भारतीय मानक
Indian Standard

IS 1364 (Part 1) : 2023
ISO 4014 : 2022

उत्पाद ग्रेड ए और बी के लिए षटकोणीय शीर्ष वाले बोलट्स, पेंच और ढिबरियाँ

भाग 1 षटकोणीय शीर्ष वाले बोलट्स (साइज़ रेंज एम1.6 से एम64 तक)

(छठा पुनरीक्षण)

Hexagon Head Bolts, Screws and Nuts of Product Grades A and B

Part 1 Hexagon Head Bolts (Size Range M1.6 to M64)

(Sixth Revision)

ICS 21.060.10

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General Engineering and Fasteners Standards Sectional Committee, PGD 37

NATIONAL FOREWORD

This Indian Standard (Part 1) (Sixth Revision) which is identical with ISO 4014 : 2022 'Hexagon head bolts — Product grades A and B' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the General Engineering and Fasteners Standards Sectional Committee and approval of the Production and General Engineering Division Council.

IS 1364 was originally published in 1960 and first revised in 1967. Subsequent to the publication of 1967 edition, many changes had been agreed upon at international level which have been reflected in IS 1367 series of standards covering 'Technical supply conditions for threaded steel fasteners'. Accordingly, second revision was published in 1983 splitting the standard into 5 parts covering hexagon head bolts, hexagon head screws, hexagon nuts, hexagon thin nuts (chamfered) and hexagon thin nuts (unchamfered). Further in 2002, Part 6 was published on 'Hexagon nuts, style 2 — Product grades A and B'.

The third, fourth and fifth revision of this standard were published to align them with latest versions of ISO 4014. This sixth revision of this standard has been undertaken to align it with ISO 4014 : 2022. The main changes compared to the fifth revision are as follows:

a) Tables for dimensions have been entirely restructured, so that the user can find information in a reliable manner (no risk of picking the wrong dimension), (*see* **4** and Annex A);
b) Size M7 has been added;
c) $d_{w,min}$ has been changed for sizes $d \leq$ M5 from s_{min} — IT16 to s_{min} — IT15, in order to have a larger bearing surface area and thus less contact pressure;
d) The rules for the shortest and greatest standard lengths have been added, and they have been amended accordingly;
e) For steel bolts, property classes 4.8 and 12.9/12.9 have been added;
f) For stainless steel bolts, grades D4 and D6 and property class 80 have been added; property class 9.8 and non-ferrous metal bolts have been deleted; and
g) Specifications for marking and labelling have been added as **6**.

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
b) Comma (,) has been used as a decimal marker, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 225 Fasteners — Bolts, screws, studs and nuts — Symbols and descriptions of dimensions	IS 8536 : 2021/ISO 225 : 2010 Fasteners — Bolts, screws, studs and nuts — Symbols and descriptions of dimensions (*first revision*)	Identical
ISO 888 Fasteners — Bolts, screws and studs — Nominal lengths and thread lengths	IS 4206 : 2012/ISO 888 : 2012 Dimensions for nominal lengths and thread lengths for bolts, screws and studs (*second revision*)	Identical
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	IS 1367 (Part 3) : 2017/ISO 898-1 : 2013 Technical supply conditions for threaded steel fasteners: Part 3 Machanical properties of fasteners made of carbon steel and bolts, screws and studs (*fifth revision*)	Identical
ISO 965-1 ISO General-purpose metric screw threads — Tolerances — Part 1: Principles and basic data	IS 14962 (Part 1) : 2018/ISO 965-1 : 2013 ISO General purpose metric screw threads — Tolerances: Part 1 Principles and basic data (*first revision*)	Identical
ISO 3269 Fasteners — Acceptance inspection	IS 1367 (Part 17) : 2005/ISO 3269 : 2000 Technical supply conditions for threaded steel fasteners: Part 17 Inspections, sampling and acceptance procedure (*fourth revision*)	Identical
ISO 3506-1 Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes	IS 1367 (Part 14/Sec 1) : 2018/ISO 3506-1 : 2009 Technical supply conditions for threaded steel fasteners: Part 14 Mechanical properties of corrosion-resistant stainless-steel fasteners, Section 1 Bolts, screws and studs (*fourth revision*)	Identical
ISO 4042 : 2018 Fastners — Electroplated coatings	IS 1367 (Part 11) : 2020/ISO 4042 : 2018 Technical supply conditions for threaded steel fasteners: Part 11 Electroplated coating systems (*fourth revision*)	Identical
ISO 4753 Fasteners — Ends of parts with external ISO metric thread	IS 1368 : 2018/ISO 4753 : 2011 Dimensions for ends of parts with external ISO metric threads (*fourth revision*)	Identical

