BS 4933:2010

BSI Standards Publication

Specification for ISO metric black cup and countersunk head bolts and screws with hexagon nuts

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Summary of pages
This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 18, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI and came into effect on 31 December 2010. It was prepared by Technical Committee FME/9, *Fasteners*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 4933:1973, which is withdrawn.

Information about this document

This is a full revision of the standard and introduces the following principal changes.

The range of products specified to this standard has been extended since the first edition was published in 1973; in particular the mechanical property classes to BS EN ISO 898-1 that now include 8.8 and 10.9.

No ISO product standards have been produced for fasteners to this standard.

A major use of some types of fasteners in this standard is in the steel construction industry, where their use might be subject to the requirements of the Construction Products Directive [1]. BS EN 15048 has been written to provide the harmonization requirements for non preloaded structural fasteners and CE marking.

To meet the loadability requirements of BS EN 15048, nuts conforming to BS EN ISO 4032, BS EN ISO 4033 and BS EN ISO 4034 should be used. Requirements are also included for maintaining the loadability requirements when thick protective coatings are applied that need modified thread tolerances for assembly of the bolt and nut combination.

The additional thread diameters M30 and M36, which are commonly used in the steel construction industry, have been included for cup and countersunk bolts and screws in the main dimensional tables.

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.

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.

1 Scope

This British Standard specifies requirements and provides general dimensions and tolerances for the following types of cup head and countersunk head bolts and screws:

- cup head bolts and screws;
- cup head bolts with nibs;
- cup head square neck bolts;
- 90° countersunk head bolts and screws;
- 90° countersunk head bolts with nibs;
- 90° countersunk head square neck bolts;
- 120° countersunk head square neck bolts.

Mechanical properties for steel bolts and screws are specified in BS EN ISO 898-1.

This British Standard also specifies requirements for the nuts to be provided with bolts and screws conforming to this standard.

NOTE 1 A table summarizing the key requirements of BS 4933 is included in Annex A. This table does not list every requirement in BS 4933 but is just intended as a quick reference for users.

NOTE 2 It is considered that the range of nominal sizes included in this standard is adequate for most of the applications for which this series is likely to be employed, but for the convenience of users requiring larger sizes, further information is provided in Annex B.

2 Normative references

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

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

BS 3643-2:2007, *ISO metric screw threads – Part 2: Specification for selected limits of size*

BS 7371 (all parts), *Coatings on metal fasteners*

BS EN 20898-2:1994, ISO 898-2:1992, *Mechanical properties of fasteners – Part 2: Nuts with specified proof load values – Coarse thread*

BS EN 15048-1, *Non-preloaded structural bolting assemblies – Part 1: General requirements*

BS EN 15048-2, *Non-preloaded structural bolting assemblies – Part 2: Suitability test*

BS EN ISO 898-1:2009, *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*

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

BS EN ISO 4033, *Hexagon nuts, style 2 – Product grades A and B*

BS EN ISO 4034, *Hexagon nuts – Product grade C*

BS EN ISO 4753, *Fasteners – Ends of parts with external ISO metric screw thread*

BS EN ISO 4759-1:2001, *Tolerances for fasteners – Part 1: Bolts, screws, studs and nuts – Product grades A, B and C*

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

BS ISO 965-5:1998, *ISO general purpose metric screw threads – Tolerances – Part 5: 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*

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

3 Manufacture and property classes of steel bolts and screws

3.1 General requirements

Products for use in structures that are subject to the Construction Products Directive [1] shall conform to the harmonization and CE marking requirements of BS EN 15048 (both parts) and BS ISO 8992.

3.2 Method of production

At the discretion of the manufacturer, bolts and screws shall be produced by either hot or cold forging.

3.3 Property classes

As specified by the purchaser, the property classes shall be 4.6, 4.8, 8.8 or 10.9, conforming to BS EN ISO 898-1:2009.

4 Mechanical properties of steel bolts and screws

The mechanical properties of steel bolts and screws shall conform to BS EN ISO 898-1.

5 General dimensions and tolerances

For general dimensions, bolts and screws shall conform to Table 2 and Table 5 to Table 11, Clause **6**, Clause **7**, and Clause **8**.

*NOTE Table 5 to Table 11 are after Clause **13** in this standard.*

For tolerances, bolts, screws and nuts shall conform to BS EN ISO 4759-1:2001, product grade C, except for nominal length (*L*), which shall conform to Table 1, and thread tolerance class (for which see **8.2**).

Table 1 **Tolerances on nominal lengths**
Dimensions in millimetres

Length *L*		
Over	**Up to and including**	**Tolerances**
10	18	±0.90
18	30	±1.05
30	50	±1.25
50	80	±1.50
80	120	±1.75
120	180	±2.00
180	250	±2.30
250	315	±2.60
315	400	±2.85
400	500	±3.15

6 Length of bolts and screws

In the case of cup head bolts and screws, the nominal length shall be the distance from the underside of the head to the extreme end of the shank, including any chamfer or radius.

