UDC 622.281.5 : 669.14-423.1

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GI sections for mine support

DIN 21541

Grubenausbau; GI-Profile

Supersedes September 1988 edition.

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

Dimensions in mm

1 Scope and field of application

This standard specifies requirements for GI sections with a height from 100 to 140 mm which have not undergone any machining, used for mine or tunnel support.

2 Dimensions and designation

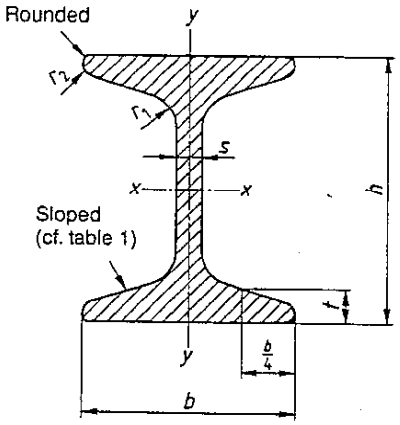

Figure 1

Designation of a GI section made from 31 Mn 4 steel (material number 1.0520), with a height, h, of 120 mm, supplied in the quenched and tempered condition (symbol V as specified in DIN 21544 or appended number 05 as specified in DIN 17 007 Part 2):

Section DIN 21541 – GI 120 – 31 Mn 4 V

or

Section DIN 21541 – GI 120 – 1.0520.05

Table 1

Section symbol	h	Limit deviations	b	Limit deviations	s	Limit deviations	t	Limit deviations	r_1	r_2	Slope, as a percentage	Cross-sectional area, in cm^2	Mass, in kg/m	Static parameters $x-x$ I_x cm^4	W_x cm^3	i_x cm	$y-y$ I_y cm^4	W_y cm^3	i_y cm
GI 100	100	± 2,0	80	± 2,0	9	± 0,5	12,5	0 -1,0	13	4	30	26,4	20,7	403	81	3,91	80,5	20,1	1,75
GI 110	110		84		10	± 0,6	14,0		14	5	33	31,1	24,5	570	103	4,28	103	24,5	1,82
GI 120	120		92		11		15,5		15	6		37,6	29,5	816	136	4,66	150	32,6	2,00
GI 130	130		100	± 2,5	12	± 0,7	17,0	0 -1,5	16	7		44,6	35,0	1130	175	5,05	211	42,3	2,10
GI 140	140		110				19,0		17	8		53,0	41,6	1586	227	5,47	315	57,3	2,44

The values specified for cross-sectional area, mass and static parameters are a function of the other dimensions and have been calculated taking the material density as 7 850 kg/m^3.

[1]) I = moment of inertia, W = section modulus, i = radius of gyration (subscripts x and y denoting the relevant axis).

Continued on pages 2 and 3.

3 Geometrical tolerances

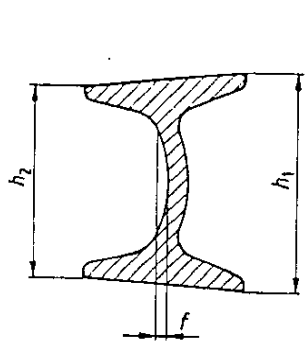

Figure 2: Convex web and non-parallel outside flange faces

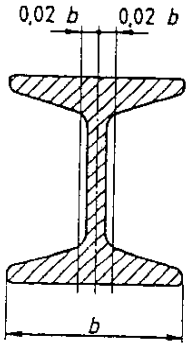

Figure 3: Section symmetry

3.1 Straightness of web

Table 2

Section height, h	Tolerance on straightness of web, f
100	0,5
Over 100 up to 140	1,0

3.2 Parallelism of outside flange faces

The parallelism of the outside flange faces shall be subject to a tolerance of $0{,}024 \cdot b$, which is to be compared to the value determined by measuring the distances between the two faces (h_1 and h_2) (cf. figure 2), and subtracting the smaller from the larger.

3.3 Section symmetry

The symmetry of the section shall be subject to a tolerance of $0{,}04 \cdot b$ (cf. figure 3).

3.4 Straightness

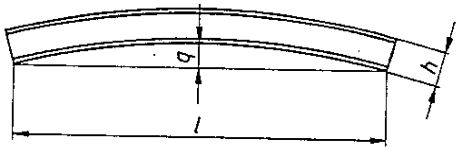

Figure 4:
Deviation from straightness of vertical web

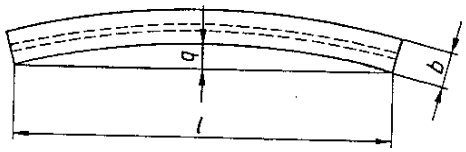

Figure 5:
Deviation from straightness of horizontal web

The deviation from straightness, q, shall not exceed $0{,}003 \cdot l$, this being determined for the total length of the web, and taken as the largest value measured.

4 Material

The sections shall preferably be made from DIN 21 544 steel.

5 Mass

The lower limit deviation for the mass of a single section shall be equal to − 3,5 %.

6 Acceptance inspection

Where sections are to undergo acceptance inspection, a check for dimensional accuracy shall be carried out on 1 % of the sections in one batch, but on at least three sections. If one section does not meet the requirements, two additional sections shall be checked, which shall be satisfactory. If this is not the case, the batch shall be rejected.

7 Form supplied

7.1 Sections shall be supplied in the lengths specified in table 3.

Table 3

Type of length	Lengths	
	Length ordered	Limit deviations
Specified length	6 000 to 15 000	± 50
Exact length	Up to 15 000	Between ± 50 and ± 5, preferably ± 25, ± 10 and ± 5

7.2 Ordering

100 t of GI sections made from 31 Mn 4 steel (material number 1.0520), with a height, h, of 120 mm, supplied in the quenched and tempered condition (symbol V as specified in DIN 21 544 or appended number 05 as specified in DIN 17 007 Part 2) shall be ordered as:

100 t sections DIN 21 541 − GI 120 − 31 Mn 4 V

or

100 t sections DIN 21 541 − GI 120 − 1.0520.05

Standards referred to

DIN 17007 Part 2 Material numbers; main group 1: steel
DIN 21544 Steel used in mine support; technical delivery conditions

Other relevant standards

DIN 21539 Steel components for use in mining sections and other workings; marking
DIN 21545 Testing of steel used in mine support
DIN 21547 Round head bolts with oval shoulder used in mine support
DIN 21552 Beaded IB and GI sections used in mine support

Previous editions

DIN 21541 Part 1: 12.43, 03.51, 10.55; DIN 21541: 08.74, 09.88.

Amendments

In comparison with the September 1988 edition, more details have been specified with regard to the mass of sections.

International Patent Classification

E 21 D 11/14
E 21 D 11/36
E 21 D 11/40
G 01 B 21/00