

भारतीय मानक
उत्पाद ग्रेड ए और बी के लिए षटकोणीय शीर्ष वाले
काबले, पेंच और ढिबरियाँ
भाग 3 शैली 1 की षटकोणीय ढिबरियाँ
(साइज़ रेंज एम 1.6 से एम 64 तक)
(चौथा पुनरीक्षण)

Indian Standard
HEXAGON HEAD BOLTS, SCREWS AND NUTS OF
PRODUCT GRADES A AND B
PART 3 HEXAGON NUTS, STYLE 1 (SIZE RANGE M 1.6 TO M 64)
(*Fourth Revision*)

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Bolts, Nuts and Fasteners Accessories Sectional Committee, BP 33

NATIONAL FOREWORD

This Indian Standard (Part 3) (Fourth Revision) which is identical with ISO 4032 : 1999 'Hexagon nuts, style 1 — 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 Bolts, Nuts and Fasteners Accessories Sectional Committee and approval of the Basic and Production 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).

The third revision of this standard was published in 1992 by adoption of ISO 4017 : 1988. This fourth revision has been made by adoption of latest version of ISO 4032 published in 1999. The remaining parts of the standard, that is, Part 1, Part 2, Part 4 and Part 5 are also being revised by adopting the corresponding latest editions of ISO Standards published in 1999.

The Committee also decided to publish Indian Standard on 'Hexagon nuts, Style 2 — Product grades A and B' as Part 6 of IS 1364. The Part 6 will supersede IS/ISO 4033 : 1979 on its publication.

In 1967 version of this standard, the widths across flat dimensions for M10 and M12 size fasteners were specified as 17 mm and 19 mm respectively. However, in the 1983 version, these widths across flat dimensions were brought in line with ISO 4032 : 1979 and specified as 16 mm and 18 mm respectively for M10 and M12 size fasteners. Recognizing the difficulty of immediate changeover to new width across flat dimensions, the Committee decided to permit width across flat dimensions as per 1967 version, that is, 17 mm and 19 mm for M10 and M12 size fasteners till 31 December 1994. Now it is expected that the entire fastener industry would have switched over to new width across flat dimensions and from 1 January 1995 no old width across flat dimensions shall be permitted.

The text of ISO Standard has been approved as suitable for publication as Indian Standard without deviations. Certain terminology and conventions are, however, not identical to those used in Indian Standards. Attention is drawn especially 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 place are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 225 : 1983	IS 8536 : 1987 Fasteners — Bolts, screws, studs and nuts — Symbols and designation of dimensions (first revision)	Identical

IS 1364 (Part 3) : 2002
ISO 4032 : 1999

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 724 : 1993	IS 4218 (Part 3) : 1999 ISO General purpose metric screw threads : Part 3 Basic dimensions (<i>second revision</i>)	Identical
ISO 898-2 : 1992	IS 1367 (Part 6) : 1994 Technical supply conditions for threaded steel fasteners: Part 6 Mechanical properties and test methods for nuts with specified proof loads (<i>third revision</i>)	do
ISO 965-1 : 1998	IS 14962 (Part 1) : 2001 ISO General purpose metric screw threads — Tolerances: Part 1 Principles and basic data	do
ISO 3269 : ¹⁾	IS 1367 (Part 17) : 1996 ²⁾ Industrial fasteners — Threaded steel fasteners — Technical supply conditions: Part 17 Inspection, sampling and acceptance procedure (<i>third revision</i>)	do
ISO 3506-2 : 1997	IS 1367 (Part 14/Sec 2) : 2002 Technical supply conditions for threaded steel fasteners: Part 14 Mechanical properties of corrosion resistant stainless-steel fasteners, Section 2 Nuts (<i>third revision</i>)	do
ISO 4042 : 1999	IS 1367 (Part 11) : 2002 Technical supply conditions for threaded steel fasteners: Part 11 Electroplated coatings (<i>third revision</i>)	do
ISO 4759-1 : ³⁾	IS 1367 (Part 2) : 2002 Technical supply conditions for threaded steel fasteners: Part 2 Product grades and tolerances (<i>third revision</i>)	do
ISO 6157-2 : 1988	IS 1367 (Part 10) : 2002 Technical supply conditions for threaded steel fasteners: Part 10 Surface discontinuities — Nuts (<i>third revision</i>)	do
ISO 8992 : 1986	IS 1367 (Part 1) : 2002 Technical supply conditions for threaded steel fasteners: Part 1 Introduction and general information (<i>third revision</i>)	do

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

<i>ISO Standard</i>	<i>Title</i>
ISO 8839 : 1986	Mechanical properties of fasteners — Bolts, screws, studs and nuts made of non-ferrous metals
ISO 16048 : — ⁴⁾	Passivation of corrosion-resistant stainless steel fasteners — Passivation process and acceptance criteria

¹⁾ To be published (Revision of ISO 3269 : 1988).

