by "design profile".</b>	
<b>1 Scope</b>	<b>1 Scope</b>
In the first paragraph <b>"maximum material profiles" is replaced by "design profile"</b> . <b>Add the second paragraph</b> according to the requirement of ISO/IEC Directives - Part 2.	
<b>2 Normative reference</b>	<b>2 Normative reference</b>
<b>ISO 2903 is replaced by ISO 5408. Undated reference is used.</b>	
<b>3 Terms and definitions</b>	
<b>Add a new clause.</b>	
<b>4 Symbols</b>	<b>3 Symbols</b>
<b>Add symbol <math>w</math></b> for the width of flat crest or root, and <b>replace <math>H_1</math> by <math>H_2</math></b> for the thread height, used in the basic profile, Figure 1. Now symbol $H_1$ is used for flank overlap in ISO 5408. <b>Add seven symbols <math>D_4, d_3, H_0, H_4, h_3, R_1</math> and <math>R_2</math></b> , used in the design profile, Figure 2. <b>Delete symbol <math>es</math></b> . For the tolerances see ISO 2903.	
<b>5 Basic profile</b>	<b>4 Basic profile</b> <b>5 Basic profile dimensions</b>
<b>The definition of basic profile, in Clause 4, is not correct, and has been deleted.</b> See it in ISO 5408. The limit deviations are applied to the design profiles, not the basic profile.	
<b>6 Design profile</b>	<b>6 Maximum material profiles</b> <b>7 Dimensions for max material profiles</b>
<b>"maximum material profiles" is replaced by "design profile"</b> . <b>Figure 3 has been deleted.</b> <b>The maximum material profile of Figure 2 is not correct. No the tolerance position <math>h</math> in ISO 2903. In fact Figure 2 is the design profile.</b> <b>Usually the design profile is specified in the profile standard, not the maximum material profiles.</b> The number of design profiles is less than maximum material profiles. The maximum material profiles come from the design profiles plus the fundamental deviations. The maximum material profiles can be given in ISO 2903, tolerances, if necessary. <b>In Figure 2 replace <math>H_1</math> by <math>H_0</math>.</b> Symbols $H_1$ and $H_0$ are used for flank overlap and thread overlap in ISO 5408, respectively. There is $R_1$ in the crest of external thread. $H_1$ is less than $H_0$ . <b>In Figure 2 delete the footnote.</b> It is in contradiction to the $R_{1\max}$ formula in Clause 6.	
<b>GENERAL NOTE</b> In order to find out above changes easily the changes have been marked with red color in ISO/CD 2901, except the sections deleted.	