DIN EN ISO 10642

DIN

ICS 21.060.10

Supersedes
February 1998 edition.

Hexagon socket countersunk head screws

(ISO 10642 : 2004)
English version of DIN EN ISO 10642

Senkschrauben mit Innensechskant (ISO 10642 : 2004)

European Standard EN ISO 10642 : 2004 has the status of a DIN Standard.

A comma is used as the decimal marker.

National foreword

This standard has been published in accordance with a decision taken by CEN/TC 185 to adopt, without alteration, International Standard ISO 10642 as a European Standard.

The responsible German body involved in its preparation was the *Normenausschuss Mechanische Verbindungselemente* (Fasteners Standards Committee), Technical Committee *Schrauben mit Innenantrieb.*

The DIN Standards corresponding to the International Standards referred to in clause 2 of the EN are as follows:

ISO Standard	DIN Standard
ISO 225	DIN EN 20225
ISO 261	DIN ISO 261
ISO 898-1	DIN EN ISO 898-1
ISO 965-2	DIN ISO 965-2
ISO 965-3	DIN ISO 965-3
ISO 3269	DIN EN ISO 3269
ISO 4042	DIN EN ISO 4042
ISO 4753	DIN EN ISO 4753
ISO 4759-1	DIN EN ISO 4759-1
ISO 6157-1	DIN EN 26157-1
ISO 6157-3	DIN EN 26157-3
ISO 8992	DIN ISO 8992
ISO 10683	DIN EN ISO 10683
ISO 23429	DIN EN ISO 23429

Continued overleaf.
Document comprises 10 pages.

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Amendments

This standard differs from the February 1998 edition in that it has been completely revised.

Previous editions

DIN 7991: 1957-08, 1970-01, 1985-05, 1986-01; DIN EN ISO 10642: 1998-02.

National Annex NA

Standards referred to

(and not included in **Normative references**)

DIN EN 20225	Bolts, screws, studs and nuts – Symbols and designations for dimensioning (ISO 225 : 1983)
DIN EN 26157-1	Fasteners – Surface discontinuities – Part 1: Bolts, screws and studs for general requirements (ISO 6157-1 : 1988)
DIN EN 26157-3	Fasteners – Surface discontinuities – Part 3: Bolts, screws and studs for special requirements (ISO 6157-3 : 1988)
DIN EN ISO 898-1	Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs (ISO 898-1 : 1999)
DIN EN ISO 3269	Fasteners – Acceptance inspection (ISO 3269 : 2000)
DIN EN ISO 4042	Fasteners – Electroplated coatings (ISO 4042 : 1999)
DIN EN ISO 4753	Fasteners – Ends of parts with external ISO metric screw thread (ISO 4753 : 1999)
DIN EN ISO 4759-1	Tolerances for fasteners – Part 1: Bolts, screws, studs and nuts – Product grades A, B and C (ISO 4759-1:2000)
DIN EN ISO 10683	Fasteners – Non-electrolytically applied zinc flake coatings (ISO 10683 : 2000)
DIN EN ISO 23429	Gauging of hexagon sockets (ISO 23429 : 2004)

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 10642

March 2004

ICS 21.060.10

Supersedes EN ISO 10642 : 1997.

English version

Hexagon socket countersunk head screws
(ISO 10642 : 2004)

Vis à tête fraisée à six pans creux
(ISO 10642 : 2004)

Senkschrauben mit Innensechskant
(ISO 10642 : 2004)

This European Standard was approved by CEN on 2004-01-16.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Management Centre: rue de Stassart 36, B-1050 Brussels

Ref. No. EN ISO 10642 : 2004 E

Foreword

International Standard

ISO 10642 : 2004 Hexagon socket countersunk head screws,

which was prepared by ISO/TC 2 'Fasteners' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 185 'Threaded and non-threaded mechanical fasteners and accessories', the Secretariat of which is held by DIN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by September 2004 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 10642 : 2004 was approved by CEN as a European Standard without any modification.

