UDC 669.14-422.41/.42 : 001.4 : 621.753.1

August 1982

Precision flat and square steel bars

Dimensions, weights, permissible deviations

DIN 59 350

Präzisionsflach- und -vierkantstahl; Masse, Gewichte, zulässige Abweichungen

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

1.1 This standard applies to fine-finished precision flat and square steel bars (hereinafter briefly referred to as precision flats and squares) supplied in bars 500 mm in length with the nominal sizes given in tables 1 to 4 and made of the materials specified in clause 5.

Note: By way of departure from the specifications laid down in EURONORM 79, in this standard the term "flat" is also used for products exceeding 150 mm in thickness.

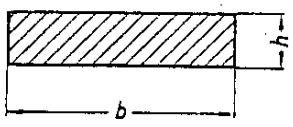
1.2 This standard does not apply to

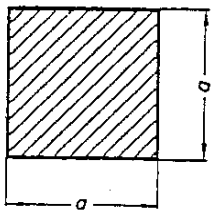
- bright flats (see DIN 174),
- bright squares (see DIN 178),
- cold rolled strip (see DIN 1544).

2 Concept

A precision flat or a precision square is a steel bar of sharp-edged rectangular or square cross section with fine-finished longitudinal surfaces free of decarburization.

3 Designation





3.1 Standard designation

a) Standard designation of a 90 MnCrV 8 steel precision flat (material number 1.2842) with a width *b* of 150 mm and a thickness *h* of 25 mm:

Precision flat DIN 59 350 – 90 MnCrV 8 – 150 X 25

or Precision flat DIN 59 350 – 1.2842 – 150 X 25

b) Standard designation of an X 210 CrW 12 steel precision square (material number 1.2436) with a side length *a* of 20,4 mm:

Precision square DIN 59 350 – x 210 CrW 12 – 20,4

or Precision square DIN 59 350 – 1.2436 – 20,4

3.2 Designation used for ordering

In the order the data relating to the required quantity to be supplied or the piece number must be placed before the standard designation.

Example:

10 pieces of precision flats with standard designation as given in subclause 3.1 a:

10 pieces precision flat DIN 59 350 – 90 MnCrV 8 – 150 X 25

or **10 pieces precision flat DIN 59 350 – 1.2842 – 150 X 25**

Continued on pages 2 to 5

4 Dimensions and permissible dimensional deviations and deviations of form

4.1 Nominal sizes

Tables 1 and 2 specify the nominal sizes to be preferred when ordering products with finished sizes, and tables 3 and 4 when ordering products with machining allowances.

The bracketed nominal sizes are not preferred sizes and are usually not in stock.

Table 1. Nominal sizes and nominal weights of precision flats with finished sizes

Width b [1]	Thickness h [1]												
	(1)	2	3	4	5	6	8	10	12	15	20	25	(30)
	Weight in kg [2]												
10	(0,039)	0,079	0,118	0,158	0,197	0,236	0,315						
15	(0,059)	0,118	0,177	0,236	0,296	0,355	0,473	0,591	0,709				
20	(0,079)	0,158	0,236	0,315	0,394	0,473	0,631	0,788	0,946	1,18			
25	(0,098)	0,197	0,295	0,394	0,493	0,591	0,788	0,985	1,18	1,48	1,97		
30	(0,118)	0,236	0,355	0,473	0,591	0,709	0,946	1,18	1,42	1,77	2,36	2,96	
40	(0,158)	0,315	0,473	0,630	0,788	0,946	1,26	1,58	1,89	2,36	3,15	3,94	(4,73)
50	(0,197)	0,394	0,591	0,788	0,985	1,18	1,58	1,97	2,36	2,96	3,94	4,93	(5,91)
60	(0,236)	0,473	0,709	0,946	1,18	1,42	1,89	2,36	2,84	3,55	4,73	5,91	(7,09)
70	(0,276)	0,552	0,828	1,10	1,38	1,66	2,21	2,76	3,31	4,14	5,52	6,90	(8,28)
(75)	(0,296)	(0,591)	(0,887)	(1,18)	(1,48)	(1,77)	(2,36)	(2,96)	(3,55)	(4,43)	(5,91)	(7,39)	(8,87)
80	(0,315)	0,631	0,946	1,26	1,58	1,89	2,52	3,15	3,78	4,73	6,31	7,88	(9,46)
100	(0,394)	0,788	1,18	1,58	1,97	2,36	3,15	3,94	4,73	5,91	7,88	9,85	(11,82)
(120)	(0,473)	(0,946)	(1,42)	(1,89)	(2,36)	(2,84)	(3,78)	(4,73)	(5,67)	(7,09)	(9,46)	(11,82)	(14,19)
125	(0,493)	(0,985)	1,48	1,97	2,29	2,96	3,94	4,93	5,91	7,39	9,85	12,31	(14,78)
150	(0,591)	(1,18)	(1,77)	2,36	2,96	3,55	4,73	5,91	7,09	8,87	11,82	14,78	(17,73)
(160)	(0,631)	(1,26)	(1,89)	(2,52)	(3,15)	(3,78)	(5,04)	(6,31)	(7,57)	(9,46)	(12,61)	(15,76)	(18,92)
200	(0,788)	(1,58)	(2,36)	3,15	3,94	4,73	6,31	7,88	9,46	11,82	15,76	19,70	(23,64)
250	(0,985)	(1,97)	(2,96)	3,94	4,93	5,91	7,88	9,85	11,82	14,78	19,70	24,63	(29,56)
300	(1,18)	(2,36)	(3,55)	4,73	5,91	7,09	9,46	11,82	14,19	17,73	23,64	29,56	(35,47)

