UDC 621.882.449

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# Curved and wave spring washers

DIN 137

Federscheiben; gewölbt oder gewellt

Supersedes December 1970 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.*

Specifications for type A spring washers are to be omitted from the present standard (transitional period: 5 years) as these washers do not comply with the specifications of DIN 267 Part 26. It is thus recommended that type B wave spring washers be used instead, where available.

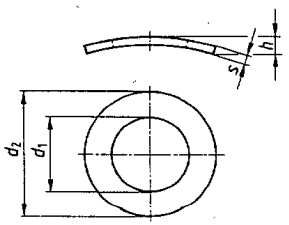
Dimensions in mm

## 1 Scope and field of application

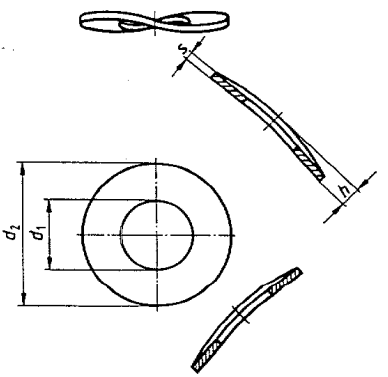
Spring lock washers covered in this standard are deemed to be spring washers designed for use with bolt/nut assemblies involving fasteners of a property class less than 5.8, as specified in ISO 898 Part 1. They are intended to counteract the effect of setting which results in bolt/nut assemblies working loose (see DIN 267 Part 26). They do not effectively prevent loosening of the assembly under varying radial load and are designed for use with short bolts predominantly subject to thrust.

## 2 Dimensions

**Type A**, curved




**Type B**, wave




Continued on pages 2 and 3

| Nominal size 2) | Type A 1) | | | | | | Type B | | | | | | Mass (7,85 kg/dm³) per 1000 units, in kg, ≈ | | For thread size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $d_1$ 5) | $d_2$ 5) | $s$ | | $h$ | | $d_1$ 5) | $d_2$ 5) | $s$ | | $h$ | | | | |
| | H14 | js16 | | Limit deviations | min. | max. | H14 | js16 | | Limit deviations | min. | max. | Type A | Type B | |
| 1 | 1,1 | 2,5 | 0,2 | ± 0,02 | 0,35 | 0,7 | – | – | – | – | – | – | 0,006 | – | 1 |
| 1,2 | 1,3 | 3 | 0,2 | ± 0,02 | 0,35 | 0,7 | – | – | – | – | – | – | 0,009 | – | 1,2 |
| 1,4 | 1,5 | 3 | 0,25 | ± 0,02 | 0,4 | 0,8 | – | – | – | – | – | – | 0,01 | – | 1,4 |
| 1,7 | 1,8 | 4 | 0,25 | ± 0,02 | 0,45 | 0,9 | – | – | – | – | – | – | 0,02 | – | 1,6; 1,7 |
| 1,8 | 1,9 | 4 | 0,25 | ± 0,02 | 0,45 | 0,9 | – | – | – | – | – | – | 0,02 | – | 1,8 |
| 2 | 2,2 | 4,5 | 0,3 | ± 0,03 | 0,5 | 1 | – | – | – | – | – | – | 0,028 | – | 2 |
| 2,3 | 2,5 | 5 | 0,3 | ± 0,03 | 0,5 | 1 | – | – | – | – | – | – | 0,035 | – | 2,3 |
| 2,6 | 2,8 | 5,5 | 0,3 | ± 0,03 | 0,55 | 1,1 | – | – | – | – | – | – | 0,041 | – | 2,5; 2,6 |
| 3 3) | 3,2 | 6 | 0,4 | ± 0,05 | 0,65 | 1,3 | 3,2 | 8 | 0,5 | ± 0,05 | 0,8 | 1,6 | 0,063 | 0,166 | 3 |
| 3,5 3) | 3,7 | 7 | 0,4 | ± 0,05 | 0,7 | 1,4 | 3,7 | 8 | 0,5 | ± 0,05 | 0,9 | 1,8 | 0,088 | 0,154 | 3,5 |
| 4 | 4,3 | 8 | 0,5 | ± 0,05 | 0,8 | 1,6 | 4,3 | 9 | 0,5 | ± 0,05 | 1 | 2 | 0,14 | 0,193 | 4 |
| 5 | 5,3 | 10 | 0,5 | ± 0,05 | 0,9 | 1,8 | 5,3 | 11 | 0,5 | ± 0,05 | 1,1 | 2,2 | 0,222 | 0,266 | 5 |
| 6 | 6,4 | 11 | 0,5 | ± 0,05 | 1,1 | 2,2 | 6,4 | 12 | 0,5 | ± 0,05 | 1,3 | 2,6 | 0,247 | 0,318 | 6 |
| 7 | 7,4 | 12 | 0,5 | ± 0,05 | 1,2 | 2,4 | 7,4 | 14 | 0,8 | ± 0,06 | 1,5 | 3 | 0,265 | 0,8 | 7 |
| 8 | 8,4 | 15 | 0,5 | ± 0,05 | 1,7 | 3,4 | 8,4 | 15 | 0,8 | ± 0,06 | 1,5 | 3 | 0,476 | 0,76 | 8 |
| 10 | 10,5 | 18 | 0,8 | ± 0,06 | 2 | 4 | 10,5 | 21 | 1 | ± 0,07 | 2,1 | 4,2 | 1,05 | 2,04 | 10 |
| 12 | – | – | – | – | – | – | 13 | 24 | 1,2 | ± 0,07 | 2,5 | 5 | – | 3,1 | 12 |
| 14 | – | – | – | – | – | – | 15 | 28 | 1,6 | ± 0,08 | 3 | 6 | – | 5,5 | 14 |
| 16 | – | – | – | – | – | – | 17 | 30 | 1,6 | ± 0,08 | 3,2 | 6,4 | – | 6 | 16 |
| 18 | – | – | – | – | – | – | 19 | 34 | 1,6 | ± 0,08 | 3,3 | 6,6 | – | 7,8 | 18 |
| 20 | – | – | – | – | – | – | 21 | 36 | 1,6 | ± 0,08 | 3,7 | 7,4 | – | 8,43 | 20 |
| 22 | – | – | – | – | – | – | 23 | 40 | 1,8 | ± 0,1 | 3,9 | 7,8 | – | 11,9 | 22 |
| 24 | – | – | – | – | – | – | 25 | 44 | 1,8 | ± 0,1 | 4,1 | 8,2 | – | 14,5 | 24 |
| 27 | – | – | – | – | – | – | 28 | 50 | 2 | ± 0,1 | 4,7 | 9,4 | – | 21,1 | 27 |
| 30 | – | – | – | – | – | – | 31 | 56 | 2,2 | ± 0,1 | 5 | 10 | – | 29,5 | 30 |
| 33 | – | – | – | – | – | – | 34 | 60 | 2,2 | ± 0,1 | 5,3 | 10,6 | – | 33,1 | 33 |
| 36 | – | – | – | – | – | – | 37 | 68 | 2,5 | ± 0,15 | 5,8 | 11,6 | – | 50,2 | 36 |
| (39) 3) 4) | – | – | – | – | – | – | 40 | 72 | 2,8 | ± 0,15 | 6,4 | 12,8 | – | 61,8 | 39 |
| (42) 3) 4) | – | – | – | – | – | – | 43 | 78 | 3 | ± 0,2 | 6,8 | 13,6 | – | 78,3 | 42 |
| (45) 3) 4) | – | – | – | – | – | – | 46 | 85 | 3 | ± 0,2 | 7,1 | 14,2 | – | 94,5 | 45 |
| (48) 3) 4) | – | – | – | – | – | – | 50 | 92 | 3,5 | ± 0,2 | 7,8 | 15,6 | – | 129 | 48 |
| (52) 3) 4) | – | – | – | – | – | – | 54 | 98 | 3,5 | ± 0,2 | 8,2 | 16,4 | – | 144 | 52 |