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 4759-1 Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C	IS 1367 (Part 2) : 2002/ISO 4759-1 : 2000 Technical supply conditions for threaded steel fasteners: Part 2 Tolerances for fasteners — Bolts, screws, studs and nuts — Product grades A, B and C (*third revision*)	Identical
ISO 6157-1 Fasteners — Surface discontinuities — Part 1: Bolts, screws and studs for general requirements	IS 1367 (Part 9 /Sec 1) : 1993/ ISO 6157-1 : 1988 Techincal supply conditions for threaded steel fasteners: Part 9 Surface discontinuties, Section 1 Bolts, screws and studs for general applications (*third revision*)	Identical
ISO 8991 Designation system for fasteners	IS 1367 (Part 16) : 2002/ISO 8991 : 1986 Technical supply conditions for threaded steel fasteners: Part 16 Designation system for fasteners (third revision)	Identical
ISO 8992 Fasteners — General requirements for bolts, screws, studs and nuts	IS 1367 (Part 1) : 2014/ISO 8992 : 2005 Technical supply conditions for threaded steel fasteners: Part 1 General requirements for bolts, screws, studs and nuts (*fourth revision*)	Identical
ISO 10683 Fasteners — Non- electrolytically applied zinc flake coatings	IS/ISO 10683 : 2018 Fasteners — Non-electrolytically applied zinc flake coating systems	Identical
ISO 10684 Fasteners — Hot dip galvanized coatings	IS 1367 (Part 13) : 2020/ISO 10684 : 2004 Technical supply conditions for threaded steel fasteners: Part 13 Hot dip galvanized coatings on threaded fasteners (*third revision*)	Identical

The technical Committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO 1891-4	Fasteners — Vocabulary — Part 4: Control, inspection, delivery, acceptance and quality
ISO 6157-3	Fasteners — Surface discontinuities — Part 3: Bolts, screws and studs for special requirements

The standard also makes a reference to the BIS Certification Marking and packaging of the product, details of which are given in National Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that specified in the standard.

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HEXAGON HEAD BOLTS, SCREWS AND NUTS OF PRODUCT GRADES A AND B

PART 1 HEXAGON HEAD BOLTS (SIZE RANGE M1.6 TO M64)

(Sixth Revision)

1 Scope

This document specifies the characteristics of hexagon head bolts, in steel and stainless steel, with metric coarse pitch threads M1,6 to M64, and with product grades A and B.

If in certain cases other specifications are requested, property classes and stainless steel grades can be selected from ISO 898-1 or ISO 3506-1, and dimensional options from ISO 888 or ISO 4753.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 888, *Fasteners — Bolts, screws and studs — Nominal lengths and thread lengths*

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 965-1, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data*

ISO 1891-4, *Fasteners — Vocabulary — Part 4: Control, inspection, delivery, acceptance and quality*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-1, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes*

ISO 4042, *Fasteners — Electroplated coating systems*

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 6157-1, *Fasteners — Surface discontinuities — Part 1: Bolts, screws and studs for general requirements*

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

ISO 8991, *Designation system for fasteners*

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

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

ISO 10684, *Fasteners — Hot dip galvanized coatings*

3 Terms and definitions

No terms and definitions are listed in this document.

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

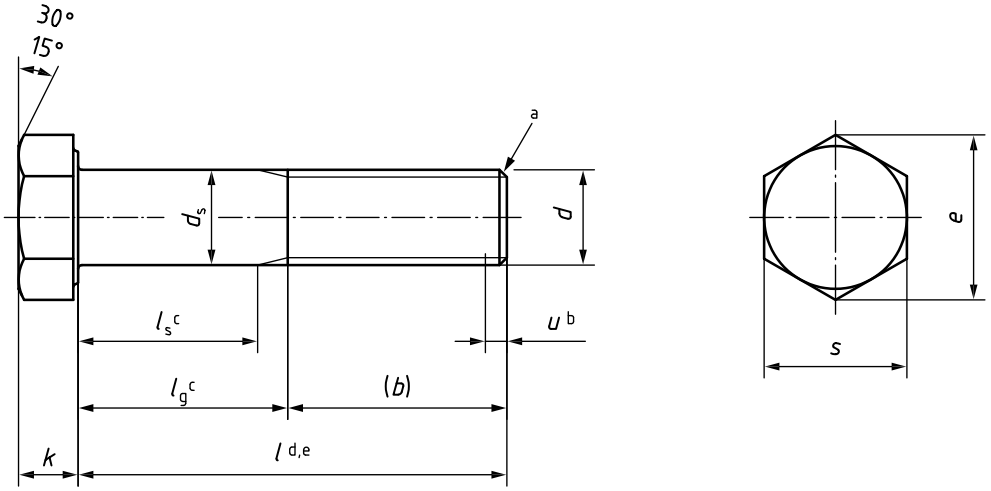
— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Dimensions

Dimensions shall be in accordance with Figures 1 and 2 and with Tables 1 to 6.

Symbols and descriptions of dimensions are defined in ISO 225.



a In accordance with ISO 4753: chamfered end (CH), but for sizes ≤ M4 as-rolled end (RL) is also allowed.

b Incomplete thread $u \leq 2P$.