In the case of countersunk head products, the nominal length shall be the distance from the upper face of the head to the extreme end of the shank, including any chamfer or radius.

NOTE Standard nominal lengths are not specified in this standard.

7 Ends of bolts and screws

The following forms of ends of bolts and screws shall be permitted:

- flat point (FL);
- as-rolled end (RL);
- rounded end (RN);
- as specified in BS EN ISO 4753.

The end shall be reasonably square with the centre line of the shank.

8 Screw threads

8.1 General

The form of thread, diameters and associated pitches shall conform to BS 3643-1 and BS 3643-2. Coarse pitch series threads only shall be used.

8.2 Tolerances

For thread tolerance class, self-colour or uncoated bolts and screws shall conform to BS 3643-2:2007, 8g, and nuts shall conform to BS 3643-2:2007, 7H. For bolts, screws and nuts which are galvanized or

sherardized, the nut shall be tapped over-size and it shall conform to BS ISO 965-5:1998, class 6AZ.

For bolts, screws and nuts which have any other coating that requires modification of the thread tolerance for the bolt and nut to assemble when coated, the relevant part of BS 7371 shall be consulted for details on tolerances.

8.3 Length of thread on bolts

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 which has been screwed as far as possible onto the bolt by hand.

The lengths of thread shall be as follows.

- All bolts except cup head square neck bolts: as in Table 2A.
- Cup head square neck bolts: as in Table 2B.

The length of thread run-out on bolts shall be no greater than the values given in Table 3.

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

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

Table 2A **Thread lengths for all bolts except cup head square neck bolts**

Nominal length of bolt	Length of thread
Up to and including 125 mm	2*d* + 6 mm
Over 125 mm up to and including 200 mm	2*d* + 12 mm
Over 200 mm	2*d* + 25 mm
NOTE d is the nominal diameter of the thread.	

Table 2B **Thread lengths for cup head square neck bolts**

Nominal diameter	Nominal length	Length of thread
Up to and including M12	Up to and including 75 mm	The whole of the shank length up to the square neck
	Over 75 mm	As for Table 2A
Over M12	All lengths	As for Table 2A

8.4 Screws

Screws shall be threaded to permit a screw ring gauge to be screwed by hand to within a distance, not exceeding the values given in Table 3, from the underside of the head.

Table 3 **Thread run-out (bolts) and underhead distance (screws)**
Dimensions in millimetres

Nominal size and thread diameter	Thread runout on bolts Max.	Distance of ring gauge from underside of head on screws Max.
M5	2	3
M6	2.5	4
M8	3	4.5
M10	3.5	5
M12	4	6
M16	5	7.5
M20	6	9
M24	7	11
M30	8	12
M36	10	15

9 Nuts

Nuts shall be hexagon style 1 or style 2, conforming to BS EN ISO 4032, BS EN ISO 4033 or BS EN ISO 4034 as appropriate, and shall conform to BS EN 20898-2:1994, property classes 4, 5, 8, 10 or 12.

Nuts conforming to BS EN ISO 4034 may be manufactured to all BS EN 20898-2 property classes except 12; property class 12 shall only be manufactured to BS EN ISO 4033.

Where the nut is tapped over-size (see **8.2**), the next property class up shall be used to maintain assembly strength, e.g. bolt/screw property class 4.6 or 4.8 uses nut property class 8, 8.8 uses 10 and 10.9 uses 12.

NOTE See Table 4 for recommended bolt and nut combinations.

This type of nut shall be provided with the bolts and screws supplied to this standard.

Table 4 **Recommended bolt and nut combinations**

Bolt property class	4.6	4.8	4.6 or 4.8 [A)]	8.8	8.8 [A)]	10.9	10.9 [A)]
Recommended nut property class	4 or 5	4 or 5	8 or 10	8 or 10	10	10 or 12	12

[A)] When a thick protective coating is applied which requires the nut thread to be tapped over-size to 6AZ.

10 Finish

10.1 General

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

10.2 Coated finishes

If the purchaser requires the bolts or screws and nuts to be coated, the type of coating required shall be stated in the enquiry or order.

If the coating is to be hot dip galvanized, it shall conform to BS EN ISO 10684.

NOTE BS 7371, BS EN ISO 4042, BS EN ISO 10683 and BS EN ISO 10684 should be considered when specifying the type of coating required.

11 Marking and identification of bolts and screws

All bolts and screws shall be marked with their property class (i.e. strength grade 4.6, 4.8, 8.8 or 10.9).

The manufacturer's identification or trade mark shall also be marked when the normal production process permits and at the option of the manufacturer.

NOTE 1 See Figure 1 and Figure 2 for examples of marking.

NOTE 2 Additional marking will be necessary if the bolts and screws conform to BS EN 15048-1. See BS EN 15048-1 for details.

