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Bright round steel

Dimensions Permissible deviations according to ISO tolerance zone h9

DIN 671

Blanker Rundstahl; Masse, zulässige Abweichungen nach ISO-Toleranzfeld h9

Supersedes 05.59 edition

As it is current practice in standards published by the International Organization for Standardization (ISO), the comma has been used throughout as a decimal marker.

Dimensions in mm

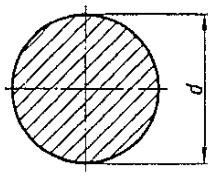
1 Field of application

This standard applies to bright round steel of nominal diameters from 1 to 150 mm, made of the steels listed in clause 5. Details as to finish and lengths to be delivered are given in clause 6.

2 Concept

Bright steel is a steel which, as a result of descaling and non-cutting cold working or of a metal-cutting machining operation, has acquired a smooth bright surface and is of a high degree of dimensional accuracy.

3 Designation



3.1 For the standard designation the following must be indicated in the order stated:

- term;
- DIN number of the dimensional standard;
- code number or material number of the steel grade;
- code letters or identification numbers of the finish (see subclause 6.1) and, where appropriate, of the heat treatment;
- nominal diameter.

Examples:

Designation of bright round steel of St 50-2 K steel (cold drawn) in accordance with DIN 1652 of nominal diameter d = 20 mm:

Round DIN 671 – St 50-2 K – 20

or Round DIN 671 – 1.0533.07 – 20

Designation of bright round steel of Ck 35 SH steel (peeled) in accordance with DIN 1652 of nominal diameter d = 50 mm:

Round DIN 671 – Ck 35 SH – 50

or Round DIN 671 – 1.1181 SH – 50

3.2 The term "round" may be replaced by the abbreviation "Rd" in accordance with DIN 1353 Part 2.

4 Dimensions, permissible dimensional deviations and deviations of form

4.1 Diameter

4.1.1 Table 1 lists the nominal diameters which can be supplied.

4.1.2 The permissible deviations from the nominal diameter corresponding to ISO tolerance zone h9 (see also DIN 7160) are given in table 1.

4.1.3 The difference between the maximum and minimum diameter in the same cross-sectional plane must not exceed 50 % of the permissible range allowed for the deviation in diameter (e.g. a maximum of 0,026 mm for d = 20 mm).

Continued on pages 2 to 5

Table 1. **Diameters, permissible deviations, cross sections and weights of bright round steel**

Diameter d [1]	per. dev.	Cross section mm²	Weight kg/m
1	0 −0,025	0,7854	0,00617
1,5		1,767	0,0139
2		3,142	0,0247
2,5		4,909	0,0385
3		7,069	0,0555
3,5	0 −0,030	9,621	0,0755
4		12,57	0,0986
4,5		15,90	0,125
5		19,63	0,154
5,5		23,76	0,187
6		28,27	0,222
6,5	0 −0,036	33,18	0,260
7		38,48	0,302
7,5		44,18	0,347
8		50,27	0,395
8,5		56,75	0,445
9		63,62	0,499
9,5		70,88	0,556
10		78,54	0,617
11	0 −0,043	95,03	0,746
12		113,1	0,888
13		132,7	1,04
14		153,9	1,21
15		176,7	1,39
16		201,1	1,58
17		227,0	1,78
18		254,5	2,00
19	0 −0,052	283,5	2,23
20		314,2	2,47
21		346,4	2,72
22		380,1	2,98
23		415,5	3,26
24		452,4	3,55
25		490,9	3,85
26	0 −0,052	530,9	4,17
27		572,6	4,49
28		615,8	4,83
29		660,5	5,19
30		706,9	5,55
32	0 −0,062	804,2	6,31
34		907,9	7,13
35		962,1	7,55
36		1 018	7,99
38		1 134	8,90
40		1 257	9,86
42		1 385	10,9
45		1 590	12,5
48		1 810	14,2
50		1 963	15,4
52	0 −0,074	2 124	16,7
55		2 376	18,7
58		2 642	20,7
60		2 827	22,2
63		3 117	24,5
65		3 318	26,0
70		3 848	30,2
75		4 418	34,7
80		5 027	39,5
85	0 −0,087	5 675	44,5
90		6 362	49,9
100		7 854	61,7
110		9 503	74,6
120		11 310	88,8
125	0 −0,100	12 270	96,3
130		13 270	104
140		15 390	121
150		17 670	139

1) By agreement, other nominal diameters can also be supplied. In such cases, the weight (in kg/m) can be calculated from the product $0{,}00617 \cdot d^2$ (d in mm) on the basis of a density of 7,85 kg/dm³.

