BS 4190:2014

BSI Standards Publication

ISO metric black hexagon bolts, screws and nuts – Specification

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 28, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 October 2014. It was prepared by Technical Committee FME/9, *Nuts and accessories*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standards supersedes BS 4190:2001, which is withdrawn.

Relationship with other publications

This British Standard should be read in conjunction with BS EN ISO 898-1 as it contains tables that reflect up-to-date best practice for mechanical properties of bolts.

Information about this document

The mechanical properties of the nuts in this British Standard do not conform to BS EN ISO 898-2. Higher proof load values have been allocated to the revised property classes in BS EN ISO 898-2 in order to ensure that fracture of the bolt generally occurs in the case of overloading.

CAUTION. Nuts in accordance with this standard cannot be fully loaded with sufficient assurance up to the yield point of the appropriate bolt, or beyond this, without the possibility of the nut thread being stripped, and for this reason it is essential that new designs of nuts for use with BS 4190 bolts and studs conforming to this standard conform to BS EN ISO 898-2.

In order to differentiate nuts that conform to this British standard from that those that conform to BS EN ISO 898-2 vertical bars have been added to the symbols for strength grade designations e.g. l8l instead of 8.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Requirements in this standard are drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause **J.1.1**, which states, "Requirements should be expressed using wording such as: 'When tested as described in Annex A, the product shall ...'". This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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1 Scope

This standard gives the general dimensions and tolerances of black hexagon bolts, screws and nuts with ISO metric threads in diameters from 5 mm to 68 mm inclusive; basic dimensions for sizes greater than M68 are also included.

This standard specifies mechanical properties of black hexagon bolts, screws and nuts made of carbon steel and alloy steel when tested at an ambient temperature range of 10 °C to 35 °C. Dimensional requirements are included for bolts, screws and nuts finished black all over and for those which have partially machined finishes.

NOTE 1 Fasteners (the term used when bolts, screws and nuts are considered all together) that conform to the requirements of this standard are evaluated at this ambient temperature range. They might not retain the specified mechanical and physical properties at elevated temperatures and/or lower temperatures.

This standard is not applicable to fasteners used in applications outside of the range -50 °C to +150 °C.

NOTE 2 Fasteners conforming to the requirements of this standard are used in applications ranging from -50 °C to +150 °C. The use of fasteners in applications outside of this range, and up to a maximum temperature of +300 °C, might need to be based on the advice of an experienced fastener metallurgist for determining appropriate choices for a given application.

NOTE 3 Nuts in accordance with this standard cannot be fully loaded with sufficient assurance up to the yield point of the appropriate bolt, or beyond this, without the possibility of the nut thread being stripped, and for this reason it is essential that new designs of nuts for use with BS 4190 bolts and studs conforming to this standard conform to BS EN ISO 898-2.

NOTE 4 Nuts with an effective height of less than 0.6d and/or with a width across flats or outside diameter of less than 1.4d are excluded from the mechanical requirements specified.

The dimensional requirements of this British Standard are also applicable to non-ferrous and stainless steel bolts, screws and nuts.

Information on strength grade designation system for steel bolts and screws can be found in Annex D.

NOTE 5 The term "black" does not necessarily relate to the appearance of the products, as these can be of bright appearance or black in the finished state. The term implies the comparatively wider tolerances to which these products are usually made.

*NOTE 6 In addition to the definitive requirements, this standard also requires the items detailed in Clause **3** to be documented. For compliance with this standard, both the definitive requirements and the documented items have to be met.*

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 1916-1, *Limits and fits for engineering – Part 1: Guide to limits and tolerances*

BS 3643-1, *ISO metric screw threads – Part 1: Principles and basic data*

BS 3643-2, *ISO metric screw threads – Part 2: Specification for selected limits of size*

BS 7371-6, *Coatings on metal fasteners – Part 6: Specification for hot dipped galvanized coatings*

BS EN ISO 4042, *Fasteners – Electroplated coatings*

BS EN ISO 10684, *Fasteners – Hot dip galvanized coatings*

BS EN ISO 898-1:2013*, Mechanical properties of fasteners made of carbon steel and alloy steel – Bolts, screws and studs with specified property classes – Part 1: Coarse thread and fine pitch thread*

BS EN ISO 1234, *Split pins*

BS EN ISO 6506-1*, Metallic materials – Brinell hardness test – Part 1: Test method*

BS EN ISO 6506-2, *Metallic materials – Brinell hardness test – Part 2: Verification and calibration of testing machines*

BS EN ISO 6506-3, *Metallic materials – Brinell hardness test – Part 3: Calibration of reference blocks*

BS EN ISO 6506-4, *Metallic materials – Brinell hardness test – Part 4: Table of hardness values*

BS EN ISO 6507-1, *Metallic materials – Vickers hardness test – Part 1: Test method*

BS EN ISO 6507-2, *Metallic materials – Vickers hardness test – Part 2: Verification and calibration of testing machines*

BS EN ISO 6507-3, *Metallic materials – Vickers hardness test – Part 3: Calibration of reference blocks*

BS EN ISO 6507-4, *Metallic materials – Vickers hardness test – Part 4: Tables of hardness values*

BS EN ISO 6508-1, *Metallic materials – Rockwell hardness test – Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

BS EN ISO 6508-2, *Metallic materials – Rockwell hardness test – Part 2: Verification and calibration of testing machines (scales A, B, C, D, E, F, G, H, K, N, T)*

BS EN ISO 6508-3, *Metallic materials – Rockwell hardness test – Part 3: Calibration and reference blocks (scales A, B, C, D, E, F, G, H, K, N, T)*

BS ISO 965-5, *ISO general purpose metric screw threads – Part 5: Tolerances. Limits of sizes for internal screw threads to mate with hot-dip galvanized external screw threads with maximum size of tolerance position h before galvanizing*

3 Information and requirements to be agreed and documented

3.1 Information to be supplied by the purchaser

The following information to be supplied by the purchaser shall be fully documented:

a) general product description, e.g. “Black bolts”, “Screws faced under head only”, “Black nuts”, etc. as appropriate, in accordance with Table 12;

b) the letter “M” indicating that the product is ISO metric;

c) the nominal size (thread diameter) of the product in millimetres;

d) the nominal length in millimetres - this applies only to bolts and screws;

e) the number of this British Standard, i.e. BS 4190;

f) the strength grade symbol;

g) details of the coating (if required), in accordance with the appropriate British Standard (BS EN ISO 4042, BS 7371-6 or BS EN ISO 10684) (see Clause **20**);

h) whether a full-bearing face, is required (see Clause **11**);

i) whether bolts with split pin holes are required (see Clause **13**).

Example

Black bolts 10 mm diameter, 50 mm long, strength grade 4.6, would be designated:

"Black bolts M10 × 50, 4.6 to BS 4190".

Screws faced under head only, 8 mm in diameter, 20 mm long, strength grade 4.8, would be designated:

"Screws faced under head only, M8 × 20, 4.8 to BS 4190".

Black nuts 24 mm in diameter, galvanized, strength grade 4, would be designated:

"Black nuts M24, 4 to BS 4190, galvanized to BS 7371-6".

*NOTE Special requirements not covered by this British Standard are subject to agreement between the purchaser and the manufacturer. The user options referred to in the standard, relating to the thread length (see Clause **8**) and the drilling of split pin holes (see Clause **13**) are set out by the purchaser in their enquiry or order.*

3.2 Items to be agreed between the manufacturer and purchaser

The following items to be agreed between the contracting parties are specified in the clauses referred to and shall be fully documented. For compliance with the standard both the definitive requirements specified throughout the standard and the following documented items shall be satisfied.

a) the tolerances on screw threads (see **7.2**);

b) whether free cutting steel is to be used for the manufacture of nuts (see **17.2**);

c) minimum hardness values for nuts which are not proof load tested (see Clause **18**).