1) It is intended to omit curved spring washers from the standard after a period of five years as they do not comply with the specifications of DIN 267 Part 26.

2) It is intended to omit the sizes in brackets from this standard after a period of five years.

3) Test values for the spring force test as described in DIN 267 Part 26 have not as yet been specified for this nominal size.

4) Test values for the test for permanent set as described in DIN 267 Part 26 have not as yet been specified for this nominal size.

5) The diameter tolerances specified apply to spring washers when pressed flat. The tolerance on coaxiality between $d_1$ and $d_2$ (related to $d_2$) shall be 1/2 IT 14.

## 3 Technical delivery conditions

DIN 267 Part 26 shall apply with regard to the technical delivery conditions.
Material: FSt = spring steel as specified in DIN 267 Part 26.

## 4 Designation

Designation of a type A spring washer of nominal size 8, made of spring steel (FSt) [1]:

Spring washer DIN 137 – A 8 – FSt

The DIN 4000 – 3 – 3 tabular layout of article characteristics shall apply for spring lock washers covered in this standard.

## Standards referred to

| | |
|---|---|
| DIN 267 Part 26 | Fasteners; technical delivery conditions; steel spring washers for bolt/nut assemblies |
| DIN 4000 Part 3 | Tabular layout of article characteristics for washers and lock washers |
| ISO 898 Part 1 | Mechanical properties of fasteners; bolts, screws and studs |

## Previous editions

DIN 137: 12.43, 07.53, 10.63, 12.70.

## Amendments

The following amendments have been made to the December 1970 edition.

a) The scope has been reduced.
b) A note on the period of validity for type A washers has been included; see Explanatory notes.
c) Nominal size 10, type B, with an external diameter of 18 mm has been deleted.
d) The technical delivery conditions have been summarized in DIN 267 Part 26.
e) The designation now includes a reference to the material to be used.
f) The standard has been editorially revised.

## Explanatory notes

By maintaining a sufficiently high preloading in a bolt/nut assembly, spring washers are designed to prevent loosening of the assembly, which may be caused, for instance, by the effect of setting. The specification of residual spring forces given in DIN 267 Part 26 has made it possible for the first time to assess the performance of spring washers.

Spring washers complying with the present standard are suitable for bolt/nut assemblies involving fasteners of a property class less than 5.8.

As however, the values specified in DIN 267 Part 26 are only achieved by type B washers, it is intended to omit type A washers from this standard in due course. The proposed transitional period of five years intended to give manufacturers and users the opportunity to convert to type B spring washers. Where such washers are not available in the nominal sizes required, it should be checked whether other types of spring washer can be used.

### International Patent Classification

F 16 B 39/24

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[1] FSt shall also apply where no material has been specified in existing documentation.