4.2 Straightness

Rods are supplied straightened. Special requirements regarding straightness must be agreed on ordering.

5 Material

Bright round steel in accordance with this standard is preferably supplied in steel grades according to DIN 1651, DIN 1652, DIN 1654 Part 1 to Part 5, DIN 17100, DIN 17111, DIN 17200, DIN 17210 and DIN 17440. Other steel grades can be supplied on agreement.

The required steel grade must be stated in the designation (see clause 3).

6 Finish and lengths to be delivered

6.1 Finish

6.1.1 For bright round steel conforming to this standard, cold drawn (K) or peeled (SH) finishes are available.

6.1.2 The usual finishes are

cold drawn (K) for diameters < 45 mm,

peeled (SH) for diameters $\geqq 45 \leqq 150$ mm.

In principle, bright steel in coils (wire) is supplied only with a cold-drawn finish.

6.1.3 The code letters for the required finish must be quoted in the designation (see clause 3). In the absence of the appropriate information, the choice of finish is left to the manufacturer.

6.2 Lengths to be delivered

6.2.1 Bright round steel conforming to this standard is usually supplied in the form of rods in the types of length and permissible deviations in length listed in table 2.

6.2.2 When rods are ordered in manufacturing lengths or in stock lengths, the length may vary between the maximum and minimum dimensions listed in table 2. Rods of a total weight of up to 10% of the quantity supplied may fall below the lower limit shown for the length range, but the length must be at least 50% of this lower limit.

6.2.3 In the case of manufacturing and stock lengths of diameters < 45 mm, the ends of the rods are usually supplied in a sheared-off form. Cut off, sawn, separated or chamfered ends may be agreed.

6.2.4 Bright steel can also be supplied in coils (wire). Where supply in coils is required, the weights and dimensions of the coils must be agreed on ordering.

6.2.5 Examples for odering

a) 5000 kg bright round steel of St 50-2 K steel (cold drawn) of diameter $d = 20$ mm in manufacturing lengths

5000 kg round DIN 671 – St 50-2 K – 20

or

5000 kg round DIN 671 – 1.0533.07 – 20

b) 3000 kg bright round steel of Ck 35 SH steel (peeled) of diameter $d = 45$ mm in stock lengths 3000 to 4000 mm:

3000 kg round DIN 671 – Ck 35 SH – 45
stock length 3000 to 4000

or

3000 kg round DIN 671 – 1.1181 SH – 45
stock length 3000 to 4000

c) 1000 kg bright round steel of Ck 35 K steel (cold drawn) of diameter $d = 10$ mm in exact lengths of 3500 mm with a permissible deviation in length of ± 10 mm:

1000 kg round DIN 671 – Ck 35 K – 10 x 3500 ± 10

or

1000 kg round DIN 671 – 1.1181.07 – 10 x 3500 ± 10

Table 2. **Types of length and permissible deviations in length**

Type of length	Length: Range	Length: Permissible deviation	Details for the length to be indicated on ordering
Manufacturing length	3000 [1] to 12000	See subclause 6.2.2	None
Stock length	3000 to 4000 6000 to 7000	See subclause 6.2.2	"Stock length" and required length range
Exact length	1000 to 12000	To be indicated on ordering [2]	Required exact length and required permissible deviation [2] in mm

[1] For high-grade steel, 2000 to 12000 mm

[2] The minimum deviations in length which may be ordered are

± 2 mm for exact lengths $\leqq 4000$ mm

± 5 mm for exact lengths > 4000 mm

7 Testing

7.1 Extent of testing

If acceptance testing has been agreed, the number of rods or coils to be tested for dimensional accuracy by the manufacturer must also be agreed.

7.2 Test procedure

7.2.1 In the case of rods in manufacturing or stock lengths, and also of coils, the diameter must be measured at a distance of at least 150 mm from the end of the product. In the case of rods in exact lengths with an agreed permissible deviation in length of less than ± 200 mm, testing must be carried out at a distance of at least 10 mm from the ends.

7.2.2 Checking of the specifications in subclauses 4.1.1 to 4.1.3 may be carried out by any suitable method (limit gap gauge, micrometer callipers, three-point measuring devices etc.). Testing must be carried out at room temperature.