[1] see subclause 4.1
[2] applicable to a bar 500 mm in length; see clause 7

Table 2. Nominal sizes and nominal weights of precision squares with finished sizes

Side length a [1]	Weight kg [2]	Side length a [1]	Weight kg [2]
(6)	(0,142)	20	1,58
(8)	(0,252)	25	2,46
10	0,394	30	3,55
12	0,567	40	6,31
15	0,887	50	9,85

[1] see subclause 4.1
[2] applicable to a bar 500 mm in length; see clause 7

Table 3. **Nominal sizes and nominal weights of precision flats with machining allowances**

Width b [1]	Thickness h [1]											
	2,2	3,2	4,2	5,2	6,2	8,2	10,4	12,4	15,4	20,4	25,4	(30,4)
	Weight in kg [2]											
10,3	0,089	0,130	0,170	0,211	0,252	0,333						
15,3	0,133	0,193	0,253	0,314	0,374	0,494	0,627	0,748				
20,3	0,176	0,256	0,336	0,416	0,496	0,656	0,832	0,992	1,23			
25,3	0,219	0,319	0,419	0,518	0,618	0,818	1,04	1,24	1,54	2,03		
30,3	0,263	0,382	0,501	0,621	0,740	0,979	1,24	1,48	1,84	2,44	3,03	
40,3	0,349	0,508	0,667	0,826	0,985	1,30	1,65	1,97	2,45	3,24	4,03	(4,82)
50,3	0,436	0,634	0,833	1,03	1,23	1,63	2,06	2,46	3,05	4,04	5,03	(6,03)
60,3	0,523	0,760	0,998	1,24	1,47	1,95	2,47	2,95	3,66	4,85	6,04	(7,22)
70,3	0,609	0,886	1,16	1,44	1,72	2,27	2,88	3,44	4,27	5,65	7,04	(8,42)
(75,3)	(0,653)	(0,950)	(1,25)	(1,54)	(1,84)	(2,43)	(3,09)	(3,68)	(4,57)	(6,05)	(7,54)	(9,02)
80,3	0,696	1,01	1,33	1,65	1,96	2,59	3,29	3,92	4,87	6,46	8,04	(9,62)
100,3	0,870	1,26	1,66	2,06	2,45	3,24	4,11	4,90	6,09	8,06	10,04	(12,02)
125,3	(1,09)	1,58	2,07	2,57	3,06	4,05	5,14	6,12	7,60	10,07	12,54	(15,01)
150,3	(1,30)	(1,90)	2,49	3,08	3,67	4,86	6,16	7,34	9,12	12,08	15,04	(18,01)
200,3	(1,74)	(2,53)	3,32	4,10	4,89	6,47	8,21	9,79	12,16	16,10	20,05	(24,0)
250,3	(2,17)	(3,16)	4,14	5,13	6,12	8,09	10,26	12,23	15,19	20,12	25,05	(29,99)
300,3	(2,60)	(3,79)	4,97	6,15	7,34	9,70	12,31	14,67	18,22	24,14	30,06	(35,98)

[1] see subclause 4.1
[2] applicable to a bar 500 mm in length; see clause 7

Table 4. **Nominal sizes and nominal weights of precision squares with machining allowances**

Side length a [1]	Weight kg [2]
(8,2)	(0,261)
10,4	0,426
12,4	0,606
15,4	0,935
20,4	1,64
25,4	2,54
(30,4)	(3,64)

[1] see subclause 4.1
[2] applicable to a bar 500 mm in length; see clause 7

4.2 **Permissible dimensional deviations**

4.2.1 The permissible deviations shall be

a) for products with finished sizes given in tables 1 and 2:

$^{+\,0,05}_{\ 0}$ mm for thickness h and side length a,

$^{+\,0,2}_{\ 0}$ mm for width b,

b) for products with machining allowances given in tables 3 and 4:

$^{+\,0,2}_{\ 0}$ mm for width b, thickness h and side length a.

