BS EN ISO 7046-2:2011

BSI Standards Publication

Countersunk flat head screws (common head style) with type H or type Z cross recess — Product grade A

Part 2: Steel screws of property class 8.8, stainless steel screws and non-ferrous metal screws (ISO 7046-2:2011)

National foreword

This British Standard is the UK implementation of EN ISO 7046-2:2011. It supersedes BS EN ISO 7046-2:1995 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee FME/9/3, Fasteners - Product Standards.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Date	Text affected

EUROPEAN STANDARD

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EN ISO 7046-2

September 2011

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Supersedes EN ISO 7046-2:1994

English Version

Countersunk flat head screws (common head style) with type H or type Z cross recess - Product grade A - Part 2: Steel screws of property class 8.8, stainless steel screws and non-ferrous metal screws (ISO 7046-2:2011)

Vis à métaux à tête fraisée à empreinte cruciforme de type H ou de type Z - Grade A - Partie 2: Vis en acier de classe de qualité 8.8, vis en acier inoxydable et vis en métaux non ferreux (ISO 7046-2:2011)

Senkschrauben (Einheitskopf) mit Kreuzschlitz Form H oder Form Z - Produktklasse A - Teil 2: Stahl mit Festigkeitsklasse 8.8, nichtrostender Stahl und Nichteisenmetalle (ISO 7046-2:2011)

This European Standard was approved by CEN on 8 August 2011.

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Ref. No. EN ISO 7046-2:2011: E

Foreword

This document (EN ISO 7046-2:2011) has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 “Fasteners” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2012, and conflicting national standards shall be withdrawn at the latest by March 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 7046-2 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 11, *Fasteners with metric external thread*.

This second edition cancels and replaces the first edition (ISO 7046-2:1990), of which it constitutes a minor revision.

ISO 7046 consists of the following parts, under the general title *Countersunk flat head screws (common head style) with type H or type Z cross recess — Product grade A*:

— *Part 1: Steel screws of property class 4.8*

— *Part 2: Steel screws of property class 8.8, stainless steel screws and non-ferrous metal screws*

Introduction

The penetration depth of cross recesses for countersunk flat head screws is intended to satisfy two requirements, which act in opposite directions for a given head dimension.

Firstly, there is the requirement for sufficient head strength to attain the proof and breaking loads of the respective property class. A shallow cross recess increases the head strength. On the other hand, it is necessary for the wrench ability of the screw to be satisfactory; this can only be achieved by a sufficiently deep cross recess.

ISO 7721-2 was developed in order to find a compromise which, as far as possible, would meet both requirements.

ISO 7721-2 specifies deep cross recesses for countersunk head screws of low strength: a good wrench ability is achieved and the head strength is still sufficient. This execution is used in ISO 7046-1 (see the Foreword).

For screws of higher strength, sufficient head strength can only be attained by a shallower penetration depth of the cross recesses. If such screws also require good wrench ability, then, under the conditions of the common head style, it is necessary for a shoulder to be provided under the head, in addition to the larger penetration depth, in order to guarantee sufficient head strength. This part of ISO 7046 covers both possibilities.

This compromise, which unfortunately results in different, but interchangeable, types of cross-recessed flat countersunk head screws, is the only way of reaching an agreement at the international level.

INTERNATIONAL STANDARD **ISO 7046-2:2011(E)**

Countersunk flat head screws (common head style) with type H or type Z cross recess — Product grade A —

Part 2:
Steel screws of property class 8.8, stainless steel screws and non-ferrous metal screws

1 Scope

This part of ISO 7046 specifies the characteristics of recessed countersunk flat head screws with threads M2 up to and including M10, of grade A and of property class 8.8 for steel, A2-70 for stainless steel and CU2 and CU3 for non-ferrous metals.

If, in special cases, specifications other than those listed in this part of ISO 7046 are required, they can be selected from existing International Standards, for example ISO 261, ISO 888, ISO 898-1, ISO 965-2, ISO 3506-1, ISO 4759-1 and ISO 8839.