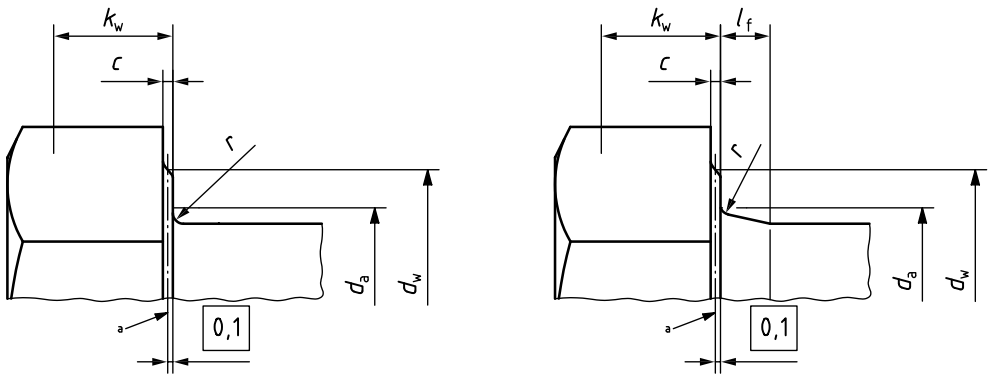
c $l_{g,max} = l_{nom} - b$ and $l_{s,min} = l_{g,max} - 5P$.

d Shortest standard length l_{nom} determined with $5d$ for M5 to M8, $4{,}5d$ for M10, $4d$ for M12 to M22, $3{,}75d$ for M24 to M60, and rounded (if necessary) to the nearest standard length; shortest standard length l_{nom} = 220 mm for M64.

e Greatest standard length $l_{nom} \leq 10d$ or 500 mm, whichever is the shorter.

Figure 1 — Hexagon head bolt

Dimensions in millimetres



a) Minimum underhead fillet **b) Maximum underhead fillet**

a Reference datum for d_w.

Figure 2 — Head details and permissible shapes

Table 1 — Dimensions for product grade A – M1,6 to M4

Dimensions in millimetres

Thread, *d*			**M1,6**	**M2**	**M2,5**	**M3**	(M3,5)	**M4**
P [a]			0,35	0,4	0,45	0,5	0,6	0,7
b	ref.	[b]	9	10	11	12	13	14
c		max.	0,25	0,25	0,25	0,40	0,40	0,40
		min.	0,10	0,10	0,10	0,15	0,15	0,15
d_a		max.	2,0	2,6	3,1	3,6	4,1	4,7
d_s	nom. =	max.	1,60	2,00	2,50	3,00	3,50	4,00
		min.	1,46	1,86	2,36	2,86	3,32	3,82
d_w		min.	2,54	3,34	4,34	4,84	5,34	6,20
e		min.	3,41	4,32	5,45	6,01	6,58	7,66
k		nom.	1,1	1,4	1,7	2	2,4	2,8
		max.	1,225	1,525	1,825	2,125	2,525	2,925
		min.	0,975	1,275	1,575	1,875	2,275	2,675
k_w		min.	0,68	0,89	1,10	1,31	1,59	1,87
l_f		max.	0,6	0,8	1,0	1,0	1,0	1,2
r		min.	0,10	0,10	0,10	0,10	0,10	0,20
s	nom. =	max.	3,20	4,00	5,00	5,50	6,00	7,00
		min.	3,02	3,82	4,82	5,32	5,82	6,78

l			**Range of standard lengths between the stepped bold lines**											
nom.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.
12	11,65	12,35	1,25	3,0	**Fully threaded screws specified in ISO 4017**									
16	15,65	16,35	5,25	7,0	4,0	6,0	2,75	5,0						
20	19,58	20,42			8,0	10,0	6,75	9,0	5,5	8,0	4,0	7,0		
25	24,58	25,42					11,75	14,0	10,5	13,0	9,0	12,0	7,5	11,0
30	29,58	30,42							15,5	18,0	14,0	17,0	12,5	16,0
35	34,50	35,50			**Product grade B in Annex A**						19,0	22,0	17,5	21,0
40	39,50	40,50											22,5	26,0
—	—	—												

NOTE Size shown in brackets is a non-preferred dimension.

[a] *P* is the pitch of the thread.

[b] For $l_{nom} \leq 125$ mm.

Table 2 — Dimensions for product grade A – M5 to M12

Dimensions in millimetres

Thread, d			M5	M6	(M7)	M8	M10	M12
P [a]			0,8	1	1	1,25	1,5	1,75
b	ref.	[b]	16	18	20	22	26	30
c		max.	0,50	0,50	0,60	0,60	0,60	0,60
		min.	0,15	0,15	0,15	0,15	0,15	0,15
d_a		max.	5,7	6,8	7,8	9,2	11,2	13,7
d_s	nom. =	max.	5,00	6,00	7,00	8,00	10,00	12,00
		min.	4,82	5,82	6,78	7,78	9,78	11,73
d_w		min.	7,20	8,88	9,63	11,63	14,63	16,63
e		min.	8,79	11,05	12,12	14,38	17,77	20,03
k		nom.	3,5	4,0	4,8	5,3	6,4	7,5
		max.	3,65	4,15	4,95	5,45	6,58	7,68
		min.	3,35	3,85	4,65	5,15	6,22	7,32
k_w		min.	2,35	2,70	3,26	3,61	4,35	5,12
l_f		max.	1,2	1,4	1,4	2,0	2,0	3,0
r		min.	0,20	0,25	0,25	0,40	0,40	0,60
s	nom. =	max.	8,00	10,00	11,00	13,00	16,00	18,00
		min.	7,78	9,78	10,73	12,73	15,73	17,73