4.2.2 The permissible deviation in length (500 mm) for products with finished sizes and also for those with machining allowances shall be $^{+\,5}_{\ 0}$ mm.

4.3 Permissible deviations of form

4.3.1 Squareness

The permissible deviation from the right angle between the side faces of the product, and between the end face (see subclause 6.2) and the side faces shall be 0° 15'.

4.3.2 Parallelism of side faces

Unless otherwise specified in the order, the side faces of the product shall be parallel to each other, within the limits of the permissible dimensional deviations given in subclause 4.2.1.

4.3.3 Straightness

The deviation from straightness is measured as the maximum distance between the product and a flat horizontal board on which the product is lying with only its dead load acting upon the board. The permissible deviations are given in table 5 (see clause 8).

Table 5. Permissible deviations from straightness

Width b or side length a	Permissible deviations from straightness [1] for thickness h or side length a				
	from 1 to 2,2	over 2,2 up to 5,2	over 5,2 up to 10,4	over 10,4 up to 20,4	over 20,4 up to 30,4
up to 100,3	(1,0)	0,8	0,7	0,5	0,3
over 100,3 up to 200,3	(1,5)	1,1	0,8	0,6	0,4
over 200,3 up to 300,3	(2,0)	1,5	0,9	0,8	0,5

[1] For small product thicknesses greater deviations are possible. Therefore the bracketed values shall be taken as reference values only.

5 Material

5.1 Precision flats and squares conforming to this standard are predominantly made of

- alloyed tool steels (e.g. 90 MnCrV 8) in accordance with DIN 17 350 for products with finished sizes as specified in tables 1 and 2,
- ledeburitic chromium steels (e.g. X 210 CrW 12) in accordance with DIN 17 350 for products with machining allowances as specified in tables 3 and 4.

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

5.2 The products made of the steels given in subclause 5.1 are usually supplied in the soft-annealed condition; other heat treatment conditions shall be agreed on ordering.

6 Finish

6.1 Surface roughness

The average peak-to-valley height R_a of the surfaces shall be

max. 2 µm for products with finished sizes,

max. 6 µm for products with machining allowances.

These values apply to surfaces of the wide sides in the case of precision flats, and to the surfaces of all the longitudinal sides in the case of precision squares.

6.2 Surface finish on delivery

Each of the products shall be supplied with one fine-finished end face and one coarse-finished end.

7 Weight

The weights given in tables 1 to 4 apply to bars 500 mm in length and a density of 7,85 kg/dm³. For steels with a greater content of alloying elements there may be considerable deviations from the latter value. Therefore, the values given in tables 1 to 4 shall be taken as reference values only.

8 Testing

If acceptance testing has been agreed, the number of bars to be tested by the manufacturer for accuracy to size must also be agreed.

The deviations from straightness (see subclause 4.3.3) may be measured over any side face of the product by using feeler gauges.

Standards referred to

DIN 174	Bright flat steel; dimensions, permissible deviations, weights
DIN 178	Bright square steel; dimensions, permissible deviations, weights
DIN 1544	Flat steel products; cold rolled steel strip; dimensions, permissible dimensional deviations and deviations of form
DIN 17 350	Tool steels; technical delivery conditions
EURONORM 79	Classification of and terminology relating to steel products on the basis of shapes and dimensions

Explanations

This first edition of DIN 59 350 is intended to specify uniform requirements for the dimensions as well as for the permissible dimensional deviations and deviations of form of precision flats and squares.

Precision flats and squares are usually made of alloyed tool steels or ledeburitic chromium steels, cut to lengths of 500 mm. Depending on the order, precision flats and squares can be supplied with finished sizes or with machining allowances, in widths of about 10 to 300 mm and thicknesses of 1 to 30 mm in the case of flats or in side lengths of about 6 to 50 mm in the case of squares. For bars with finished sizes the permissible dimensional deviations are generally smaller compared with bright flats and squares specified in DIN 174 and DIN 178 respectively; in accordance with DIN 59 350 only positive deviations (i.e. no lower deviation from the nominal dimensions) are permissible. In addition, maximum values of the surface roughness have been specified for the products.

International Patent Classification

B 21 C 37/04
C 21 D 9/52