UDC 669.14.018.27-122.7-417

February 1979

Hot Rolled, Ribbed and Grooved Spring Steel
Dimensions, Weights, Permissible Deviations, Static Values

DIN 1570

Warmgewalzter gerippter Federstahl; Masse, Gewichte, zulässige Abweichungen, statische Werte

For connection with Euronorm 92, issued by the European Community for Coal and Steel, see Explanations.

Dimensions in mm

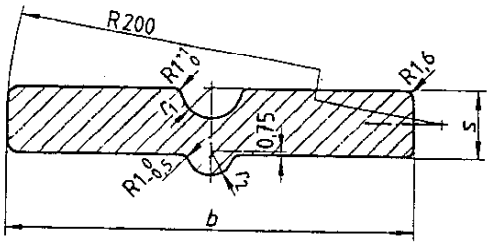
1 Scope

This Standard applies to hot rolled, ribbed and grooved spring steel with the dimensions stated in Table 1, of the steel grades stated in Section 5, which are preferably used for rail vehicle construction.

2 Other relevant standards

DIN 17 221 Hot rolled steels for quenched and tempered springs; quality specifications

3 Designation



3.1 Standard designation

3.1.1 The standard designation is to be formed according to DIN 820 Part 27. Accordingly, the following are to be stated in the order shown:

- The denomination (spring steel),
- DIN number of this dimension standard,
- Code number or material number for the steel grade,
- Treatment condition of the steel,
- Nominal dimensions *b* X *s*.

3.1.2 Example of the standard designation

Designation of hot rolled ribbed and grooved spring steel in steel 51 Si 7, untreated (U) (material number 1.0903.00) of width *b* = 90 mm and thickness *s* = 13 mm:

Spring steel DIN 1570 – 51 Si 7 U – 90 X 13
or Spring steel DIN 1570 – 1.0903.00 – 90 X 13

3.2 Designation in order

3.2.1 For the satisfactory handling of an order, the standard designation is to be supplemented by the following data:

a) Quantity or number of pieces ordered (statement before the standard designation)

b) Length and desired permissible length deviation (for fixed lengths and exact lengths, see Table 3), also supplementary data on the requirement class *) for the steel grade according to DIN 17 221.

3.2.2 Example of designation in order

20 t steel with the standard designation according to Section 3.1.2 in exact lengths of 6500 mm, permissible length deviation ± 10 mm, requirement class 1 according to DIN 17 221:

20 t Spring steel DIN 1570 – 51 Si 7 U – 90 X 13 X 6500 ± 10, requirement class 1
or 20 t Spring steel DIN 1570 – 1.0903.00 – 90 X 13 X 6500 ± 10, requirement class 1

*) At present still called mode of delivery in DIN 17 221, December 1972 issue.

Continued on pages 2 and 3
Explanations on page 4

4 Dimensions and permissible deviations on dimension and form

4.1 Thickness and width

4.1.1 The thicknesses and widths, with which ribbed and grooved spring steel is supplied preferably, and their permissible deviations are contained in Table 1.

Table 1. **Dimensions and permissible dimension deviations**

Nominal dimension $b \times s$	Permissible deviations for b	Permissible deviations for s	Permissible difference in thickness within the same cross-section	Weight [1] kg/m	Section modulus [2] cm^3
60 × 8	± 0,3	± 0,2	0,2	3,68	0,640
70 × 10	± 0,3	± 0,2	0,2	5,41	1,17
90 × 13	± 0,5	± 0,2	0,2	9,09	2,53
90 × 16	± 0,5	± 0,2	0,2	11,2	3,84
100 × 13	± 0,5	± 0,2	0,2	11,1	2,81
120 × 13	± 0,5	± 0,2	0,2	12,1	3,38
120 × 16	± 0,5	± 0,2	0,2	15,0	5,12

[1] Calculated with a density of 7.85 kg/dm^3

[2] Calculated for the plain rectangular cross-section without groove and rib

4.1.2 The permissible differences in thickness within the same cross-section are also stated in Table 1.

4.1.3 The edge chamfer of the side faces has a radius of ≈ 1.6 mm.

4.2 Rib and groove

4.2.1 In the case of the nominal dimension 60 × 8, the radius r_1 for the groove must be at least 3.25 mm, and for the other nominal dimensions according to Table 1 at least 4.5 mm.

For the rib, the radius r_2 must not exceed 3.5 mm. (The centre-point for r_2 is displaced from the broad face carrying the rib into the center of the bar by 0.75 mm; see Fig. in Section 3.)

4.2.2 For the radius r_1 of the groove, a deviation of $^{+0,5}_{0}$ mm, for the radius r_2 of the rib deviation of $^{0}_{-0,5}$ mm is permissible.

4.2.3 The groove and rib may not be displaced laterally by more than 0.3 mm. The divergence between the axes of the two, within this permissible lateral displacement, must also not exceed 0.3 mm.