²⁾ Identical with ISO 3269 : 1988.

³⁾ Since published in 2000.

⁴⁾ To be published.

CORRIGENDUM

(Page 3, Table 2, col 1, row 11) — Read ' m_w ' in place of ' d_w '.

ALTERATION

In clause 5, the designation of hexagon nut, style 1 shall be read as:

'Hexagon nut - IS 1364 (Part 3) /ISO 4032 - M12 - 8' in place of 'Hexagon nut - ISO 4032 - M12 - 8'

PACKAGING

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

BIS CERTIFICATION MARKING

Details available with the Bureau of Indian Standards.

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 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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

PART 3 HEXAGON NUTS, STYLE 1 (SIZE RANGE M 1.6 TO M 64)

(*Fourth Revision*)

1 Scope

This International Standard specifies the characteristics of hexagon nuts, style 1, with threads from M1.6 up to including M64, with product grade A for threads $d \leq M16$ and product grade B for threads $d > M16$.

If, in special cases, specifications other than those listed in this International Standard are required, they should be selected from existing International Standards, for example ISO 724, ISO 898-2, ISO 965-1, ISO 3506-2 and ISO 4759-1.

NOTE For hexagon nuts style 2, see ISO 4033.

2 Normative references

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

ISO 724:1993, *ISO general-purpose metric screw threads — Basic dimensions.*

ISO 898-2:1992, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values — Coarse thread.*

ISO 965-1:1998, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data.*

ISO 3269:—¹⁾, *Fasteners — Acceptance inspection.*

ISO 3506-2:1997, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 2: Nuts.*

ISO 4042:1999, *Fasteners — Electroplated coatings.*

ISO 4759-1:—²⁾, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C.*

ISO 6157-2:1988, *Fasteners — Surface discontinuities — Part 2: Nuts.*

ISO 8839:1986, *Mechanical properties of fasteners — Bolts, screws, studs and nuts made of non-ferrous metals.*

ISO 8992:1986, *Fasteners — General requirements for bolts, screws, studs and nuts.*

ISO 10683:—³⁾, *Fasteners — Non-electrolytically applied zinc flake coatings.*

¹⁾ To be published. (Revision of ISO 3269:1988)

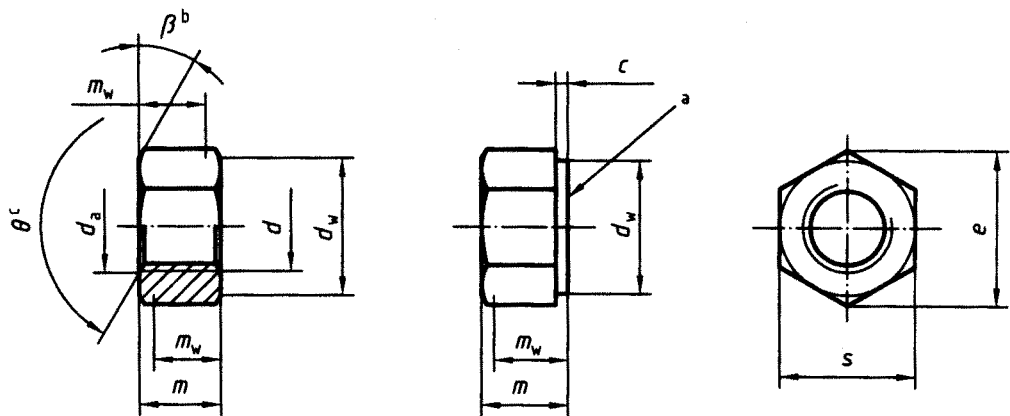
²⁾ To be published. (Revision of ISO 4759-1:1978)

³⁾ To be published.

3 Dimensions

See Figure 1 and Tables 1 and 2.

Symbols and descriptions of dimensions are defined in ISO 225.