Figure 1 **Example of marking of cup head bolts and screws**

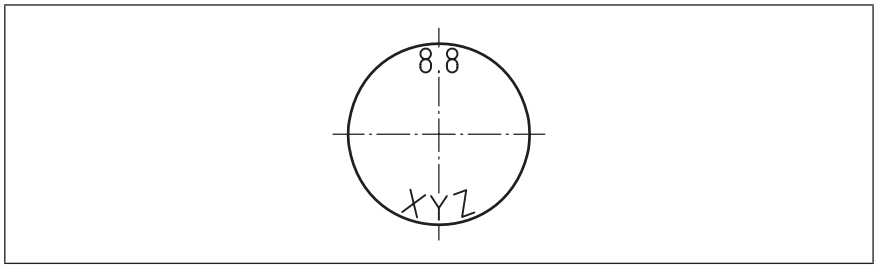
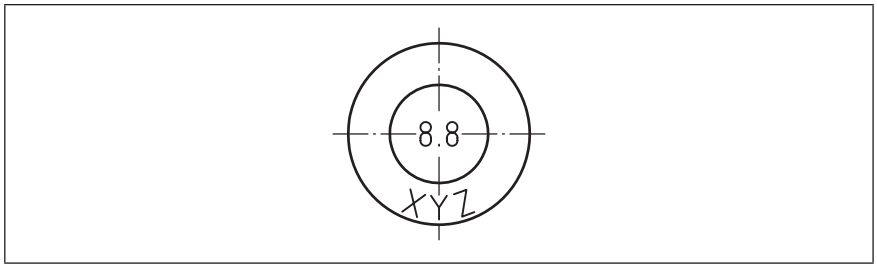


Figure 2 **Example of marking of countersunk head bolts and screws**



12 Inspection and testing

Products for use in structures that are subject to the Construction Products Directive [1] shall be tested and inspected in accordance with BS EN 15048.

NOTE Manufacturers should inform purchasers that if they wish to inspect products for acceptance, they should do so in accordance with BS EN ISO 3269.

13 Complete designation for the purpose of an enquiry or order

13.1 Information to be given

When designating ISO metric black cup and countersunk head bolts and screws with suitable nuts for the purpose of an enquiry or order, the following information shall be given.

a) General product description, e.g. Black cup head square neck bolts as Table 7.

b) The nominal size (thread diameter) of the product in millimetres.

c) The nominal length in millimetres.

d) The number of this British Standard, i.e. BS 4933:2010 [1)].

e) Details of the coating (if required) in accordance with the appropriate British Standard (e.g. BS 7371, BS EN ISO 4042, BS EN ISO 10683 or BS EN ISO 10684).

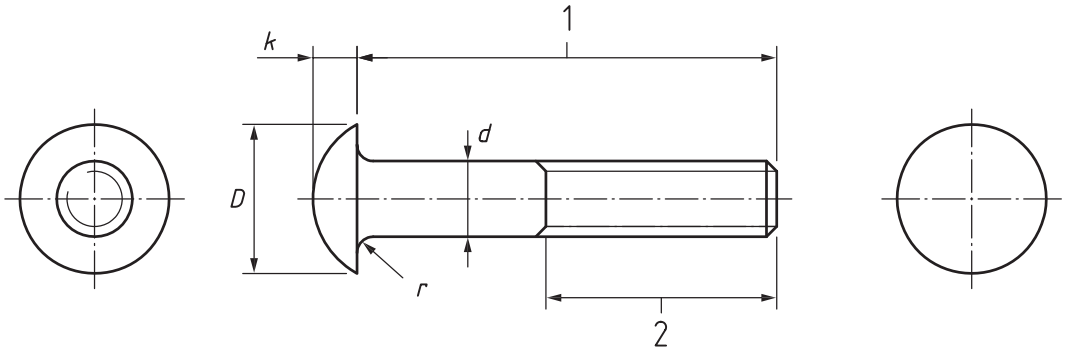
EXAMPLE
Black cup head square neck bolts 10 mm in diameter, 50 mm long, with nuts, would be designated: Black cup square bolts M10 × 50 to BS 4933:2010 with nuts.

13.2 Special requirements or options

Requirements not stated within this standard shall be subject to agreement between the purchaser and the manufacturer.

