UDC 621.882.21 : 621.88.082.131

July 1990

Reduced shank bolts and screws with coarse thread

DIN 7964

Schrauben mit Regelgewinde mit dünnem Schaft

Supersedes March 1988 edition.

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

Dimensions in mm

1 Scope and field of application

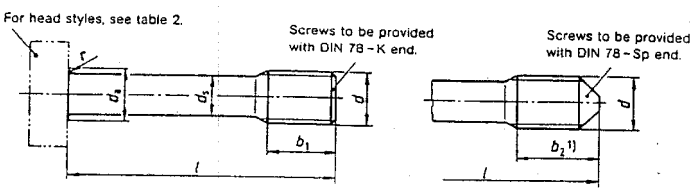
This standard specifies requirements for M 2,5 to M 30 bolts and screws ('bolts', for short) with various head styles and a diameter of the unthreaded portion of the shank smaller than the minor diameter. Although such bolts have a reduced shank, they are not waisted shank bolts.

In addition to the head styles adopted from existing DIN Standards (cf. table 2), this standard specifies two bolt types with different thread lengths, namely type K (with short thread) and type L (with long thread), each serving a different purpose. Type K is mainly intended for use in cases where the bolt is to be screwed into a threaded hole of a component (e.g. for fastening a cover or lid to a housing), while type L is designed for bolt/(hexagon) nut assemblies.

Bolts may be designed as captive fasteners, a snap ring being used, where required (cf. clause 5), as a safeguard to prevent the screw from working loose.

See DIN 962 (or the standards referred to therein) for special bolt types or finishes.

2 Dimensions



1) Dimension b_2 (cf. table 1) has been chosen so that the thread length for screws with cone point is equal to that for bolts with chamfered end.

Continued on pages 2 to 6

Table 1.

Thread size (d)			M2,5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30
P [1]			0,45	0,5	0,7	0,8	1	1,25	1,5	1,75	2	2,5	3	3,5
$b_1 \approx 2P$	Type K		3,2	3,8	5	6,25	7,5	10	12,5	15	20	25	30	38
	Type L		10	12	14	16	18	22	26	30	38	46	54	66
$b_2 \approx 2P$	Type K		3,75	4,5	6	7,55	8,5	11,2	14,3	17,5	23	28,5	33,5	43
	Type L		10,55	12,7	15	17,3	19	23,2	27,8	32,5	41	49,5	57,5	71
d_a		max.	3,1	3,6	4,7	5,7	6,8	9,2	11,2	13,7	17,7	22,4	26,4	33,4
r		min.	0,1		0,2		0,25	0,4		0,6		0,8		1
d_b [2]		max.	2,5	3	4	5	6	8	10	–	–	–	–	–
		min.	2,36	2,86	3,82	4,82	5,82	7,78	9,78	–	–	–	–	–
c [2]		min.	0,7	0,8	1	1,3	1,5	1,9	2,4	–	–	–	–	–
		max.	1,2	1,3	1,5	1,8	2	2,4	2,9	–	–	–	–	–
d_s		max.	1,9	2,3	3	3,9	4,6	6,2	7,7	9,2	12,7	16,2	19,2	24,2
		min.	1,7	2,1	2,8	3,7	4,4	6	7,5	9	12,5	16	19	24
Nominal size	l min.	l max.	Commercially available bolts [3]											
8	7,7	8,3		–	–	–	–	–	–	–	–	–	–	–
10	9,7	10,3			–	–	–	–	–	–	–	–	–	–
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	54,5	55,6										–	–	–
60	59,4	60,6										–	–	–
65	64,4	65,6											–	–
70	69,4	70,6											–	–
80	79,4	80,6												–
90	89,3	90,7												–
100	99,3	100,7												
110	109,3	110,7												
120	119,3	120,7												
130	129,2	130,8												
140	139,2	140,8												
150	149,2	150,8												
160	159,2	160,8												

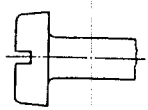
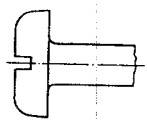
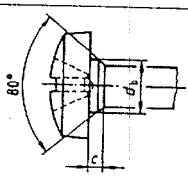
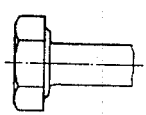
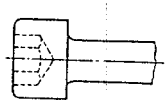
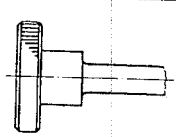
Use of thread size given in brackets should be avoided where possible.

