

BS ISO 2901:2016



BSI Standards Publication

# ISO metric trapezoidal screw threads — Basic and design profiles

**National foreword**

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A list of organizations represented on this committee can be obtained on request to its secretary.

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

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



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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 1, *Screw threads*.

This third edition cancels and replaces the second edition (ISO 2901:1993), which has been technically revised. The following changes have been made:

- the phrase “maximum material profiles” has been replaced by “design profiles”;
- the reference ISO 2903 has been replaced by ISO 5408;
- the symbols have been updated;
- the definition of basic profile has been deleted;
- [Figure 2](#) has been revised and [Figure 3](#) has been deleted.

# ISO metric trapezoidal screw threads — Basic and design profiles

## 1 Scope

This document specifies the basic and design profiles of ISO metric trapezoidal screw threads.

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

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

## 4 Symbols

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

$D$	major diameter of internal thread on basic profile
$D_4$	major diameter of internal thread on design profile
$d$	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 on basic profile
$d_3$	minor diameter of external thread on design profile
$P$	pitch
$H$	fundamental triangle height
$H_2$	thread height on basic profile
$H_0$	thread overlap on design profile
$H_4$	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
- $R_1$  radius on crest corners of external thread on design profile
- $R_2$  radius on root corners of internal and external threads on design profile

## 5 Basic profile

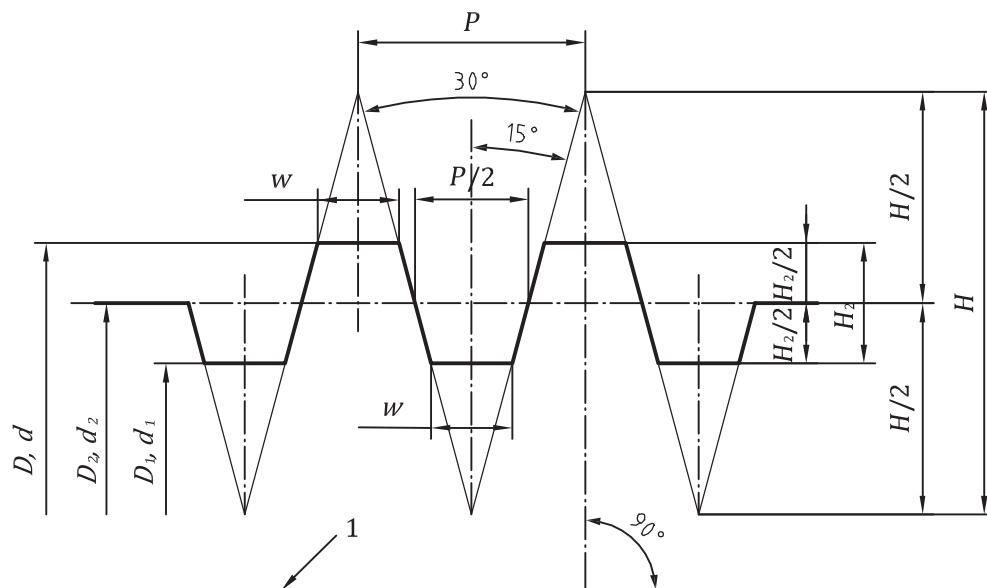
The basic profile is shown as a thick line in [Figure 1](#). It is common to internal and external threads.

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

<b>Pitch</b> <i>P</i>	<b>H</b>	<b>H/2</b>	<b>H<sub>2</sub></b>	<b>w</b>
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](#).

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

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

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

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

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

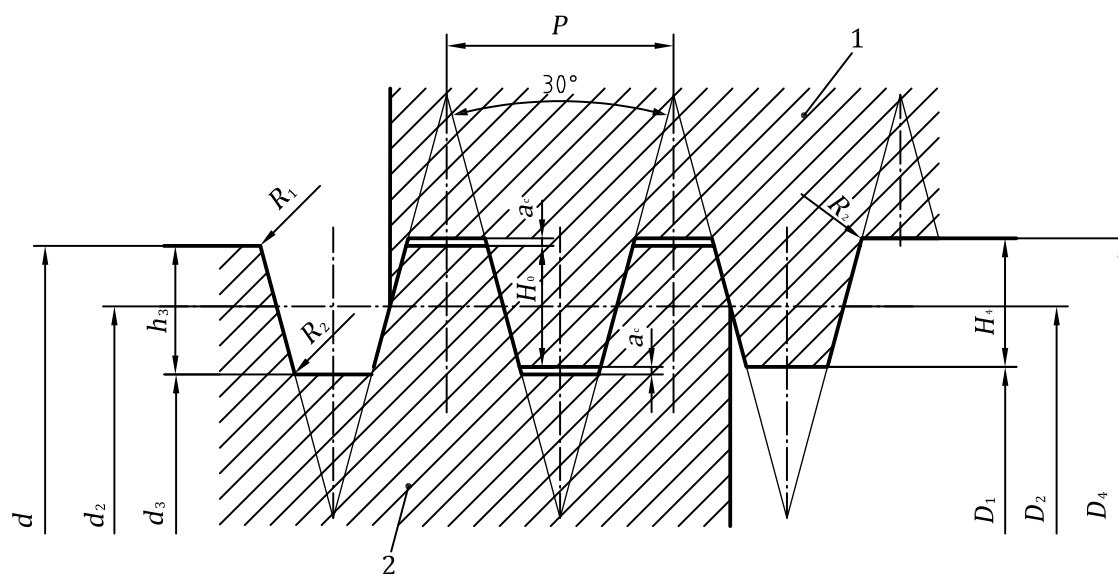
$$D_4 = d + 2a_c$$

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

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

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 upon 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 <i>P</i>	<i>a<sub>c</sub></i>	<i>H<sub>4</sub> = h<sub>3</sub></i>	<i>R<sub>1</sub> max</i>	<i>R<sub>2</sub> max</i>
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

## Bibliography

- [1] ISO 5408, *Screw threads — Vocabulary*







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