1) Marking BS 4933:2010 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

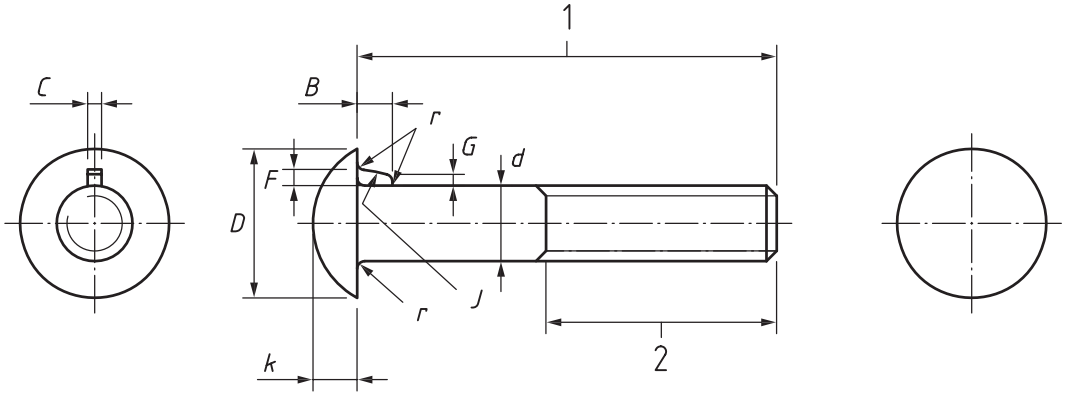
Table 5 **Cup head bolts and screws**
Dimensions in millimetres



Key
1 Length
2 Length of thread

Nominal size and thread diameter	Pitch of thread	Diameter of unthreaded shank *d*		Head diameter *D*		Head thickness *k*		Radius under head *r*
		Max.	Min.	Max.	Min.	Max.	Min.	Max.
M5	0.80	5.48	4.52	11.3	10.2	3.2	2.5	0.5
M6	1.00	6.48	5.52	13.5	12.4	3.6	3.0	0.5
M8	1.25	8.58	7.42	18.0	16.9	4.8	4.0	0.5
M10	1.50	10.58	9.42	22.5	21.2	5.8	5.0	0.5
M12	1.75	12.70	11.30	27.0	25.7	6.8	6.0	1.0
M16	2.00	16.70	15.30	36.0	34.4	8.90	8.0	1.0
M20	2.50	20.84	19.16	45.0	43.4	10.90	10.0	1.0
M24	3.00	24.84	23.16	54.0	52.1	13.10	12.0	1.5
M30	3.50	30.84	29.16	67.5	65.6	16.10	15.0	2.0
M36	4.00	37.00	35.00	81.0	78.8	19.10	18.0	2.0

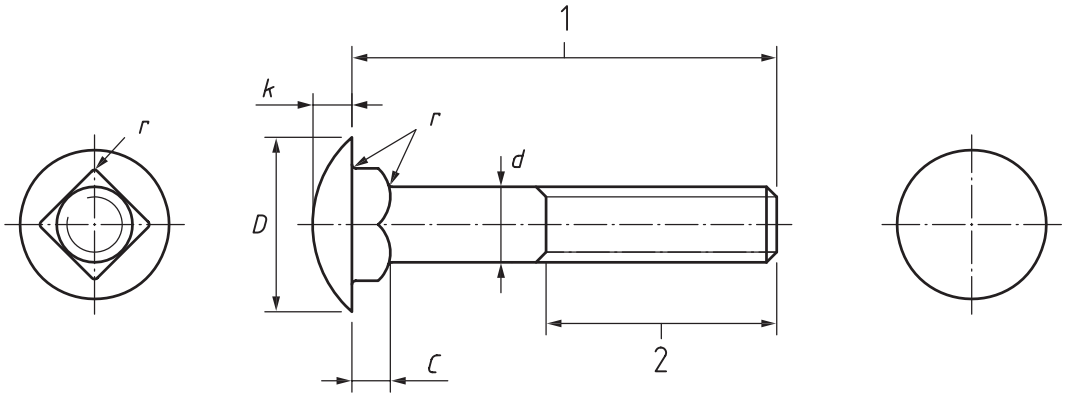
Table 6 **Cup head bolts with nibs**
Dimensions in millimetres



Key
1 Length
2 Length of thread

Nominal size and thread diameter	Pitch of thread	Diameter of unthreaded shank *d*		Head diameter *D*		Head thickness *k*		Radius under head and under nib *r*	Thickness of nib *C*	Length of nib *B*	Height of nib at shank *G*	Height of nib *F*	Radius of nib (Ref. only) *J*
		Max.	Min.	Max.	Min.	Max.	Min.	Max.					
M5	0.8	5.48	4.52	11.3	10.2	3.1	2.5	0.5	1.3	2.5	0.6	1.3	6
M6	1.0	6.48	5.52	13.5	12.4	3.6	3.0	0.5	1.5	3.0	0.8	1.5	8
M8	1.25	8.58	7.42	18.0	16.9	4.8	4.0	0.5	2.0	4.0	1.0	2.0	10
M10	1.5	10.58	9.42	22.5	21.2	5.8	5.0	0.5	2.5	5.0	1.3	2.5	13
M12	1.75	12.70	11.30	27.0	25.7	6.8	6.0	1.0	3.0	6.0	1.5	3.0	15
M16	2.0	16.70	15.30	36.0	34.4	8.9	8.0	1.0	4.0	8.0	2.0	4.0	20
M20	2.5	20.84	19.16	45.0	43.4	10.9	10.0	1.0	5.0	10.0	2.5	5.0	25
M24	3.0	24.84	23.16	54.0	52.1	13.1	12.0	1.5	6.0	12.0	3.0	6.0	30