4 General dimensions

The general dimensions and tolerances of bolts, screws and nuts shall be in accordance with Table 1, Table 2, Table 3, Table 4, Table 5, Table 6, Table 7, Table 8 and Table 13a and Table 13b and Clause **4** to Clause **13**.

5 Length of bolts and screws

5.1 Nominal length

The nominal length of the bolts and screws shall be the distance from the underside of the head to the extreme end of the thread, including any chamfer or radius.

NOTE Preferred nominal lengths of bolts and screws, in association with diameters, are given in Table 13a and Table 13b.

5.2 Tolerance on length

The tolerance on the nominal length shall in accordance with Table 1.

Table 1 **Tolerance on nominal lengths of bolts and screws**

Length		Bolts faced under head only or black bolts and screws	Screws faced under head only or bolts faced under head and turned on shank
Over	Up to and including		
mm	mm	mm	mm
10	18	±0.90	±0.55
18	30	±1.05	±0.65
30	50	±1.25	±0.80
50	80	±1.50	±0.95
80	120	±1.75	±1.10
120	180	±2.0	±1.25
180	250	±2.30	±1.45
250	315	±2.60	±1.60
315	400	±2.85	±1.80
400	500	±3.15	±2.00

6 Ends of bolts and screws

The ends of bolts and screws shall be finished with either a 45° chamfer to a depth slightly exceeding the depth of the thread or with a radius approximately equal to one and a quarter times the nominal diameter of the shank; the choice of method being left to the manufacturer.

When bolts are made with rolled threads, the lead formed at the end of the bolt or screw by the thread rolling operation provides the necessary chamfer to the end so no other machining operation is necessary, and the end shall be reasonably square with the centre line of the shank. (See Figure 1 and Figure 2).

Figure 1 **Rounded end**

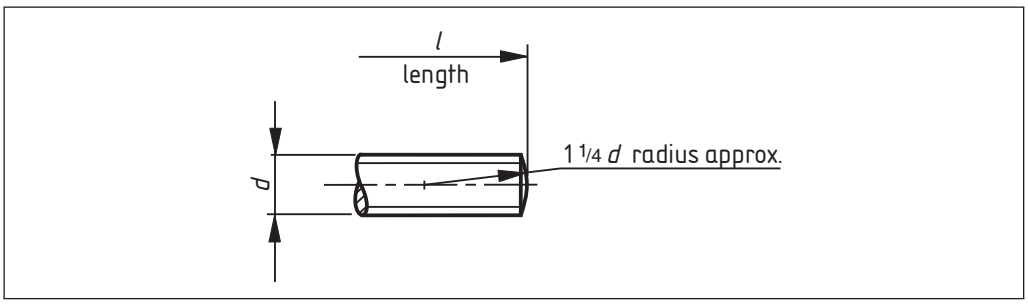
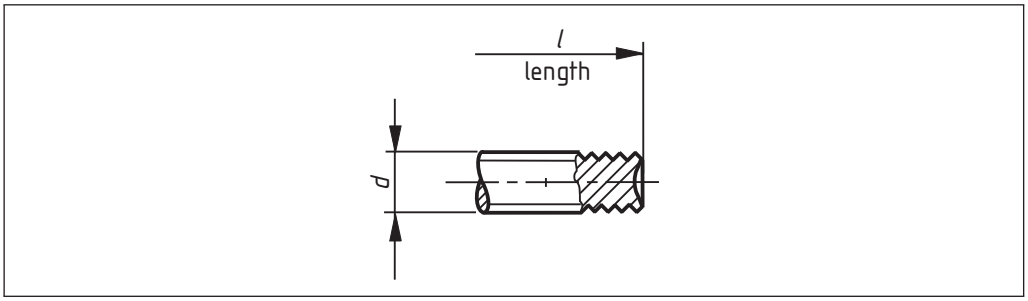


Figure 2 **Rolled thread end**



7 Screw threads

7.1 General

The form of thread, diameters and associated pitches of standard ISO metric bolts, screws and nuts shall be in accordance with BS 3643-1.

NOTE Only coarse pitch series threads are specified in this British Standard.

7.2 Tolerances

The tolerances on the screw threads shall be in accordance with BS 3643-2, as detailed in Table 2.

Table 2 **Thread tolerance classes**

Product	Tolerance class
Black bolts Black screws	8g
Bolts faced under head only Screws faced under head only	6g
Bolts faced under head and turned on shank Nuts (black or faced)	7H
Nuts (used with galvanized bolts)	6AZ (in accordance with BS ISO 965-5)

8 Length of thread on bolts and screws

8.1 Bolts

8.1.1 The length of thread on bolts shall be the distance from the end of the bolt (including any chamfer or radius) to the leading face of a screw ring gauge that has been screwed as far as possible on to the bolt by hand (see Figure 3).

8.1.2 The standard thread lengths shall be in accordance with Table 3.

8.1.3 The length of thread runout shall not exceed the values given in Table 4.

8.1.4 In order to provide for structural applications, particularly shear connections where the thread is not allowed in the shear plane, bolts in the diameter range M12 to M30 inclusive up to 125 mm nominal length may alternatively have a shorter thread length, equal to 1½ *d*, if this is specified in the purchaser's enquiry and order.

Table 3 **Thread lengths**

Nominal length of bolt ***l***	**Length of thread** ***b***
Up to and including 125 mm	2d +6 mm
Over 125 mm up to and including 200 mm	2d +12 mm
Over 200 mm	2d +25 mm

Table 4 **Thread runout (bolts) and underhead distance (screws)**

Dimensions in mm

Nominal size and thread diameter ***d***	**Thread runout on bolts** ***a***	**Distance of ring gauge from underside of head on screws**
	max.	**max.**
5	2	3
M6	2.5	4
M8	3	4.5
M10	3.5	5
M12	4	6
M16	5	7.5
M20	6	9
(M22)	6	9
M24	7	11
(M27)	7	11
M30	8	12
(M33)	8	12
M36	10	15
(M39)	10	15
M42	11	16
(M45)	11	16
M48	12	18
(M52)	12	18
M56	19	20
(M60)	19	20
M64	21	22
(M68)	21	22

NOTE Sizes in brackets are non-preferred.

8.1.5 Bolts that are too short for minimum thread lengths shall be threaded as screws and shall be designated screws.

NOTE Guidance in this respect is given in Table 13a and Table 13b.

8.1.6 The tolerances on bolt thread lengths shall be plus two pitches for all diameters.

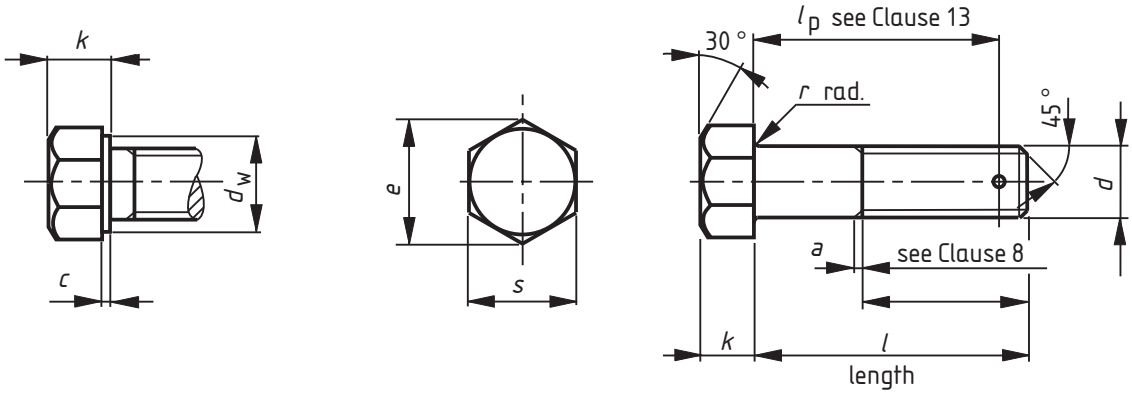
8.2 Screws

Screws (see Figure 4) shall be threaded to permit a screw ring gauge being screwed by hand to within a distance from the underside of the head in accordance with the values given in Table 4.

