UDC 621.884 : 621.713.1 : 620.1 May 1993

Rivets
Technical delivery conditions

DIN 101

Niete; technische Lieferbedingungen

Supersedes July 1977 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 technical delivery conditions, test methods and acceptance conditions for all types of standardized rivets (except for blind rivets). These specifications are generally applicable but may deviate from the specifications of other relevant product standards, in which case the latter shall take precedence.

Subject to agreement, the specifications of this standard may also be used for non-standardized rivets.

2 General requirements

The quality of rivets is a function of their material, accuracy to size and whether they comply with certain special requirements. All requirements are minimum requirements and apply to unused rivets.

Specific manufacturing processes and a particular appearance have not been specified (such being subject to agreement).

The manufacturing process used shall produce rivets that have no surface defects, be sharp-edged and free from burr, except where such burr results from stamping, for example, and does not impair rivet performance or use.

Minor scaling (but not flaking) as well as small scars which do not adversely affect the riveting process, strength and proper seating of rivet head and shank (assuming workmanlike riveting) are permitted, as are unavoidable shear marks at the rivet end and superficial cracks which do not impair the strength of the riveted joint.

Tubular rivets made from tube or drawn from wire may have stamping marks consistent with the manufacturing process.

Steel rivets, except for those drawn from strip, shall be stressrelieved unless otherwise agreed, and have a hardness of 85 to 130 HV.

ISO 2768 Part 1, tolerance class m, shall apply for dimensions without tolerance indication.

Continued on pages 2 to 8

3 Dimensional tolerances

The nominal size specified in the relevant product standard shall be the reference dimension for the tolerances and limit deviations specified.

The tolerances and limit deviations for rivets cut from tube and tubular rivets are specified in the relevant product standards.

The tolerances and limit deviations specified apply to rivets with any coating.

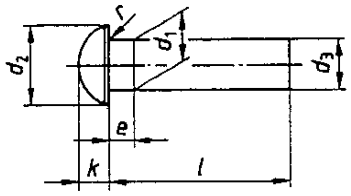

Figure 1

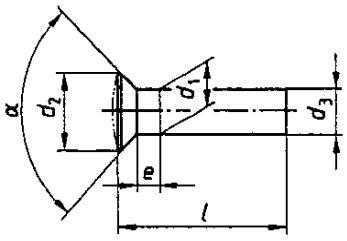

Figure 2

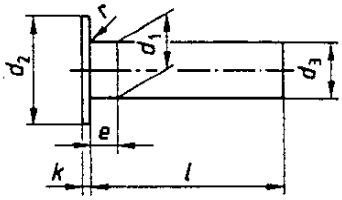

Figure 3

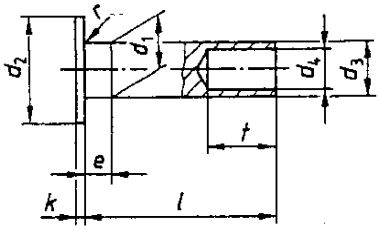

Figure 4

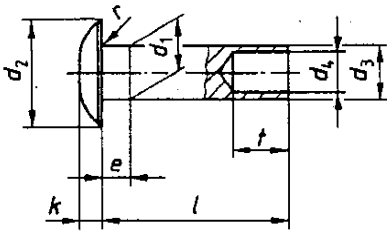

Figure 5

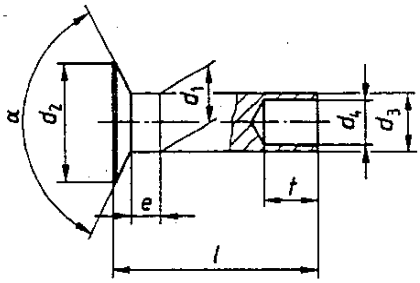

Figure 6

Table 1: Tolerances and limit deviations

Dimensions		Nominal diameter, d_1																								
		1	1,2	(1,4)	1,6	(1,7)	2	2,5	(2,6)	3	(3,5)	4	5	6	(7)	8	10	12	14	16	18	20	22	24	27	30	33	36
d_1	Limit deviations	±0,05					±0,1						±0,15				±0,2							±0,3				
d_2		h 14											h 15				h 16											
$d_3 = d_{1\,\text{nenn}}$ [1]		$^{0}_{-0,07}$			$^{0}_{-0,08}$		$^{0}_{-0,13}$						$^{0}_{-0,18}$			$^{0}_{-0,24}$	$^{0}_{-0,6}$	$^{0}_{-0,7}$	$^{0}_{-0,8}$	$^{0}_{-0,09}$		$^{0}_{-1,1}$		$^{0}_{-1,2}$	$^{0}_{-1,4}$			
d_4		H13																					–					
e	max.	$0,5 \cdot d_{1\,\text{nenn}}$ [1]																										
k		js 14															+ IT 16											
l		+ IT 14															+ IT 15											
r	max.	0,2									0,3			0,4			0,5	0,6		0,8		1		1,2		1,6		2
t		$^{+0,5}_{0}$																					–					
α		$^{+5°}_{0}$																										

