INTERNATIONAL STANDARD

ISO 10509

Second edition
2012-05-15

Hexagon flange head tapping screws

Vis à tôle à tête hexagonale à embase cylindro-tronconique

Reference number
ISO 10509:2012(E)

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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 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 10509 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 13, *Fasteners with non-metric thread*.

This second edition cancels and replaces the first edition (ISO 10509:1992), which has been technically revised. In particular, Clauses 2 and 5, Tables 1 and 2, as well as Figures 1 and A.1 have been technically revised.

Hexagon flange head tapping screws

1 Scope

This International Standard specifies hexagon flange head tapping screws with threads from ST2,2 up to and including ST9,5.

2 Normative references

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 225, *Fasteners — Bolts, screws, studs and nuts — Symbols and descriptions of dimensions*

ISO 1478, *Tapping screws thread*

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

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-4, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 4: Tapping screws*

ISO 4042, *Fasteners — Electroplated coatings*

ISO 4759-1, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C*

ISO 8992, *Fasteners — General requirements for bolts, screws, studs and nuts*

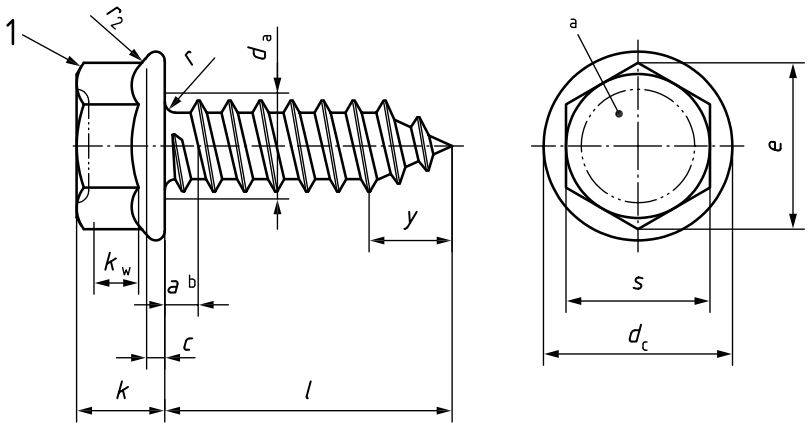
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

ISO 16048, *Passivation of corrosion-resistant stainless-steel fasteners*

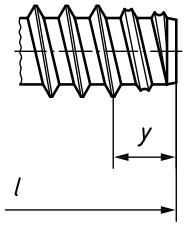
3 Dimensions

For the dimensions, see Figure 1 and Table 1.

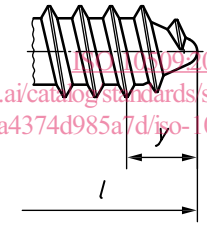
Symbols and descriptions of dimensions are specified in ISO 225.



a) Type C



b) Type F



c) Type R

Key

1 chamfer or radius

a Optional indentation.

b Dimension a is to be measured at the core diameter of the first full thread.

Figure 1 — Hexagon flange head tapping screw

Table 1 — Dimensions

Dimensions in millimetres

Thread			ST2,2	ST2,9	ST3,5	ST4,2	ST4,8	ST5,5	ST6,3	ST8	ST9,5
P[a]			0,8	1,1	1,3	1,4	1,6	1,8	1,8	2,1	2,1
a		max.	0,8	1,1	1,3	1,4	1,6	1,8	1,8	2,1	2,1
d_a		max.	2,8	3,5	4,1	4,9	5,6	6,3	7,3	9,2	10,7
d_c		max.	4,5	6,4	7,5	8,5	10,0	11,2	12,8	16,8	21,0
		min.	4,1	5,9	6,9	7,8	9,3	10,3	11,8	15,5	19,3
c		min.	0,3	0,4	0,5	0,6	0,6	0,8	1,0	1,2	1,4
s	nom. =	max.	3,00	4,00	5,00	5,50	7,00	7,00	8,00	10,00	13,00
		min.	2,86	3,82	4,82	5,32	6,78	6,78	7,78	9,78	12,73
e		min.	3,16	4,27	5,36	5,92	7,55	7,55	8,66	10,89	14,16
k		max.	2,2	3,2	3,8	4,3	5,2	6,0	6,7	8,6	10,7
k_w		min.	0,85	1,25	1,60	1,80	2,20	2,50	2,80	3,70	4,60
r		min.	0,1	0,1	0,1	0,2	0,2	0,2	0,3	0,4	0,4
r_2		max.	0,1	0,2	0,2	0,2	0,3	0,3	0,4	0,5	0,6
y	ref.	Type C	2,0	2,6	3,2	3,7	4,3	5,0	6,0	7,5	8,0
		Type F	1,6	2,1	2,5	2,8	3,2	3,6	3,6	4,2	4,2
		Type R	—	—	2,7	3,2	3,6	4,3	5,0	6,3	—

