

**DIN 1478****DIN**

ICS 21.060.70

Supersedes  
DIN 1478:1975-09.**Turnbuckles made from steel tubes or round steel bars**

Spannschlossmuttern aus Stahlrohr oder Rundstahl

Document comprises 8 pages

Translation by DIN-Sprachendienst.

In case of doubt, the German-language original should be consulted as the authoritative text.

## Foreword

This standard has been prepared by Technical Committee FMV-AA 3.12.2 *Spannschlösser* of the *Normenausschuss Mechanische Verbindungselemente* (Fasteners Standards Committee).

The revision of this standard was considered necessary since the proper length of engagement of the connecting component could not be easily checked when using turnbuckles of the type specified in the September 1975 edition. However, in order to ensure the safe use of such turnbuckles, particularly in the field of structural bolting, the length of engagement of the connecting component needs to be at least equal to length  $t$ . The control bore on the turnbuckles specified here ensures this.

The DIN 4000-2-8.4 tabular layout of article characteristics shall apply to turnbuckles covered in this standard.

NOTE Parts of DIN 4000-2 are intended to be superseded by DIN 4000-161 in which case the DIN 4000-161-6 tabular layout of article characteristics will apply to turnbuckles complying with this standard.

## Amendments

This standard differs from DIN 1478:1975-09 as follows:

- a) The title of the standard has been changed.
- b) Clause 1 'Scope' has been included.
- c) Dimensional tolerances have been specified.
- d) For M16 to M48 turnbuckles, the minimum diameter  $d_3$  has been amended.
- e) Measurement of coaxiality by gauging has been introduced (see clause 5).
- f) Grade L 235 or S235JR steel is now used instead of grade St 37 steel.
- g) For M48 turnbuckles, grade St50-2 steel has been replaced by grade S355JR steel.
- h) Turnbuckles up to size M48 may now also be made of grade L 355 steel.
- i) Grade A4 stainless steel has been introduced.
- j) For threads, tolerance 6H has been specified.
- k) The designation has been amended.
- l) The designation of a complete turnbuckle (including turnbuckle nut and two welding studs) has been dropped.
- m) Control bores for checking the position of the welding studs have been specified.
- n) For turnbuckles made of grade L 355 or S355JR steel, details of marking have been specified.
- o) Specifications relating to loadability have been included.

## Previous editions

DIN 1478: 1931-07, 1975-09

DIN 1478-1: 1942x-04

## 1 Scope

This standard specifies requirements for M6 to M80 turnbuckles made from steel or austenitic steel tubes or round bars.

## 2 Normative references

The following reference 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.

DIN 1013-1, *Hot rolled round steel for general applications — Dimensions and tolerances*

DIN 4000-2:1999-12, *Tabular layouts of article characteristics for bolts, screws and fit bolts*

DIN 34828, *Welding studs for turnbuckles*

DIN EN 10025, *Hot rolled products of structural steels — Technical delivery conditions*

DIN EN 10220, *Seamless and welded steel tubes — Dimensions and masses per unit length*

DIN EN 10224, *Non-alloy steel tubes for the conveyance of aqueous liquids including water for human consumption — Technical delivery conditions*

DIN EN ISO 3506-2, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 2: Nuts*

DIN EN ISO 4042, *Fasteners — Electroplated coatings*

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

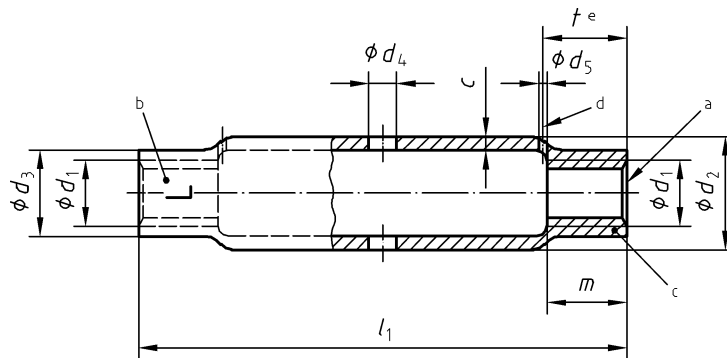
DIN EN ISO 10684, *Fasteners — Hot dip galvanized coatings*