Sizes in brackets should be avoided if possible. 1) nenn = nom.

The shank diameter, from a plane through the shank at a distance e from the bearing surface, may increase towards the underhead radius (to a maxiumum of d_7) (see table 7) or decrease towards the shank end (to a minimum of d_3).

In the case of rivets with round or countersunk head, the head may be provided a cylindrical portion (dimension *c*) which is to comply with the specifications of table 2 (cf. figures 7 and 8).

In the case of rivets with cylindrical heads, the edges of the head may be rounded.

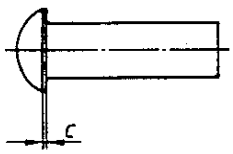

Figure 7

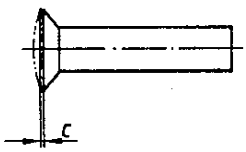

Figure 8

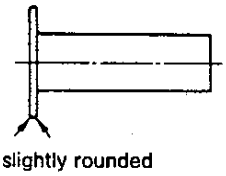

Figure 9

Table 2: Height of rim

Head diameter, d_2	Over	–	3	5	7	10	15	18	28	36	48
	Up to	3	5	7	10	15	18	28	36	48	64
Maximum length of cylindrical portion, *c*		0,1	0,2	0,3	0,4	0,5	0,8	1,2	2	2,5	3

4 Geometrical tolerances

4.1 Coaxiality

The reference dimension for the tolerance on coaxiality of the rivet head relative to the shank or of the hole relative to the shank over length *e* is the nominal diameter, d_1.

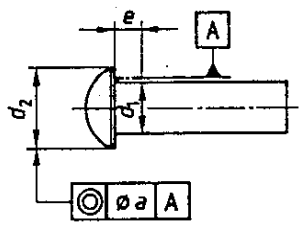

Figure 10

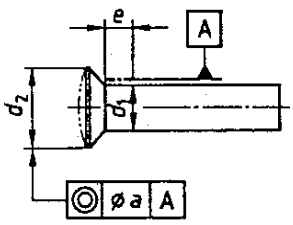

Figure 11

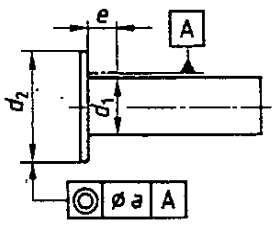

Figure 12

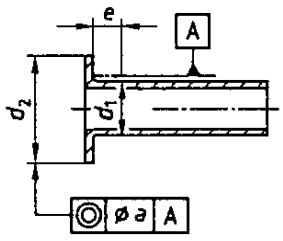

Figure 13

Table 3: Tolerance on coaxiality of rivet head and shank

Nominal diameter, d_1		Coaxiality tolerance, *a*			
		Solid rivets			Rivets made from tube and tubular rivets
Over	Up to	Round head	Countersunk head	Flat head	
–	8	2 IT 14	2 IT 13	2 IT 14	2 IT 14
8	–	2 IT 15	2 IT 14	2 IT 15	2 IT 15

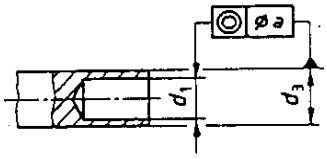

Figure 14

Table 4: Tolerance on coaxiality of clearance hole and rivet shank

Nominal diameter, d_1		Coaxiality tolerance, a
Over	Up to	
–	2,5	0,15
2,5	4	0,2
4	8	0,3
8	10	0,4

