
**Hexagon bolts with flange with metric
fine pitch thread — Small series —
Product grade A**

*Vis à tête hexagonale à embase cylindro-tronconique, à filetage
métrique à pas fin — Série étroite — Grade A*

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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 15072 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 11, *Fasteners with metric external thread*.

This second edition cancels and replaces the first (ISO 15072:1999), of which it constitutes a minor revision. It also incorporates the Technical Corrigendum ISO 15072:1999/Cor.1:2006.

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Hexagon bolts with flange with metric fine pitch thread — Small series — Product grade A

1 Scope

This International Standard specifies the characteristics of hexagon bolts with flange with metric fine pitch thread, small series, with product grade A, and with nominal thread diameters from 8 mm up to and including 16 mm and property classes 8.8, 9.8, 10.9, 12.9/12.9 and A2-70.

If, in special cases, specifications other than those listed in this International Standard are required, they can be selected from existing International Standards, for example ISO 261, ISO 888, ISO 898-1, ISO 965-2 and ISO 3506-1.

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 261, *ISO general purpose metric screw threads — General plan*

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

ISO 965-2, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose external and internal screw threads — Medium quality*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs*

ISO 4042, *Fasteners — Electroplated coatings*

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

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

ISO 6157-3, *Fasteners — Surface discontinuities — Part 3: Bolts, screws and studs for special requirements*

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

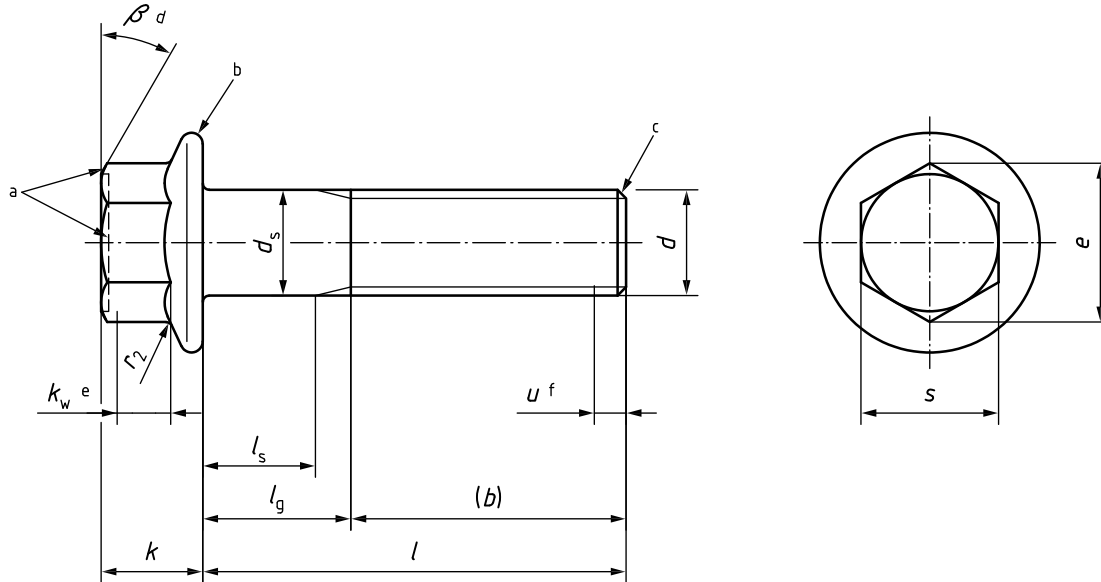
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

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

3 Dimensions

See Figures 1 to 4 and Table 1.

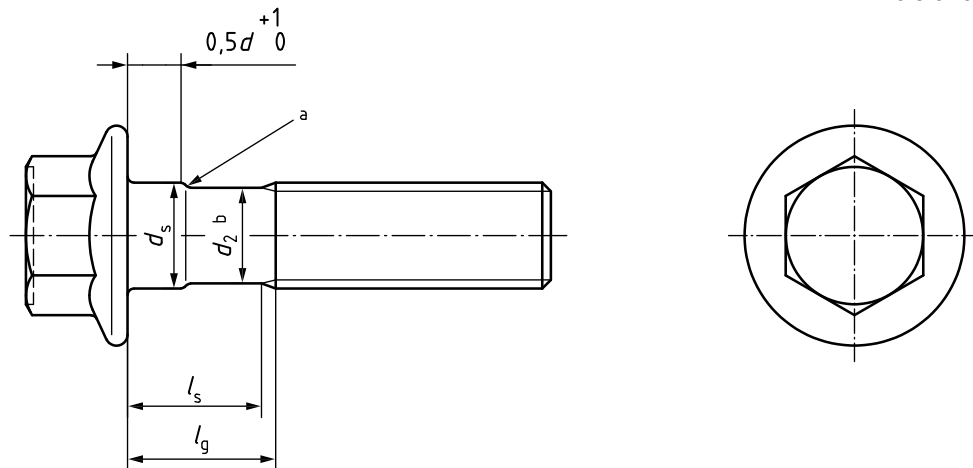
Symbols and descriptions of dimensions are specified in ISO 225.



