INTERNATIONAL STANDARD

ISO 6410-1

First edition
1993-05-15

Technical drawings — Screw threads and threaded parts —

Part 1: General conventions

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Dessins techniques — Filetages et pièces filetées —

Partie 1: Conventions générales

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Reference number
ISO 6410-1:1993(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.

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International Standard ISO 6410-1 was prepared by Technical Committee ISO/TC 10, *Technical drawings, product definition and related documentation*, Sub-Committee SC 6, *Mechanical engineering documentation*.

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This first edition of ISO 6410-1 cancels and replaces ISO 6410:1981, of which it constitutes a technical revision.

ISO 6410 consists of the following parts, under the general title *Technical drawings — Screw threads and threaded parts*:

— *Part 1: General conventions*

— *Part 2: Screw thread inserts*

— *Part 3: Simplified representation*

Annex A of this part of ISO 6410 is for information only.

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Introduction

ISO 6410 has been devised to provide a universal means of communication among the various interests involved in the design, manufacture and installation of fasteners.

Requirements within industries vary considerably; in recognition of this fact, ISO 6410 is presented in three parts (see foreword).

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Technical drawings — Screw threads and threaded parts —

Part 1:
General conventions

1 Scope

This part of ISO 6410 specifies methods for representing screw threads and threaded parts on technical drawings.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 6410. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 6410 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 128:1982, *Technical drawings — General principles of presentation.*

ISO 129:1985, *Technical drawings — Dimensioning — General principles, definitions, methods of execution and special indications.*

ISO 225:1983, *Fasteners — Bolts, screws, studs and nuts — Symbols and designations of dimensions.*

ISO 4753:1983, *Fasteners — Ends of parts with external metric ISO thread.*

ISO 6410-3:1993, *Technical drawings — Screw threads and threaded parts — Part 3: Simplified representation.*

3 Representation

3.1 Detailed representation of threads

In certain types of technical product documentation (e.g. publications, user manuals, etc.) the detailed representation of a thread either in a side view or in a section (see figures 1 to 3) may be needed to illustrate single or assembled parts. Neither pitch nor profile of the threads need usually be drawn exactly to scale.

In technical drawings, the detailed representation of threads (see figures 1 to 3) should only be used if absolutely necessary and whenever possible the helix should be represented by straight lines (see figure 2).

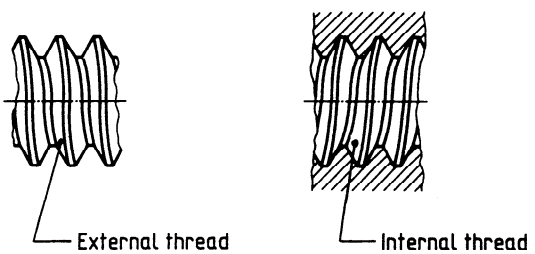

Figure 1

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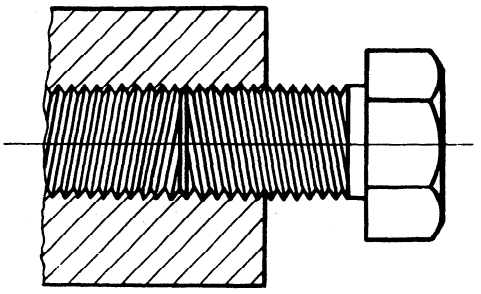

Figure 2

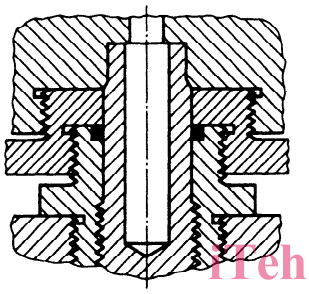

Figure 3

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3.2 Conventional representation

Normally, by convention, the representation of threads and threaded parts in all types of technical drawings is simplified as shown in figures 4 to 7.

3.2.1 Views and sections of screw threads

For visible screw threads in side views and sections, the crests[1] of threads shall be defined by a continuous thick line (type A, ISO 128), and the roots[2] of threads by a continuous thin line (type B, ISO 128), as shown in figures 4 to 13.

The space between the lines representing the crest and root of the thread should approximate as closely as possible the depth of the thread, but, in all cases, this spacing shall be not less than

— twice the thickness of the thick line, or

— 0,7 mm,

whichever is the larger.