l			Range of standard lengths between the stepped bold lines											
nom.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.
25	24,58	25,42	5,0	9,0										
30	29,58	30,42	10,0	14,0	7,0	12,0								
35	34,5	35,5	15,0	19,0	12,0	17,0	10,0	15,0						
40	39,5	40,5	20,0	24,0	17,0	22,0	15,0	20,0	11,75	18,0				
45	44,5	45,5	25,0	29,0	22,0	27,0	20,0	25,0	16,75	23,0	11,5	19,0		
50	49,5	50,5	30,0	34,0	27,0	32,0	25,0	30,0	21,75	28,0	16,5	24,0	11,25	20,0
55	54,4	55,6			32,0	37,0	30,0	35,0	26,75	33,0	21,5	29,0	16,25	25,0
60	59,4	60,6			37,0	42,0	35,0	40,0	31,75	38,0	26,5	34,0	21,25	30,0
65	64,4	65,6					40,0	45,0	36,75	43,0	31,5	39,0	26,25	35,0
70	69,4	70,6					45,0	50,0	41,75	48,0	36,5	44,0	31,25	40,0
80	79,4	80,6							51,75	58,0	46,5	54,0	41,25	50,0
90	89,3	90,7									56,5	64,0	51,25	60,0
100	99,3	100,7									66,5	74,0	61,25	70,0
110	109,3	110,7											71,25	80,0
120	119,3	120,7											81,25	90,0
—	—	—												

Fully threaded screws specified in ISO 4017

Product grade B in Annex A

NOTE Size shown in brackets is a non-preferred dimension.

[a] P is the pitch of the thread.

[b] For $l_{nom} \leq 125$ mm.

Table 3 — Dimensions for product grade A – M14 to M24

Dimensions in millimetres

Thread, d			(M14)	**M16**	(M18)	**M20**	(M22)	**M24**
P [a]			2	2	2,5	2,5	2,5	3
b	ref.	[b]	34	38	42	46	50	54
		[c]	40	44	48	52	56	60
c		max.	0,60	0,80	0,80	0,80	0,80	0,80
		min.	0,15	0,20	0,20	0,20	0,20	0,20
d_a		max.	15,7	17,7	20,2	22,4	24,4	26,4
d_s	nom. =	max.	14,00	16,00	18,00	20,00	22,0	24,00
		min.	13,73	15,73	17,73	19,67	21,67	23,67
d_w		min.	19,64	22,49	25,34	28,19	31,71	33,61
e		min.	23,36	26,75	30,14	33,53	37,72	39,98
k		nom.	8,8	10	11,5	12,5	14	15
		max.	8,98	10,18	11,715	12,715	14,215	15,215
		min.	8,62	9,82	11,285	12,285	13,785	14,785
k_w		min.	6,03	6,87	7,90	8,60	9,65	10,35
l_f		max.	3	3	3	4	4	4
r		min.	0,6	0,6	0,6	0,8	0,8	0,8
s	nom. =	max.	21,00	24,00	27,00	30,00	34,00	36,00
		min.	20,67	23,67	26,67	29,67	33,38	35,38

l			**Range of standard lengths between the stepped bold lines**											
nom.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.
55	54,4	55,6	11,0	21,0	**Fully threaded screws specified in ISO 4017**									
60	59,4	60,6	16,0	26,0										
65	64,4	65,6	21,0	31,0	17,0	27,0								
70	69,4	70,6	26,0	36,0	22,0	32,0	15,5	28,0						
80	79,4	80,6	36,0	46,0	32,0	42,0	25,5	38,0	21,5	34,0				
90	89,3	90,7	46,0	56,0	42,0	52,0	35,5	48,0	31,5	44,0	27,5	40,0	21,0	36,0
100	99,3	100,7	56,0	66,0	52,0	62,0	45,5	58,0	41,5	54,0	37,5	50,0	31,0	46,0
110	109,3	110,7	66,0	76,0	62,0	72,0	55,5	68,0	51,5	64,0	47,5	60,0	41,0	56,0
120	119,3	120,7	76,0	86,0	72,0	82,0	65,5	78,0	61,5	74,0	57,5	70,0	51,0	66,0
130	129,2	130,8	80,0	90,0	76,0	86,0	69,5	82,0	65,5	78,0	61,5	74,0	55,0	70,0
140	139,2	140,8	90,0	100,0	86,0	96,0	79,5	92,0	75,5	88,0	71,5	84,0	65,0	80,0
150	149,2	150,8	**Product grade B in Annex A**		96,0	106,0	89,5	102,0	85,5	98,0	81,5	94,0	75,0	90,0
> 150					**Product grade B in Table 4**									

NOTE Sizes shown in brackets are non-preferred dimensions.