9 Dimensions of bolts and screws

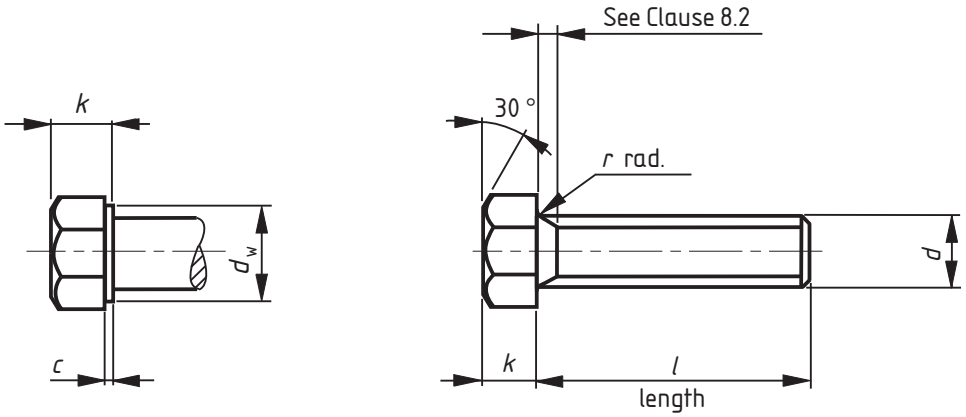
The dimensions of bolts and screws are in Table 5 and Table 6. Figure 3 and Figure 4 give the explanation for those dimensions.

Figure 3 **Hexagon head bolt**



NOTE Bolts with washer face c may be provided as an alternative to a plain bearing face.

Figure 4 **Hexagon head screw**



NOTE Bolts with washer face c may be provided as an alternative to a plain bearing face.

Table 5 **Dimensions of ISO metric black hexagon head bolts and screws** *(1 of 2)*

Dimensions in mm

1	2	3	4	5	6	7	8	9	10	11	12	13
Nominal size and thread diameter *d*	Pitch of thread (coarse pitch series)	Diameter of unthreaded shank *d*		Width across flats *s*		Width across corners *e*		Height of head *k*		Radius *r*	Washer face dia. (see note 2) *dw*	Depth of washer face *c*
		max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
M5	0.8	5.48	4.52	8.00	7.64	9.2	8.63	3.88	3.13	0.35	6.8	0.5
M6	1	6.48	5.52	10.00	9.64	11.5	10.89	4.38	3.63	0.40	8.7	0.5
M8	1.25	8.58	7.42	13.00	12.57	15.0	14.20	5.88	5.13	0.8	11.5	0.6
M10	1.5	10.58	9.42	17.00	16.57	19.6	18.72	7.45	6.55	0.8	15.5	0.6
M12	1.75	12.70	11.30	19.00	18.48	21.9	20.88	8.45	7.55	1.25	17.2	0.6
M16	2	16.70	15.30	24.00	23.16	27.7	26.17	10.45	9.55	1.25	22.0	0.8
M20	2.5	20.84	19.16	30.00	29.16	34.6	32.95	13.90	12.10	1.78	27.7	0.8
(M22)	2.5	22.84	21.16	32.00	31.00	36.9	35.03	14.90	13.10	1.78	–	–
M24	3	24.84	23.16	36.00	35.00	41.6	39.55	15.90	14.10	1.78	33.2	0.8
(M27)	3	27.84	26.16	41.00	40.00	47.3	45.20	17.90	16.10	2.28	–	–
M30	3.5	30.84	29.16	46.00	45.00	53.1	50.85	20.05	17.95	2.28	42.7	0.8
(M33)	3.5	34.00	32.00	50.00	49.00	57.7	55.37	22.05	19.95	2.28	–	–
M36	4	37.00	35.00	55.00	53.80	63.5	60.79	24.05	21.95	2.7	51.1	0.8
(M39)	4	40.00	38.00	60.00	58.80	69.3	66.44	26.05	23.95	2.7	–	–
M42	4.5	43.00	41.00	65.00	63.80	75.1	72.09	27.05	24.95	2.8	60.8	1.0
(M45)	4.5	46.00	44.00	70.00	68.80	80.8	77.74	29.05	26.95	3.3		
M48	5	49.00	47.00	75.00	73.80	86.6	83.39	31.05	28.95	3.8	70.8	1.0
(M52)	5	53.20	50.80	80.00	78.80	92.4	89.04	34.25	31.75	4.7	–	–
M56	5.5	57.20	54.80	85.00	83.60	98.1	94.47	36.25	33.75	4.9	–	–
(M60)	5.5	61.20	58.80	90.00	88.60	103.9	100.12	39.25	36.75	4.9	–	–
M64	6	65.20	62.80	95.00	93.60	109.7	105.77	41.25	38.75	4.9	–	–
(M68)	6	69.20	62.80	100.00	98.60	115.5	111.42	44.25	41.75	4.9	–	–

Table 5 **Dimensions of ISO metric black hexagon head bolts and screws** *(2 of 2)*

Dimensions in mm

1	2	3	4	5	6	7	8	9	10	11	12	13
Nominal size and thread diameter ***d***	**Pitch of thread (coarse pitch series)**	**Diameter of unthreaded shank**		**Width across flats**		**Width across corners**		**Height of head**		**Radius**	**Washer face dia. (see note 2)**	**Depth of washer face**
		d		***s***		***e***		***k***		***r***	***dw***	***c***
		max.	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**

NOTE 1 Size in brackets are non-preferred.

NOTE 2 Calculations of washer face diameters for other sizes may be obtained from the following formulae:

1) for sizes up to and including M20:
washer face diameter (min.) = $s_{min.}$ – IT16;

2) for sizes over M20:

washer face diameter (min.) = $s_{min.}$ – IT17;

where IT stands for standard tolerance, and belongs to the ISO series of tolerances (see BS EN ISO 286-1 and BS EN ISO 286-2).

Table 6 **Dimensions of ISO metric hexagon head bolts and screws faced under head or faced under head and turned on shank**

