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Ground and polished bright round steel

Dimensions Permissible deviations according to ISO tolerance zone h 6

DIN 59 361

Geschliffen-polierter blanker Rundstahl; Masse; zulässige Abweichungen nach ISO-Toleranzfeld h6

Supersedes 06.69 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

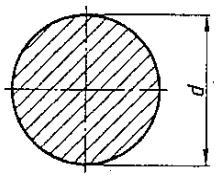
1 Field of application

This Standard applies to ground and polished bright round steel (rounds) of nominal diameters from 1 up to 150 mm of the steels quoted in clause 5. Details as to finish and deliverable lengths are given in clause 6.

2 Concept

Bright steel is a steel, having got a smooth, bright surface by descaling and non-cutting cold working and showing a high accuracy to size. A still better surface finish and a higher accuracy is achieved by a ground or ground and polished finish.

3 Designation



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

- term,
- DIN number of the dimensional standard,
- code number or material number of the steel grade,
- nominal diameter

Examples:

Designation of ground and polished[1] bright round steel of steel C 35 K according to DIN 1652 with nominal diameter d = 20 mm:

Round DIN 59 361 — C 35 K — 20

or Round DIN 59 361 — 1.0501.07 — 20

If an ISO tolerance zone other than h is agreed (for example, f6) this must be indicated behind the indentification number for the nominal diameter, e.g.:

Round DIN 59 361 — C 35 K — 20 f6

or Round DIN 59 361 — 1.0501.07 — 20 f6

3.2 The term "Round" may be replaced by the abbreviated form "Rd" according to DIN 1353 Part 2.

4 Dimensions, permissible dimensional deviations and deviations of form

4.1 Diameter

4.1.1 The deliverable nominal diameters are given in table 1.

4.1.2 The permissible deviations from the nominal diameter corresponding to ISO tolerance zone h6 (see also DIN 7160) are quoted 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 for the deviation of diameter e.g., 0,004 mm maximum for d = 5 mm).

[1] The suffix numbers to the material numbers for the "ground and polished" and "ground" finishes will be stipulated at a later date.

Continued on pages 2 to 5

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

Diameter d [1]	per. dev.	Cross section mm²	Weight kg/m
1	0 −0,006	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 −0,008	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 −0,009	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 −0,011	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 −0,013	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 −0,013	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 −0,016	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 −0,019	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 −0,022	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 −0,025	12 270	96,3
130		13 270	104
140		15 390	121
150		17 670	139

[1] Other nominal diameters can be supplied by agreement. The weight (in kg/m) can, in these cases, be calculated from the product $0{,}00617 \cdot d^2$ (d in mm), with a density of 7,85 kg/dm³ taken as the basis.

4.2 Straightness

Rods are delivered in straight condition. Special requirements regarding the straightness must be agreed on ordering.

5 Material

Bright round steel according to this Standard is preferably supplied in steel grades in accordance with DIN 1651, DIN 1652, DIN 17 100, DIN 17 200, DIN 17 210 and DIN 17 440.

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

6 Finish and deliverable lengths

6.1 Finish

6.1.1 Bright round steel according to this Standard is usually cold-drawn (K) or peeled (SH) and in both cases ground and polished afterwards.

6.1.2 The customary finishes are

cold-drawn (K) and then ground and polished for diameters < 45 mm,

peeled (SH) and then ground and polished for diameters $\geqq 45 \leqq 150$ mm.

6.1.3 The code letters for the required finish must be quoted in the designation (see clause 3). If corresponding details are not indicated, the finish is left to the manufacturer.

6.2 Deliverable lengths

6.2.1 Bright round steel according to this Standard is supplied in rods with the types of length and the permissible length deviations according to table 2.

6.2.2 When ordering rods of manufacturing length or stock length the length may vary between the maximum and minimum dimensions specified in table 2. Rods with a total weight not exceeding 10 % of the quantity delivered may fall below the lower limit of the length range; the length, however, must be at least 50 % of the lower limiting value.

6.2.3 If in manufacturing or stock lengths, rod ends with diameters < 45 mm are usually delivered with a sheared-off finish. Cut off ends, sawn, separated or chamfered ends may be agreed.

