

Data sheet: H1.1

## Rails

### Hot rolled steel sections for railway material

#### General description

Rails for use in mines are supplied to ArcelorMittal South Africa's own specification as Mines and Sidings rails in 15 kg/m, 22 kg/m and 30 kg/m sizes.

This data sheet contains only the standard manufactured specifications. Other steel specifications, surface specifications, rolling tolerances, sizes and lengths may be considered on an enquiry basis.

#### Steel making

Steel used for the manufacture of rails is made in a basic oxygen furnace and then continuously cast into blooms before rolling.

#### Quality assurance

Quality assurance systems based on the requirements of SANS ISO 9001: 2000 are in operation.

#### Steel specification

Specification	Code	Rail size	% Carbon Equivalent <sup>1</sup>
Mines and Sidings: Grade 700	512 300	15 kg/m	0,63/0,74
Mines and Sidings: Grade 700	512 300	22 kg/m	0,63/0,74
Mines and Sidings: Grade 700	512 550	30 kg/m	0,67/0,82

$$1\% \text{ Carbon equivalent} = \% C + \frac{\% Mn}{4} + \frac{(\% Cr + \% Mo + \% V)}{5} + \frac{(\% Ni + \% Cu)}{15}$$

#### Mechanical properties

Modern testing and analysis facilities are used to ensure compliance with the rail specifications.

Specification	Tensile strength (min) MPa	Elongation (min) %	Yield <sup>1</sup> strength (min) MPa
Mines and Sidings Grade 700	680	10	400

<sup>1</sup> Typical values, not guaranteed.

#### Design data

Data	Sizes in kg/m		
	15	22	30
Nominal mass (kg/m)	14,905	22,542	30,250
Total Cross sectional areas (x10 <sup>3</sup> mm <sup>2</sup> )	1,899	2,872	3,853
Moments of inertia: x : (10 <sup>6</sup> mm <sup>4</sup> )	1,49	3,51	6,25
Moments of inertia: y : (10 <sup>6</sup> mm <sup>4</sup> )	3,86	8,61	15,58

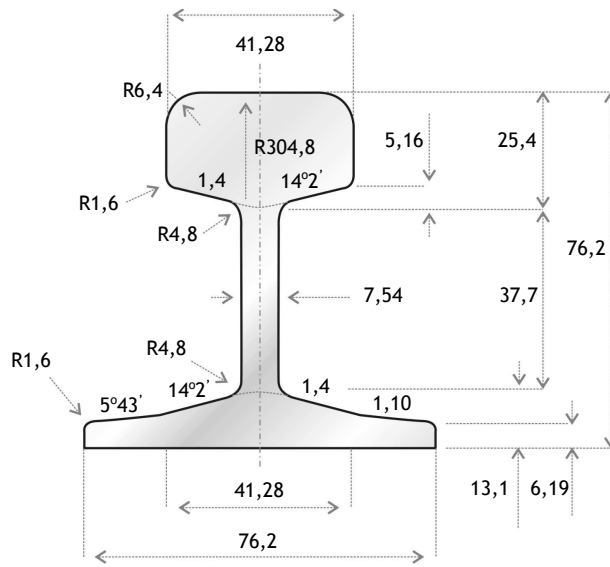
Note: See the cross sectional drawings for other dimensions.

### Welding

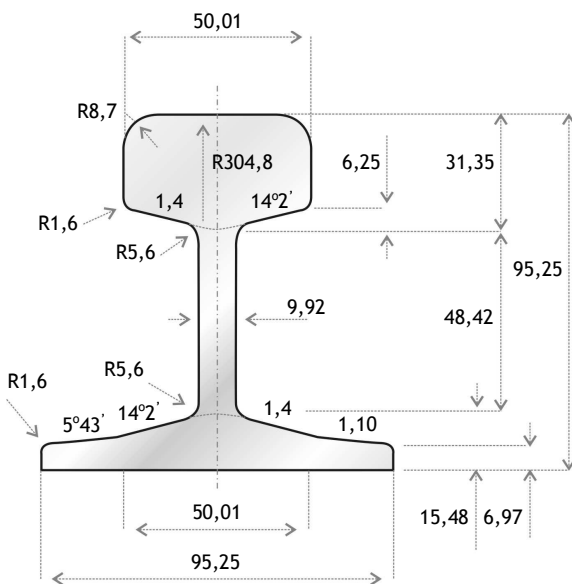
Rails produced by ArcelorMittal South Africa can be welded by "flash-butt" or "thermite" techniques. For practical details it is recommended that an authority should be consulted. The following table gives an indication of the minimum cooling time recommended for the heat-affected zone.

Specification	Minimum cooling time from 800°C to 500°C in seconds	
	1000°C <sup>1</sup>	850°C <sup>1</sup>
Mines and Sidings: Grade 700	35	26

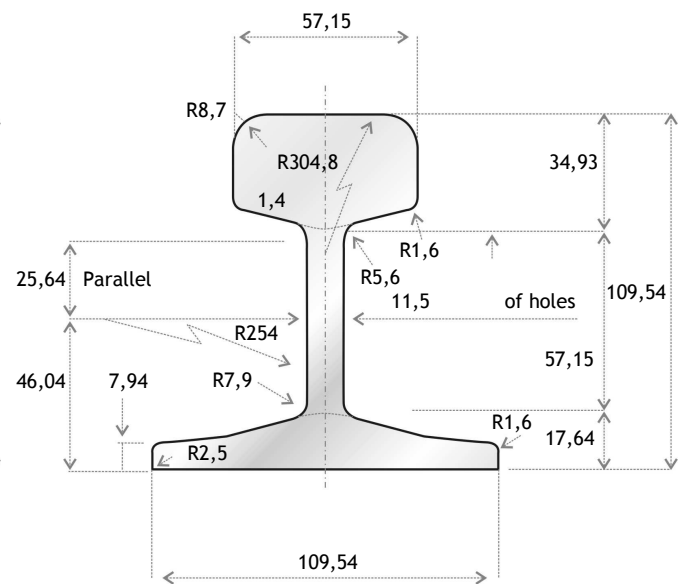
1 Austenitising temperature



15 kg/m



22 kg/m



30 kg/m

### Tolerances to SPE 240

	15, 22 and 30 kg/m rails
Overall height	+ 1,0 -0,5 mm
Width of the head	± 1,0 mm
Width of the base	± 2,0 mm
Thickness of the web	+ 1,0 -0,5 mm
Corner radius	± 1,0 mm
Length	- 0 mm + 50 mm
<b>Delivery tolerance:</b>	
40 < 100 tons	
≥ 100 tons	± 10 % ± 5%

### Standard lengths

5 - 18m

### Supply conditions

Railway rails are supplied in accordance with ArcelorMittal South Africa's General Conditions of Sale and Price List on Rails Number 240.