Dimensions in mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nominal size and thread diameter *d*	Pitch of thread (coarse pitch series)	Diameter of unthreaded shank *d*				Width across flats *s*		Width across corners *e*		Height of head *k*		Radius under head *r*	
		Faced under head		Faced under head and turned on shank									
		max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.
M6	1	6.48	5.52	6.00	5.82	10.00	9.64	11.5	10.89	4.24	3.76	0.4	0.25
M8	1.25	8.58	7.42	8.00	7.78	13.00	12.57	15.0	14.20	5.74	5.26	0.8	0.4
M10	1.5	10.58	9.42	10.00	9.78	17.00	16.57	19.6	18.72	7.29	6.71	0.8	0.4
M12	1.75	12.70	11.30	12.00	11.73	19.00	18.48	21.9	20.88	8.29	7.71	1.25	0.6
M16	2	16.70	15.30	16.00	15.73	24.00	23.16	27.7	26.17	10.29	9.71	1.25	0.6
M20	2.5	20.84	19.16	20.00	19.67	30.00	29.16	34.6	32.95	13.35	12.65	1.78	0.8
(M22)	2.5	22.84	21.16	22.00	21.67	32.00	31.00	36.9	35.03	14.35	13.65	1.78	0.8
M24	3	24.84	23.16	24.00	23.67	36.00	35.00	41.6	39.55	15.35	14.65	1.78	0.8
(M27)	3	27.84	26.16	27.00	26.67	41.00	40.00	47.3	45.20	17.35	16.65	2.28	1.0
M30	3.5	30.84	29.16	30.00	29.7	46.00	45.00	53.1	50.85	19.42	18.58	2.28	1.0
(M33)	3.5	34.00	32.00	33.00	32.61	50.00	49.00	57.7	55.37	21.42	20.58	2.28	1.0
M36	4	37.00	35.00	36.00	35.61	55.00	53.80	63.5	60.79	23.42	22.58	2.7	1.0
(M39	4	40.00	38.00	39.00	38.61	60.00	58.80	69.3	66.44	25.42	24.58	2.7	1.0
M42	4.5	43.00	41.00	42.00	41.61	65.00	63.80	75.1	72.09	26.42	25.58	2.8	1.2
(M45)	4.5	46.00	44.00	45.00	44.61	70.00	68.80	80.8	77.74	28.42	27.58	3.3	1.2
M48	5.0	49.00	47.00	48.00	47.61	75.00	73.80	86.6	83.39	30.42	29.58	3.8	1.6
(M52)	5.0	53.20	50.80	52.00	51.54	80.00	78.80	92.4	89.04	33.50	32.50	4.7	1.6
M56	5.5	57.20	54.80	56.00	55.54	85.00	83.60	98.1	94.47	35.50	34.50	4.9	2.0
(M60)	5.5	61.20	58.80	60.00	59.54	90.00	88.60	103.9	100.12	38.50	37.50	4.9	2.0
M64	6	65.20	62.80	64.00	63.54	95.00	93.60	109.7	105.77	40.50	39.50	4.9	2.0
(M68)	6	69.20	66.80	68.00	67.54	100.00	98.60	115.5	111.42	43.50	42.50	4.9	2.0

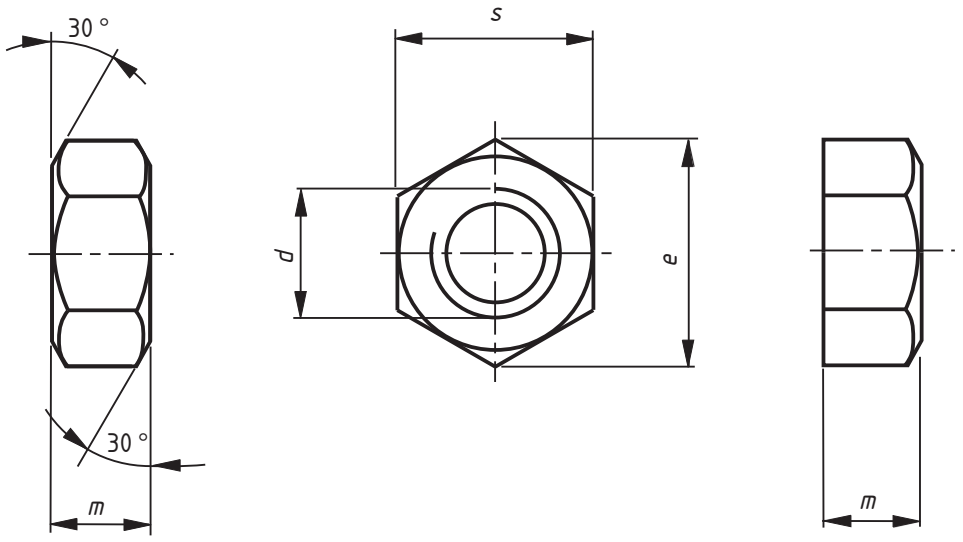
NOTE Sizes in brackets are non-preferred.

10 Dimensions of nuts

10.1 Normal thickness and thin nuts

Figure 5 and Figure 6 show the symbols used in Table 7 for nut dimensions.

Figure 5 **Alternative types of normal thickness nut**



NOTE These alternative methods of finishing the lower face of the nut are associated both with the nominal size and the particular method of manufacture. A request by the purchaser for a specific type of finish limits the manufacturing processes available.

Figure 6 **Thin nut**

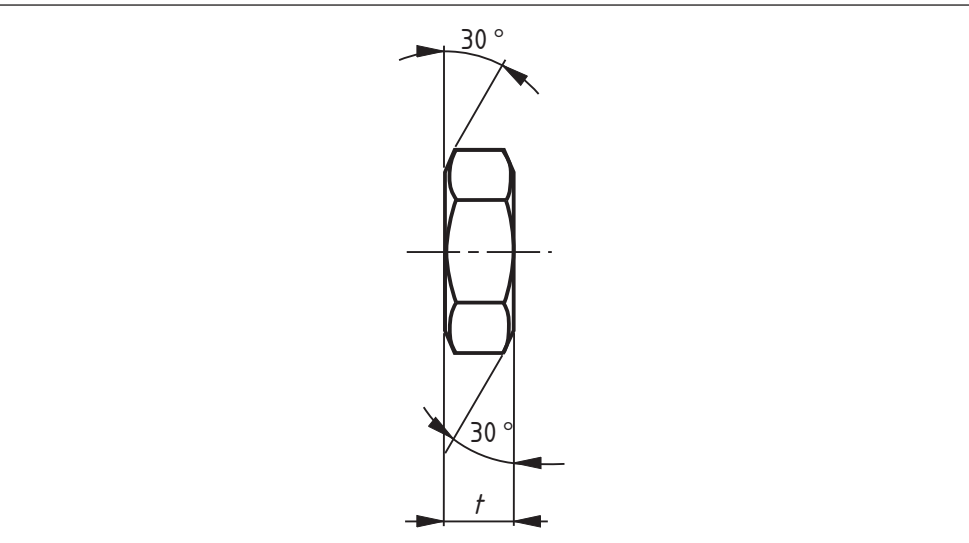


Table 7 **Dimensions of ISO metric hexagon nuts and hexagon thin nuts**

Dimensions in mm

1	2	3	4	5	6	7	8	9	10	11	12
Nominal size and thread diameter *d*	**Pitch of thread (coarse pitch series)**	**Width across flats** *s*		**Width across corners** *e*		**Thickness of nut** *m*				**Thickness of thin nut (faced both sides)** *t*	
						Black		**Faced on one side**			
		max.	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**
M5	0.8	8.00	7.64	9.20	8.63	4.38	3.63	4.0	3.52	–	–
M6	1	10.00	9.64	11.50	10.89	5.38	4.63	5.00	4.52	–	–
M8	1.25	13.00	12.57	15.00	14.20	6.88	6.13	6.50	5.92	5.00	4.52
M10	1.5	17.00	16.57	19.60	18.72	8.45	7.55	8.00	7.42	6.00	5.52
M12	1.75	19.00	18.48	21.90	20.88	10.45	9.55	10.00	9.42	7.00	6.42
M16	2	24.00	23.16	27.70	26.17	13.55	12.45	13.00	12.30	9.00	8.42
M20	2.5	30.00	29.16	34.60	32.95	16.55	15.45	16.00	15.30	9.00	8.42
(M22)	2.5	32.00	31.00	36.90	35.03	18.55	17.45	18.00	17.30	10.00	9.42
M24	3	36.00	35.00	41.60	39.55	19.65	18.35	19.00	18.16	10.00	9.42
(M27)	3	41.00	40.00	47.30	45.20	22.65	21.35	22.00	21.16	12.00	11.30
M30	3.5	46.00	45.00	53.10	50.85	24.65	23.35	24.00	23.16	12.00	11.30
(M33)	3.5	50.00	49.00	57.70	55.37	26.65	25.35	26.00	25.16	14.00	13.30
M36	4	55.00	53.80	63.50	60.79	29.65	28.35	29.00	28.16	14.00	13.30
(M39)	4	60.00	58.80	69.30	66.44	31.80	30.20	31.00	30.00	16.00	15.30
M42	4.5	65.00	63.80	75.10	72.09	34.80	33.20	34.00	33.00	16.00	15.30
(M45)	4.5	70.00	68.80	80.80	77.74	36.80	35.20	36.00	35.00	18.00	17.30
M48	5	75.00	73.80	86.60	83.39	38.80	37.20	38.00	37.00	18.00	17.30
(M52)	5	80.00	78.80	92.40	89.04	42.80	41.20	42.00	41.00	20.00	19.16
M56	5.5	85.00	83.60	98.10	94.47	45.80	44.20	45.00	44.00	–	–
(M60)	5.5	90.00	88.60	103.90	100.12	48.80	47.20	48.00	47.00	–	–
M64	6	95.00	93.60	109.70	105.77	51.95	50.05	51.00	49.80	–	–
(M68)	6	100.00	98.60	115.50	111.42	54.95	53.05	54.00	52.80	–	–

NOTE Sizes in brackets are non-preferred.