[a] P is the pitch of the thread.

[b] For $l_{nom} \leq 125$ mm.

[c] For 125 mm < $l_{nom} \leq 200$ mm.

Table 4 — Dimensions for product grade B – M16 to M27

Dimensions in millimetres

Thread, d			**M16**	(M18)	**M20**	(M22)	**M24**	(M27)
P [a]			2	2,5	2,5	2,5	3	3
b	ref.	[b]	—	—	—	—	—	60
		[c]	44	48	52	56	60	66
		[d]	—	—	—	69	73	79
c		max.	0,8	0,8	0,8	0,8	0,8	0,8
		min.	0,2	0,2	0,2	0,2	0,2	0,2
d_a		max.	17,7	20,2	22,4	24,4	26,4	30,4
d_s	nom. =	max.	16,00	18,00	20,00	22,0	24,00	27,00
		min.	15,57	17,57	19,48	21,48	23,48	26,48
d_w		min.	22,00	24,85	27,70	31,35	33,25	38,00
e		min.	26,17	29,56	32,95	37,29	39,55	45,20
k		nom.	10	11,5	12,5	14	15	17
		max.	10,29	11,85	12,85	14,35	15,35	17,35
		min.	9,71	11,15	12,15	13,65	14,65	16,65
k_w		min.	6,80	7,81	8,51	9,56	10,26	11,66
l_f		max.	3	3	4	4	4	6
r		min.	0,6	0,6	0,8	0,8	0,8	1,0
s	nom. =	max.	24,00	27,00	30,00	34,00	36,00	41,00
		min.	23,16	26,16	29,16	33,00	35,00	40,00

l			**Range of standard lengths between the stepped bold lines**											
nom.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.
100	98,25	101,75	**Product grade A in Table 3**										25,0	40,0
110	108,25	111,75											35,0	50,0
120	118,25	121,75											45,0	60,0
130	128,0	132,0											49,0	64,0
140	138,0	142,0											59,0	74,0
150	148,0	152,0											69,0	84,0
160	158,0	162,0	106	116	99,5	112	95,5	108	91,5	104	85,0	100	79,0	94,0
180	178,0	182,0	**Length by agreement in accordance with ISO 888**		119,5	132	115,5	128	111,5	124	105	120	99,0	114
200	197,7	202,3					135,5	148	131,5	144	125	140	119	134
220	217,7	222,3							138,5	151	132	147	126	141
240	237,7	242,3									152	167	146	161
260	257,4	262,6											166	181
—	—	—												

NOTE Sizes shown in brackets are non-preferred dimensions.

[a] P is the pitch of the thread.

[b] For $l_{nom} \leq 125$ mm.

[c] For 125 mm < $l_{nom} \leq 200$ mm.

[a] For $l_{nom} > 200$ mm.

Table 5 — Dimensions for product grade B – M30 to M42

Dimensions in millimetres

Thread, *d*			**M30**	(M33)	**M36**	(M39)	**M42**
P [a]			3,5	3,5	4	4	4,5
b	ref.	[b]	66	72	—	—	—
		[c]	72	78	84	90	96
		[d]	85	91	97	103	109
c		max.	0,8	0,8	0,8	1,0	1,0
		min.	0,2	0,2	0,2	0,3	0,3
d_a		max.	33,4	36,4	39,4	42,4	45,6
d_s	nom. =	max.	30,00	33,00	36,00	39,00	42,00
		min.	29,48	32,38	35,38	38,38	41,38
d_w		min.	42,75	46,55	51,11	55,86	59,95
e		min.	50,85	55,37	60,79	66,44	71,30
k		nom.	18,7	21	22,5	25	26
		max.	19,12	21,42	22,92	25,42	26,42
		min.	18,28	20,58	22,08	24,58	25,58
k_w		min.	12,80	14,41	15,46	17,21	17,91
l_f		max.	6	6	6	6	8
r		min.	1,0	1,0	1,0	1,0	1,2
s	nom. =	max.	46,00	50,00	55,00	60,00	65,00
		min.	45,00	49,00	53,80	58,80	63,10

l			**Range of standard lengths between the stepped bold lines**									
nom.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.
110	108,25	111,75	26,5	44,0	**Fully threaded screws specified in ISO 4017**							
120	118,25	121,75	36,5	54,0	30,5	48,0						
130	128,0	132,0	40,5	58,0	34,5	52,0						
140	138,0	142,0	50,5	68,0	44,5	62,0	36,0	56,0				
150	148,0	152,0	60,5	78,0	54,5	72,0	46,0	66,0	40,0	60,0		
160	158,0	162,0	70,5	88,0	64,5	82,0	56,0	76,0	50,0	70,0	41,5	64,0
180	178,0	182,0	90,5	108	84,5	102	76,0	96,0	70,0	90,0	61,5	84,0
200	197,7	202,3	110,5	128	104,5	122	96,0	116	90,0	110	81,5	104
220	217,7	222,3	117,5	135	111,5	129	103	123	97,0	117	88,5	111
240	237,7	242,3	137,5	155	131,5	149	123	143	117	137	108,5	131
260	257,4	262,6	157,5	175	151,5	169	143	163	137	157	128,5	151
280	277,4	282,6	177,5	195	171,5	189	163	183	157	177	148,5	171
300	297,4	302,6	197,5	215	191,5	209	183	203	177	197	168,5	191
320	317,15	322,85	**Length by agreement in accordance with ISO 888**		211,5	229	203	223	197	217	188,5	211
340	337,15	342,85					223	243	217	237	208,5	231
360	357,15	362,85					243	263	237	257	228,5	251
380	377,15	382,85							257	277	248,5	271
400	397,15	402,85									268,5	291
420	416,85	423,15									288,5	311
—	—	—										