4.2 Perpendicularity

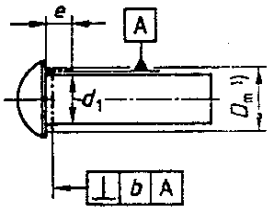

Figure 15

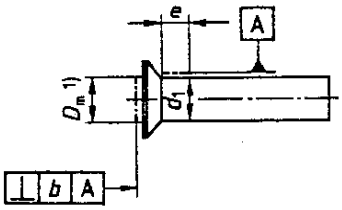

Figure 16

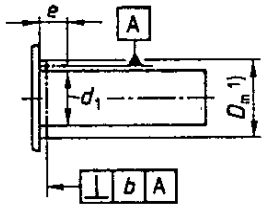

Figure 17

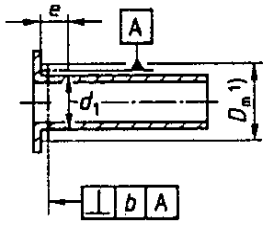

Figure 18

1) D_m is the diameter on which the tolerance is based.

Table 5: Perpendicularity tolerance

Nominal diameter, d_1		Perpendicularity tolerance, b
Over	Up to	
–	4	0,2
4	10	0,3
10	16	0,4
16	30	0,6
30	36	0,8

5 Materials

The rivet material shall be as specified in the relevant product standards.

6 Marking

Any marking of rivets shall be agreed when ordering.

7 Packaging

Rivets shall be packed so as to minimize the likelihood of damage in transit. Packages of standardized rivets shall bear the standard designation and, unless otherwise agreed, the number of units they contain, and the manufacturer's symbol.

8 Testing

8.1 Acceptance inspection

Acceptance inspection shall be based on the principles specified in ISO 3269, using the AQL values given in table 6.

Table 6: Characteristics

Characteristic	AQL value
Major characteristic: – Shank diameter – Head diameter – Nominal length	1,0
Minor characteristics: – Head height – Countersink angle – Wall thickness (of tubular rivets)[1] – Coaxiality – Impact strength – Hardness	1,5
[1] For DIN 7338 rivets, the wall thickness shall be deemed a major characteristic.	

AQL 1,0 shall apply for defectives (e.g. wire offcuts) and rivets of a different diameter or shape, etc.

8.2 Testing

8.2.1 Hardness testing

Vickers hardness testing (deemed to be non-destructive) shall be carried out as specified in DIN 50 133, with the indentation being made in the zone where the upset head will be formed.

Hardness values shall not be used as a basis for assessing the tensile strength.

8.2.2 Impact test

Several hammer blows shall be used to bend the rivet head through an angle of 30° from the axis, as a result of which the head shall not break off nor shall incipient cracks appear on the underhead fillet or radius.

The rivet shall not be heated for this test.

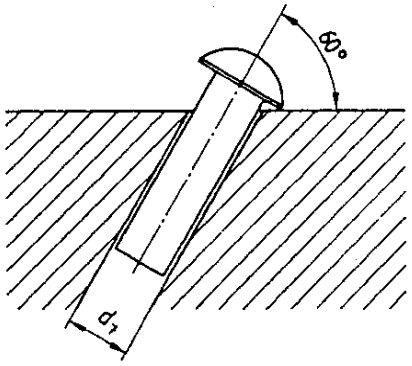

Figure 19

Table 7: Clearance hole diameter

d_1	1	1,2	1,4	1,6	1,7	2	2,5	2,6	3	3,5	4	5	6	7
Clearance hole diameter, d_7 (H12)	1,05	1,25	1,45	1,65	1,75	2,1	2,6	2,7	3,1	3,6	4,2	5,2	6,3	7,3

d_1	8	10	12	14	16	18	20	22	24	27	30	33	36
Clearance hole diameter, d_7 (H12)	8,4	10,5	13	15	17	19	21	23	25	28	31	34	37

Appendix A

Fundamental tolerances and tolerance zones

To facilitate the application of this standard, relevant fundamental tolerances and tolerance zones are reproduced below for information purposes.