10.2 Squareness of thread to face

10.2.1 The bearing surface of unmachined (black) nuts shall be square to the axis of the thread of the nuts ±2°.

10.2.2 The bearing surface of machined nuts shall be square to the axis of the thread of the nuts ±1°.

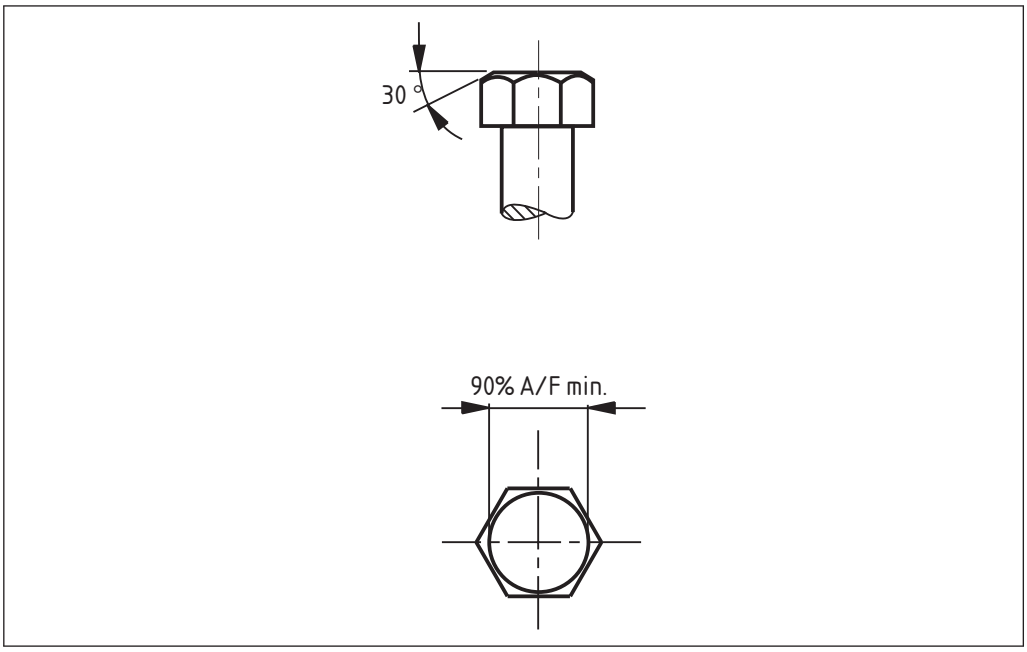
11 Chamfering and facing

11.1 Bolts and screws

Bolt and screw heads shall be chamfered at an angle of approximately 30° on their upper faces. The diameter of the ring formed by the chamfer on the upper face of the bolt or screw head shall be not less than 90% of the minimum across flats dimension (see Figure 7). The lower or bearing face shall be machined if specified by the purchaser.

NOTE A washer face may be provided at the option of the manufacturer.

Figure 7 **Head chamfering**



11.2 Nuts

Hexagon nuts shall be chamfered at an angle of approximately 30°, on either one or both faces. The diameter of the ring formed by the chamfer on the nut shall be not less than 90% of the minimum across flats dimension in an identical manner to that of a bolt head (see Figure 7). The nuts shall be machined on the bearing side unless they specifically state that nuts are to be "full bearing" or "double chamfered" in their order or enquiry (see Figure 5).

11.3 Thin nuts

Thin nuts shall be chamfered at an angle of approximately 30° on both faces (see Figure 6). The diameter of the ring formed by the chamfer shall not be smaller than 90% of the minimum across flats dimension. Thin nuts shall be machined on both faces.

12 Diameter of shank of bolt

12.1 The diameter of the unthreaded portion of the shank of the bolts shall be in accordance with the dimensions given in columns 3 and 4 of Table 5 for black bolts, columns 3 and 4 of Table 6 for bolts faced under head and columns 5 and 6 of Table 6 for bolts faced under head and turned on shank.

12.2 The unthreaded portion of the shank on bolts shall not be machined unless required by the purchaser in their order.

13 Drilled bolts and split pin holes

13.1 Bolts with split pin holes shall be supplied only when ordered by the purchaser.

NOTE The purchaser usually states, in the enquiry and order, dimension l_p, as illustrated in Figure 3. Table 8 gives the tolerance dimension on l_p.

13.2 The split pin holes shall be drilled through the centre of the bolt, perpendicular to the axis as specified in BS EN ISO 1234.

Table 8 **Split pin holes**

Nominal size and thread diameter *d*	**Tolerance on dimension l_p (see Figure 3)** mm	
M5	–0	+0.8
M6	–0	+0.8
M8	–0	+0.8
M10	–0	+0.8
M12	–0	+0.8
M16	–0	+1.2
M20	–0	+1.2
(M22)	–0	+1.2
M24	–0	+1.2
(M27)	–0	+1.6
M30	–0	+1.6
M33	–0	+1.6
M36	–0	+1.6
M39	–0	+1.6
M42	–0	+1.6
M45	–0	+1.6
M48	–0	+1.6
M52	–0	+1.6
M56	–0	+1.6
M60	–0	+1.6
M64	–0	+1.6
(M68)	–0	+1.6

NOTE 1 Sizes in brackets are non-preferred.

NOTE 2 For information, refer to BS EN ISO 1234.

14 Material and manufacture of steel bolts and screws

Bolts and screws shall be produced by either cold forging or hot forging. The choice of method of manufacture is at the option on the manufacturer.

For the material types and their strength grades, refer to BS EN ISO 898-1:2013, Table 2.

15 Mechanical properties of bolts and screws

15.1 Steel bolts and screws shall meet the requirements for mechanical properties given in BS EN ISO 898-1:2013 Table 3 for property class 4.6, 4.8, 6.8, 8.8 or 10.9 as appropriate.

15.2 Mechanical testing shall be in accordance with BS EN ISO 898-1:2013, Clause **7**.

16 Strength grade designation system for steel nuts

The strength grade designation system for steel nuts shall be a number, which is one-hundredth of the specified proof load stress in MPa.

NOTE 1 The proof load stress corresponds to the nominal tensile strength of the highest grade of bolt, stud or screw with which the nut can be used (see Table 9).

NOTE 2 The mechanical properties of steel nuts are given in Table 14. It is recommended that the grades of nut to be used with each grade of bolt or screw should be as shown in Table 10.

Table 9 **Strength grade designations for steel nuts**

Strength grade designation	4	6	8	10	12
Proof load stress MPa	400	600	800	1 000	1 200

Table 10 **Recommended bolt and nut combinations**

Grade of bolt	4.6	4.8	6.8	8.8	8.8 [A)]	10.9	10.9 [A)]
Recommended grade of nut	4	4	6	8	10	10	12

[A)] When a thick protective coating is applied to a bolt of grade 8.8 or 10.9, which requires the nut thread to be overtapped, the next higher grade of nut should be used.

