

# INTERNATIONAL STANDARD

# ISO 7046-2

First edition  
1990-10-15

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## Cross recessed countersunk flat head screws (common head style) — Grade A —

### Part 2 :

Steel of property class 8.8, stainless steel and non-ferrous metals

*Vis à métaux à tête fraisée à empreinte cruciforme — Grade A —*

*Partie 2 : Acier de classe de qualité 8.8, acier inoxydable et métaux non ferreux*



Reference number  
ISO 7046-2 : 1990 (E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

International Standard ISO 7046-2 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

ISO 7046 consists of the following parts, under the general title *Cross recessed countersunk flat head screws (common head style) — Grade A*:

- *Part 1: Steel of property class 4.8 (future revision of ISO 7046 : 1983)*
- *Part 2: Steel of property class 8.8, stainless steel and non-ferrous metals*

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## Introduction

### Penetration depths of cross recesses for countersunk flat head screws

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

First, 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, the wrenchability of the screw should 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 wrenchability is achieved and the head strength is still sufficient. This execution will be 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 wrenchability, then, under the conditions of the common head style, a shoulder has 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 at the moment the only way of reaching an agreement at the international level.

# Cross recessed countersunk flat head screws (common head style) — Grade A —

## Part 2 :

## Steel of property class 8.8, stainless steel and non-ferrous metals

### 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 International Standard are required, they shall be selected from existing International Standards, for example ISO 261, ISO 888, ISO 898-1, ISO 965-2, ISO 3506, ISO 4759-1, ISO 8839.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7046. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7046 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 261 : 1973, *ISO general purpose metric screw threads — General plan.*

ISO 888 : 1976, *Bolts, screws and studs — Nominal lengths, and thread lengths for general purpose bolts.*

ISO 898-1 : 1988, *Mechanical properties of fasteners — Part 1: Bolts, screws and studs.*

ISO 965-2 : 1980, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose bolt and nut threads — Medium quality.*

ISO 3269 : 1988, *Fasteners — Acceptance inspection.*

ISO 3506 : 1979, *Corrosion-resistant stainless steel fasteners — Specifications.*

ISO 4042 : 1989, *Threaded components — Electroplated coatings.*

ISO 4757 : 1983, *Cross recesses for screws.*

ISO 4759-1 : 1978, *Tolerances for fasteners — Part 1: Bolts, screws and nuts with thread diameters  $\geq 1,6$  and  $\leq 150$  mm and product grades A, B and C.*

ISO 6157-1 : 1988, *Fasteners — Surface discontinuities — Part 1: Bolts, screws and studs for general requirements.*

ISO 6157-3 : 1988, *Fasteners — Surface discontinuities — Part 3: Bolts, screws and studs for special requirements.*

ISO 7721 : 1983, *Countersunk head screws — Head configuration and gauging.*

ISO 7721-2 : 1990, *Countersunk flat head screws — Part 2: Penetration depth of cross recesses.*

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

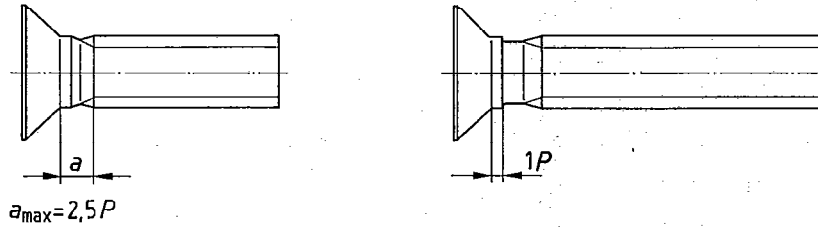
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### 3 Dimensions

See figures 1, 2 and 3, and table 1.

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

NOTE — Symbols and designations of dimensions are specified in ISO 225.



NOTE — For other dimensions see figures 2 and 3.

