UDC 621.882.2.082.1 : 621.882.449

December 1990

Screw and washer assemblies

Coarse threaded screws with captive curved spring lock washer

DIN 6900 Part 3

Kombi-Schrauben mit Regelgewinde mit Federring

This standard, together with DIN 6900 Parts 1, 2, 4 and 5, December 1990 editions, supersedes DIN 6900, December 1972 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 screw and washer assemblies consisting of an M 2,5 to M 12 screw with flat bearing face, assigned to a property class below 8.8, and a captive curved spring lock washer (and also an optional plain washer). Curved spring lock washers are intended to counteract loosening of bolted connections (e.g. as a result of setting) (cf. DIN 267 Part 26). They do not effectively prevent loosening of the connection under varying radial load and are thus designed for use with short screws predominantly subject to thrust.

2 Concept

See DIN 6900 Part 1 for definition of "screw and washer assembly".

3 Dimensions

Only screws with a shank diameter approximately equal to the pitch diameter or threaded up to the head may be used for assemblies as specified here.

Examples of screw and washer assemblies

x = sum of maximum permissible thicknesses of washers.

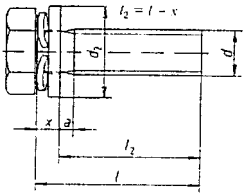

Figure 1. Assembly with screw threaded approximately up to the head

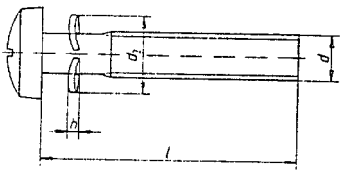

Figure 2. Assembly with screw with unthreaded portion of shank

Continued on pages 2 to 4

Table 1. **Dimensions**

Thread size (d)	a max	l_2 [1] min	Washer dimensions: DIN 6902 washer, Type A (1) h	Type A (1) d_2	Type B (2) h	Type B (2) d_2	DIN 6905 washer (4) h max	DIN 6905 washer (4) d_2
M2,5	0,9	4	0,6	6	0,8	8	1,1	4,55
M3	1	4	0,6	7	0,8	9	1,3	5,6
(M3,5)	1,2	6	0,8	8	0,8	11	1,3	6,1
M4	1,4	6	0,8	9	1	12	1,4	6,95
M5	1,6	6	1	10	1,6	15	1,7	8,55
M6	2	8	1,6	12	1,6	18	2,2	11
M8	2,5	10	2	16	2	24	2,75	13,95
M10	3	12	2,5	20	2,5	30	3,15	16,95
M12	3,5	14	3	24	3	37	3,65	19,7

Use of the size given in brackets should be avoided where possible.
[1] $l_{2\,min}$ is the smallest effective screw length manufacturable.

See relevant product standards for specifications for l.

As a deviation from the relevant product standards, the underhead fillet shall comply with the following specifications.

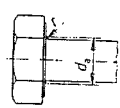

Table 2. **Underhead fillet dimensions**

Thread size	M2,5	M3	(M3,5)	M4	M5	M6	M8	M10	M12
r min	-	-	-				0,1	0,1	0,1
d_a max	2,3	2,8	3,3	3,8	4,7	5,6	7,5	9,4	11,2

4 Technical delivery conditions

Screws and washers used to make assemblies shall comply with the relevant technical delivery conditions except for the following.

4.1 Assemblies with steel screw

Steel screws for assemblies as specified here are to be produced to a property class less than 8.8. As a deviation from ISO 898 Part 1, tensile strength and strength under wedge loading are to be tested on the assembly, not on its components.

If screws are to comply with specifications other than those given in this standard (e.g. regarding material), these shall be agreed between manufacturer and customer.

4.2 Assemblies with stainless steel or non-ferrous metal screw

If the screw of an assembly is to be of stainless steel or non-ferrous metal, the corrosion behaviour of the washer material shall be equivalent to that of the screw.

5 Designation

The designation of a screw and washer assembly is to include the name of the screw, letter Z to denote that the screw is fitted with a captive washer and code number 4 denoting the curved spring lock washer.