NOTE 1 The nuts in Table 7 are at least 10% lower in height than ISO metric "Regular" nuts, in BS EN ISO 4032, for example. Therefore they are not capable of withstanding the same tensile loads without the risk of thread stripping (see also Foreword).

NOTE 2 Nuts of higher strength grade may be substituted for nuts of lower strength grade.

17 Material and manufacture of steel nuts

17.1 Method of production

Steel nuts shall be produced by either cold forging, hot forging or by turning from bar. The choice of method of manufacture is left to the manufacturer.

17.2 Chemical composition

The chemical compositions of the steels from which nuts are made shall conform to those given in Table 15.

NOTE The use of free-cutting steels at temperatures above 250 °C is not recommended. Free-cutting steel may be used where permitted in Table 15 , or otherwise by special agreement between the purchase and the supplier.

17.3 Heat treatment

Nuts shall be heat-treated where necessary to obtain the mechanical properties given in Clause **18**.

18 Mechanical properties of steel nuts (excluding thin nuts)

The mechanical properties of steel nuts (excluding thin nuts) shall be in accordance with Table 14. The nuts shall withstand the proof load stress given in Table 16 when tested in accordance with Annex A. Nuts that are exempt from proof testing shall have a hardness not less than the minimum agreed between the purchaser and the supplier and not more than the maximum given in Table 14. The tests shall be made in accordance with Annex A.

19 Marking and identification

19.1 Bolts and screws

Marking of bolts and screws shall be in accordance with BS EN ISO 898-1:2013, Clause **10**.

19.2 Nuts

Marking of nuts shall be with the strength grade designation between two vertical bars as shown in Table 11.

Table 11 **Nut marking**

Strength grade designation	8	10	12
Marking symbol	|8|	|10|	|12|

20 Finishes

The bolts, screws and nuts shall be cleanly finished, sound and free from defects.

NOTE 1 Table 12 gives the alternative categories of product finishes covered in this British Standard.

NOTE 2 If the bolts, screws or nuts are to be coated, the type of coating should be stated in the enquiry and order. Where possible, reference should be made to the appropriate British Standard (BS EN ISO 4042, BS 7371-6 or BS EN ISO 10684).

Table 12 **Product categories**

Non-machined products (finished black all over)	Partially machined products
Black bolts	Bolts faced under head only
	Bolts faced under head and turned on shank
Black screws	Screws faced under head only
Black nuts	Nuts faced on bearing face only
	Thin nuts (faced both sides)

21 Inspection and testing

*COMMENTARY ON Clause **21***

If the purchaser requires that the manufacturer demonstrates that the bolts, screws and nuts conform to this British Standard, testing and further inspection may be agreed between the purchaser and the manufacturer.

Tests for mechanical properties shall be in accordance with BS EN ISO 898-1:2013 for bolts and screws and Annex A for nuts.

Table 13a **Standard nominal lengths and preferred sizes of ISO metric black hexagon bolts and screws (12 to 180 *l*)**

Nominal size and thread diameter	Standard nominal lengths *l*																										
d	12	14	16	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	130	140	150	160	170	180
M5	**X**	**X**	**X**	**X**	X	X	X	X	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M6	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	—	—	—
M8	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	—	—	—
M10	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M12	—	—	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M16	—	—	—	—	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M20	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(M22)	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M24	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(M27)	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X
M30	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X	X	X
(M33)	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X	X
M36	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X	X
(M39)	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X	X
M42	—	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X
(M45)	—	—	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X	X
M48	—	—	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X	X
(M52)	—	—	—	—	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X
M56	—	—	—	—	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X
M60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X
M64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X
(M68)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X

NOTE 1 Bolded symbols screws only.

NOTE 2 Sizes shown in brackets are non-preferred.

NOTE 3 The inclusion of dimensional data in this British Standard is not intended to imply that all of the products described are stock production sizes. The manufacturer should be consulted about lists of stock production sizes.

Table 13b **Standard nominal lengths and preferred sizes of ISO metric black hexagon bolts and screws (200 to 500 *l*)**

Nominal size and thread diameter	Standard nominal lengths *l*												
d	200	220	240	260	280	300	325	375	400	425	450	475	500
M5	—	—	—	—	—	—	—	—	—	—	—	—	—
M6	—	—	—	—	—	—	—	—	—	—	—	—	—
M8	—	—	—	—	—	—	—	—	—	—	—	—	—
M10	—	—	—	—	—	—	—	—	—	—	—	—	—
M12	X	X	X	X	X	—	—	—	—	—	—	—	—
M16	X	X	X	X	X	—	—	—	—	—	—	—	—
M20	X	X	X	X	X	—	—	—	—	—	—	—	—
(M22)	X	X	X	X	X	—	—	—	—	—	—	—	—
M24	X	X	X	X	X	—	—	—	—	—	—	—	—
(M27)	X	X	X	X	X	X	X	X	X	X	X	X	X
M30	X	X	X	X	X	X	X	X	X	X	X	X	X
(M33)	X	X	X	X	X	X	X	X	X	X	X	X	X
M36	X	X	X	X	X	X	X	X	X	X	X	X	X
(M39)	X	X	X	X	X	X	X	X	X	X	X	X	X
M42	X	X	X	X	X	X	X	X	X	X	X	X	X
(M45)	X	X	X	X	X	X	X	X	X	X	X	X	X
M48	X	X	X	X	X	X	X	X	X	X	X	X	X
(M52)	X	X	X	X	X	X	X	X	X	X	X	X	X
M56	X	X	X	X	X	X	X	X	X	X	X	X	X
M60	X	X	X	X	X	X	X	X	X	X	X	X	X
M64	X	X	X	X	X	X	X	X	X	X	X	X	X
(M68)	X	X	X	X	X	X	X	X	X	X	X	X	X

NOTE 1 Sizes shown in brackets are non-preferred.
NOTE 2 The inclusion of dimensional data in this British Standard is not intended to imply that all of the products described are stock production sizes. The manufacturer should be consulted about lists of stock production sizes.

Table 14 **Mechanical properties of steel nuts**

Strength grade designation	4	6	8	10	12	
Proof load stress [A)] MPa	400	600	800	1 000	1 200	[C)]
Brinell hardness (HB) max.	302	302	302	353	375	All nuts
Rockwell hardness [B)] (HRC) max.	30	30	30	36	39	All nuts
Vickers hardness (HV) max.	310	310	310	370	395	All nuts

NOTE For Materials and Mechanical Properties of hexagon bolts and screws, refer to BS EN ISO 898-1.

[A)] The proof load is calculated by multiplying the proof load stress by the tensile stress area of the bolt.

[B)] The conversion from Brinell hardness into Rockwell hardness has been calculated in accordance with BS EN ISO 6506-1 BS EN ISO 6506-2 and BS EN ISO 6506-3, and BS EN ISO 6508-1.

[C)] All nuts other than those exempted by agreement between the purchaser and the manufacturer. Nuts with a specified proof load in excess of 500 000 N (see Table 16) may be exempt from proof load testing. Such nuts shall meet the minimum hardness as agreed between the purchaser and the manufacturer.

Table 15 **Chemical composition of steel nuts**

Strength grade designation	**Chemical composition limits (check analysis)**			
	Carbon max. %	**Manganese min.**	**Phosphorus max.** %	**Sulfur max.** %
4 and 6	0.50	–	0.110	0.150
8	0.58	0.30	0.060	0.150
10	0.58	0.45	0.048	0.058

NOTE 1 Free cutting steel may be used only by agreement between the purchaser and the supplier. In such cases, the following maximum phosphorus, sulfur and lead contents are permissible: phosphorus, 0.12%, sulfur, 0.34%, lead, 0.35%.