NOTE 1 In certain cases, for example computer-aided draughting,

— a distance of 1,5 mm for threads of nominal diameter $d \geqslant 8$ mm is generally acceptable;

— a simplified representation is recommended for threads of nominal diameter $d \leqslant 6$ mm, see ISO 6410-3.

3.2.2 End view of screw threads

On an end view of a screw thread, the thread roots shall be represented by a portion of a circle, drawn with a continuous thin line (type B, ISO 128) approximately equal to three-quarters of the circumference (see figures 4 and 5), preferably open in the right-hand upper quadrant. The thick line representing the chamfer circle is generally omitted on the end view (see figures 4 and 5).

NOTE 2 The portion of the circle may also have any other position relative to the intersecting axes (see figure 6).

3.2.3 Hidden screw threads

Where it is necessary to show hidden screw threads, the crests[1] and the roots[2] shall be represented by dashed thin lines (type F, ISO 128), as shown in figure 7.

3.2.4 Hatching of sections of threaded parts

For threaded parts shown in section, hatching shall extend to the line defining the crests of the thread (see figures 5 to 8).

1) "Crest" normally refers to the major diameter for external threads and to the minor diameter for internal threads.

2) "Root" normally refers to the minor diameter for external threads and to the major diameter for internal threads.

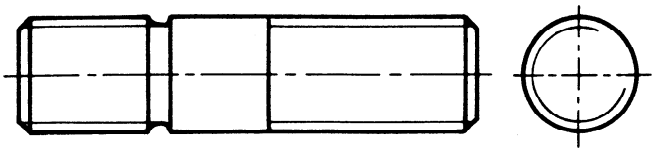

Figure 4

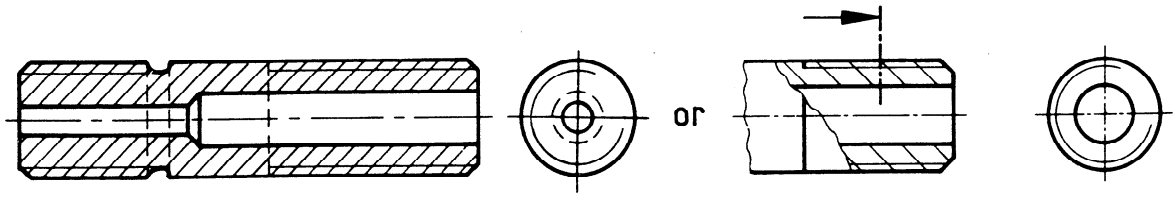

Figure 5

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Figure 6

3.2.5 Limit of length of full depth thread

The limit of the length of full depth thread

— shall be shown, if visible, by a continuous thick line (type A, ISO 128)

— may be shown, if hidden, by a dashed line (type F, ISO 128).

These limit lines shall terminate at the lines defining the major diameter of the thread (see figures 4, 8 to 11 and 13).

3.2.6 Thread run-outs

Thread run-outs are beyond the effective ends of the thread except for the end of studs.

They shall be represented by a continuous inclined thin line (type B, ISO 128) if functionally necessary (see figure 8) or for dimensioning (see figure 13). However it is allowed not to represent the run-out wherever possible (see figures 4, 5 and 7).

3.3 Assembled threaded parts

The conventions specified in 3.2 apply also to assemblies of threaded parts. However, externally threaded parts shall always be shown covering internally threaded parts and shall not be hidden by them (see figures 8 and 10). The thick line representing the limit of the useful length of the internal screw thread shall be drawn to the root of the internal thread (see figures 8 and 9).

