UDC 669.14-423

October 1963x

Steel Bars
Hot Rolled Round Edge Zeds
Dimensions, Weights, Permissible Variations, Static Values

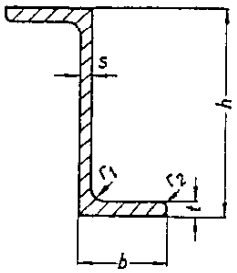
DIN 1027

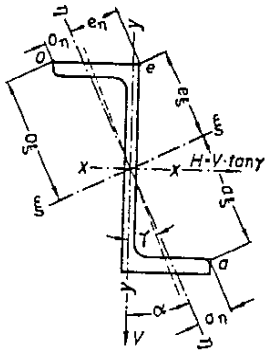
Stabstahl; Warmgewalzter rundkantiger Z-Stahl;
Maße, Gewichte, zulässige Abweichungen, statische Werte

Dimensions in mm

1. Scope

This Standard applies to hot rolled Zeds with rounded edges in heights between 30 and 200 mm in the grades of steel stated in Section 4.





2. Designation

Designation of a hot rolled Zed of height h = 100 mm in a steel according to the code number USt 37-2 or material number 1.0112 according to DIN 17100:

Z 100 DIN 1027 - USt 37-2
or Z 100 DIN 1027 - 1.0112

For Explanations see DIN-Mitteilungen Vol. 41 (1962) No. 11, pp. 517 - 519

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Table 1.

Symbol	Dimensions for h	perm. var.	b	perm. var.	s	perm. var.	t	perm. var.	r_1	r_2	Cross-sectional area F cm²	Weight G kg/m	Surface area U m²/m	Position of axis $\eta-\eta$ $\tan\alpha$	Distances of axes $\xi-\xi$ and $\eta-\eta$: o_ξ cm	o_η cm	e_ξ cm	e_η cm	a_ξ cm	a_η cm
30	30	±1,0	38	±1,0	4	±0,5	4,5	±0,5	4,5	2,5	4,32	3,39	0,198	1,655	3,86	0,58	0,61	1,39	3,54	0,87
40	40		40		4,5		5		5	2,5	5,43	4,26	0,225	1,181	4,17	0,91	1,12	1,67	3,82	1,19
50	50		43		5		5,5		5,5	3	6,77	5,31	0,253	0,939	4,60	1,24	1,65	1,89	4,21	1,49
60	60	±1,5	45		5		6		6	3	7,91	6,21	0,282	0,779	4,98	1,51	2,21	2,04	4,56	1,76
80	80		50		6		7		7	3,5	11,1	8,71	0,339	0,558	5,83	2,02	3,30	2,29	5,35	2,25
100	100		55	±1,5	6,5	±0,75	8	±0,75	8	4	14,5	11,4	0,397	0,492	6,77	2,43	4,34	2,50	6,24	2,65
120	120	±2,0	60		7		9		9	4,5	18,2	14,3	0,454	0,433	7,75	2,80	5,37	2,70	7,16	3,02
140	140		65		8		10		10	5	22,9	18,0	0,511	0,385	8,72	3,18	6,39	2,89	8,08	3,39
160	160	±4,0	70		8,5		11		11	5,5	27,5	21,6	0,569	0,357	9,74	3,51	7,39	3,09	9,04	3,72
180 *)	180		75		9,5		12		12	6	33,3	26,1	0,626	0,329	10,7	3,86	8,40	3,27	9,99	4,08
200 *)	200		80		10		13		13	6,5	38,7	30,4	0,683	0,313	11,8	4,17	9,39	3,47	11,0	4,39