2 Normative references

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

ISO 225, *Fasteners — Bolts, screws, studs and nuts — Symbols and descriptions of dimensions*

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

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

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

ISO 3269, *Fasteners — Acceptance inspection*

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

ISO 4042, *Fasteners — Electroplated coatings*

ISO 4757, *Cross recesses for screws*

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 7721-2, *Countersunk flat head screws — Part 2: Penetration depth of cross recesses*

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

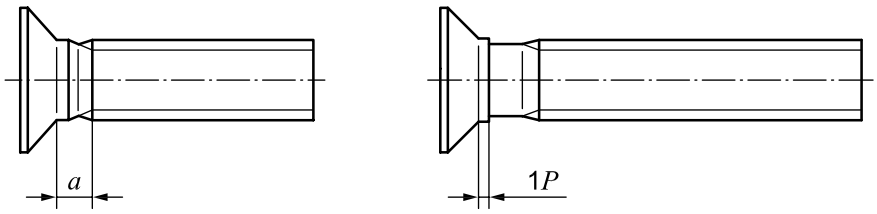
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

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

3 Dimensions

See Figures 1, 2 and 3 and Table 1. Symbols and descriptions of dimensions are specified in ISO 225.

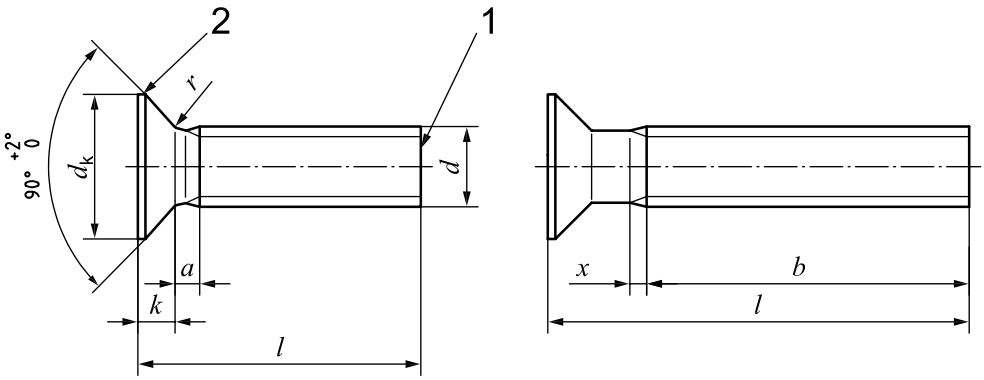
The shank diameter is approximately equal to the pitch diameter or equal to the permissible major thread diameter.



$a_{max} = 2{,}5P$

NOTE For other dimensions, see Figures 2 and 3.

Figure 1 — Screw with underhead shoulder for penetration depth series 1 — Deep



$a_{max} = 2P$

Key

1 as-rolled end

2 edge (rounded or flat)

Figure 2 — Screw without underhead shoulder for penetration depth series 2 — Shallow