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- a The top of the head shall be either full form or indented at the manufacturer's discretion and shall be either chamfered or rounded. The minimum diameter of the chamfer circle or start of rounding shall be equal to the maximum width across flats minus 15 %. If the top of the head is indented, the periphery may be rounded.
- b Edge contour is at the discretion of the manufacturer (optional).
- c Chamfered end, as specified in ISO 4753.
- d $\beta = 15^\circ$ to 30° .
- e k_w is the wrenching height; see the note to Table 1.
- f Incomplete thread $u \leq 2 P$.

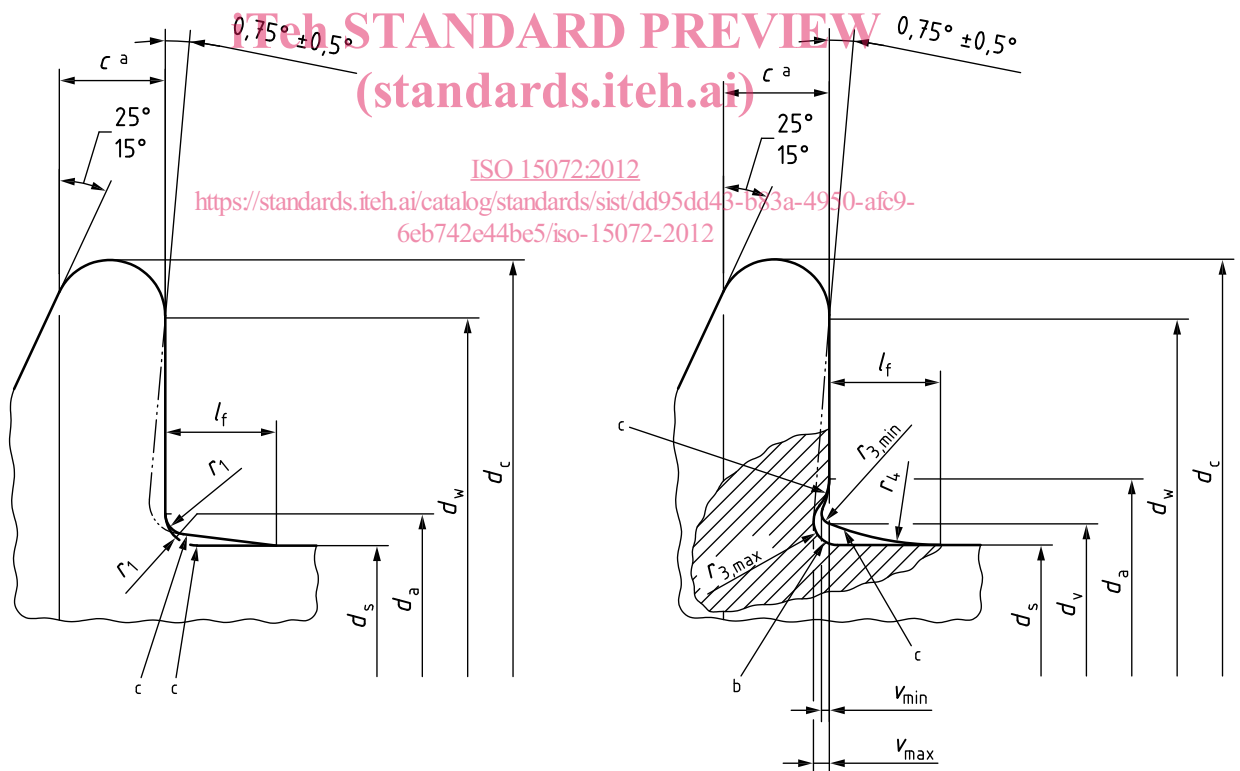
Figure 1 — Hexagon bolt with flange — Full shank — Standard type



NOTE For other dimensions, see Figure 1.

- a Rounded, chamfered or conical.
- b d_2 is approximately equal to the pitch diameter (rolling diameter).

Figure 2 — Hexagon bolt with flange — Reduced shank — Type R (upon request)



Type F without undercut — Standard type

Type U with undercut (upon request or optional)

- a c is measured at $d_{w,min}$.
- b Maximum and minimum underhead fillet.
- c Junction of fillet with bearing surface shall be a smooth blend.