- a Washer-face form to be ordered separately
- b $\beta = 15^\circ$ to 30°
- c $\theta = 90^\circ$ to 120°

Figure 1

Table 1 — Preferred threads

Dimensions in millimetres

Thread (d)		M1,6	M2	M2,5	M3	M4	M5	M6	M8	M10	M12
<i>p</i> _a		0,35	0,4	0,45	0,5	0,7	0,8	1	1,25	1,5	1,75
<i>c</i>	max.	0,2	0,2	0,3	0,40	0,40	0,50	0,50	0,60	0,60	0,60
	min.	0,1	0,1	0,1	0,15	0,15	0,15	0,15	0,15	0,15	0,15
<i>d</i> _a	max.	1,84	2,3	2,9	3,45	4,6	5,75	6,75	8,75	10,8	13
	min.	1,60	2,0	2,5	3,00	4,0	5,00	6,00	8,00	10,0	12
<i>d</i> _w	min.	2,4	3,1	4,1	4,6	5,9	6,9	8,9	11,6	14,6	16,6
<i>e</i>	min.	3,41	4,32	5,45	6,01	7,66	8,79	11,05	14,38	17,77	20,03
<i>m</i>	max.	1,30	1,60	2,00	2,40	3,2	4,7	5,2	6,80	8,40	10,80
	min.	1,05	1,35	1,75	2,15	2,9	4,4	4,9	6,44	8,04	10,37
<i>m</i> _w	min.	0,8	1,1	1,4	1,7	2,3	3,5	3,9	5,2	6,4	8,3
<i>s</i>	nom. = max.	3,20	4,00	5,00	5,50	7,00	8,00	10,00	13,00	16,00	18,00
	min.	3,02	3,82	4,82	5,32	6,78	7,78	9,78	12,73	15,73	17,73

Thread (d)		M16	M20	M24	M30	M36	M42	M48	M56	M64
<i>p</i> _a		2	2,5	3	3,5	4	4,5	5	5,5	6
<i>c</i>	max.	0,8	0,8	0,8	0,8	0,8	1,0	1,0	1,0	1,0
	min.	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3
<i>d</i> _a	max.	17,3	21,6	25,9	32,4	38,9	45,4	51,8	60,5	69,1
	min.	16,0	20,0	24,0	30,0	36,0	42,0	48,0	56,0	64,0
<i>d</i> _w	min.	22,5	27,7	33,3	42,8	51,1	60	69,5	78,7	88,2
<i>e</i>	min.	26,75	32,95	39,55	50,85	60,79	71,3	82,6	93,56	104,86
<i>m</i>	max.	14,8	18,0	21,5	25,6	31,0	34,0	38,0	45,0	51,0
	min.	14,1	16,9	20,2	24,3	29,4	32,4	36,4	43,4	49,1
<i>m</i> _w	min.	11,3	13,5	16,2	19,4	23,5	25,9	29,1	34,7	39,3
<i>s</i>	nom. = max.	24,00	30,00	36	46	55,0	65,0	75,0	85,0	95,0
	min.	23,67	29,16	35	45	53,8	63,1	73,1	82,8	92,8
a <i>P</i> is the pitch of the thread.										

Table 2 — Non-preferred threads

Dimensions in millimetres

Thread (d)		M3,5	M14	M18	M22	M27	M33	M39	M45	M52	M60
<i>p</i> _a		0,6	2	2,5	2,5	3	3,5	4	4,5	5	5,5
<i>c</i>	max.	0,40	0,60	0,8	0,8	0,8	0,8	1,0	1,0	1,0	1,0
	min.	0,15	0,15	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3
<i>d</i> _a	max.	4,0	15,1	19,5	23,7	29,1	35,6	42,1	48,6	56,2	64,8
	min.	3,5	14,0	18,0	22,0	27,0	33,0	39,0	45,0	52,0	60,0
<i>d</i> _w	min.	5	19,6	24,9	31,4	38	46,6	55,9	64,7	74,2	83,4
<i>e</i>	min.	6,58	23,36	29,56	37,29	45,2	55,37	66,44	76,95	88,25	99,21
<i>m</i>	max.	2,80	12,8	15,8	19,4	23,8	28,7	33,4	36,0	42,0	48,0
	min.	2,55	12,1	15,1	18,1	22,5	27,4	31,8	34,4	40,4	46,4
<i>m</i> _w	min.	2	9,7	12,1	14,5	18	21,9	25,4	27,5	32,3	37,1
<i>s</i>	nom. = max.	6,00	21,00	27,00	34	41	50	60,0	70,0	80,0	90,0
	min.	5,82	20,67	26,16	33	40	49	58,8	68,1	78,1	87,8
a <i>P</i> is the pitch of the thread.											

4 Specifications and reference standards

See Table 3.