4.3 Concavity

The concavity must not exceed the values in Table 2.

Table 2. **Permissible concavity**

Thickness s above	Thickness s up to	Permissible concavity
–	10	0,2
10	16	0,3

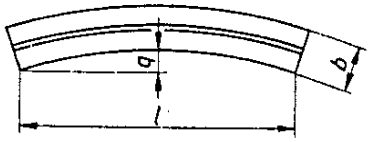
This concavity is permissible on either side, but at this point the greatest permissible lower thickness deviation must not be less than 50 %.

Example:

For the thickness s = 13 mm, with a permissible deviation of ± 0.2 mm, the smallest permissible dimension is 12.8 mm and the smallest permissible dimension due to concavity is 12.7 mm (with a permissible negative deviation of - 0.2 mm, increased by 50 % of this value = - 0.3 mm).

4.4 Straightness

The deviation q from the straightness must not exceed $0.0015 \cdot l$.



5 Material

Hot rolled ribbed and grooved spring steel according to this Standard will be produced from steel grades according to DIN 17 221, namely:

- preferably from 51 Si 7 (material number 1.0903),
- in exceptional cases from 50 CrV 4 (material number 1.8159).

The desired steel grade and the treatment condition are to be stated in the designation.

6 Mode of delivery

6.1 For the supply of hot rolled ribbed and grooved spring steel, the types of length according to Table 3 apply.

6.2 In case of ordering by weight, the length may vary between the maximum and minimum dimensions stated for the manufacturing length.

Table 3. **Types of length and permissible length deviations**

Type of length	Length		Ordering data for the length
	Range [1]	Permissible deviation	
Manufacturing length [2]	3000 to 8000	See Section 6.2	None [2]
Fixed length	3000 to 8000	± 100 [3]	Desired fixed length in mm
Exact length	3000 to 8000	± 50; ± 25 or ± 10 [3]	Desired exact length and desired permissible deviation in mm

1) Enquiries should be made to the manufacturer as to whether shorter or greater lengths can be supplied.

2) Ribbed and grooved spring steel can also be supplied in limited manufacturing lengths with a length range to be stated when ordering. The span between the shortest and greatest length of this range must be at least 2000 mm (e.g. 6000 to 8000).

3) When ordering the total spans for the permissible deviations may, by agreement, be arranged entirely on the plus side, e.g. $^{+\,200}_{0}$ mm (instead of ± 100 mm) in the case of fixed lengths or $^{+\,50}_{0}$ mm (instead of ± 25 mm) in the case of exact lengths.

7 Testing for accuracy to size

7.1 Extent of testing

If an acceptance testing is agreed, the number of bars which shall be tested for accuracy to size by measurements at the manufacturer's works shall also be agreed when ordering.

7.2 Testing procedure

7.2.1 The thickness and width according to Section 4.1 shall be measured at least 150 mm from the end of the bars when manufacturing lengths are supplied and at any point when fixed or exact lengths are supplied.

7.2.2 The thickness s shall be measured outside the area of the edge chamfer of the side faces (see Section 4.1.3).

7.2.3 When testing the straightness according to Section 4.4, the dimension q shall be measured over the full length of the bar.

Explanations

After publication of the first issue (April 1975) of Euronorm 92 – Hot rolled flat steel bar for leaf springs – the contents of DIN 1570 were also revised. The significant changes as compared with the October 1969 version of the DIN Standard and the differences from the above-mentioned Euronorm are listed below:

1. The discussions showed that only the 7 dimensions comprised in Table 1 are now used and produced in significant quantities in Germany. Accordingly, the spring steels 50 X 7 – 50 X 8 – 60 X 10 – 70 X 8 – 80 X 10 – 90 X 10 – 100 X 10 – 100 X 16 and 120 X 20, which were still included in the October 1969 issue, have been deleted.

   The number of standardized dimensions is thus far fewer than in Euronorm 92, which contains 30 spring steels – also including all the nominal dimensions listed in the DIN Standard.

2. The values for the permissible deviations on dimension and form have been adapted as far as possible to the provisions in the Technical Conditions of delivery of the International Railway Union (UIC) for ribbed and grooved spring steels and have thus been increased in some cases, as compared with the October 1969 version. However, in the following items, the tolerances are less than the values (stated in brackets) of Euronorm 92:

   Permissible width deviations for the nominal dimension 60 X 8 and 70 X 10 (± 0.5 mm),

   Permissible thickness deviations for the nominal dimension 120 X 16 (± 0.3 mm),

   deviation from the straightness ($0.002 \cdot l$).

   Through the new values, the previous special rule for the UIC section 120 X 16 is also eliminated.

3. As in the other new dimension standards for steel bars with simple cross-sectional shapes, the provisions for the permissible weight deviations have also been deleted in DIN 1570.