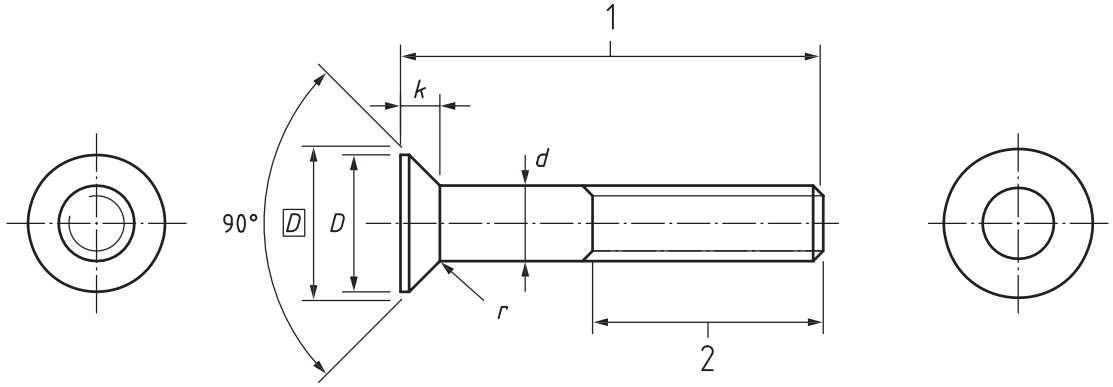
Table 7 **Cup head square neck bolts**
Dimensions in millimetres



Key
1 Length
2 Length of thread

Nominal size and thread diameter	Pitch of thread	Diameter of unthreaded shank and width across flats of square neck *d*		Head diameter *D*		Head thickness *k*		Length of square neck *C*		Radius under head and at corners and end of square neck *r*
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
M5	0.80	5.48	4.52	11.3	10.2	3.1	2.5	3.10	2.5	0.5
M6	1.00	6.48	5.52	13.5	12.4	3.6	3.0	3.60	3.0	0.5
M8	1.25	8.58	7.42	18.0	16.9	4.8	4.0	4.75	4.0	0.5
M10	1.50	10.58	9.42	22.5	21.2	5.8	5.0	5.75	5.0	0.5
M12	1.75	12.70	11.30	27.0	25.7	6.8	6.0	6.75	6.0	1.0
M16	2.00	16.70	15.30	36.0	34.4	8.9	8.0	8.90	8.0	1.0
M20	2.50	20.84	19.16	45.0	43.4	10.9	10.0	10.90	10.0	1.0
M24	3.00	24.84	23.16	54.0	52.1	13.1	12.0	13.10	12.0	1.5