Table 3 — Specifications and reference standards

Material		Steel	Stainless steel	Non-ferrous metal
General requirements	International Standard	ISO 8992		
	Tolerance	6H		
Thread	International Standards	ISO 724, ISO 965-1		
	Property class ^a	$d < M3$: as agreed $M3 \leq d \leq M39$: 6, 8, 10 $d > M39$: as agreed	$d \leq M24$: A2-70, A4-70 $M24 < d \leq M39$: A2-50, A4-50 $d > M39$: as agreed	Materials specified in ISO 8839
Mechanical properties	International Standards	$M3 \leq d \leq M39$: ISO 898-2 $d < M3$ and $d > M39$: as agreed	$d \leq M39$: ISO 3506-2 $d > M39$: as agreed	
Tolerances	Product grade	$d < M16$: A $d > M16$: B		
	International Standard	ISO 4759-1		
Finish and/or coating		As processed Requirements for electroplating are covered in ISO 4042 Requirements for non-electrolytically applied zinc flake coatings are covered in ISO 10683 If different electroplating requirements are desired or if requirements are needed for other finishes, they should be agreed between customer and supplier. Limits for surface discontinuities are covered in ISO 6157-2	Plain	Plain Requirements for electroplating are covered in ISO 4042
Acceptability		For acceptance procedure, see ISO 3269.		
^a For other property classes see ISO 898-2 for steel and ISO 3506-2 for stainless steel respectively.				

5 Designation

EXAMPLE

A hexagon nut, style 1, with thread M12 and property class 8 is designated as follows:

Hexagon nut ISO 4032 - M12 - 8

Bibliography

- [1] ISO 4014:1999, *Hexagon head bolts — Product grades A and B.*
- [2] ISO 4015:1979, *Hexagon head bolts — Product grade B — Reduced shank (shank diameter approximately equal to pitch diameter).*
- [3] ISO 4016:1999, *Hexagon head bolts — Product grade C.*
- [4] ISO 4017:1999, *Hexagon head screws — Product grades A and B.*
- [5] ISO 4018:1999, *Hexagon head screws — Product grade C.*
- [6] ISO 4033:1999, *Hexagon nuts, style 2 — Product grades A and B.*
- [7] ISO 4034:1999, *Hexagon nuts — Product grade C.*
- [8] ISO 4035:1999, *Hexagon thin nuts (chamfered) — Product grades A and B.*
- [9] ISO 4036:1999, *Hexagon thin nuts (unchamfered) — Product grade B.*
- [10] ISO 4161:1999, *Hexagon nuts with flange — Coarse thread.*
- [11] ISO 4162:—⁴⁾, *Hexagon bolts with flange — Small series — Product grade combination A/B.*
- [12] ISO 4775:1984, *Hexagon nuts for high-strength structural bolting with large width across flats — Product grade B — Property classes 8 and 10.*
- [13] ISO 7411:1984, *Hexagon bolts for high-strength structural bolting with large width across flats (thread lengths according to ISO 888) — Product grade C — Property classes 8.8 and 10.9.*
- [14] ISO 7412:1984, *Hexagon bolts for high-strength structural bolting with large width across flats (short thread length) — Product grade C — Property classes 8.8 and 10.9.*
- [15] ISO 7413:1984, *Hexagon nuts for structural bolting, style 1, hot-dip galvanized (oversize tapped) — Product grades A and B — Property classes 5, 6 and 8.*
- [16] ISO 7414:1984, *Hexagon nuts for structural bolting with large width across flats, style 1 — Product grade B — Property class 10.*
- [17] ISO 7417:1984, *Hexagon nuts for structural bolting, style 2, hot-dip galvanized (oversize tapped) — Product grade A — Property class 9.*
- [18] ISO 8673:1999, *Hexagon nuts, style 1, with metric fine pitch thread — Product grades A and B.*
- [19] ISO 8674:1999, *Hexagon nuts, style 2, with metric fine pitch thread — Product grades A and B.*
- [20] ISO 8675:1999, *Hexagon thin nuts (chamfered) with metric fine pitch thread — Product grades A and B.*
- [21] ISO 8676:1999, *Hexagon head screws with metric fine pitch thread — Product grades A and B.*

⁴⁾ To be published. (Revision of ISO 4162:1990)

[22] ISO 8765:1999, *Hexagon head bolts with metric fine pitch thread — Product grades A and B.*

[23] ISO 10663:1999, *Hexagon nuts with flange — Fine pitch thread.*

[24] ISO 15071:1999, *Hexagon bolts with flange — Small series — Product grade A.*

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

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