Table A.1: Fundamental tolerances and tolerance zones

Nominal size[1]		Fundamental tolerances				Tolerance zones Shaft dimensions							Hole dimensions		
Over	Up to	IT13	IT14	IT15	IT16	h13	h14	h15	h16	js14	js15	js16	H12	H13	H14
From 1	3	0,14	0,25	0,40	0,60	$^{0}_{-0,14}$	$^{0}_{-0,25}$	$^{0}_{-0,40}$	$^{0}_{-0,60}$	±0,125	±0,20	±0,30	$^{+0,10}_{0}$	$^{+0,14}_{0}$	$^{+0,25}_{0}$
3	6	0,18	0,30	0,48	0,75	$^{0}_{-0,18}$	$^{0}_{-0,30}$	$^{0}_{-0,48}$	$^{0}_{-0,75}$	±0,15	±0,24	±0,375	$^{+0,12}_{0}$	$^{+0,18}_{0}$	$^{+0,30}_{0}$
6	10	0,22	0,36	0,58	0,90	$^{0}_{-0,22}$	$^{0}_{-0,36}$	$^{0}_{-0,58}$	$^{0}_{-0,90}$	±0,18	±0,29	±0,45	$^{+0,15}_{0}$	$^{+0,22}_{0}$	$^{+0,36}_{0}$
10	18	0,27	0,43	0,70	1,10	$^{0}_{-0,27}$	$^{0}_{-0,43}$	$^{0}_{-0,70}$	$^{0}_{-1,10}$	±0,215	±0,35	±0,55	$^{+0,18}_{0}$	$^{+0,27}_{0}$	$^{+0,43}_{0}$
18	30	0,33	0,52	0,84	1,30	$^{0}_{-0,33}$	$^{0}_{-0,52}$	$^{0}_{-0,84}$	$^{0}_{-1,30}$	±0,26	±0,42	±0,65	$^{+0,21}_{0}$	$^{+0,33}_{0}$	$^{+0,52}_{0}$
30	50	0,39	0,62	1,00	1,60	$^{0}_{-0,39}$	$^{0}_{-0,62}$	$^{0}_{-1,00}$	$^{0}_{-1,60}$	±0,31	±0,50	±0,80	$^{+0,25}_{0}$	$^{+0,39}_{0}$	$^{+0,62}_{0}$
50	80	0,46	0,74	1,20	1,90	$^{0}_{-0,46}$	$^{0}_{-0,74}$	$^{0}_{-1,20}$	$^{0}_{-1,90}$	±0,37	±0,60	±0,95	$^{+0,30}_{0}$	$^{+0,46}_{0}$	$^{+0,74}_{0}$
80	120	0,54	0,87	1,40	2,20	$^{0}_{-0,54}$	$^{0}_{-0,87}$	$^{0}_{-1,40}$	$^{0}_{-2,20}$	±0,435	±0,70	±1,1	$^{+0,35}_{0}$	$^{+0,54}_{0}$	$^{+0,87}_{0}$
120	180	0,63	1,00	1,60	2,50	$^{0}_{-0,63}$	$^{0}_{-1,00}$	$^{0}_{-1,60}$	$^{0}_{-2,50}$	±0,50	±0,80	±1,25	$^{+0,40}_{0}$	$^{+0,63}_{0}$	$^{+1,00}_{0}$
180	250	0,72	1,15	1,85	2,90	$^{0}_{-0,72}$	$^{0}_{-1,15}$	$^{0}_{-1,85}$	$^{0}_{-2,90}$	±0,575	±0,925	±1,45	$^{+0,46}_{0}$	$^{+0,72}_{0}$	$^{+1,15}_{0}$
250	315	0,81	1,30	2,10	3,20	$^{0}_{-0,81}$	$^{0}_{-1,30}$	$^{0}_{-2,10}$	$^{0}_{-3,20}$	±0,65	±1,05	±1,60	$^{+0,52}_{0}$	$^{+0,81}_{0}$	$^{+1,30}_{0}$

1) The fundamental tolerances and tolereance zones given for nominal sizes from 1 to 3 mm are also applicable for nominal sizes below 1 mm until such time as a corresponding DIN Standard on tolerances for these sizes is aviailable.

Standards referred to

DIN 7338	Brake and clutch lining rivets
DIN 50 133	Vickers hardness testing of metallic materials; HV 0,2 to HV 100
ISO 2768-1 : 1989	Tolerances for linear and angular dimensions without individual tolerance indications
ISO 3269 : 1988	Fasteners; acceptance inspection

Previous editions

DIN 101: 12.54, 08.69, 06.77.

Amendments

The following amendments have been made to the July 1977 edition.

a) Specifications for hardness and dimension *e* (cf. table 1) have been included.

b) The specification of dimensions and tolerances in clause 3 now also cover rivets made from tube and tubular rivets.

c) For acceptance inspection (cf. subclause 9.1), major and minor characteristics have been redefined and AQL values amended.

d) A shear test is no longer specified.

e) For hardness testing the Vickers test has been specified.

f) In appendix A, tables A.2 and A.3 have been dropped.

g) The standard has been editorially revised.

International Patent Classification

F 16 B 019/04