Figure 3 — Hexagon bolt with flange — Underhead configuration (bearing area)

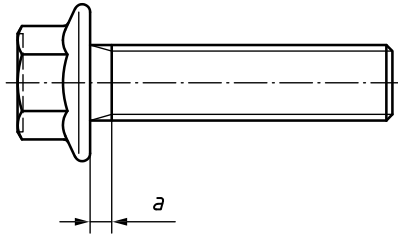


Figure 4 — Hexagon bolt with flange threaded to the head

Table 1 — Dimensions

Dimensions in millimetres

Thread ($d \times P^a$)		M8 × 1	M10 × 1 M10 × 1,25	M12 × 1,25 M12 × 1,5	(M14 × 1,5) ^b	M16 × 1,5
a	max.	3,0	3,0	4,5	4,5	4,5
	min.	1,0	1,0	1,5	1,5	1,5
b ref.	c	22	26	30	34	38
	d	28	32	36	40	44
	e	—	—	—	—	57
c	min.	1,2	1,5	1,8	2,1	2,4
d _a Types $\frac{F}{U}$	max.	9,2	11,2	13,7	15,7	17,7
		10,0	12,5	15,2	17,7	20,5
d _c	max.	17,0	20,8	24,7	28,6	32,8
d _s	max.	8,00	10,00	12,00	14,00	16,00
	min.	7,78	9,78	11,73	13,73	15,73
d _v	max.	8,8	10,8	12,8	14,8	17,2
d _w	min.	14,9	18,7	22,5	26,4	30,6
e	min.	10,95	14,26	16,50	19,86	23,15
k	max.	8,5	9,7	12,1	12,9	15,2
k _w	min.	3,8	4,3	5,4	5,6	6,8
l _f	max.	2,1	2,1	2,1	2,1	3,2
r ₁	min.	0,4	0,4	0,6	0,6	0,6
r ₂ ^f	max.	0,5	0,6	0,7	0,9	1,0
r ₃	max.	0,36	0,45	0,54	0,63	0,72
	min.	0,16	0,20	0,24	0,28	0,32
r ₄	ref.	5,7	5,7	5,7	5,7	8,8
s	max.	10,00	13,00	15,00	18,00	21,00
	min.	9,78	12,73	14,73	17,73	20,67
v	max.	0,25	0,30	0,35	0,45	0,50
	min.	0,10	0,15	0,15	0,20	0,25

Table 1 (continued)

Dimensions in millimetres

Thread ($d \times P^a$)			M8 × 1		M10 × 1 M10 × 1,25		M12 × 1,25 M12 × 1,5		(M14 × 1,5) ^b		M16 × 1,5	
<i>g, h</i>			<i>l_s and l_gⁱ</i>									
nom.	min.	max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.	<i>l_s</i> min.	<i>l_g</i> max.
16	15,65	16,35	—	—	—	—	—	—	—	—	—	—
20	19,58	20,42	—	—	—	—	—	—	—	—	—	—
25	24,58	25,42	—	—	—	—	—	—	—	—	—	—
30	29,58	30,42	—	—	—	—	—	—	—	—	—	—
35	34,5	35,5	6,75	13	—	—	—	—	—	—	—	—
40	39,5	40,5	11,75	18	6,5	14	—	—	—	—	—	—
45	44,5	45,5	16,75	23	11,5	19	6,25	15	—	—	—	—
50	49,5	50,5	21,75	28	16,5	24	11,25	20	6	16	—	—
55	54,4	55,6	26,75	33	21,5	29	16,25	25	11	21	7	17
60	59,4	60,6	31,75	38	26,5	34	21,25	30	16	26	12	22
65	64,4	65,6	36,75	43	31,5	39	26,25	35	21	31	17	27
70	69,4	70,6	41,75	48	36,5	44	31,25	40	26	36	22	32
80	79,4	80,6	51,75	58	46,5	54	41,25	50	36	46	32	42
90	89,3	90,7	56,5	64	51,25	60	46	56	42	52	—	—
100	99,3	100,7	66,5	74	61,25	70	56	66	52	62	—	—
110	109,3	110,7	—	—	—	—	71,25	80	66	76	62	72
120	119,3	120,7	—	—	—	—	81,25	90	76	86	72	82
130	129,2	130,8	—	—	—	—	—	—	80	90	76	86
140	139,2	140,8	—	—	—	—	—	—	90	100	86	96
150	149,2	150,8	—	—	—	—	—	—	—	—	96	106
160	159,2	160,8	—	—	—	—	—	—	—	—	106	116

NOTE If the product passes the gauging in Annex A, the requirements for dimensions c , e and k_W are satisfied.

a P is the pitch of the thread.

b The size in parentheses should be avoided, if possible.

c For $l_{nom} \leq 125$ mm.

d For 125 mm $< l_{nom} \leq 200$ mm.

e For $l_{nom} > 200$ mm.

f Radius r_2 is applicable both at the corners and at the flats of the hexagon.

g Screws with non-specified dimensions, l_s and l_g , given as "—", shown above the solid, bold, stepped line are threaded to the head.

h Reduced shank type (type R) shown only below the dashed stepped line.

i $l_{g,max} = l_{nom} - b$
 $l_{s,min} = l_{g,max} - 5 P$ (P is the pitch of the coarse thread, specified in ISO 261).