Contents

Page

1 Scope

This International Standard specifies the characteristics of hexagon socket countersunk head screws with threads from M3 up to and including M20, with product grade A and property classes 8.8, 10.9 and 12.9.

NOTE Particular attention is drawn to the note in Table 2 and to Table 3, concerning the limitation on ultimate tensile load.

If, in special cases, specifications other than those listed in this International Standard are required, they should be selected from existing International Standards,e.g. ISO 261, ISO 888, ISO 898-1, ISO 965-2 and ISO 4759-1.

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 designations of dimensions*

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

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

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs*

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 965-3, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 4042, *Fasteners — Electroplated coatings*

ISO 4753, *Fasteners — Ends of parts with external ISO metric thread*

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 8992, *Fasteners — General requirements for bolts, screws, studs and nuts*

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

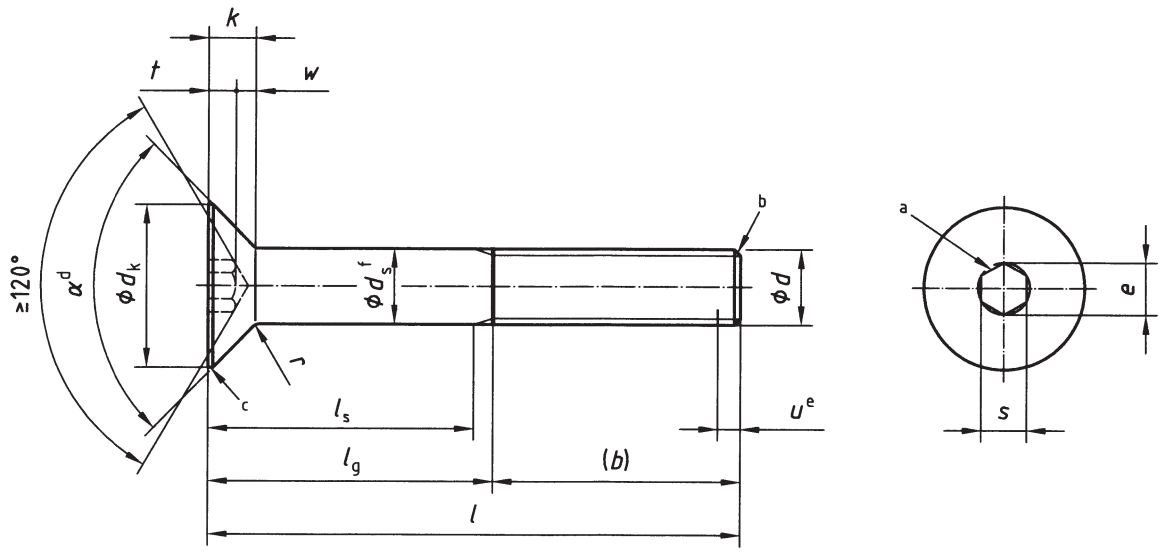
ISO 23429, *Gauging of hexagon sockets*

3 Dimensions and gauging of head

3.1 Dimensions

See Figure 1 and Table 1.

Symbols and designations of dimensions are defined in ISO 225.



Permissible alternative form of socket

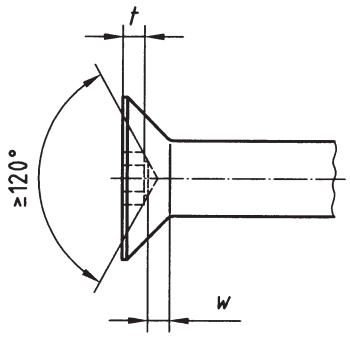
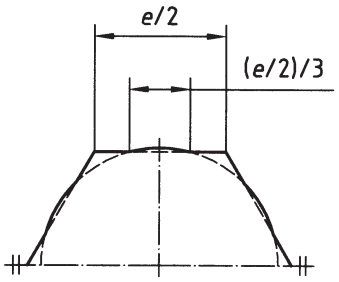


Figure 1 — Hexagon socket countersunk head screws

For broached sockets which are at the maximum limit of size the overcut resulting from drilling shall not exceed 1/3 of the length of any flat of the socket which is $e/2$.