NOTE Sizes shown in brackets are non-preferred dimensions.

[a] *P* is the pitch of the thread.

[b] For $l_{nom} \leq 125$ mm.

[c] For 125 mm < $l_{nom} \leq 200$ mm.

[d] For $l_{nom} > 200$ mm.

Table 6 — Dimensions for product grade B – M45 to M64

Dimensions in millimetres

Thread, d			(M45)	**M48**	(M52)	**M56**	(M60)	**M64**
P [a]			4,5	5	5	5,5	5,5	6
b	ref.	[b]	102	108	116	—	—	—
		[c]	115	121	129	137	145	153
c		max.	1,0	1,0	1,0	1,0	1,0	1,0
		min.	0,3	0,3	0,3	0,3	0,3	0,3
d_a		max.	48,6	52,6	56,6	63,0	67,0	71,0
d_s	nom. =	max.	45,00	48,00	52,00	56,00	60,00	64,00
		min.	44,38	47,38	51,26	55,26	59,26	63,26
d_w		min.	64,70	69,45	74,20	78,66	83,41	88,16
e		min.	76,95	82,60	88,25	93,56	99,21	104,86
k		nom.	28	30	33	35	38	40
		max.	28,42	30,42	33,50	35,50	38,50	40,50
		min.	27,58	29,58	32,50	34,50	37,50	39,50
k_w		min.	19,31	20,71	22,75	24,15	26,25	27,65
l_f		max.	8	10	10	12	12	13
r		min.	1,2	1,6	1,6	2,0	2,0	2,0
s	nom. =	max.	70,00	75,00	80,00	85,00	90,00	95,00
		min.	68,10	73,10	78,10	82,80	87,80	92,80

l			**Range of standard lengths between the stepped bold lines**											
nom.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.
160	158,0	162,0	35,5	58	**Fully threaded screws specified in ISO 4017**									
180	178,0	182,0	55,5	78	47	72								
200	197,7	202,3	75,5	98	67	92	59	84						
220	217,7	222,3	82,5	105	74	99	66	91	55,5	83	47,5	75	37	67
240	237,7	242,3	102,5	125	94	119	86	111	75,5	103	67,5	95	57	87
260	257,4	262,6	122,5	145	114	139	106	131	95,5	123	87,5	115	77	107
280	277,4	282,6	142,5	165	134	159	126	151	115,5	143	107,5	135	97	127
300	297,4	302,6	162,5	185	154	179	146	171	135,5	163	127,5	155	117	147
320	317,15	322,85	182,5	205	174	199	166	191	155,5	183	147,5	175	137	167
340	337,15	342,85	202,5	225	194	219	186	211	175,5	203	167,5	195	157	187
360	357,15	362,85	222,5	245	214	239	206	231	195,5	223	187,5	215	177	207
380	377,15	382,85	242,5	265	234	259	226	251	215,5	243	207,5	235	197	227
400	397,15	402,85	262,5	285	254	279	246	271	235,5	263	227,5	255	217	247
420	416,85	423,15	282,5	305	274	299	266	291	255,5	283	247,5	275	237	267
440	436,85	443,15	302,5	325	294	319	286	311	275,5	303	267,5	295	257	287
460	456,85	463,15			314	339	306	331	295,5	323	287,5	315	277	307
480	476,85	483,15			334	359	326	351	315,5	343	307,5	335	297	327
500	496,85	503,15					346	371	335,5	363	327,5	355	317	347
—	—	—	**Length by agreement in accordance with ISO 888**											

NOTE Sizes shown in brackets are non-preferred dimensions.

[a] P is the pitch of the thread.

[b] For 125 mm < l_{nom} ≤ 200 mm.

[c] For l_{nom} > 200 mm.

5 Requirements and reference International Standards

The requirements specified in the International Standards listed in Table 7 shall apply.