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

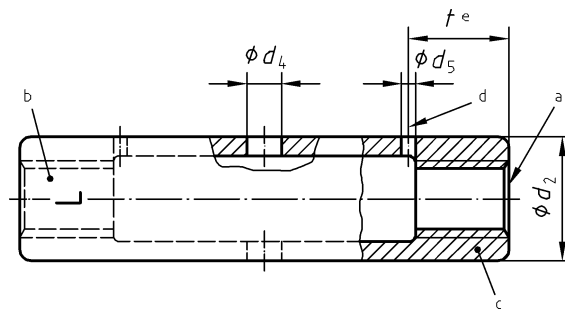
DIN ISO 965-2, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose external and internal screw threads — Medium quality*

### 3 Dimensions

Turnbuckle dimensions shall be as given in figure 1 and table 1.



a) Turnbuckle made from steel tube (for sizes up to M48)



(Other dimensions as for a))

b) Turnbuckle made from round steel bar (for sizes M56 and above)

- a Thread at both end faces countersunk at 120° down to the major thread diameter and end faces machined at right angles to the thread axis
- b Left-hand thread, marked by 'L'
- c Right-hand thread
- d Control bore for checking the position of the welding stud
- e Minimum length of engagement of the connecting component

Figure 1 — Turnbuckle dimensions (notation)

Table 1 — Turnbuckle dimensions

Dimensions in millimetres

Thread size ( $d_1$ )	M6	M8	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72 × 6	M80 × 6	
$d_2$	Nominal dimension	17,2	17,2	21,3	25	30	33,7	42,4	51	63,5	70	82,5	90	100	110	120
	max.	17,7	17,7	21,8	25,5	30,5	34,2	42,9	51,51	64,14	70,7	83,33	91,3	101,3	111,5	121,5
	min.	16,7	16,7	20,8	24,5	29,5	33,2	41,9	50,49	62,86	69,3	81,67	88,7	98,7	108,5	118,5
$d_3$	min.	9	12	15	18	22,5	27	32	38	47,5	57	63	—	—	—	—
$d_4$	Nominal dimension	6	8	8	10	10	12	12	16	16	20	20	25	25	30	30
	max.	6,3	8,5	8,5	10,5	10,5	12,5	12,5	16,5	16,5	20,5	20,5	25,5	25,5	30,5	30,5
	min.	5,7	7,5	7,5	9,5	9,5	11,5	11,5	15,5	15,5	19,5	19,5	24,5	24,5	29,5	29,5
$d_5$	Nominal dimension	4						6				10				
	max.	4,3						6,3				10,5				
	min.	3,7						5,7				9,5				
$c$	Nominal dimension	2,9	3,6	4	4	4,5	5	5,6	6,3	8	8,8	10	≈ 15	≈ 16	≈ 17	≈ 18
	max.	3,34	4,14	4,60	4,60	5,18	5,75	6,3	7,09	9	9,9	11,25				
	min.	2,61	3,24	3,60	3,60	4,05	4,5	5,04	5,67	7,2	7,92	9				
$l_1$	Nominal dimension	110	110	125	125	170	200	255	255	295	330	355	355	425	425	440
	max.	110,8	110,8	126,2	126,2	171,2	201,2	256,2	256,2	296,2	331,2	356,2	356,5	426,5	426,5	441,5
	min.	109,2	109,2	123,8	123,8	168,8	198,8	253,8	253,8	293,8	328,8	353,8	343,5	423,5	423,5	438,5
$m$	min.	7,5	10	12	15	20	24	29	36	43	51	58	68	77	87	96
$t$	≈	9,5	12	14	17	22	26	31	38	46	54	61	73	82	92	101
Length of engagement	≈	90	85	95	90	120	140	180	160	180	200	210	190	240	210	210

## 4 Semi-finished products

### 4.1 Turnbuckles made of steel

For turnbuckles of sizes up to M48, seamless cold drawn tubes of grade L 235 or L 355 steel as in DIN EN 10224 shall be used. The nominal dimensions of the tubes shall be as specified in DIN EN 10220.

For turnbuckles of sizes M56 and above, round bars as in DIN 1013-1 made of grade S235JR or S355JR steel as in DIN EN 10025 shall be used.

