February 1995

Metric interference-fit thread studs
with a length of engagement equal to about 2 d (type A)

DIN 949 Part 1

ICS 21.060.10

Stiftschrauben mit metrischem
Feststitzgewinde MFS, Einschraublänge ≈ 2 d
(Form A)

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

The studs specified in this standard shall be used in preference to the studs specified in DIN 835 (cf. Explanatory notes).

Dimensions in mm

1 Scope and field of application

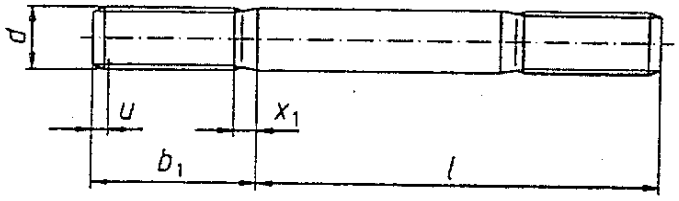
This standard specifies dimensions and technical delivery conditions for studs with metric interference-fit thread (MFS thread) intended for use in light metal including aluminium (they are thus unsuitable for steel and cast iron). Thread ends shall comply with the specifications of DIN 8141-1.

Part 1 of this standard specifies requirements for type A studs (property classes 5.6 and 8.8, length of engagement equal to about 2 d) and Part 2 requirements for type B studs (property class 10.9, length of engagement equal to about 2,5 d).

See DIN 976-1 and DIN 976-2 for metric stud bolts and metric interference-fit thread stud bolts, respectively.

2 Dimensions

Studs shall be provided with DIN 78 – K type ends.



u (incomplete thread): 1,5 P maximum.

Continued on pages 2 to 4.

Table 1: Dimensions

d	MFS 5 —	MFS 6 —	(MFS 7) —	MFS 8 MFS 8 × 1	MFS 10 MFS 10 × 1,25	MFS 12 MFS 12 × 1,5	(MFS 14) (MFS 14 × 1,5)	MFS 16 MFS 16 × 1,5
b_1	10	12	14	16	20	24	28	32
x_1	2,0	2,5	2,5	3,2	3,8	4,3	5,0	5,0
l js15	Approximate mass (7,85 kg/dm³) per 1000 units, in kg							
12 (14) 16								
(18) 20 (22)	4,31							
25 (28) 30	4,77 5,23 5,54	7,13 7,80 8,24	11,2 11,8	15,7				
35 40 45	6,31 7,08 7,85	9,35 10,5 11,6	13,3 14,8 16,3	17,7 19,6 21,6	29,4 32,5 35,6	49,1 53,5	76,2	
50 55 60	8,62	12,7 13,8 14,9	17,8 19,4 20,9	23,6 25,6 27,5	38,6 41,7 44,8	58,0 62,4 66,9	82,2 88,3 94,3	114 122 130
65 70 75			22,4 23,9	29,5 31,5 33,5	47,9 51,0 54,1	71,3 75,7 80,2	100 106 112	138 146 153
80 (85) 90				35,4	57,1 60,2 63,3	84,6 89,1 93,5	118 125 131	161 169 177
(95) 100 110					66,4 69,5	97,9 102 111	137 143 155	185 193 209
120 130 140						120	167 179 191	224 240 256
150 160								272 288

Bracketed sizes should be avoided if possible

The zone between the stepped lines indicates the commercial sizes of interference-fit thread studs

3 Technical delivery conditions

Table 2: Technical delivery conditions

Material		Steel
General requirements		As specified in ISO 8992.
Thread	Type	Interference-fit thread (MFS thread)
	As specified in	DIN 8141-1.
Mechanical properties	Property class[1]) (material)	5.6 or 8.8
	As specified in	DIN EN 20 898-1.
Limit deviations, geometrical tolerances	Product grade	A
	As specified in	ISO 4759-1.
Surface finish		Property class < 8.8: as processed. Property class 8.8: (thermally or chemically) blackened. DIN 267-2 shall apply with regard to surface roughness. DIN EN 26 157-3 shall apply with regard to limits for surface discontinuities. ISO 4042 shall apply with regard to electroplating (cf. DIN 8141-1).
Acceptance inspection		As specified in ISO 3269.