Table 8 **90° countersunk head bolts and screws**
Dimensions in millimetres

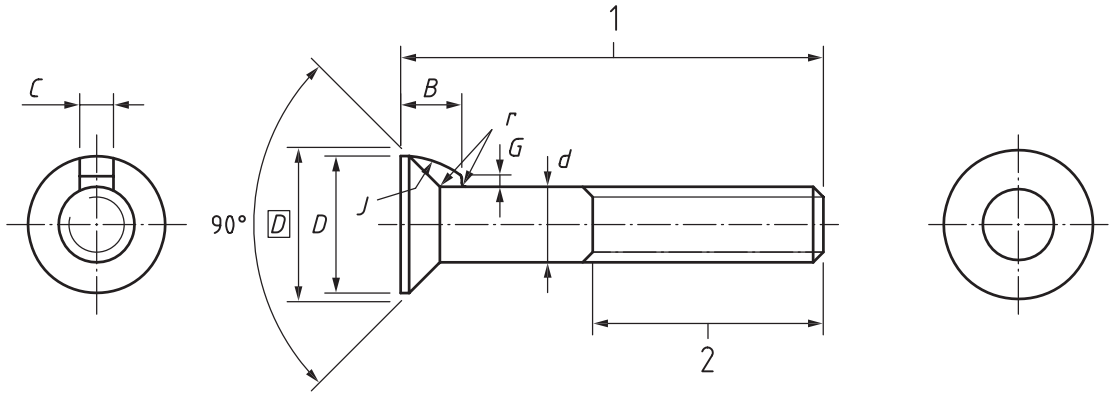


Key
1 Length
2 Length of thread

Nominal size and thread diameter	Pitch of thread	Diameter of unthreaded shank		Head diameter		Head thickness		Radius under head
		d		[*D*]	*D*	*k*		*r*
		Max.	Min.	Max. theoretical sharp	Min.	Max.	Min.	Max.
M5	0.80	5.48	4.52	10	8.5	2.8	2.2	0.5
M6	1.00	6.48	5.52	12	10.2	3.3	2.7	0.5
M8	1.25	8.58	7.42	16	13.6	4.38	3.63	0.5
M10	1.50	10.58	9.42	20	17.0	5.38	4.63	0.5
M12	1.75	12.70	11.30	24	20.4	6.38	5.63	1.0
M16	2.00	16.70	15.30	32	27.2	8.45	7.55	1.0
M20	2.50	20.84	19.16	40	34.0	10.75	9.25	1.0
M24	3.00	24.84	23.16	48	40.8	12.9	11.1	1.5
M30	3.50	30.84	29.16	60	51.0	15.9	14.1	2.0
M36	4.00	37.00	35.00	72	61.2	18.9	17.1	2.0

NOTE A feature to prevent rotation of the bolt or screw during tightening, such as a screwdriver slot, can be formed in the bolt or screw head; the form of the feature is at the choice of the manufacturer and/or purchaser. The feature should not reduce the loadability of the bolt or screw when subject to an axial tensile stress. See BS EN ISO 898-1 for further guidance.

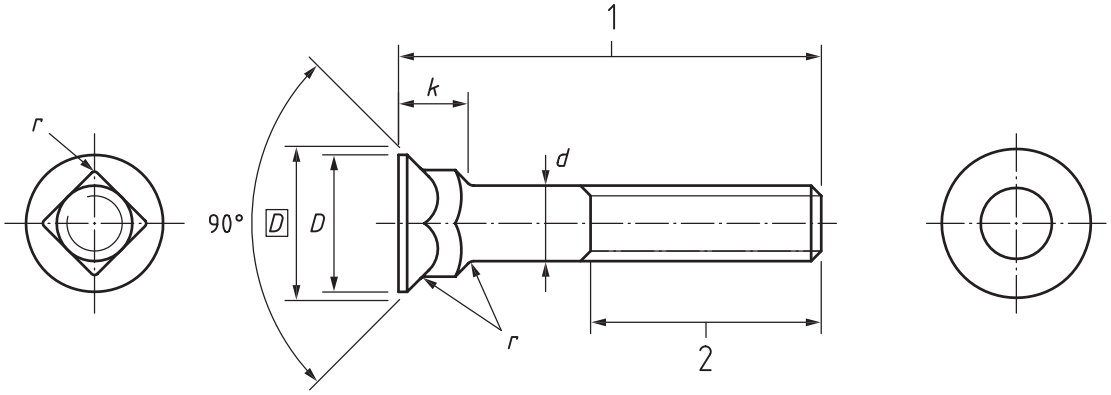
Table 9 **90° countersunk head bolts with nibs**
Dimensions in millimetres



Key
1 Length
2 Length of thread

Nominal size and thread diameter	Pitch thread	Diameter of unthreaded shank		Head diameter		Radius under head, and under nib	Thickness of nib	Length of nib	Height of nib	Radius of nib (Ref. only)
		d		*D*	*D*	*r*	*C*	*B*	*G*	*J*
		Max.	Min.	Max. theoretical sharp	Min.					
M5	0.80	5.48	4.52	10	8.5	0.5	1.3	3.2	0.6	4
M6	1.00	6.48	5.52	12	10.2	0.5	1.50	3.8	0.8	5
M8	1.25	8.58	7.42	16	13.6	0.5	2.00	5.0	1.0	6
M10	1.50	10.58	9.42	20	17.0	0.5	2.50	6.3	1.3	8
M12	1.75	12.70	11.30	24	20.4	1.0	3.00	7.5	1.5	10
M16	2.00	16.70	15.30	32	27.2	1.0	4.00	10.0	2.0	13
M20	2.50	20.84	19.16	40	34.0	1.0	5.00	12.5	2.5	16
M24	3.00	24.84	23.16	48	40.8	1.5	6.00	15.0	3.0	20

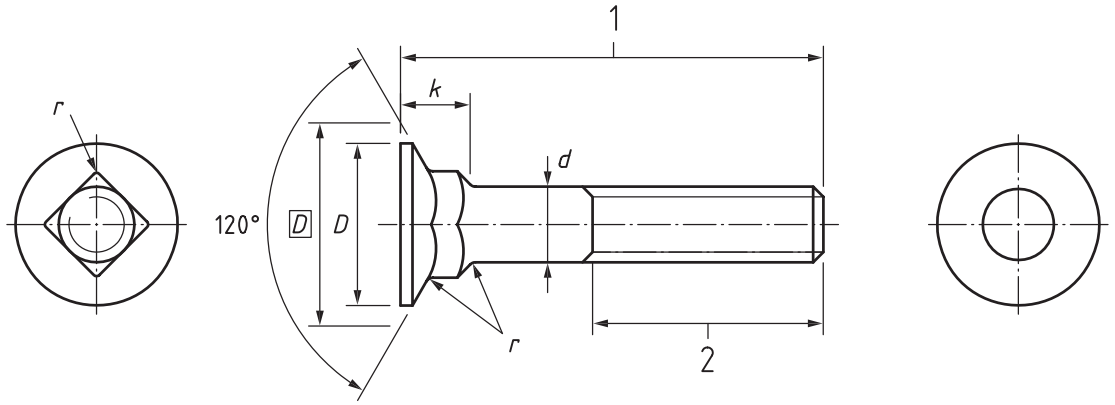
Table 10 **90° countersunk head square neck bolts**
Dimensions in millimetres