1) P = pitch of coarse thread.

2) Only for head style C.

3) The zone between the stepped lines indicates the commercial lengths for type K. Smaller lengths (identified by dashes) cannot be manufactured. The range of commercial lengths for type L bolts is still to be established. When ordering such bolts, it is recommended that the supplier be previously consulted.

Table 2.

Head style	Illustration	Head dimensions as in	Commercial thread sizes From	Commercial thread sizes To
A		DIN 84	M 2,5	M 10
B		DIN 85	M 3	M 10
C [1]		DIN 7985	M 2,5	M 10
D1 [2]		ISO 4014	M 3	M 30
D2 [2]		DIN 931 Part 1	M 2,5	M 30
E		DIN 912	M 2,5	M 30
F		DIN 464	M 2,5	M 10

[1] For reinforcement, screws with recessed head are provided with a shoulder at the transition between head and shank.

[2] M 10 and M 12 bolts with style D1 head are supplied with the new widths across flats 16 mm and 18 mm, respectively, as specified in ISO 272, while those with style D2 head are supplied with widths across flats 17 mm and 19 mm. Where the head of bolts up to size M 16 is to be slotted head, the symbol Sz (cf. DIN 962) shall be included in the designation.

3 Technical delivery conditions

Table 3.

Material		Steel	Stainless steel	Non-ferrous metal
General requirements		As specified in DIN 267 Part 1.		
Screw thread	Tolerance	6g[1])		
	As specified in	DIN 13 Parts 13 and 15.		
Mechanical properties	Property class (material)[2])	4.8, 5.6, 5.8, 8.8, or St[3])	For sizes up to M 20: A2-70 or A4-70; for sizes exceeding M 20: A2-50 or A4-50.	CuZn = Copper-zinc alloy[4])
	As specified in	ISO 898 Part 1	DIN 267 Part 11	DIN 267 Part 18
Limit deviations and geometrical tolerances	Product grade	A		
	As specified in	ISO 4759 Part 1		
Bolts of type and finish requiring additional specifications to be given when ordering		As specified in DIN 962.		
Surface finish		As processed. Property class 8.8: (thermally or chemically) blackened.	Bright	Bright
		DIN 267 Part 2 shall apply with regard to surface roughness. DIN 267 Part 19 shall apply with regard to permissible surface discontinuities. DIN 267 Part 9 shall apply with regard to electroplating, any other type of surface protection being subject to agreement.		
Acceptance inspection		DIN 267, Part 5 shall apply with regard to acceptance inspection.		

1) Only for screws without surface protection, the 6g tolerance makes it possible for normal coating thicknesses to be applied in accordance with DIN 267 Part 9, the reference line not being exceeded. Depending on the coating thickness required, a larger fundamental deviation shall be selected than that for the g position. This might, however, impair the resistance to stripping of the bolt/nut assembly.

2) Other property classes or materials shall be subject to agreement.
Note. Since the shank diameter specified in this standard is equal to about 75 % of the thread major diameter, i.e. smaller than the minor thread diameter, the bolts are not capable of accommodating the minimum breaking loads of the corresponding property classes as specified in ISO 898 Part 1 and failure is liable to occur when the corresponding proof loads are applied. Any calculation made should therefore be based on smaller loads and torques.

3) St = 9 SMnPb 28 K as specified in DIN 1651 (ISO 898 Part 1 not applying here).

4) CuZn = CU2 or CU3, at the manufacturer's discretion.

4 Designation

The designation of bolts and screws as specified in this standard shall, in the following order, consist of:

a) the name of product;
b) the DIN number;
c) the thread size;
d) the nominal length;
e) the thread length (referring to either type K or L);
f) the symbol denoting the head style (as in table 2);
g) the symbol denoting the type of thread end (as in DIN 78);
h) the property class or material;
i) any further details (e.g. type of cross recess).

