

INTERNATIONAL STANDARD

ISO 10510

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Tapping screw and washer assemblies with plain washers

Vis à tôle à rondelle plate incorporée

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ISO 10510:1999

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Reference number
ISO 10510:1999(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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 10510 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

Tapping screw washer assemblies with plain washers

1 Scope

This International Standard specifies the requirements for tapping screw and plain washer assemblies with spaced threads from ST2,2 to ST9,5 inclusive, flat seating heads and mechanical properties in accordance with ISO 2702.

The plain washers are captive, i.e. prevented from disassembly and free to rotate.

2 Normative references

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The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1479:1983, *Hexagon head tapping screws*.

ISO 1481:1983, *Slotted pan head tapping screws*.

ISO 2702:1992, *Heat-treated steel tapping screws — Mechanical properties*.

ISO 6507-1:1997, *Metallic materials — Vickers hardness test — Part 1: Test method*.

ISO 7049:1983, *Cross recessed pan head tapping screws*.

ISO 10669:1999, *Plain washers for tapping screw and washer assemblies — Normal and large series — Product grade A*.

3 Dimensions

The dimensions of the assembled screws shall conform to the designated product standards for loose parts with the following exceptions:

- Screws shall have a shank of such diameter (d_s) that the washer with dimensions in accordance with ISO 10669 is free to rotate.
- The permitted distance from the underside of the head to the first full thread is increased by the maximum permitted thickness of the washer as specified in ISO 10669.
- The transition diameter d_a shall be reduced by the difference between the nominal and thread rolling diameter.

For the dimensions see Figures 1 to 3 and Table 1.

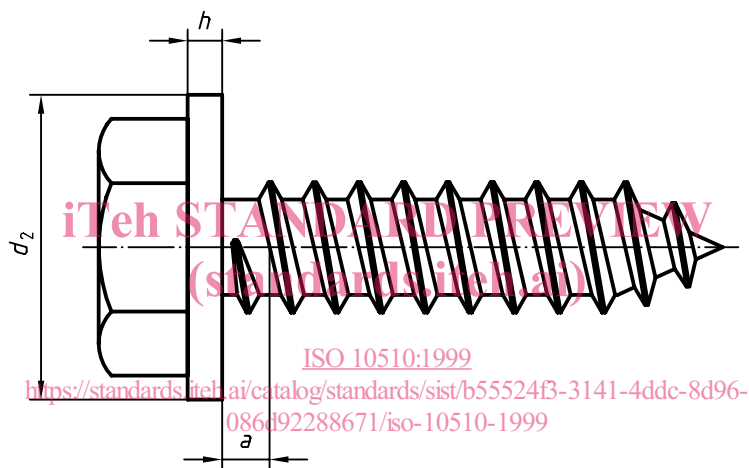


Figure 1 — Hexagon head tapping screw with cone end

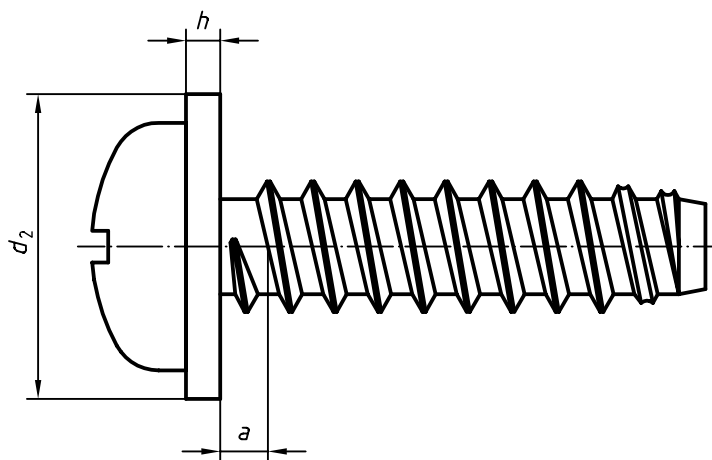


Figure 2 — Pan head tapping screw with flat end

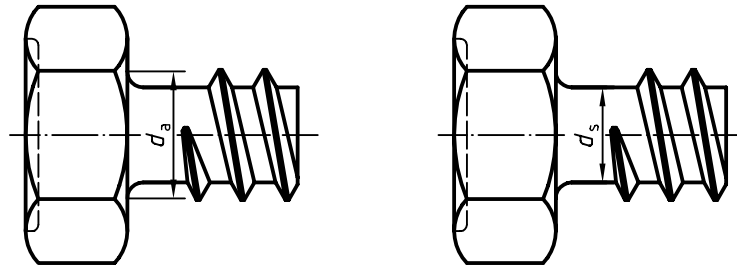


Figure 3 — Transition diameter d_a and shank diameter d_s

Table 1 — Dimensions

Dimensions in millimetres

Thread size	a^b max.	d_a max.	Washer dimensions ^a			
			Normal Series Type N		Large Series Type L	
			h nom.	d_2 max.	h nom.	d_2 max.
ST2,2	0,8	2,1	1	5	1	7
ST2,9	1,1	2,8	1	7	1	9
ST3,5	1,3	3,3	1	8	1	11
ST4,2	1,4	4,03	1	9	1	12
ST4,8	1,6	4,54	1	10	1,6	15
ST5,5	1,8	5,22	1,6	12	1,6	15
ST6,3	1,8	5,93	1,6	14	1,6	18
ST8	2,1	7,76	1,6	16	2	24
ST9,5	2,1	9,43	1,6	20	2,5	30

^a Dimensions extracted from ISO 10669 for information only.

^b Dimension a measured after assembly, with washer in contact with the screw bearing face or underhead radius.

4 Specifications and reference standards

The mechanical properties of the screw component of the tapping screw and washer assembly shall be those specified in ISO 2702. Following assembly and heat treatment the washer component shall have a hardness of 90 HV to 320 HV.

Vickers hardness testing shall be carried out in accordance with ISO 6507-1.

Test force: HV 10 for nominal thickness $h \leq 1,2$ mm

Test force: HV 30 for nominal thickness $h > 1,2$ mm

Prior to assembly, suitable precautions shall be taken to prevent detrimental case hardening of the washer during heat treatment, e.g. copper plating.

5 Designation

The designation of a tapping screw and washer assembly shall consist of:

- the description of the component;
- reference to this International Standard;
- the characteristics of the screw component;
- the screw symbol indicating the type of screw (see Table 2);
- the washer symbol indicating the type of washer (see Table 3).

Table 2 — Symbols for the screws

Reference Standard		Symbol
ISO 1479	Hexagon head tapping screws	S1
ISO 7049	Cross recessed pan head tapping screws	S2
ISO 1481	Slotted pan head tapping screws	S3

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Table 3 — Symbols for the washers

Reference Standard	Outside Diameter	Symbol
ISO 10669 Plain Washers for tapping screw and washer assemblies	Normal	N
	Large	L

EXAMPLE 1 A hexagon head tapping screw and washer assembly with a screw of size ST4,2 × 16, with cone end (C) in accordance with ISO 1479 (symbol S1), and a plain washer, normal series, in accordance with ISO 10669 (symbol N) is designated as follows:

Tapping screw and washer assembly ISO 10510 - ST4,2 × 16 - C - S1 - N

EXAMPLE 2 A cross recessed pan head tapping screw and washer assembly with a screw of size ST 4,2 × 16, with cone end (C) and recess type Z in accordance with ISO 7049 (symbol S2) and a plain washer, normal series, according to ISO 10669 (symbol N) is designated as follows:

Tapping screw and washer assembly ISO 10510 - ST4,2 × 16 - C - Z - S2 - N

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