[a] A slight rounding or countersink at the mouth of the socket is permissible.

[b] Point to be chamfered or, for sizes M4 and below, "as rolled" in accordance with ISO 4753.

[c] Edge of the head to be truncated or rounded.

[d] $\alpha = 90^\circ$ à 92°.

[e] Incomplete thread $u \leqslant 2\ P$.

[f] d_s applies if values of $l_{s,\,min}$ are specified.

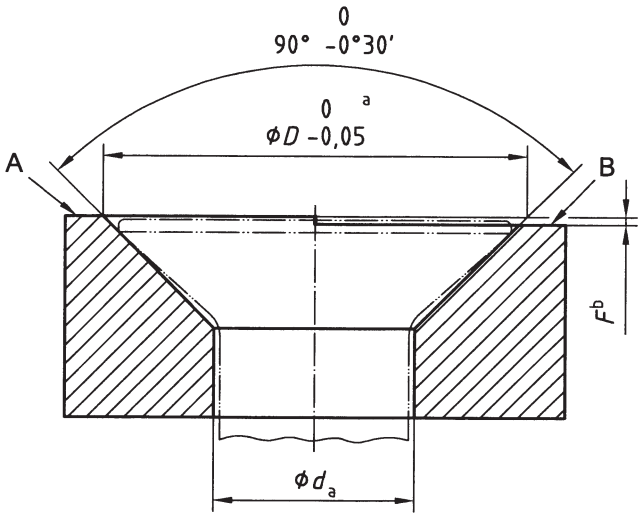
Figure 1 — Hexagon socket countersunk head screws (*continued*)

3.2 Gauging of head

See Figure 2.

The top surface of the screw shall be located between the gauge surfaces A and B.

Tolerances in millimetres



[a] $D = d_{k,\,theor.,\,max}$ (see Table 1).

[b] F is the Flushness tolerance of the head (see Table 1).

Figure 2 — Flushness gauge

Table 1 — Dimensions

Dimensions in millimetres

Thread (d)			M3	M4	M5	M6	M8	M10	M12	(M14)[g]	M16	M20
P[a]			0,5	0,7	0,8	1	1,25	1,5	1,75	2	2	2,5
b[b]		ref.	18	20	22	24	28	32	36	40	44	52
d_a		max.	3,3	4,4	5,5	6,6	8,54	10,62	13,5	15,5	17,5	22
d_k	theor.	max.	6,72	8,96	11,20	13,44	17,92	22,40	26,88	30,8	33,60	40,32
	actual	min.	5,54	7,53	9,43	11,34	15,24	19,22	23,12	26,52	29,01	36,05
d_s		max.	3,00	4,00	5,00	6,00	8,00	10,00	12,00	14,00	16,00	20,00
		min.	2,86	3,82	4,82	5,82	7,78	9,78	11,73	13,73	15,73	19,67
e[c, d]		min.	2,303	2,873	3,443	4,583	5,723	6,863	9,149	11,429	11.429	13,716
k		max.	1,86	2,48	3,1	3,72	4,96	6,2	7,44	8,4	8,8	10,16
F[e]		max.	0,25	0,25	0,3	0,35	0,4	0,4	0,45	0,5	0,6	0,75
r		min.	0,1	0,2	0,2	0,25	0,4	0,4	0,6	0,6	0,6	0,8
s[d]		nom.	2	2,5	3	4	5	6	8	10	10	12
		max.	2,08	2,58	3,08	4,095	5,14	6,140	8,175	10,175	10,175	12,212
		min.	2,02	2,52	3,02	4,020	5,02	6,020	8,025	10,025	10,025	12,032
t		min.	1,1	1,5	1,9	2,2	3	3,6	4,3	4,5	4,8	5,6
w		min.	0,25	0,45	0,66	0,7	1,16	1,62	1,8	1,62	2,2	2,2

l[f]			Shank length l_s and grip length l_g																			
			l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g	l_s	l_g
nom.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
8	7,71	8,29																				
10	9,71	10,29																				
12	11,65	12,35																				
16	15,65	16,35																				
20	19,58	20,42																				
25	24,58	25,42																				
30	29,58	30,42	9,5	12	6,5	10																
35	34,5	35,5			11,5	15	9	13														
40	39,5	40,5			16,5	20	14	18	11	16												
45	44,5	45,5					19	23	16	21												
50	49,5	50,5					24	28	21	26	15,75	22										
55	54,4	55,6							26	31	20,75	27	15,5	23								