a) Type H **b) Type Z**

Figure 3 — Cross recess

Table 1 — Dimensions

Dimensions in millimetres

Thread, d					**M2**	**M2,5**	**M3**	**(M3,5)**[a]	**M4**	**M5**	**M6**	**M8**	**M10**
P[b]					0,4	0,45	0,5	0,6	0,7	0,8	1	1,25	1,5
b				min.	25	25	25	38	38	38	38	38	38
d_k[c]		Theoretical		max.	4,4	5,5	6,3	8,2	9,4	10,4	12,6	17,3	20
		Actual		max.	3,8	4,7	5,5	7,3	8,4	9,3	11,3	15,8	18,3
				min.	3,5	4,4	5,2	6,9	8,0	8,9	10,9	15,4	17,8
k				max.	1,2	1,5	1,65	2,35	2,7	2,7	3,3	4,65	5
r				max.	0,5	0,6	0,8	0,9	1	1,3	1,5	2	2,5
x				max.	1	1,1	1,25	1,5	1,75	2	2,5	3,2	3,8
Cross recess	Series 1[d] (deep)	Type H	Recess no.		0	1		2			3	4	
			m	ref.	1,9	2,9	3,2	4,4	4,6	5,2	6,8	8,9	10
			Penetration depth	min.	0,9	1,4	1,7	1,9	2,1	2,7	3,0	4,0	5,1
				max.	1,2	1,8	2,1	2,4	2,6	3,2	3,5	4,6	5,7
		Type Z	Recess no.		0	1		2			3	4	
			m	ref.	1,9	2,8	3	4,1	4,4	4,9	6,6	8,8	9,8
			Penetration depth	min.	0,95	1,48	1,76	1,75	2,06	2,60	3,00	4,15	5,19
				max.	1,20	1,73	2,01	2,20	2,51	3,05	3,45	4,60	5,64
	Series 2[d] (shallow)	Type H	Recess no.		0	1		2			3	4	
			m	ref.	1,9	2,7	2,9	4,1	4,6	4,8	6,6	8,7	9,6
			Penetration depth	min.	0,9	1,25	1,4	1,6	2,1	2,3	2,8	3,9	4,8
				max.	1,2	1,55	1,8	2,1	2,6	2,8	3,3	4,4	5,3
		Type Z	Recess no.		0	1		2			3	4	
			m	ref.	1,9	2,5	2,8	4	4,4	4,6	6,3	8,5	9,4
			Penetration depth	min.	0,95	1,22	1,48	1,61	2,06	2,27	2,73	3,87	4,78
				max.	1,20	1,47	1,73	2,05	2,51	2,72	3,18	4,32	5,23

Table 1 (*continued*)

Dimensions in millimetres

Thread, d			**M2**	**M2,5**	**M3**	**(M3,5)**	**M4**	**M5**	**M6**	**M8**	**M10**
l^{ae}											
nom.	min.	max.									
3	2,8	3,2									
4	3,76	4,24									
5	4,76	5,24									
6	5,76	6,24									
8	7,71	8,29	Range								
10	9,71	10,29									
12	11,65	12,35									
(14)	13,65	14,35				of					
16	15,65	16,35									
20	19,58	20,42									
25	24,58	25,42						preferred			
30	29,58	30,42									
35	34,5	35,5									
40	39,5	40,5									
45	44,5	45,5								lengths	
50	49,5	50,5									
(55)	54,05	55,95									
60	59,05	60,95									

a Sizes in brackets should be avoided if possible.

b P is the pitch of the thread.

c See ISO 7721.

d In accordance with ISO 7721-2.

e Screws with nominal lengths above the bold, discontinuous line are threaded up to the head; $b = l - (k + a)$.

4 Specifications and reference International Standards

See Table 2.

Table 2 — Specifications and reference International Standards

Material		Steel	Stainless steel	Non-ferrous metal
Thread	Tolerance class	6g		
	International Standard	ISO 261, ISO 965-2		
Mechanical property	Property class	8.8	A2-70	CU2, CU3[a]
	International Standard	ISO 898-1	ISO 3506-1	ISO 8839
Tolerance	Product grade	A		
	International Standard	ISO 4759-1		
Cross recess	International Standard	ISO 4757		
Finish — Coating		As processed		
		Requirements for electroplating are specified in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683.	Requirements for passivation are specified in ISO 16048.	Requirements for electroplating are specified in ISO 4042.
		Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.		
Surface integrity		Limits for surface discontinuities are specified in ISO 6157-1 and ISO 6157-3.		
Acceptability		Acceptance inspection is specified in ISO 3269.		

[a] At the manufacturer's discretion.

5 Designation

EXAMPLE 1 A cross-recessed countersunk flat head screw, with thread M5, nominal length $l = 20$ mm, property class 8.8 and cross recess type Z, penetration depth series 1 or 2 at the manufacturer's discretion is designated as follows:

Countersunk head screw ISO 7046-2 - M5 × 20 - 8.8 - Z

EXAMPLE 2 If, in special cases, one of the two series is wanted, the number of the series should be included in the designation as follows:

Countersunk head screw ISO 7046-2 - M5 × 20 - 8.8 - Z1

Bibliography

[1] ISO 888, *Bolts, screws and studs — Nominal lengths, and thread lengths for general purpose bolts*

[2] ISO 7721, *Countersunk head screws — Head configuration and gauging*

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