Table 7 — Requirements and reference International Standards

<table>
<tr><th colspan="2">Material</th><th colspan="2">Steel</th><th colspan="2">Stainless steel</th></tr>
<tr><td>General requirements</td><td>International Standard</td><td colspan="4">ISO 8992</td></tr>
<tr><td rowspan="2">Thread</td><td>Tolerance class</td><td colspan="4">6g [a]</td></tr>
<tr><td>International Standard</td><td colspan="4">ISO 965-1</td></tr>
<tr><td rowspan="6">Mechanical properties</td><td rowspan="2">Property class
Symbol</td><td>M1,6 ≤ d ≤ M39</td><td>4.8, 5.6, 8.8, 10.9, 12.9/12.9 [b]</td><td colspan="2" rowspan="2">—</td></tr>
<tr><td>d > M39</td><td>As agreed</td></tr>
<tr><td rowspan="3">Grade [c] and property class
Symbol</td><td colspan="2" rowspan="3">—</td><td>M1,6 ≤ d ≤ M24</td><td>A2-70, A4-70, A4-80, D4-80, D6-80</td></tr>
<tr><td>M24 < d ≤ M39</td><td>A2-50, A2-70, A4-50, A4-70, D4-70, D6-70</td></tr>
<tr><td>d > M39</td><td>As agreed</td></tr>
<tr><td>International Standard</td><td colspan="2">ISO 898-1</td><td colspan="2">ISO 3506-1</td></tr>
<tr><td rowspan="2">Tolerances</td><td>Product grade</td><td colspan="4">For d ≤ M24 and l ≤ 10d or 150 mm [d]: A
(except for sizes d ≤ M5 where $d_{w,min} = s_{min}$ – IT15)
For d > M24 or l > 10d or 150 mm [d]: B</td></tr>
<tr><td>International Standard</td><td colspan="4">ISO 4759-1</td></tr>
<tr><td colspan="2" rowspan="2">Surface condition</td><td colspan="2">As processed (no coating)
Electroplated coatings as specified in ISO 4042
Non-electrolytically applied zinc flake coatings as specified in ISO 10683
Hot dip galvanized coatings as specified in ISO 10684</td><td colspan="2">Clean and bright
and/or
Passivated [e]</td></tr>
<tr><td colspan="4">Additional requirements or other finishes or coatings shall be agreed between the purchaser and the supplier</td></tr>
<tr><td colspan="2">Surface integrity</td><td colspan="2">Limits for surface discontinuities as specified in ISO 6157-1, and in ISO 6157-3 for property class 12.9/12.9</td><td colspan="2">As agreed [f]</td></tr>
<tr><td colspan="2">Acceptability</td><td colspan="4">Acceptance inspection as specified in ISO 3269</td></tr>
</table>

[a] Depending on the type of coating to be applied, another tolerance position of the thread may be specified for the uncoated fastener in accordance with the relevant coating standard.

[b] Fasteners of property class 12.9/12.9 are susceptible to hydrogen embrittlement: see ISO/TR 20491.

[c] The most common stainless steel grades are A2 and A4; however, depending on the application, it can be necessary to select other grades in ISO 3506-1 suitable for the service corrosive environment. For use at high temperatures (up to 800 °C), mechanical properties are specified in ISO 3506-5. See also ISO 3506-6 for the selection of suitable stainless steel grades.

[d] Whichever is the shorter.

[e] See e.g. ISO 16048.

[f] See e.g. ISO 6157-1.

6 Marking and labelling

6.1 Marking on product

Marking shall be:

— for steel fasteners, as specified in ISO 898-1,

— for stainless steel fasteners, as specified in ISO 3506-1.

6.2 Labelling on package

Labelling on the package shall be in accordance with ISO 898-1 or ISO 3506-1, and shall include at least:

— the reference to this document, i.e. ISO 4014,

— the thread size *d* and nominal length *l*,

— the symbol of the property class for steel fasteners,

— the grade and symbol of the property class for stainless steel fasteners,

— the type of surface condition (finish and/or coating),

— the manufacturer's and/or distributor's identification and/or name,

— the manufacturing lot number as specified in ISO 1891-4,

— the quantity of pieces in the package.

7 Designation

The designation requirements as specified in ISO 8991 shall apply for all sizes, with:

— the symbol of the property class for steel fasteners, as specified in ISO 898-1,

— the grade and symbol of the property class for stainless steel fasteners, as specified in ISO 3506-1.

When no specific surface condition (finish and/or coating) is specified in the designation, steel fasteners are delivered in the "as processed" condition, and stainless steel fasteners in the "clean and bright" condition.

EXAMPLE A hexagon head bolt, with thread size M12, nominal length *l* = 80 mm, product grade A, property class 8.8, as processed, is designated as follows:

Hexagon head bolt ISO 4014 – M12 × 80 – 8.8

Annex A
(normative)

Dimensions for bolts M1,6 to M14 with product grade B

Tables A.1 and A.2 are included in this document to specify the dimensions for bolts M1,6 to M14 with product grade B because of their longer length $l_{nom} > 10d$ or 150 mm: the length of these bolts shall be agreed between the purchaser and the manufacturer at the time of the order.