Examples of designation

Designation of a DIN 933 - M 10 × 35 - 5.6 hexagon head screw [1] with DIN 6905 - 9,3 captive curved spring lock washer (Z 4):

Hexagon head screw DIN 933 – M 10 × 35 – Z 4 – 5.6

If the assembly is additionally to be provided with a DIN 6902 plain washer, the relevant code number (1 or 2; cf. table 1), shall be indicated in the designation.

Designation of a DIN 7985 - M 10 × 50 - 4.8 - H raised cheese head screw with DIN 6905 - 9.3 captive spring washer and DIN 6902 - B 9.3 captive plain washer (Z 4 - 2):

Raised cheese head screw DIN 7985 – M 10 × 50 – Z 4 – 2 – 4.8 – H

Note: As screw and washer assemblies have not yet been assigned an ISO designation, a screw which is to be supplied fitted with a captive washer and is to be produced to an ISO Standard shall be designated as follows:

Designation of an ISO 4017 - M 10 × 35 - 5.6 hexagon head screw with DIN 6905 - 9.3 captive washer (Z 4):

Hexagon head screw ISO 4017 – M 10 × 35 – 5.6,
Z 4 type as in DIN 6900 Part 3

Designation of an ISO 7045 - M 10 × 50 - 4.8 - H pan head screw with DIN 6905 - 9.3 spring washer and DIN 6902 - B 9.3 captive plain washer (Z 4 - 2):

Pan head screw ISO 7045 – M 10 × 50 – 4.8 – H,
Z 4 - 2 type as in DIN 6900 Part 3

Appendix A

Additional thread size (M 7) for replacement and maintenance purposes

Thread size M 7 is not included in the international range of threads for screws and nuts and its further use is deprecated. However, with regard to existing documentation and for meeting replacement and maintenance requirements, they may still be ordered on the basis of DIN 931 Part 1 and DIN 933, September 1987 editions. The dimensions of the corresponding screw and washer assemblies shall be as specified in the table below.

Table A.1.

Thread size (d)	a	l_2 [2]	d_s	r	Washer dimensions					
					DIN 6902 washer				DIN 6905 washer	
					Type A (1)		Typ B (2)		(4)	
					h	d_2	h	d_2	h	d_2
	max	min	max	min					max	
M7	2	14	6.6	-	1.6	14	2	21	2.2	12

[1] Shorter screw lengths are subject to agreement on ordering.

[1] Cf. note on the limited period of validity in DIN 933, September 1987 edition.
[2] Cf. note on the limited period of validity in DIN 7985, August 1990 edition.

Standards referred to

DIN 267 Part 26	Fasteners; technical delivery conditions; steel spring washers for bolt/nut assemblies
DIN 931 Part 1	M 1.6 to M 39 hexagon head bolts; product grades A and B
DIN 933	M 1.6 to M 52 hexagon head screws threaded up to the head; product grades A and B
DIN 6900 Part 1	Screw and washer assemblies; coarse threaded screws with captive plain washer
DIN 6902	Plain washers for screw and washer assemblies
DIN 6905	Curved spring lock washers for screw and washer assemblies
DIN 7985	Cross recessed raised cheese head screws
ISO 898-1:1988	Mechanical properties of fasteners; bolts, screws and studs
ISO 4017:1988	Hexagon head screws; product grades A and B
ISO 7045:1983	Cross recessed pan head screws; product grade A

Previous editions

DIN 6900: 09.66, 12.72.

Amendments

The following amendments have been made to the December 1972 edition of DIN 6900.

a) DIN 6900 has been split up into five Parts.

b) The 'Scope and field of application' clause has been included.

c) Dimension a for thread size M 12 has been amended.

d) The assembly dimensions for size M 7 which is not included in the international range of screw threads have been specified in an appendix.

e) The l_2 values have been amended.

f) The minimum length of screws with an unthreaded portion of shank, l_3, is no longer specified.

g) Specifications for assemblies with countersunk head screws are no longer included.

h) Technical delivery conditions have been included.

i) An example of designation has been included that relates to assemblies with screw produced to an ISO Standard.

International Patent Classification

F 16 B 35/00

F 16 B 39/26