Table 1 — Dimensions (*continued*)

60	59,4	60,6							31	36	25,75	32	20,5	28								
65	64,4	65,6									30,75	37	25,5	33	20,25	29						
70	69,4	70,6									35,75	42	30,5	38	25,25	34	20	30				
80	79,4	80,6									45,75	52	40,5	48	35,25	44	30	40	26	36		
90	89,3	90,7											50,5	58	45,25	54	40	50	36	46		
100	99,3	100,7											60,5	68	55,25	64	50	60	46	56	35,5	48

[a] P is the pitch of the thread.

[b] For lengths between the bold stepped lines in the unshaded area.

[c] $e_{min} = 1{,}14\ s_{min}$.

[d] Combined gauging of socket dimensions e and s, see ISO 23429.

[e] F is the flushness of the head, see Figure 2. The gauge dimension F has the tolerance $^{0}_{-0{,}01}$.

[f] The range of commercial lengths is between the bold stepped lines. Lengths in the shaded area are threaded to the head within 3 P. Lengths below the shaded area have values of l_g and l_s in accordance with the following formulae:

$$l_{g,\,max} = l_{nom} - b$$

$$l_{s,\,min} = l_{g,\,max} - 5\ P$$

[g] The size in brackets should be avoided if possible.

4 Requirements and reference International Standards

See Tables 2 and 3.

Table 2 — Requirements and reference International Standards

Material		Steel
General requirements	International Standard	ISO 8992
Thread	Tolerance	6g for property classes 8.8 and 10.9; 5g6g for property class 12.9
	International Standards	ISO 261, ISO 965-2, ISO 965-3
Mechanical properties	Property class[a]	8.8, 10.9, 12.9
	International Standard	ISO 898-1
Tolerances	Product grade	A
	International Standard	ISO 4759-1
Finish		As processed. Requirements for electroplating are covered in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are covered in ISO 10683.
Surface discontinuities		Limits for surface discontinuities are given in ISO 6157-1 and ISO 6157-3 for property class 12.9.
Acceptability		Acceptance procedure is covered in ISO 3269.

[a] Because of their head configurations, these screws may not meet the minimum ultimate tensile load for property classes 8.8, 10.9 and 12.9, specified in ISO 898-1, when tested in accordance with test programme B. They shall nevertheless meet the other material and property requirements for property classes 8.8, 10.9 and 12.9 specified in ISO 898-1. In addition, when full-size screws are loaded with the head supported on a suitable collar (conical bearing surface) using the type of testing fixture illustrated in ISO 898-1, they shall withstand, without fracture, the minimum ultimate tensile loads given in Table 3. If tested to failure, the fracture may occur in the threaded section, the head, the shank or at the head/shank junction.

Table 3 — Minimum ultimate tensile loads for hexagon socket countersunk head screws
(80 % of the values specified in ISO 898-1)

Thread (d)	Property class		
	8.8	10.9	12.9
	Minimum ultimate tensile load N		
M3	3 220	4 180	4 190
M4	5 620	7 300	8 560
M5	9 080	11 800	13 800
M6	12 900	16 700	19 600
M8	23 400	30 500	35 700
M10	37 100	48 200	56 600
M12	53 900	70 200	82 400
M14	73 600	96 000	112 000
M16	100 000	130 000	154 000
M20	162 000	204 000	239 000

5 Designation

EXAMPLE A hexagon socket countersunk head screw with thread M12 nominal length $l = 40$ mm and property class 12.9 is designated as follows:

Hexagon socket countersunk head screw ISO 10642-M12×40-12.9