Table A.1 — Dimensions for product grade B – M1,6 to M4

Dimensions in millimetres

Thread, *d*			**M1,6**	**M2**	**M2,5**	**M3**	(M3,5)	**M4**
P [a]			0,35	0,4	0,45	0,5	0,6	0,7
b	ref.	[b]	9	10	11	12	13	14
		[c]	15	16	17	18	19	20
		[d]	28	29	30	31	32	33
c		max.	0,25	0,25	0,25	0,40	0,40	0,40
		min.	0,10	0,10	0,10	0,15	0,15	0,15
d_a		max.	2,0	2,6	3,1	3,6	4,1	4,7
d_s	nom. =	max.	1,60	2,00	2,50	3,00	3,50	4,00
		min.	1,35	1,75	2,25	2,75	3,20	3,70
d_w		min.	2,42	3,22	4,22	4,72	5,22	6,06
e		min.	3,28	4,18	5,31	5,88	6,44	7,50
k		nom.	1,1	1,4	1,7	2	2,4	2,8
		max.	1,30	1,60	1,90	2,20	2,60	3,00
		min.	0,90	1,20	1,50	1,80	2,20	2,60
k_w		min.	0,63	0,84	1,05	1,26	1,54	1,82
l_f		max.	0,6	0,8	1,0	1,0	1,0	1,2
r		min.	0,10	0,10	0,10	0,10	0,10	0,20
s	nom. =	max.	3,20	4,00	5,00	5,50	6,00	7,00
		min.	2,90	3,70	4,70	5,20	5,70	6,64
l			**Range of lengths to be agreed below the stepped bold line**					
nom.	min.	max.						
20	18,95	21,05		**Product grade A in Table 1**				[e]
25	23,95	26,05						
30	28,95	31,05						
35	33,75	36,05						
40	38,75	41,25		**Length by agreement in accordance with ISO 888**				
45	43,75	46,25						
50	48,75	51,25						
> 50								

NOTE Size shown in brackets is a non-preferred dimension.

[a] *P* is the pitch of the thread.

[b] For $l_{nom} \leq 125$ mm.

[c] For 125 mm < $l_{nom} \leq 200$ mm.

[d] For $l_{nom} > 200$ mm.

[e] Fully threaded screws specified in ISO 4017.

Table A.2 — Dimensions for product grade B – M5 to M14

Dimensions in millimetres

Thread, d			M5	M6	(M7)	M8	M10	M12	(M14)
P [a]			0,8	1	1	1,25	1,5	1,75	2
b	ref.	[b]	16	18	20	22	26	30	34
		[c]	22	24	26	28	32	36	40
		[d]	35	37	39	41	45	49	53
c		max.	0,50	0,50	0,60	0,60	0,60	0,60	0,60
		min.	0,15	0,15	0,15	0,15	0,15	0,15	0,15
d_a		max.	5,7	6,8	7,8	9,2	11,2	13,7	15,7
d_s	nom. =	max.	5,00	6,00	7,00	8,00	10,00	12,00	14,00
		min.	4,70	5,70	6,64	7,64	9,64	11,57	13,57
d_w		min.	7,06	8,74	9,47	11,47	14,47	16,47	19,15
e		min.	8,63	10,89	11,94	14,20	17,59	19,85	22,78
k		nom.	3,5	4,0	4,8	5,3	6,4	7,5	8,8
		max.	3,74	4,24	5,04	5,54	6,69	7,79	9,09
		min.	3,26	3,76	4,56	5,06	6,11	7,21	8,51
k_w		min.	2,28	2,63	3,19	3,54	4,28	5,05	5,96
l_f		max.	1,2	1,4	1,4	2,0	2,0	3,0	3,0
r		min.	0,20	0,25	0,25	0,40	0,40	0,60	0,60
s	nom. =	max.	8,00	10,00	11,00	13,00	16,00	18,00	21,00
		min.	7,64	9,64	10,57	12,57	15,57	17,57	20,16

l			Range of lengths to be agreed below the stepped bold line						
nom.	min.	max.							
55	53,50	56,50							
60	58,50	61,50							
65	63,50	66,50							
70	68,50	71,50							
80	78,50	81,50							
90	88,25	91,75							
100	98,25	101,75							
110	108,25	111,75							
120	118,25	121,75							
130	128	132							
140	138	142							
150	148	152							
> 150									

Product grade A in Table 2

Product grade A in Table 3

Length by agreement in accordance with ISO 888

NOTE Sizes shown in brackets are non-preferred dimensions.

[a] P is the pitch of the thread.

[b] For $l_{nom} \leq 125$ mm.

[c] For 125 mm < $l_{nom} \leq 200$ mm.

[d] For $l_{nom} > 200$ mm.

Bibliography

ISO 3506-5, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 5: Special fasteners (also including fasteners from nickel alloys) for high temperature applications*

ISO 3506-6, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 6: General rules for the selection of stainless steels and nickel alloys for fasteners*

ISO 4017, *Fasteners — Hexagon head screws — Product grades A and B*

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

ISO/TR 20491, *Fasteners — Fundamentals of hydrogen embrittlement in steel fasteners*

NATIONAL ANNEX A

(*National Foreword*)

A-1 PACKAGING

The packaging of hexagon head bolts shall be in accordance with IS 1367 (Part 18) : 1996 'Industrial fasteners — Threaded steel fasteners — Technical supply conditions: Part 18 Packaging*'.*

A-2 BIS CERTIFICATION MARKING

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

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