Designation of an M 5 bolt with reduced shank and short thread (K) of nominal length, l = 20 mm, head style C, thread end K, property class 4.8 and cross recess type Z:

Bolt DIN 7964 – M 5 × 20 – KC – K – 4.8 – Z

Designation of an M 5 bolt with reduced shank and long thread (L) of nominal length, l = 20 mm, head style D1, thread end Sp and property class 8.8:

Bolt DIN 7964 – M 5 × 20 – LD1 – Sp – 8.8

DIN 962 shall apply for the designation of special features, with additional information to be given on ordering.

5 Example of application

The example given below shows a cover/housing assembly where the captivity of the bolt is ensured by means of a snap ring and a threaded hole in the cover.

Note. Screws with style C head cannot be used for covers with thread because of the shoulder below the screw head.

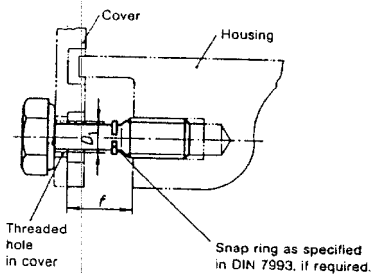


Table 4.

Thread size (d)	M 2.5	M 3	M 4	M 5	M 6	M 8	M 10	M 12	M 16	M 20	M 24	M 30
D_1 [1] min	2,2	2,7	3,5	4,5	5,3	7,2	9	10,8	14,7	18,3	22	27,7
f [2] min	5,5	6	9	11	13	17	20	23	30	40	46	56

[1] Larger than normal minor diameter of thread in cover.
[2] Minimum size to ensure captivity of type K bolts.

Standards referred to

DIN 13 Part 13	ISO metric screw threads; series of preferred sizes for screws, bolts and nuts from 1 mm to 52 mm diameter and limits of size
DIN 13 Part 15	ISO metric screw threads; fundamental deviations and tolerances for screw threads of 1 mm diameter and larger
DIN 78	Thread ends and lengths of projection of bolt ends for ISO metric screw threads in accordance with DIN 13
DIN 84	Slotted cheese head screws
DIN 85	Slotted pan head screws
DIN 267 Part 1	Fasteners; technical delivery conditions; general requirements
DIN 267 Part 2	Fasteners; technical delivery conditions; design and dimensional accuracy
DIN 267 Part 5	Fasteners; technical delivery conditions; acceptance inspection (modified version of ISO 3269, 1984 edition)
DIN 267 Part 9	Fasteners; technical delivery conditions; electroplated parts
DIN 267 Part 11	Fasteners; technical delivery conditions with addenda to ISO 3506; stainless and acid resistant steel components
DIN 267 Part 18	Fasteners; technical delivery conditions; nonferrous metal components
DIN 267 Part 19	Fasteners; technical delivery conditions; surface discontinuities on bolts
DIN 464	Knurled thumb screws
DIN 912	Hexagon socket head cap screws (modified version of ISO 4762)
DIN 931 Part 1	M 1,6 to M 39 hexagon head bolts; product grades A and B
DIN 962	Bolts, screws, studs and nuts; designation of types and finishes
DIN 1651	Free cutting steel; technical delivery conditions
DIN 7985	Cross recessed raised cheese head screws
DIN 7993	Round wire snap rings and snap ring grooves for shafts and bores
ISO 272	Fasteners; hexagon products; widths across flats
ISO 898 Part 1	Mechanical properties of fasteners; bolts, screws and studs
ISO 4014	Hexagon head bolts; product grades A and B
ISO 4759 Part 1	Tolerances for fasteners; bolts, screws and nuts with thread diameters from 1,6 to 150 mm, product grades A, B and C

Previous editions

DIN 7964: 11.57, 08.63, 04.77, 03.88.

Amendments

The following amendments have been made to the March 1988 edition.

a) The title of the standard has been amended.

b) Dimension b has been replaced by dimensions b_1 (thread length for screws with chamfered end) and b_2 (thread length for screws with cone point).

c) Dimension c_{max} has been amended.

d) Values of dimensions d_b and c for thread sizes exceeding M 10 are no longer included.

e) The standard has been editorially revised.

International Patent Classification

F 16 B 35/04