Figure 1 — Screw with underhead shoulder for penetration depth series 1 (deep)

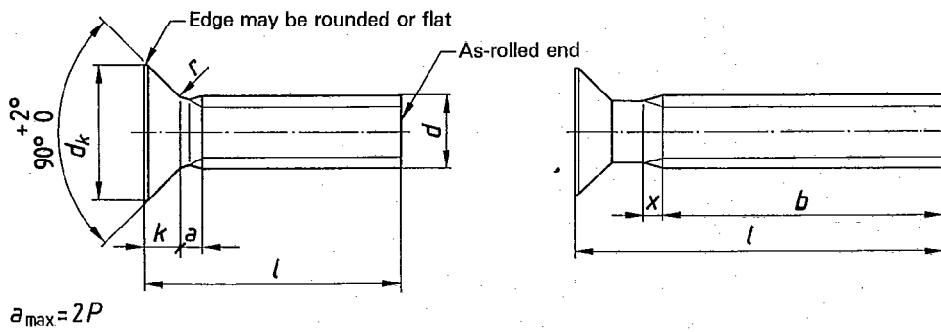


Figure 2 — Screw without underhead shoulder for penetration depth series 2 (shallow)



Figure 3 — Cross recess

Table 1

Dimensions in millimetres

Thread (d)			M2	M2,5	M3	(M3,5) <sup>1)</sup>	M4	M5	M6	M8	M10		
<i>p</i> <sup>2)</sup>			0,4	0,45	0,5	0,6	0,7	0,8	1	1,25	1,5		
<i>b</i>		min.	25	25	25	38	38	38	38	38	38		
<i>d<sub>k</sub></i>	theoretical <sup>3)</sup>	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		
<i>k</i>		max.	1,2	1,5	1,65	2,35	2,7	2,7	3,3	4,65	5		
<i>r</i>		max.	0,5	0,6	0,8	0,9	1	1,3	1,5	2	2,5		
<i>x</i>		max.	1	1,1	1,25	1,5	1,75	2	2,5	3,2	3,8		
Cross recesses	Series 1 <sup>4)</sup> (deep)	Type H	Recess No.	0	1	2		3	4				
			<i>m</i>	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				
			<i>m</i>	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 <sup>4)</sup> (shallow)	Type H	Recess No.	0	1	2		3	4				
			<i>m</i>	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					
		<i>m</i>	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			
nom. 1)	<sup>5)</sup>	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											
10	9,71	10,29											
12	11,65	12,35											
(14)	13,65	14,35											
16	15,65	16,35											
20	19,58	20,42											
25	24,58	25,42											
30	29,58	30,42											
35	34,5	35,5											
40	39,5	40,5											
45	44,5	45,5											
50	49,5	50,5											
(55)	54,05	55,95											
60	59,05	60,95											

- Sizes in brackets should be avoided if possible.
- P* = pitch of the thread.
- See ISO 7721.
- In accordance with ISO 7721-2.
- Screws with nominal lengths above the dashed thick line are threaded up to the head;  $b = l - (k + a)$ .

#### 4 Specifications and reference International Standards

See table 2.

Table 2

Material		Steel	Stainless steel	Non-ferrous metal
Thread	Tolerance	6g		
	International Standard	ISO 261, ISO 965-2		
Mechanical properties	Property class	8.8	A2-70	CU2, CU3 <sup>1)</sup>
	International Standard	ISO 898-1	ISO 3506	ISO 8839
Tolerances	Product grade	A		
	International Standard	ISO 4759-1		
Cross recesses		ISO 4757		
Finish		Plain		
		Requirements for electroplating are covered in ISO 4042.		
		If different electroplating requirements are desired or if requirements are needed for other finishes, they should be agreed between supplier and customer.		
		Limits for surface discontinuities are covered in ISO 6157-1 and ISO 6157-3.		
Acceptability		For acceptance procedure, see ISO 3269.		
1) At the manufacturer's option.				

#### 5 Designation

Example for the designation of 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 manufacturer's option:

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

If, in special cases, one of the two series is wanted, the number of the series should be included in the designation, for example:

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

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**Descriptors :** fasteners, screws, cross recessed screws, countersunk head screws, flat head screws, specifications, dimensions, designation.

Price based on 4 pages

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