*NOTE 2 Alloying elements may be added if necessary to develop the mechanical properties of the nuts stipulated in Clause **18**.*

Table 16 **Proof loads for steel nuts (coarse pitch series)**

Nominal size of nut mm	**Tensile stress area of bolt** mm^2	**Strength grade designation**				
		5	6	8	10	12
		Stress under proof load MPa				
		400	600	800	1 000	1 200
		Proof load N				
M5	14.2	5 680	8 500	11 400	14 800	17 000
M6	20.1	8 040	12 000	16 000	20 000	24 000
M8	36.6	14 600	22 000	29 000	36 500	43 000
M10	58.0	23 200	35 000	46 000	58 000	69 500
M12	84.3	33 700	50 500	67 000	84 000	100 000
M16	157	62 800	94 000	125 000	157 000	188 000
M20	245	98 000	147 000	196 000	245 000	294 000
M22	303	121 000	182 000	242 000	303 000	364 000
M24	353	141 000	212 000	282 000	353 000	423 000
M27	459	184 000	276 000	367 000	459 000	550 000
M30	561	224 000	336 000	448 000	561 000	673 000
M33	694	278 000	416 000	555 000	694 000	833 000
M36	817	327 000	490 000	653 000	817 000	980 000
M39	976	390 000	585 000	780 000	976 000	1 170 000
M42	1 120	448 000	672 000	896 000	1 120 000	1 340 000
M45	1 300	520 000	780 000	1 400 000	1 300 000	1 560 000
M48	1 470	588 000	882 000	1 180 000	1 470 000	1 760 000
M52	1 760	704 000	1 060 000	1 410 000	1 760 000	2 110 000
M56	2 030	812 000	1 220 000	1 620 000	2 030 000	2 440 000
M60	2 360	944 000	1 420 000	1 890 000	2 360 000	2 830 000
M64	2 680	1 072 000	1 610 000	2 140 000	2 680 000	3 220 000
M68	3 060	1 224 000	1 840 000	2 450 000	3 060 000	3 670 000

NOTE 1 Proof load = stress under proof load × tensile stress area divided by 1 000.

NOTE 2 For stress under proof load, see Table 14.

*NOTE 3 Nuts with a specified proof load about 500 000 N may be exempted from proof load testing; see Clause **18** and Table 14.*

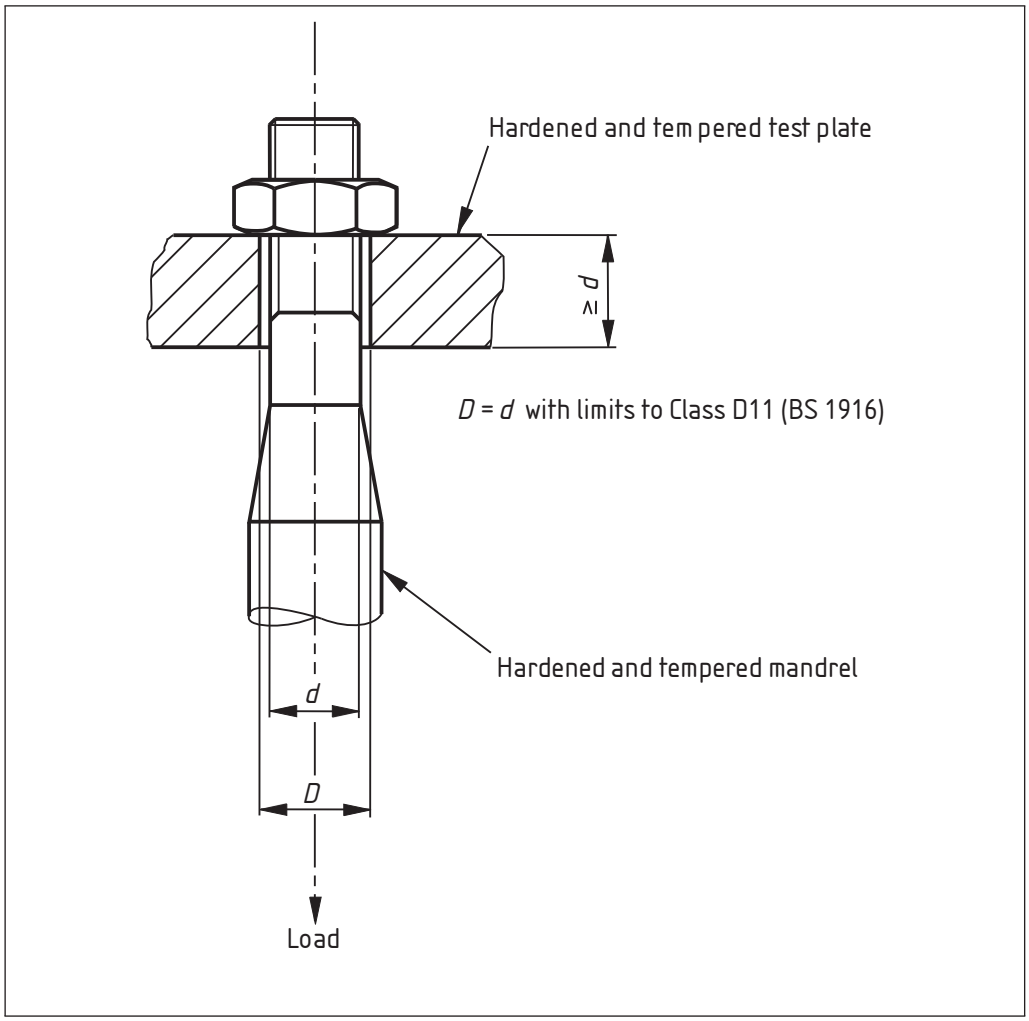
Annex A (normative) Testing of mechanical properties of steel nuts

A.1 Proof load test

A.1.1 The proof load test consists of applying the relevant proof load given in Table 16 which was obtained from the proof load stress given in Table 14.

A.1.2 Assemble the nut to be tested on a hardened and tempered mandrel as shown in Figure A.1 and apply the specified load in an axial direction.

Figure A.1 **Proof load test for nut**



A.1.3 The nut shall withstand this load without failure by stripping or rupture, and shall be removable by hand after the load is released. If the threads of the mandrel are damaged during the test, the test shall be discarded.

NOTE It might be necessary to use a manual wrench to start the nut in motion. Such wrenching is permissible providing it is restricted to a half turn and the nut is then removable by hand after this initial loosening.

A.2 Hardened mandrel

The mandrel shall have a hardness of not less than Rockwell C45. The thread shall be tolerance class 5*h* except that the tolerance on the major diameter shall be the last quarter of the 6*g* range of the minimum material side.

A.3 Hardened test plate

The test plate shall have a hardness of not less than Rockwell C38.

A.4 Hardness test on nuts

A.4.1 Brinell, Rockwell and Vickers hardness may be determined. Apply the impression to the top and bottom face of the nut, otherwise on the side of the nut.

A.4.2 Perform a Brinell hardness test in accordance with BS EN ISO 6506-1, BS EN ISO 6506-2, BS EN ISO 6506-3 and BS EN ISO 6506-4.

A.4.3 Perform a Rockwell hardness test in accordance with BS EN ISO 6508-1, BS EN ISO 6508-2 and BS EN ISO 6508-3.

A.4.4 Perform a Vickers hardness test in accordance with of BS EN ISO 6507-1, BS EN ISO 6507-2, BS EN ISO 6507-3, BS EN ISO 6507-4.

