UDC 669.14-422.4-122.4

January 1977

Steel Bars

Hot Rolled Bulb Flats

Dimensions, Weights, Permissible Variations, Static Values

DIN 1019

Stabstahl; Warmgewalzter Wulstflachstahl; Maße, Gewichte, zulässige Abweichungen, statische Werte

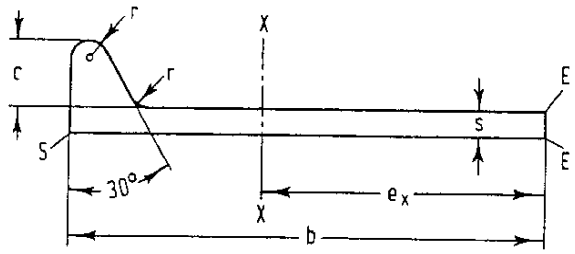
For connection with Euronorm 67 issued by the European Coal and Steel Community and with the ISO Standard just in course of preparation, see Explanations.

Dimensions in mm

1 Scope

This Standard applies to hot rolled bulb flats with bulb on one end only, within the range of dimensions stated in Table 1 and made of steel grades specified in Section 4.

2 Designation



Designation of a hot rolled bulb flat (shape letters HP) of width b = 200 mm and thickness s = 10 mm, made of shipbuilding steel A according to the prescriptions of the Germanischer Lloyd (GL, see Section 4), material number 1.0441:

Bulb flats DIN 1019 – A – GL – HP 200 x 10

or

Bulb flats DIN 1019 – 1.0441 – HP 200 x 10

Instead of the denomination "Wulstflach" (bulb flat) the abbreviation "Wulst Fl" according to DIN 1353 Part 2 may be used.

3 Dimensions and permissible dimension and form variations

3.1 Cross-section

3.1.1 Hot rolled bulb flats according to this Standard shall be supplied to the dimensions specified in Table 1.

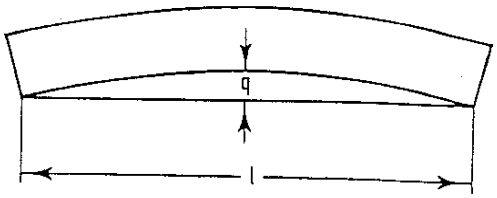
3.1.2 The permissible variations on width and thickness are given in Table 2.

3.1.3 The maximum values for the radii of curvature at the corners E and S shall be those specified in Table 3.

3.1.4 The static values and the data relating to area of cross-section and surface area in Table 1 have been calculated from the nominal dimensions.

3.2 Straightness

The permissible variation q from straightness shall not exceed 0.0035 · l. Straightness requirements more stringent shall be agreed to at the time of ordering.



4 Material

Bulb flats according to this Standard shall preferably be made of steel grades according to the prescriptions of the following Shipbuilding Classification Societies *):

American Bureau of Shipping (ABS)

Bureau Veritas (BV)

Germanischer Lloyd (GL)

Lloyd's Register of Shipping (LR)

Det Norske Veritas (NV)

Registro Italiano Navale (R. I. NA)

The grade of steel required shall be indicated when ordering (see Section 2).

*) The addresses of the Classification Societies can be obtained from the Fachnormenausschuss für Eisen und Stahl (FES) (Committee for Iron and Steel), Breite Strasse 27, 4000 Düsseldorf

Continued on pages 2 and 3
Explanations on page 4

Table 1. Dimensions, cross-section, weight and surface area as well as static values of hot rolled bulb flats

