

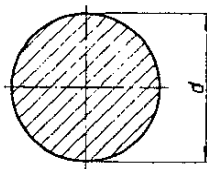
Bright round steel		<u>DIN</u> 668
Dimensions Permissible deviations according to ISO tolerance zone h11		
Blanker Rundstahl; Masse, zulässige Abweichungen nach ISO-Toleranzfeld h11		Supersedes 05.59 edition
<p><i>As it is current practice in standards published by the International Organization for Standardization (ISO), the comma has been used throughout as a decimal marker.</i></p> <p style="text-align: center;">Dimensions in mm</p>		
<p><b>1 Field of application</b></p> <p>This standard applies to bright round steel of nominal diameters from 1 to 200 mm, made of the steels listed in clause 5. Details as to finish and lengths to be delivered are given in clause 6.</p> <p><b>2 Concept</b></p> <p>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.</p> <p><b>3 Designation</b></p> <div style="text-align: center;">  </div> <p><b>3.1</b> For the standard designation the following must be indicated in the order stated:</p> <ul style="list-style-type: none"> <li>— term;</li> <li>— DIN number of the dimensional standard,</li> <li>— code number or material number of the steel grade;</li> <li>— code letters or identification numbers of the finish (see subclause 6.1) and, where appropriate, of the heat treatment;</li> <li>— nominal diameter.</li> </ul>	<p><b>Examples:</b></p> <p>Designation of bright round steel of St 50-2 K steel (cold drawn) in accordance with DIN 1652 of nominal diameter <math>d = 20</math> mm:</p> <p style="padding-left: 40px;">Round DIN 668 — St 50-2 K -- 20</p> <p>or Round DIN 668 — 1.0533.07 — 20</p> <p>Designation of bright round steel of Ck 35 SH steel (peeled) in accordance with DIN 1652 of nominal diameter <math>d = 50</math> mm:</p> <p style="padding-left: 40px;">Round DIN 668 — Ck 35 SH — 50</p> <p>or Round DIN 668 — 1.1181 SH — 50</p> <p><b>3.2</b> The term "round" may be replaced by the abbreviation "Rd" in accordance with DIN 1353 Part 2.</p> <p><b>4 Dimensions, permissible dimensional deviations and deviations of form</b></p> <p><b>4.1 Diameter</b></p> <p><b>4.1.1</b> Table 1 lists the nominal diameters which can be supplied.</p> <p><b>4.1.2</b> The permissible deviations from the nominal diameter corresponding to ISO tolerance zone h11 (see also DIN 7160) are given in table 1.</p> <p><b>4.1.3</b> 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 0,065 mm for <math>d = 20</math> mm).</p>	
Continued on pages 2 to 5		

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

Diameter <i>d</i> 1)		Cross section	Weight	Diameter <i>d</i> 1)		Cross section	Weight
	per. dev.	mm <sup>2</sup>	kg/m		per. dev.	mm <sup>2</sup>	kg/m
1	0 -0,060	0,7854	0,00617	27	0 -0,130	572,6	4,49
1,5		1,767	0,0139	28		615,8	4,83
2		3,142	0,0247	29		660,5	5,19
2,5		4,909	0,0385	30		706,9	5,55
3		7,069	0,0555				
3,5	0 -0,075	9,621	0,0755	32	0 -0,160	804,2	6,31
4		12,57	0,0986	34		907,9	7,13
4,5		15,90	0,125	35		962,1	7,55
5		19,63	0,154	36		1 018	7,99
5,5		23,76	0,187	38		1 134	8,90
6		28,27	0,222	40		1 257	9,86
6,5	0 -0,090	33,18	0,260	42	0 -0,190	1 385	10,9
7		38,48	0,302	45		1 590	12,5
7,5		44,18	0,347	48		1 810	14,2
8		50,27	0,395	50		1 963	15,4
8,5		56,75	0,445				
9		63,62	0,499	52		2 124	16,7
9,5	70,88	0,556	55	2 376	18,7		
10	78,54	0,617	58	2 642	20,7		
11	0 -0,110	95,03	0,746	60	0 -0,220	2 827	22,2
12		113,1	0,888	63		3 117	24,5
13		132,7	1,04	65		3 318	26,0
14		153,9	1,21	70		3 848	30,2
15		176,7	1,39	75		4 418	34,7
16		201,1	1,58	80		5 027	39,5
17		227,0	1,78				
18		254,5	2,00	85		5 675	44,5
19	0 -0,130	283,5	2,23	90	0 -0,250	6 362	49,9
20		314,2	2,47	100		7 854	61,7
21		346,4	2,72	110		9 503	74,6
22		380,1	2,98	120		11 310	88,8
23		415,5	3,26				
24		452,4	3,55	125		12 270	96,3
25		490,9	3,85	130		13 270	104
26		530,9	4,17	140		15 390	121
			150	17 670	139		
			160	20 110	158		
			180	25 450	200		
			200	31 420	247		

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  $7,85 \text{ kg/dm}^3$ .

## 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 17 100, DIN 17 111, DIN 17 200, DIN 17 210 and DIN 17 440. 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  $\geq 45 \leq 150$  mm.

In principle, bright steel in coils (wire) is supplied only with a cold-drawn finish; rods of diameters  $> 150$  mm are normally supplied only with a peeled 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 not exceeding 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 ordering

- 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 668 – St 50-2 K – 20**  
 or  
**5000 kg round DIN 668 – 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 668 – Ck 35 SH – 45**  
**stock length 3000 to 4000**  
 or

**3000 kg round DIN 668 – 1.1181 SH – 45**  
**stock length 3000 to 4000**

- c) 1000 kg bright round steel of Ck 35 K steel (cold drawn) of  $d = 10$  mm in exact lengths of 3500 mm with a permissible deviation in length of  $\pm 10$  mm:  
**1000 kg round DIN 668 – Ck 35 K – 10 x 3500  $\pm 10$**   
 or  
**1000 kg round DIN 668 – 1.1181.07 – 10 x 3500  $\pm 10$**

Table 2. Types of length and permissible deviations in length

Type of length	Length		Details for the length to be indicated on ordering
	Range	Permissible deviation	
Manufacturing length	3 000 <sup>1)</sup> to 12 000	See subclause 6.2.2	None
Stock length	3 000 to 4 000 6 000 to 7 000	See subclause 6.2.2	"Stock length" and required length range
Exact length	1 000 to 12 000	To be indicated on ordering <sup>2)</sup>	Required exact length and required permissible deviation <sup>2)</sup> in mm
<sup>1)</sup> For high-grade steel, 2000 to 12 000 mm <sup>2)</sup> The minimum deviations in length which may be ordered are $\pm 2$ mm for exact lengths $\leq 4000$ mm $\pm 5$ 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  $\pm 200$  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 17 100	Steels for general structural purposes; quality standard
DIN 17 111	Low carbon unalloyed steels for bolts, nuts and rivets; technical conditions of delivery
DIN 17 200	Quenched and tempered steels; quality specifications
DIN 17 210	Case hardening steels; quality specifications
DIN 17 440	Stainless steels; quality specifications

**Further standards**

DIN 175	Polished round steel; dimensions, permissible deviations according to ISO tolerance zone h9
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 671	Bright round steel; dimensions, permissible deviations according to ISO tolerance h9
DIN 59 360	Ground and polished round steel; dimensions, permissible deviations according to ISO tolerance zone h7
DIN 59 361	Ground and polished round steel; dimensions, permissible deviations according to ISO tolerance zone h6

**Previous editions**

DIN 668: 10.23, 10.25, 05.32, 10.38, 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.
- 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 one 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.