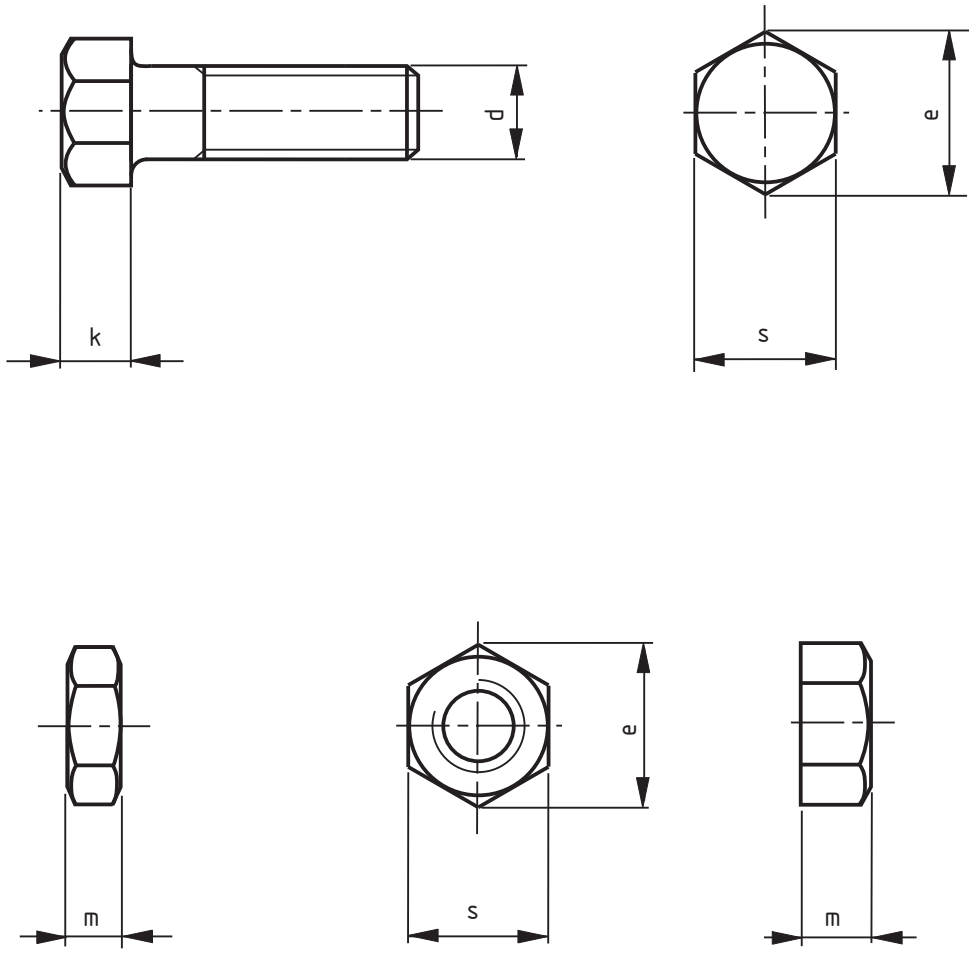
Annex B (normative) Basic dimensions for sizes greater than 68 mm diameter

The range of nominal sizes included in this British Standard is adequate for most of the applications for which this series is employed. However, information on larger sizes is provided in Table B.1.

Table B.1 **Sizes greater than 68 mm diameter**

Nominal size and thread diameter *d*	**Width across flats** *s*		**Width across corners** *e*	**Nominal height of head** *k*	**Nominal thickness of nut** *m*
	max.	min.	min.		
M72	105	103.60	117.07	45	58
(M76)	110	108.60	122.72	48	61
M80	115	113.60	128.37	50	64
(M85)	120	118.60	134.02	54	68
M90	130	128.40	145.09	57	72
(M95)	135	133.40	150.74	60	76
M100	145	143.40	162.04	63	80
(M105)	150	148.40	167.69	66	84
M110	155	153.40	173.34	69	88
(M115)	165	163.40	184.64	72	92
(M120)	170	168.40	190.29	76	96
M125	180	178.40	201.59	79	100
(M130)	185	183.15	206.96	82	104
M140	200	198.15	223.91	88	112
M150	210	208.15	235.21	95	120

Figure B.1 **Sizes greater than 68 mm diameter**



NOTE Symbols in figure correspond to the symbols in column headings of Table B.1.

Annex C (informative)

Manufacturers' recommended range of sizes

NOTE The sizes in Table C.1 and Table C.2 might be revised. The purchaser is advised to consult the supplier concerning current production sizes.

Table C.1 **Hexagon head bolts** *(1 of 2)*

Nominal length mm	**M6**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
20	●	—	—	—	—	—	—
25	●	●	●	●	—	—	—
30	●	●	●	●	○	—	—
35	●	●	●	●	○	○	—
40	●	●	●	●	○	○	—
42	●	●	●	●	○	○	—
50	●	●	●	●	●○	○	—
55	—	—	●	●	●○	○	—
60	●	●	●	●	●○	●○	○
65	—	—	●	●	●○	●○	—

Table C.1 **Hexagon head bolts** *(2 of 2)*

Nominal length mm	M6	M8	M10	M12	M16	M20	M24
70	●	●	●	●	●○	●○	●○
75	—	—	●	●	●○	●○	—
80	●	●	●	●	●○	●○	●○
90	●	●	●	●	●○	●○	●○
100	●	●	●	●	●○	●○	●○
110	—	—	—	●	●○	●○	●
120	—	●	●	●	●	●	●
130	—	—	—	—	●	●	—
140	—	—	—	—	●	●	—
150	—	—	●	●	●	●	●
160	—	—	—	—	—	●	—
180	—	—	—	●	●	●	●
200	—	—	—	●	●	●	●
220	—	—	—	●	●	●	●
260	—	—	—	●	●	●	●
300	—	—	—	●	●	●	●

Key

● = standard thread lengths

○ = short thread lengths

●○ = available in standard and short thread lengths

Table C.2 **Hexagon head screws**

Nominal length	Nominal diameter					
mm	M6	M8	M10	M12	M16	M20
16	●	●	—	—	—	—
20	●	●	●	—	—	—
25	●	●	●	●	—	—
30	●	●	●	●	●	—
35	●	●	●	●	●	●
40	●	●	●	●	●	●
45	●	●	●	●	●	●
50	●	●	●	●	●	●
60	●	●	●	●	●	●
70	●	●	●	●	●	●
80	●	●	●	●	●	●
100	—	—	●	●	●	●

Key

● = standard thread lengths

Annex D (informative) Strength grade designation system for steel bolts and screws

Being in accordance with BS EN ISO 898-1, the strength grade designation system (property class symbol) for steel bolts and screws consists of two numbers separated by a dot. The number to the left of the dot is one hundredth of the nominal tensile strength in MPa, and the number to the right is 10 times the ratio between the nominal yield strength (or nominal stress at permanent set limit, $R_{0.2,\ nom}$) and the nominal tensile strength.

Table D.1 **Strength grade designations of steel bolts and screws**

Strength grade designation	**4.6**	**4.8**	**6.8**	**8.8**	**10.9**
Tensile strength R_m – nominal MPa	400	400	600	800	1000
Yield stress R_e – nominal MPa	240	320	480	–	–
Stress at permanent set limit $R_{0.2}$ MPa	–	–	–	640	900

NOTE Refer to BS EN ISO 898-1 for full details of the range of mechanical property requirements for these strength grades

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN ISO 286-1, *Geometrical product specifications (GPS) – ISO code system for tolerances on linear sizes – Part 1: Basis of tolerances, deviations and fits*

BS EN ISO 286-2, *Geometrical product specifications (GPS) – ISO code system for tolerances on linear sizes – Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts*

BS EN ISO 898-2, *Mechanical properties of fasteners made of carbon steel and alloy steel – Nuts with specified property classes – Part 2: Coarse thread and fine pitch thread*

BS EN ISO 4032, *Hexagon regular nuts (style 1) – Product grades A and B*

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