6.2.4 Examples for ordering

a) 5000 kg of ground and polished bright round steel of steel C 35 K, diameter $d = 20$ mm, in manufacturing lengths

5000 kg round DIN 59 361 – C 35 K – 20

or

5000 kg round DIN 59 361 – 1.0501.07 – 20

b) 3000 kg of ground and polished bright round steel of steel Ck 35 SH (peeled), of diameter $d = 50$ mm, in stock lengths 3000 to 4000 mm:

3000 kg round DIN 59 361 – Ck 35 SH – 50
stock length 3000 to 4000

or

3000 kg round DIN 59 361 – 1.1181 SH – 50
stock length 3000 to 4000

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

1000 kg round
DIN 59 361 – Ck 35 K – 10 SL x 3500 ± 10

or

1000 kg round
DIN 59 361 – 1.1181.07 – 10 SL x 3500 ± 10

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

Type of length	Length: Range	Length: Permissible deviation	Details concerning length to be indicated on ordering
Manufacturing length	3 000 [1] up to 12 000	See subclause 6.2.2	None
Stock length	3 000 up to 4 000 6 000 up to 7 000	See subclause 6.2.2	"Stock length" and required length range
Exact length	1 000 up to 12 000	To be indicated on ordering [2]	Required exact length and required permissible deviation in mm [2]

[1] In the case of high-grade steel from 2000 up to 12 000 mm

[2] The minimum available length deviations 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 is agreed the number of rounds to be tested for dimensional accuracy by the manufacturer must also be agreed.

7.2 Procedure

7.2.1 The diameter of rods in manufacturing length or stock length must be measured at a distance of at least 150 mm from the end of the product. On rods in exact length with an agreed permissible length deviation 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 stipulations in subclauses 4.1.1 to 4.1.3 may be carried out by using all suitable methods (limit gap gauges, micrometer callipers, three-point measuring devices). 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 7160	ISO allowances for external dimensions (shafts) for nominal dimensions from 1 up to 500 mm
DIN 17 100	Steels for structural purposes; quality standard
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, 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 671	Bright round steel; dimensions, permissible deviations according to ISO tolerance zone h9
DIN 59 360	Ground and polished bright round steel; dimensions, permissible deviations according to ISO tolerance zone h7

Previous editions

DIN 59 361: 06.69,

Amendments

As compared with the June 1969 edition the following amendments have been made:

a) The stipulations relating to the designations of the product have been adapted to the rules laid down in DIN 820 Part 27 (clause 3 and subclause 6.2.4).

b) The number of nominal diameters quoted in table 1 has been reduced. The scope of the Standard has been extended to cover nominal diameters up to 150 mm (previously up to 80 mm).

c) The details on the appropriate materials have been extended (clause 5).

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

Explanations

The existing subsequent editions of dimensional standards for bright round steel (DIN 175, DIN 668, DIN 669, DIN 670, DIN 671, DIN 59 360 and DIN 59 361) are the result of discussions of a technical committee in which manufacturers and customers were represented in equal numbers. The representatives of the consumers did not support the discussed proposal to include all stipulations for the products quoted in o n e standard because of the numerous amendments to be made in the documents for ordering, drawings, parts lists etc. Consequently, the previous splitting remained unchanged, in principle, so that the following standards apply to the individual ISO tolerance zones, classified according to an increasing dimensional accuracy.

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 59 360

h6: DIN 59 361

It is intended to realize the proposal of combining these standards in 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 made in comparison with previous editions of the DIN Standards are explained once more in the following.

a) The range of the stated nominal diameters was restricted in some cases, in other cases it was extended. The details are indicated in the "amendments" clause of the respective standard.

b) The nominal diameters which were not presented as preferred dimensions in previous editions have been deleted from table 1, to concentrate the orders to a smaller number of nominal dimensions. In DIN 175 preferred dimensions are not mentioned because any nominal diameter within the range from 1 up to 30 mm is supplied when ordered.

c) The permissible deviations from the nominal diameter in the individual tolerance zones correspond with DIN 7160 and accordingly to the stipulations of ISO/R 286 – 1962. As compared with previous editions of the dimensional standards amendments have only been made in the diameter range from 1 up to 1,6 mm, for which, in DIN 7160, the same permissible dimensional deviations apply 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 of the rods were dispensed with again, especially since hardly any complaints on this subject have been made so far. On request of the consumers the words "to the eye" have been deleted from the previous stipulation "straight to the eye", as these words do not furnish any additional proof in cases of complaint. The manufacturers would have rather retained the previous stipulation which has shown its merit in practice and must be regarded as the strictest requirement on straightness.

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