Symbol	Static values for bending axis[1]) $x-x$: J_x cm⁴	W_x cm³	i_x cm	$y-y$: J_y cm⁴	W_y cm³	i_y cm	$\xi-\xi$: J_ξ cm⁴	W_ξ cm³	i_ξ cm	$\eta-\eta$: J_η cm⁴	W_η cm³	i_η cm	Centrifugal moment J_{xy} cm⁴	Under vertical load V and assuming: prevention of lateral deflection due to H: W_x cm³	$\frac{H}{V}=\tan\gamma$	free lateral deflection W cm³
30	5,96	3,97	1,17	13,7	3,80	1,78	18,1	4,69	2,04	1,54	1,11	0,60	7,35	3,97	1,227	1,26
40	13,5	6,75	1,58	17,6	4,66	1,80	28,0	6,72	2,27	3,05	1,83	0,75	12,2	6,75	0,913	2,26
50	26,3	10,5	1,97	23,8	5,88	1,88	44,9	9,76	2,57	5,23	2,76	0,88	19,6	10,5	0,752	3,64
60	44,7	14,9	2,38	30,1	7,09	1,95	67,2	13,5	2,81	7,60	3,73	0,98	28,8	14,9	0,647	5,24
80	109	27,3	3,13	47,4	10,1	2,07	142	24,4	3,58	14,7	6,44	1,15	55,6	27,3	0,509	10,1
100	222	44,4	3,91	72,5	14,0	2,24	270	39,8	4,31	24,6	9,26	1,30	97,2	44,4	0,433	16,8
120	402	67,0	4,70	106	18,8	2,42	470	60,6	5,08	37,7	12,5	1,44	158	67,0	0,392	25,6
140	676	96,6	5,43	148	24,3	2,54	768	88,0	5,79	56,4	16,6	1,57	239	96,6	0,353	38,0
160	1060	132	6,20	204	31,0	2,72	1180	121	6,57	79,5	21,4	1,70	349	132	0,330	52,9
180	1600	178	6,92	270	38,4	2,84	1760	164	7,26	110	27,0	1,82	490	178	0,307	72,4
200	2300	230	7,71	357	47,6	3,04	2510	213	8,06	147	33,4	1,95	674	230	0,293	94,1

The cross-sectional areas, weights, surface areas and static values have been calculated from the dimensions detailed in the Table.

[1]) J = moment of inertia, W = section modulus, i = radius of gyration, referenced in each case to the bending axis concerned.

*) These dimensions should be avoided wherever possible; it is planned to delete them in the next edition of this Standard.

3. Dimensions and permissible dimension and form variations

3.1. Cross-section

3.1.1. Hot rolled Zeds are supplied in the dimensions and with the permissible variations shown in Table 1.

3.1.2. The out-of-squareness k shall not be more than 1 mm.

3.1.3. The web bow f shall not exceed the values given in Table 2.

3.2. Straightness

For Zeds the permissible variations from straightness q are given in Table 3.

Straightness requirements more stringent than the above shall be agreed to at the time of ordering.

4. Material

Zeds to this Standard should preferably be made of steel grades according to DIN 17100.

5. Weight and permissible weight variations

5.1. The weights stated in Table 1 have been evaluated from the cross-section on the basis of a density of 7.85 kg/dm³.

5.2. The permissible weight variations as percentages of total weights are given in Table 4.

The weight variation for the purpose of this Standard is the difference between the weight actually supplied and the weight as calculated from the weight according to Table 1 and the metres supplied (when ordering in manufacturing lengths) or the metres ordered (when ordering in fixed lengths and exact lengths).

6. Mode of delivery

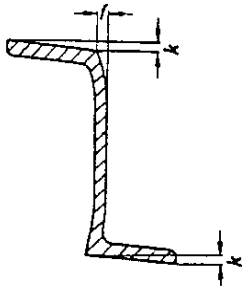
6.1. Length data for deliveries of hot rolled Zeds are contained in Table 5.

6.2. In the case of angled cuts the length shall be taken as the greatest useful length on the assumption that the ends are cut square.

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

Table 2

Depth h above	Depth h up to	Web bow f *) maximum
–	100	0,5
100	200	1,0



*) It applies to web bows to the right-hand as well as to the left-hand.

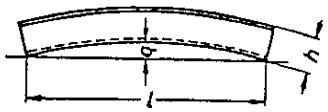


Table 3

Depth h above	Depth h up to	Permissible variation from straightness q
50	150	$0{,}004 \cdot l$
150	200	$0{,}0025 \cdot l$

Table 4

Web thickness s Nominal above	Web thickness s Nominal up to	Permissible weight variation on deliveries of 5 t and above	Permissible weight variation on deliveries less than 5 t
	4	± 8%	± 10,6%
4	6	± 5%	± 6,6%
6	10	± 4%	± 5,3%

Table 5

Description	Length Range	Length Permissible variation	Length details to be given when ordering
Manufacturing length	3000 to 15000	anywhere between 3000 and 15000	none
Fixed length	to 15000	± 100	required fixed length in mm
Exact length[1])	to 15000	under ± 100 to ± 5; the following being preferred: ± 50, ± 25, ± 10, ± 5	required exact length and required permissible variation in mm

[1]) In the case of exact lengths subject to restricted length variations the bevel produced by non-square cutting shall fall within the permissible length variations.

6.4. Example of order

100 t hot rolled Zeds of height h = 100 mm in a steel according to the code number USt 37-2 or material number 1.0112 according to DIN 17100 in manufacturing lengths:

100 t Z 100 DIN 1027 - USt 37-2

or 100 t Z 100 DIN 1027 - 1.0112

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 bar.