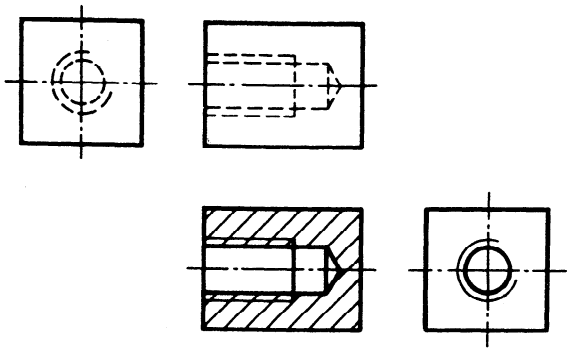

Figure 7

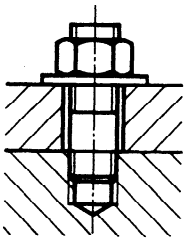

Figure 9

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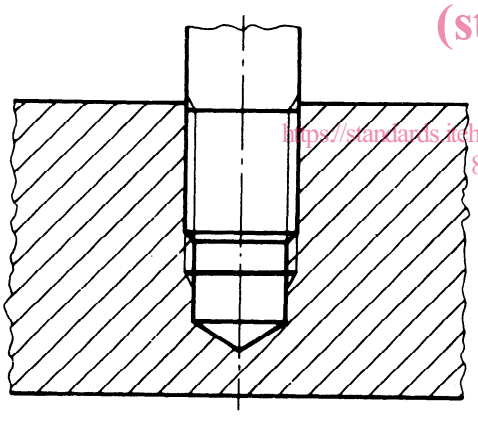

Figure 8

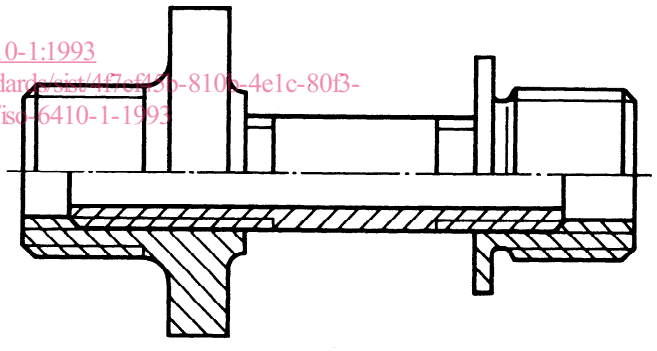

Figure 10

4 Indication and dimensioning of threaded parts

4.1 Designation

The type of screw thread and its dimensions shall be indicated by means of the designation specified in the relevant International Standards for threads.

When indicating the designation on technical drawings, the description block as well as the International Standard block shall be omitted.

In general, the screw thread designation covers

— the abbreviation of the kind of thread (standardized symbol, e.g. M, G, Tr, HA, etc.);

— the nominal diameter or size (e.g. 20; 1/2; 40; 4,5; etc.);

and, if necessary,

— the lead (L), in millimetres;

— the pitch (P), in millimetres;

— the direction of lead (see 4.4);

as well as additional indications, such as

— the tolerance class according to the relevant International Standard;

— thread engagement (S = short, L = long, N = normal);

— the number of starts.

EXAMPLES (taken from International Standards, see annex A)

a) **M20 × 2 - 6G/6h - LH**

b) **M20 × L3 - P1,5 - 6H - S**

c) **G 1/2 A**

d) **Tr 40 × 7**

e) **HA 4,5**

4.2 Dimensioning

4.2.1 The nominal diameter, *d*, always refers to the crest[1] of the external thread (see figures 11 and 13 or the root[2] of the internal thread (see figure 12).

The dimension of the thread length normally refers to the length of the full depth thread (see figure 11) unless the run-out is functionally necessary (e.g. studs) and therefore specifically drawn (see figures 8 and 13).

NOTE 3 Ends of bolts (see ISO 4753) should be included in the length of full depth thread (*b*) or (*l*).

All dimensions shall be indicated in accordance with ISO 129 and ISO 225 or in accordance with 4.3.

4.3 Thread length and blind hole depth

It is generally necessary to dimension the length of thread but the blind hole depth may usually be omitted.

The need for indicating the blind hole depth depends mostly on the part itself and the tool used for threading. When the dimension of the hole depth is unspecified, it shall be depicted as being 1,25 times that of the thread length (see figure 14). A short designation as shown in figure 15 may also be used.

4.4 Indication of direction of lead

Right-hand threads need not be denoted in general. Left-hand threads shall be denoted by adding the abbreviation LH to the thread designation. Right-hand and left-hand threads on the same part shall be denoted, in every case. Right-hand threads shall be denoted, if necessary, by adding the abbreviation "RH" to the thread designation.

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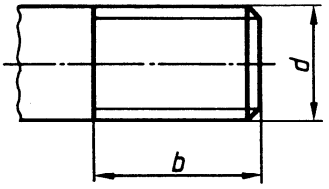

Figure 11