Symbol	Dimensions [1] for				Cross-section	Weight	Surface area	Distance of axis	Characteristic sizes for the bending axis [4] x – x	
HP	b	s	c	r	A [2] cm²	G kg/m	U [3] m²/m	e_x cm	I_x cm⁴	W_x cm³
80 × 6	80	6	14	4	6,20	4,87	0,192	4,78	39,0	8,15
80 × 7	80	7	14	4	7,00	5,50	0,194	4,69	43,3	9,24
100 × 7	100	7	15,5	4,5	8,74	6,86	0,236	5,87	85,3	14,5
100 × 8	100	8	15,5	4,5	9,74	7,65	0,238	5,78	94,3	16,3
120 × 7	120	7	17	5	10,5	8,25	0,278	7,07	148	21,0
120 × 8	120	8	17	5	11,7	9,19	0,280	6,96	164	23,6
140 × 7	140	7	19	5,5	12,6	9,74	0,320	8,31	241	29,0
140 × 8	140	8	19	5,5	13,8	10,8	0,322	8,18	266	32,5
160 × 7	160	7	22	6	14,6	11,4	0,365	9,66	373	38,6
160 × 8	160	8	22	6	16,2	12,7	0,367	9,49	411	43,3
160 × 9	160	9	22	6	17,8	14,0	0,369	9,36	448	47,9
180 × 8	180	8	25	7	18,9	14,8	0,411	10,9	609	55,9
180 × 9	180	9	25	7	20,7	16,2	0,413	10,7	663	61,8
180 × 10	180	10	25	7	22,5	17,6	0,415	10,6	717	67,8
200 × 9	200	9	28	8	23,6	18,5	0,457	12,1	941	77,7
200 × 10	200	10	28	8	25,6	20,1	0,459	11,9	1020	85,0
200 × 11,5	200	11,5	28	8	28,6	22,5	0,462	11,7	1126	96,2
220 × 10	220	10	31	9	29,0	22,8	0,503	13,4	1400	105
220 × 11,5	220	11,5	31	9	32,3	25,4	0,506	13,1	1550	118
240 × 10	240	10	34	10	32,4	25,4	0,547	14,7	1860	126
240 × 11	240	11	34	10	34,9	27,4	0,549	14,6	2000	137
240 × 12	240	12	34	10	37,3	29,3	0,551	14,4	2130	148
260 × 10	260	10	37	11	36,1	28,3	0,593	16,2	2477	153
260 × 11	260	11	37	11	38,7	30,3	0,593	16,0	2610	162
260 × 12	260	12	37	11	41,3	32,4	0,595	15,8	2770	175
280 × 11	280	11	40	12	42,6	33,5	0,637	17,4	3330	191
280 × 12	280	12	40	12	45,5	35,7	0,639	17,2	3550	206
300 × 11	300	11	43	13	46,7	36,7	0,681	18,9	4190	222
300 × 12	300	12	43	13	49,7	39,0	0,683	18,7	4460	239
300 × 13	300	13	43	13	52,8	41,5	0,685	18,5	4720	256
320 × 12	320	12	46	14	54,2	42,5	0,728	20,1	5530	274
320 × 13	320	13	46	14	57,4	45,0	0,730	19,9	5850	294
340 × 12	340	12	49	15	58,8	46,1	0,772	21,5	6760	313
340 × 14	340	14	49	15	65,5	51,5	0,776	21,1	7540	357
370 × 13	370	13	53,5	16,5	69,6	54,6	0,840	23,5	9470	402
370 × 15	370	15	53,5	16,5	77,0	60,5	0,844	23,0	10490	455
400 × 14	400	14	58	18	81,4	63,9	0,908	25,5	12930	507
400 × 16	400	16	58	18	89,4	70,2	0,912	25,0	14220	568
430 × 15	430	15	62,5	19,5	94,1	73,9	0,976	27,4	17260	628
430 × 17	430	17	62,5	19,5	103	80,6	0,980	26,9	18860	700

[1] For permissible variations see Table 2.

[2] $A = b \cdot s + 0{,}2887 \cdot c^2 + 1{,}5774 \cdot c \cdot r - 0{,}2416 \cdot r^2$

[3] $U = 2 \cdot (b + s) + 1{,}5774 \cdot c - 0{,}6442 \cdot r$

[4] I moment of inertia, W section modulus

Table 2. **Permissible dimension variations**

Dimensions b >	b ≦	s ≧	s ≦	Permissible variations for b	Permissible variations for s
	120	6	8	± 1,5	+ 0,7 − 0,3
120	180	7	10	± 2,0	+ 1,0 − 0,3
180	300	9	13	± 3,0	+ 1,0 − 0,4
300	430	12	17	+ 4,0	+ 1,2 − 0,4

Table 3. **Radii of curvature at corners E and S**

Thickness s >	Thickness s ≦	Radius of curvature maximum
	6	1,5
6	9	2
9	13	3
13	17	4

5 Weight and permissible weight variations

5.1 The weights stated in Table 1 have been calculated from the cross-section, on the basis of a density of 7,85 kg/dm³.

5.2 The permissible weight variations amount to:

$^{+6}_{-2}$ % of total weight for delivered quantities ≧ 5 t,

$^{+8}_{-2.7}$ % of total weight for delivered quantities < 5 t.