Standards referred to

DIN 1353 Part 2	Abbreviations of terms for semi-finished products
DIN 1651	Free cutting steels; technical conditions of delivery
DIN 1652	Bright unalloyed steel; technical conditions of delivery
DIN 1654 Part 1	Steels for cold heading and cold extruding; technical conditions of delivery; general
DIN 1654 Part 2	Steels for cold heading and cold extruding; technical conditions of delivery for killed unalloyed steels not intended for heat treatment
DIN 1654 Part 3	Steels for cold heading and cold extruding; technical conditions of delivery for case hardening steels
DIN 1654 Part 4	Steels for cold heading and cold extruding; technical conditions of delivery for steels for quenching and tempering
DIN 1654 Part 5	Steels for cold heading and cold extruding; technical conditions of delivery for stainless steels
DIN 7160	ISO allowances for external dimensions (shafts) for nominal dimensions from 1 to 500 mm
DIN 17100	Steels for general structural purposes; quality standard
DIN 17111	Low carbon unalloyed steels for bolts, nuts and rivets; technical conditions of delivery
DIN 17200	Quenched and tempered steels; quality specifications
DIN 17210	Case hardening steels; quality specifications
DIN 17440	Stainless steels; quality specifications

Further standards

DIN 175	Polished round steel; dimensions, permissible deviations according to ISO tolerance zone h9
DIN 668	Bright round steel; dimensions, permissible deviations according to ISO tolerance zone h11
DIN 669	Bright steel shafts; dimensions, permissible deviations according to ISO tolerance zone h9
DIN 670	Bright round steel; dimensions, permissible deviations according to ISO tolerance zone h8
DIN 59360	Ground and polished round steel; dimensions, permissible deviations according to ISO tolerance zone h7
DIN 59361	Ground and polished round steel; dimensions, permissible deviations according to ISO tolerance zone h6

Previous editions

DIN 667: 10.23; DIN 670: 09.39; DIN 671: 09.39, 02.43, 05.59

Amendments

As compared with the May 1959 edition, the following amendments have been made:

a) The stipulations regarding the designation of the products have been adapted to the rules laid down in DIN 820 Part 27 (clause 3 and subclause 6.2.5).

b) The number of nominal diameters listed in table 1 has been reduced. The field of application has been limited to nominal diameters up to a maximum of 150 mm (previous maximum 200 mm).

c) Details on the materials concerned have been expanded (clause 5).

d) The stipulations on finish and lengths of the products to be delivered have been adapted to the present state of the art and to current ordering practices (clause 6 and table 2). (See also Explanations).

Explanations

The existing subsequent editions of dimensional standards on bright round steel (DIN 175, DIN 668, DIN 669, DIN 670, DIN 671, DIN 59360 and DIN 59361) are the outcome of discussions within a technical committee consisting of equal numbers of manufacturers and users. The proposal discussed therein, that all stipulations for the products in question be brought together in o n e standard, met with no support, especially from the representatives of the users, on the grounds of the numerous amendments to order documents, drawings, parts lists, etc., which this would entail. Accordingly, the previous splitting remained in principle unchanged for the time being, with the result that the following standards, listed in order of increasing dimensional accuracy, apply to the individual ISO tolerance zones:

h11: DIN 668

h9: DIN 175 (polished round steel),
DIN 671 (drawn or peeled round steel),
DIN 669 (bright steel shafts)

h8: DIN 670

h7: DIN 59360

h6: DIN 59361

The suggestion that these standards be combined may, if it is thought appropriate, be put into effect at a later revision provided that this proceeding will be adopted in the planned version of an international delivery condition for bright round steel.

The major amendments, as compared with previous editions of the DIN Standards, are explained once more below:

a) The range of nominal diameters covered has been reduced in some cases and extended in others. Details are given in the "Amendments" clause of the relevant standard.

b) Those nominal diameters which were not listed as preferred dimensions have been deleted from table 1 with a view to concentrating orders on a smaller number of nominal dimensions. In DIN 175 preferred dimensions are not mentioned, because, in practice, any nominal diameter in the range from 1 to 30 mm will be supplied when ordered.

c) The permissible deviations from the nominal diameter in the individual tolerance zones conform to DIN 7160 and thus to the stipulations of ISO/R 286 – 1962. As compared with the earlier editions of the dimensional standards, amendments have only been made in the diameter range from 1 to 1,6 mm, for which the same permissible dimensional deviations apply in DIN 7160 as for the range over 1,6 up to 3 mm.

d) With the approval of all parties concerned, concrete numerical values for the permissible deviations from straightness were dispensed with again, especially as no real objections were raised to this point. At the request of users, the words "to the eye" have been deleted from the stipulation "straight to the eye" because these words do not furnish any additional proof in cases of complaint. Manufacturers would have rather retained the previous stipulation, because, in their view, it had proved useful in practice and must be regarded as the strictest possible requirement on straightness.

e) The specifications for the appropriate materials (clause 5), finishes and lengths to be delivered (clause 6) have been adapted to the present state of the art. Otherwise, the contents of the standard remained factually almost unchanged.