Key
1 Length
2 Length of thread

Nominal size and thread diameter	Pitch of thread	Diameter of unthreaded shank and width across flats of square neck *d*		Head diameter		Combined length of square neck and head thickness *k*		Radius under head, at corners and at the end of square neck *r*
				D	*D*			
		Max.	Min.	Max. theoretical sharp	Min.	Max.	Min.	Max.
M5	0.80	5.48	4.52	10	8.5	4.75	4.0	0.5
M6	1.00	6.48	5.52	12	10.2	5.75	5.0	0.5
M8	1.25	8.58	7.42	16	13.6	7.90	7.0	0.5
M10	1.50	10.58	9.42	20	17.0	9.40	8.5	0.5
M12	1.75	12.70	11.30	24	20.4	10.90	10.0	1.0
M16	2.00	16.70	15.30	32	27.2	14.10	13.0	1.0
M20	2.50	20.84	19.16	40	34.0	18.10	17.0	1.0
M24	3.00	24.84	23.16	48	40.8	21.30	20.0	1.5

Table 11 **120° countersunk head square neck bolts**
Dimensions in millimetres



Key

1 Length

2 Length of thread

Nominal size and thread diameter	Pitch of thread	Diameter of unthreaded shank and width across flats of square neck *d*		Head diameter		Length of square neck and head thickness *k*		Radius under head, at corners and at the end of square neck *r*
				D	*D*			
		Max.	Min.	Max. theoretical sharp	Min.	Max.	Min.	Max.
M5	0.8	5.48	4.52	11.25	8.65	4.25	3.5	0.5
M6	1.0	6.48	5.52	13.50	10.38	4.75	4.0	0.5
M8	1.25	8.58	7.42	18.00	13.84	6.25	5.5	0.5
M10	1.5	10.58	9.42	22.50	17.30	7.90	7.0	0.5
M12	1.75	12.70	11.30	27.00	20.76	9.4	8.5	1.0
M16	2.0	16.70	15.30	36.00	27.68	12.1	11.0	1.0
M20	2.5	20.84	19.16	45.00	34.60	15.1	14.0	1.0
M24	3.0	24.84	23.16	54.00	41.52	17.6	16.5	1.5

Annex A (informative) Summary of requirements

Table A.1 gives a summary of the key requirements and standards needed to comply with BS 4933.

Table A.1 **Summary of requirements for bolts, screws and nuts**

Requirements			BS 4933 clause
Material		Steel	—
General requirements (bolts and screws)		BS ISO 8992 and/or BS EN 15048 for CE marked bolts and screws	**3**
Thread (bolts and screws)	Tolerance	8g[A)] (BS 3643-2:2007)	**8.2**
Mechanical properties (bolts and screws)	Property classes	4.6, 4.8, 8.8 or 10.9 (BS EN ISO 898-1:2009)	**3** and **4**
Tolerances (bolts, screws and nuts)	Product grade	C (BS EN ISO 4759-1:2001), except nominal length (*L*): B (Table 1)	**5**
Surface finish[B)] (bolts, screws and nuts)	Normal	As processed[C)]	**10.2**
	Hot dip galvanized	BS EN ISO 10684	**10.2**
	Others	To be agreed[D)]	**10.2**
Associated nuts	Nuts[E)]	Hexagon style 1 or style 2 (BS EN ISO 4032, BS EN ISO 4033 and BS EN ISO 4034)	**9**
	Property classes	4, 5, 8, 10 or 12 (BS EN 20898-2:1994)	**9**
	Thread tolerance	7H or 6AZ[F)] (BS 3643-2:2007 or BS ISO 965-5:1998)	**8.2**
Inspection and testing		BS EN 15048 (only applies to CE marked products)	**12**

A) The tolerance class specified applies before hot dip galvanizing or coating with any thick protective coating.

B) Attention is drawn to the need to consider the risk of hydrogen embrittlement in the case of bolts of property class 10.9 when selecting an appropriate surface treatment process.

C) "As processed" means the normal finish resulting from manufacture with a light coating of oil.

D) Other coatings may be negotiated between the purchaser and manufacturer provided they do not impair the mechanical properties or the functional characteristics. Coatings of cadmium or cadmium alloy are not permitted.