The weight variation for the purpose of this Standard is the difference between the actual weight delivered and the theoretical weight calculated from the data in Table 1 and the number of metres delivered or ordered.

6 Mode of delivery

6.1 Length data for deliveries of hot rolled bulb flats are contained in Table 4.

6.2 When ordered by weight it is permissible for the length to vary between the maximum and the minimum limits stated for manufacturing lengths.

Table 4. **Descriptions and permissible length variations**

Description	Length Range	Length perm. var.	Length details to be given when ordering
Manufacturing length	≧ 6000 ≦ 16000	anywhere between the limits specified for the length range	none
Fixed length	≦ 18000	+ 100 0	required fixed length in mm

6.3 Example of order

100 t of hot rolled bulb flats of width b = 200 mm and thickness s = 10 mm, made of shipbuilding steel A according to the prescriptions of the Germanischer Lloyd, material number 1.0441, in manufacturing lengths.

100 t bulb flats DIN 1019 – A – GL – HP 200 x 10

or **100 t bulb flats DIN 1019 – 1.0441 – HP 200 x 10**

7 Checking accuracy to size

7.1 Scope of test

The number of bars which shall be checked for accuracy to size by measurements made at the manufacturer's works prior to despatch shall be agreed to at the time of ordering.

7.2 Procedure

When checking straightness according to Section 3.2 the dimension q shall be measured over the full length of the bars.

Explanations

The negotiations relating to the present follow-up issue of DIN 1019, the draft of which had already been published in November 1971, were very lengthy and time-consuming. The reason for this long delay can be attributed to the efforts in securing a complete alignment of the national and international dimension standards for bulb flats, and these efforts were finally successful. The new version of the DIN standard is in complete agreement with the planned follow-up issue of Euronorm 67 (at present still in March 1969 version) and with the ISO standard at present in preparation (DP 4974, at present Document ISO/TC 17/N 1679, May 1976), both as regards the type and number of sections encompassed, and as regards the specification of dimension and form variations. The negotiations relating to the factual contents of these international standards can now be considered completed.

In comparison with the earlier edition of DIN 1019 dated October 1963, the following alterations should be noted.

1) The number of nominal dimensions has been reduced from 62 to 40. All the nominal widths, with the exception of 60 mm, have been retained, but numerous nominal thicknesses have been deleted. In particular, the heavy bulb flat sections have been dropped, probably in favour of the special angle steels for shipbuilding, which will no doubt be adopted in future, and the standardization of which is still under negotiation. Some new sections not contained in the October 1963 edition have also emerged from the amalgamation of two neighbouring dimensions (e.g. 220 mm x 11.5 mm in lieu of 220 mm x 11 mm and 220 mm x 12 mm).

The bulb flats taken over from the earlier version of the DIN standard have remained unchanged in their nominal sectional dimensions. The increase in bulb height c by 10 to 15% approximately incorporated in the March 1969 issue of Euronorm 67 will be dropped again in the new version of this Euronorm.

2) The permissible variations from width are now symmetrically distributed on either side of the nominal value, and the overall spread has been narrowed (see Table 2). As regards the permissible variations on thickness, the asymmetrical distribution in relation to the nominal dimension has been retained, but the values have altered. The radii of curvature at the corners (Table 3) have been reduced for some dimension ranges.

The delegates from the shipyards had requested narrower permissible variations on straightness, but finally agreed to the value specified in Section 3.2, which is unchanged from the previous version, and which had been internationally agreed upon. An additional recommendation is however included in the DIN standard, to the effect that more stringent requirements may be mutually agreed at the time of placing the order.

3) Because exact lengths are seldom used in shipbuilding, they have no longer been featured as a mode of delivery, i.e. they have been deleted from Table 4. The permissible variations on fixed lengths have been narrowed. This also is in accordance with the agreements on the contents of the international standards on bulb flats.