[1]) Use of other property classes or materials shall be subject to agreement.

4 Designation

Designation of a type A stud with series MFS 12 type metric interference-fit thread, a nominal length, *l*, of 80 mm, and assigned to property class 8.8:

Stud DIN 949 – A MFS 12 × 80 – 8.8

DIN 962 shall apply to the designation of type and finish, with additional information to be given on ordering.

The DIN 4000 – 2 – 4 tabular layout of article characteristics shall apply to studs as covered in this standard.

5 Use

In order to achieve an interference fit, the studs specified in this standard shall be installed in holes produced to DIN 8141-1.

Nuts provided with a DIN 13-13 metric thread may also be used, without this requiring an increased assembly torque or resulting in loosening or breakage of the assembly.

Standards referred to

DIN 13-13	ISO metric screw threads; series of preferred sizes for bolts, screws and nuts from 1 mm to 52 mm diameter and limits of size
DIN 78	Thread ends and lengths of projection of bolt ends for ISO metric screw threads in accordance with DIN 13
DIN 267-2	Fasteners; technical delivery conditions; design and dimensional accuracy
DIN 835	Studs, threaded end equal to about 2 *d*
DIN 940	Studs, metal end equal to about 2,5 *d*
DIN 949-2	Metric interference-fit thread studs with a length of engagement equal to about 2,5 *d* (type B)
DIN 962	Bolts, screws, studs and nuts; designation of types and finishes
DIN 976-1	Metric stud bolts
DIN 976-2	Metric interference-fit thread stud bolts
DIN 4000-2	Tabular layouts of article characteristics for bolts, screws and nuts
DIN 8141-1	ISO metric coarse and fine pitch screw threads for interference fits in aluminium cast alloys with diameters from 5 to 16 mm; nominal sizes, tolerances and limits of size
DIN EN 20 898-1	Mechanical properties of fasteners; bolts, screws and studs (ISO 898-1 : 1988)
DIN EN 26 157-3	Fasteners; surface discontinuities; bolts, screws and studs for special requirements (ISO 6157-3 : 1988)
ISO 3269 : 1988	Fasteners; acceptance inspection
ISO 4042 : 1989	Threaded components; electroplated coatings
ISO 4759-1 : 1978	Tolerances for fasteners; bolts, screws and nuts with thread diameters between 1,6 (inclusive) and 150 mm (inclusive) and product grades A, B and C
ISO 8992 : 1986	Fasteners; general requirements for bolts, screws, studs and nuts

[1] H.-J. Bestenreiner. *Metrisches ISO-Gewinde; Gewinde für Festsitz in Leichtmetall-Legierungen* (ISO metric screw threads; interference-fit threads in light metal alloys) (DIN 8141-1 and DIN 8141-2). *DIN-Mitteilungen*, 1993: 72 (7), 411 to 415.

Explanatory notes

Recent research on interference-fit threads has shown that tolerance Sk 6 specified for the pitch diameter of external threads does not ensure sufficient tightness of fit. Thus, an interference-fit thread stud has been developed in which a tight fit is achieved by an increased external thread major diameter (see [1]).

Clamping does not occur when nuts with a DIN 13-13 metric screw thread are assembled with interference-fit thread studs, while the bearing capacity of the stud/nut assembly is maintained. Hence, both thread ends can be produced to the same limits of size (i.e. with a DIN 8141-1 thread), without the strength of the stud/nut assembly being weakened. Such studs are thus particularly suitable for automatic assembly (e.g. in the automobile industry).

Until more experience with interference-fit thread studs is gained, DIN 835 and DIN 940 shall remain effective.

Where very short studs are required, it is recommended that stud bolts to DIN 976-2 be used.