E) BS EN ISO 4034 may be manufactured to all property classes except 12; property class 12 is only to be manufactured to BS EN ISO 4033.

F) The nuts of any assembly coated with hot dip galvanizing or any other thick coating are to be tapped over-size to permit the assembly of the bolt and nut. When tapped over-size, the next higher grade of nut is to be used to maintain the loadability requirements of BS EN 15048.

Annex B (informative) Formulae for basic dimensions of products greater than 24 mm diameter

Table B.1 gives formulae for basic dimensions of products greater than 24 mm diameter.

Table B.1 **Formulae for basic dimensions of products greater than 24 mm diameter**
Dimensions in millimetres

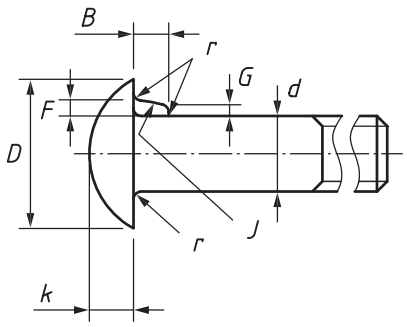
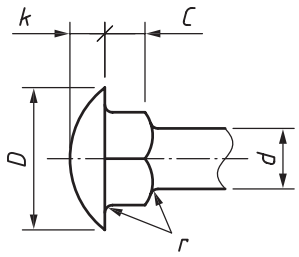
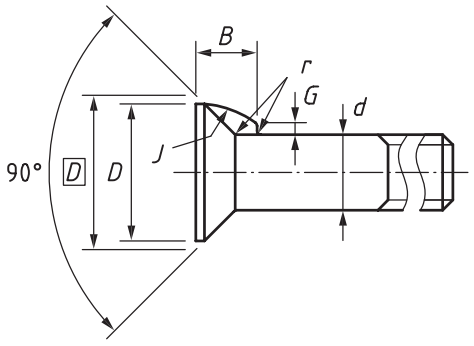
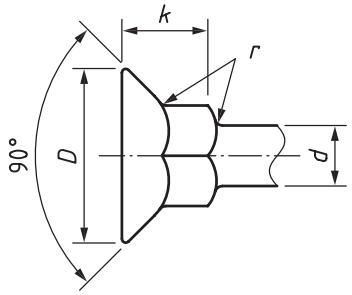
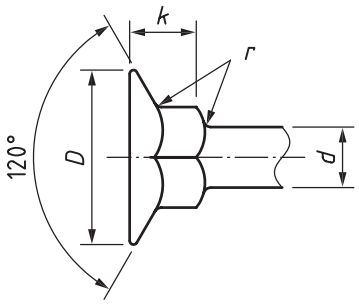
	Nominal diameter = *d* Dimensions: • *D* = 2.25 × *d* (max.) and (2.25 × *d*) – h16 (min.) • *k* = 0.5 × *d* (min.) and (0.5 × *d*) + 1T16 (max.) • *B* = 0.5 × *d* • *F* = 0.25 × *d* • *G* = 0.125 × *d* • *J* = 1.25 × *d* • *r* = as in DIN 603 Nib thickness: *C* = 0.25 × *d*
	Nominal diameter = *d* Dimensions: • *D* = 2.25 × *d* (max.) and (2.25 × *d*) – h16 (min.) • *k* = 0.5 × *d* (min.) and (0.5 × *d*) + 1T16 (max.) • *C* = 0.5 × *d* (min.) and (0.5 × *d*) + 1T16 (max.) • *r* = as in DIN 603
	Nominal diameter = *d* Dimensions: • *B* = 0.625 × *d* • *D* = 2 × *d* (max.) and 1.7 × *d* (min.) • *G* = 0.125 × *d* • *J* = 0.8 × *d* • *r* = as in DIN 603 Nib thickness: *C* = 0.25 × *d*
	Nominal diameter = *d* Dimensions: • *k* = 0.83 × *d* (min.) to nearest 0.5 mm and (0.83 × *d*) + 1T16 (max.) • *D* = 2 × *d* (max.) and 1.7 × *d* (min.) • *r* = as in DIN 603

Table B.1 **Formulae for basic dimensions of products greater than 24 mm diameter** *(continued)*
Dimensions in millimetres

	Nominal diameter = d Dimensions: k = 0.69 × d (min.) and (0.69 × d) + 1T16 (max.) D = 2.25 × d (max.) and 1.73 × d (min.) r = as in DIN 603

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 3269, *Fasteners – Acceptance inspection*

BS EN ISO 4042, *Fasteners – Electroplated coatings*

BS EN ISO 10683, *Fasteners – Non-electrolytically applied zinc flake coatings*

DIN 603, *Mushroom head square neck bolts*

Other publications

[1] EUROPEAN COMMUNITIES. 89/106/EEC. Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products. Luxembourg: Office for Official Publications of the European Communities, 1988.

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