l[b]				
	Type C and type R		Type F	
nom.	min.	max.	min.	max.
4,5	3,7	5,3	3,7	4,5
6,5	5,7	7,3	5,7	6,5
9,5	8,7	10,3	8,7	9,5
13	12,2	13,8	12,2	13,0
16	15,2	16,8	15,2	16,0
19	18,2	19,8	18,2	19,0
22	21,2	22,8	20,7	22,0
25	24,2	25,8	23,7	25,0
32	30,7	33,3	30,7	32,0
38	36,7	39,3	36,7	38,0
45	43,7	46,3	43,5	45,0
50	48,7	51,3	48,5	50,0

Range of preferred lengths

[a] P is the pitch of the thread.

[b] Sizes with lengths marked with a dash (—) shall not be manufactured.

4 Specifications and reference International Standards

See Table 2.

Table 2 — Specifications and reference International Standards

Material		Steel, in accordance with ISO 2702	Stainless steel
General requirements		ISO 8992	
Thread	International Standard	ISO 1478	
Mechanical property	International Standard	ISO 2702	ISO 3506-4
Tolerances	Product grade	A	
	International Standard	ISO 4759-1	
Finish — Coating		As processed.	
		Requirements for electroplating are specified in ISO 4042.	A method for passivation is specified in ISO 16048.
		Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683.	
		Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.	
Acceptability		Acceptance procedure is specified in ISO 3269.	

5 Designation

EXAMPLE 1 A hexagon flange head tapping screw with thread size ST3,5, of nominal length l = 16 mm, made of steel (St) in accordance with ISO 2702 and with a rounded end (type R) is designated as follows:

Tapping screw ISO 10509 - ST3,5 × 16 - St - R

EXAMPLE 2 A hexagon flange head tapping screw with thread size ST3,5, of nominal length l = 16 mm, made of stainless steel (A4-20H) in accordance with ISO 3506-4 and with a rounded end (type R) is designated as follows:

Tapping screw ISO 10509 - ST3,5 × 16 - A4-20H - R

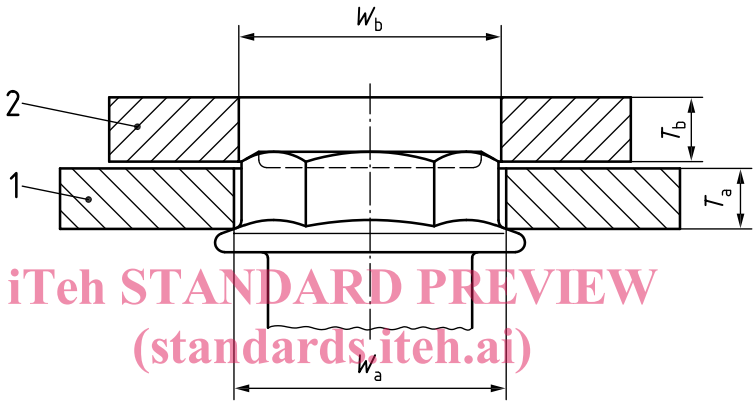
Annex A
(normative)

Check on head and flange gauges

The head shall be gauged using two ring gauges, A and B, to demonstrate the coincidental acceptability of hexagon height, wrenching height, corner fill and width across corners; see Figure A.1.

Gauge A shall be placed over the head and shall seat on the flange.

Gauge B shall be placed on the top of the head normal to the bolt axis. The two gauges shall not be in contact.



Key

1 gauge A
2 gauge B

$W_{a,min}$ is equal to the theoretical maximum width across corners;

$W_{b,max}$ is equal to the minimum width across corners minus 0,01 mm;

$T_{a,max}$ is equal to the minimum wrenching height k_w.

Figure A.1 — Check on head and flange gauges