

DIN 267-26

ICS 21.060.30

Supersedes
DIN 267-26:1987-10**Technical delivery conditions for fasteners –
Part 26: Conical spring washers for bolt/nut assemblies**

Mechanische Verbindungselemente –
Technische Lieferbedingungen –
Teil 26: Spannscheiben aus Federstahl für Schraubenverbindungen

Document comprises 10 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 the *Normenausschuss Mechanische Verbindungselemente* (Fasteners Standards Committee), Technical Committee NA 067-04-02 AA *Scheiben und Ringe*.

The DIN 267 standards series consists of the following parts, under the general title *Technical delivery conditions for fasteners*:

- *Part 2: Design and dimensional accuracy*
- *Part 6: Design and tolerances for product grade F fasteners*
- *Part 13: Parts for bolt/nut assemblies with specific mechanical properties for use at temperatures ranging from –200 °C to +700 °C*
- *Part 24: Hardness classes for nuts*
- *Part 26: Conical spring washers for bolt/nut assemblies*
- *Part 27: Adhesive-coated steel screws, bolts and studs*
- *Part 28: Self-locking steel screws, bolts and studs*
- *Part 29: Product grades for parts for bolt/nut assemblies for use at temperatures ranging from –200 °C to +700 °C*
- *Part 30: Metric thread rolling screws of property class 10.9*

Amendments

This standard differs from DIN 267-26:1987-10 as follows:

- a) The title has been amended.
- b) The standard now only covers conical spring washers.
- c) References have been updated.
- d) In order to reduce the risk of hydrogen embrittlement, a maximum hardness of 490 HV has been specified.
- e) For conical spring washers intended for use with screw and washer assemblies, the minimum free height has been corrected in accordance with DIN 6908:1995-08.
- f) The compression load for spring force testing has been increased.
- g) The residual spring force values are no longer given as provisional specifications.
- h) A normative Annex A giving a detailed description of the test device for the spring force test has been added.
- i) A normative Annex B on the determination of the spring characteristic curve has been included.

Previous editions

DIN 267-26: 1987-10

1 Scope

This standard specifies requirements and methods of test for conical spring washers which are intended for use with bolt/nut assemblies as dealt with in the following standards:

- DIN 6796, Conical spring washers for bolt/nut assemblies
- DIN 6908, Conical spring washers for screw and washer assemblies

It is recommended that this standard also be applied for conical spring washers for bolt/nut assemblies which have not been standardized.

Conical spring washers made from materials other than spring steel are not covered by this standard.

NOTE Conical spring washers serve to counteract the loss in inherent tension caused by setting and creep of a bolt/nut assembly provided that

- they are sufficiently resilient to increase the overall resilience of the assembly;
- their inherent spring force can compensate for any loss in tension so that the clamping force required to ensure the reliability of the assembly is maintained.

There may be relative movement between bolt and nut if the friction between the clamped components is overcome by transverse forces. If this does occur, loosening of the assembly cannot usually be prevented by spring washers.

Thus, when using these components, it should be checked whether the spring washers may usefully be employed as the elements maintaining the clamping force.

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 879-1, *Precision dial indicators — Part 1: Analogue indicators*

DIN 6796, *Conical spring washers for bolt/nut assemblies*

DIN 6908, *Conical spring washers for screw and washer assemblies*

DIN EN 10089, *Hot rolled steels for quenched and tempered springs — Technical delivery conditions*

DIN EN 10132-4, *Cold-rolled narrow steel strip for heat-treatment — Technical delivery conditions — Part 4: Spring steels and other applications*

DIN EN ISO 3269, *Fasteners — Acceptance inspection*

DIN EN ISO 4042, *Fasteners — Electroplated coatings*

DIN EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

DIN EN ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

DIN EN ISO 18265, *Metallic materials — Conversion of hardness values*

VDI 2230-1:2003, *Systematic calculation of high duty bolted joints — Joints with one cylindrical bolt*

3 General requirements

The effectiveness of springs washers in bolt/nut assemblies depends on

- the material (see clause 4) and
- whether the test criteria specified in clause 5 are met.

Spring washers shall have a smooth surface and be free from scale and burrs. The surface roughness shall be specified in the relevant product standards where required. In the as-delivered condition, spring washers shall have rust protection.

DIN EN ISO 4042 shall apply with regard to electroplating.

NOTE Hydrogen-induced embrittlement cannot be ruled out when employing current methods of applying metal coating from aqueous solutions (see DIN EN ISO 4042). As there is even an increased risk of embrittlement in the case of components with a hardness of ≥ 400 HV, particular care is to be taken when selecting the material, and in connection with heat treatment and surface treatment.

4 Material

Spring washers shall be made of spring steel (FSt) complying with DIN EN 10089 or DIN EN 10132-4, or of spring steel with equivalent properties, the grade being at the manufacturer's discretion. This requirement shall also apply where the documentation does not specify any material. Spring washers for bolt/nut assemblies, in the hardened and tempered condition, shall have a hardness of 420 HV to 490 HV.

5 Testing

5.1 Testing for dimensional stability and finish

The specifications of DIN EN ISO 3269 shall apply for acceptance inspection with respect to the dimensional stability of spring washers. For the characteristics

- internal diameter,
- washer thickness,
- free height and
- external diameter,

an AQL value of 1,5 shall apply.

5.2 Testing the mechanical properties

5.2.1 General

The mechanical properties shall be tested as specified in 5.2.2 to 5.2.5.