### 4.2 Turnbuckles made of stainless steel

Grade A4 austenitic steel as in DIN EN ISO 3506-2 shall be used.

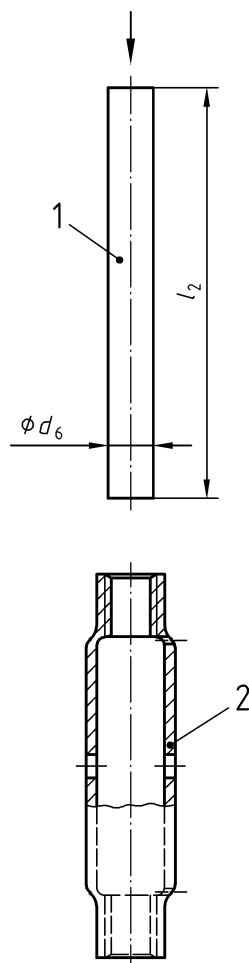
## 5 Coaxiality of bores

The coaxiality of bores shall be measured by means of a plug gauge as in figure 2 and table 2. The gauge shall pass through the bore in a vertical position under its own weight and without excessive force (see figure 2).

Table 2 — Plug gauge dimensions

Dimensions in millimetres

Thread size ( $d_1$ )	$l_2$ $\approx$	$d_6$	
		Nominal dimension	Limit deviations
M6	120	4,86	0,000 – 0,012
M8	120	6,57	0,000 – 0,015
M10	150	8,28	0,000 – 0,015
M12	150	9,99	0,000 – 0,018
M16	200	13,69	0,000 – 0,018
M20	220	17,15	0,000 – 0,021
M24	260	20,59	0,000 – 0,021
M30	260	25,99	0,000 – 0,021
M36	300	31,41	0,000 – 0,025
M42	350	36,82	0,000 – 0,025
M48	380	42,23	0,000 – 0,025
M56	380	49,59	0,000 – 0,025
M64	450	57,00	0,000 – 0,030
M72 × 6	450	64,89	0,000 – 0,030
M80 × 6	485	72,85	0,000 – 0,030



### Key

- 1 Plug gauge
- 2 Turnbuckle

Figure 2 — Gauging of coaxiality

## 6 Screw threads

The threads of turnbuckles shall be metric coarse pitch threads as in DIN ISO 965-2, produced to tolerance 6H.

## 7 Surface finish

DIN EN ISO 4042 shall apply with regard to electroplating.

DIN EN ISO 10684 shall apply with regard to hot dip galvanizing.

DIN EN ISO 10683 shall apply with regard to non-electrolytically applied zinc flake coatings.

For turnbuckles made of grade A4 steel, passivation in accordance with DIN EN ISO 16048 is required.

## **8 Designation**

Designation of an M12 turnbuckle (SP) with right-hand and left-hand thread, made of steel L 355 (L 355), without special surface finish:

Turnbuckle DIN 1478 — SP — M12 — L 355

Designation of an M12 turnbuckle (SP) with right-hand and left-hand thread, made of stainless steel A4 of strength class 50 (A4-50):

Turnbuckle DIN 1478 — SP — M12 — A4-50

## **9 Marking**

For turnbuckles made of grade L 235 or S235JR steel, marking is not required.

Turnbuckles made of grade L 355 steel shall be marked with the symbol 'L 355', the marking being imprinted on one of the two threaded ends.

Turnbuckles made of grade S355JR steel shall be marked with the symbol 'S 355', the marking being imprinted on one of the two threaded ends.

Turnbuckles made of grade A4 stainless steel shall be marked with the symbol 'A4-50', the marking being imprinted on one of the two threaded ends.

## **10 Connecting components**

Welding studs for turnbuckles complying with this standard are covered in DIN 34828.

NOTE Connecting components which are not standardized at present may be used, this being subject to agreement. It should, however, be noted that the loadability of such components does not necessarily comply with that of the turnbuckle.

## **11 Assembly and loadability**

Turnbuckles complying with this standard shall be assembled with welding studs as specified in DIN 34828 which are made of the same steel (S235JR or S355JR) or belong to the same property class (A4-50). The loadability of such assemblies is higher than that of the welding studs.

When using turnbuckles with connecting components made of other materials, in particular materials of higher strength, the loadability of the turnbuckles shall be determined separately.