BRITISH STEEL

Rail Product Range

BUILDING STRONGER FUTURES

2020

WELCOME TO BRITISH STEEL

British Steel is one of Europe's leading steel manufacturers, producing around 3 million tonnes of quality steel products every year. We supply high-quality rail, sections, special profiles, wire rod and a variety of semi-finished products for some of the most demanding applications around the world.

In March 2020, we were bought by distinguished Chinese multi-industrial company Jingye Group, beginning a new chapter in British steelmaking.

Our steelworks have existed for around 150 years and we're excited about what we can collectively achieve to build a successful future for many years to come.

THE MARKETS WE SERVE

Our wide range of products, manufactured to internationally recognised standards, are used in many markets and demanding applications, helping share the modern world we see around us every day.

Our steel has helped build some of the world's most iconic and awe-inspiring projects, including:

- The Shard, London
- Crossrail, London
- Petronas Towers, Kuala Lumpur
- Camlica Tower, Istanbul
- Yankees Stadium, New York
- Harmony of the Seas cruise ship

Automotive

Construction

Energy & Power

Construction & Earthmoving Equipment

Defence & Security

Photo courtesy of Andrew Linnett/MOD

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ABOUT RAIL

Based in Scunthorpe since 2006, our rail manufacturing dates back to the mid-nineteenth century, when the first public railways were making a major impact on transport throughout the world.

Our innovations have included several world firsts including the Bessemer conversion method of steel production, continuous casting of rail steel and non-destructive testing technologies.

We work in partnership with rail customers to understand their demands and develop products that directly address their needs for more rail life with fewer maintenance requirements.

That means we play a central role in helping the rail industry rise to the challenges of higher traffic volumes, heavier axle loads and faster train speeds.

We provide a wide range of high performance rail products of up to 120m in length (or 216m in welded strings) to meet the needs of international high speed, heavy duty, mixed traffic, metro and tramway networks. These are supplied in accordance with directive 2008/57/EC for rail interoperability.

Our technical consultancy team is available to provide advice and support, helping customers to optimise their rail selections. Rail products and grades can be matched precisely to track conditions, track types, environmental conditions and a host of other variables to ensure that every rail we deliver provides optimum performance throughout its service life.

1 RAIL PROFILES AND GRADES

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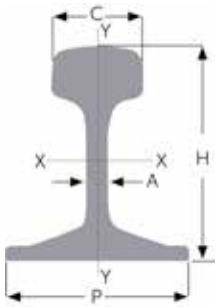
Dimensions, properties and compositions

The tables below indicate the technical dimensions and mechanical properties for our rail profile range.

These are available in lengths of up to 120m or 216m welded.



EN 13674-1 Flat bottom rails >46kg/m

Rail profile	Equivalent profile name	Section weight kg/m	Rail height mm (H)	Head width mm (C)	Web thickness mm (A)	Foot width mm (P)	Moment of inertia Ixx cm^4	Moment of inertia Iyy cm^4
54E1	UIC 54	54.77	159.00	70.00	16.00	140.00	2337.9	419.2
54E4	–	54.31	154.00	67.00	16.00	125.00	2056.2	352.7
56E1	BS 113lb	56.3	158.75	69.85	20.00	140.00	2321.0	421.6
60E1	UIC 60	60.21	172.00	72.00	16.50	150.00	3038.3	512.3
60E2	–	60.03	172.00	72.00	16.50	150.00	3021.5	510.5

EN 13674-4 Flat bottom rail 27kg/m to 46kg/m

Rail profile	Equivalent profile name	Section weight kg/m	Rail height mm (H)	Head width mm (C)	Web thickness mm (A)	Foot width mm (P)	Moment of inertia Ixx cm^4	Moment of inertia Iyy cm^4
39E1	BS 80A	39.77	133.35	63.50	13.10	117.47	1204.9	219.6

Special rail sections

Rail profile	Equivalent profile name	Section weight kg/m	Rail height mm (H)	Head width mm (C)	Web thickness mm (A)	Foot width mm (P)	Moment of inertia Ixx cm^4	Moment of inertia Iyy cm^4
BS 95RBH	Bullhead	47.07	145.26	69.85	19.05	69.85	1458.00	171.00
Section 65*	Conductor	65.41	102.00	89.00	70.00	70.00	677.04	483.57
Section 75	Conductor	75.17	138.00	89.00	22.50	140.00	2163.93	891.66

*Available by agreement – please contact us to discuss your requirements.

Other rail profiles may be available – please contact us to discuss your requirements.

1 RAIL PROFILES AND GRADES

Rail application steel grades

The tables below indicate the typical steel compositions and mechanical properties for our rail application grades.

Flat bottom rail grades

		Chemical composition % by mass									Mechanical properties		
Specification	Grade	C	Si	Mn	P	S	Cr	Al	V	H2 (ppm)	Rm (MPa)	Elongation (%)	HBW running surface
UIC 860-R	700	0.40-0.60	0.05-0.35	0.80-1.25	≤ 0.050	≤ 0.050	–	–	–	–	680-830	≥ 14	–
	900A	0.60-0.80	0.10-0.50	0.80-1.30	≤ 0.040	≤ 0.040	–	–	–	–	880-1030	≥ 10	–
	900B	0.55-0.75	0.10-0.50	1.30-1.70	≤ 0.040	≤ 0.040	–	–	–	–	880-1030	≥ 10	–
EN 13674-1	R200	0.40-0.60	0.15-0.58	0.70-1.20	≤ 0.035	0.008-0.035	≤ 0.15	≤ 0.004	≤ 0.03	≤ 3.0	≥ 680	≥ 14	200-240
	R220	0.50-0.60	0.20-0.60	1.00-1.25	≤ 0.025	0.008-0.025	≤ 0.15	≤ 0.004	≤ 0.03	≤ 3.0	≥ 770	≥ 12	220-260
	R260	0.62-0.80	0.15-0.58	0.70-1.20	≤ 0.025	0.008-0.025	≤ 0.15	≤ 0.004	≤ 0.03	≤ 2.5	≥ 880	≥ 10	260-300
	R260Mn	0.55-0.75	0.15-0.60	1.30-1.70	≤ 0.025	0.008-0.025	≤ 0.15	≤ 0.004	≤ 0.03	≤ 2.5	≥ 880	≥ 10	260-300
IRS	880	0.60-0.80	0.10-0.50	0.80-1.30	≤ 0.030	≤ 0.030	–	≤ 0.015	–	≤ 1.6	≥ 880	≥ 10	≥ 260
British Steel	Premium: BLF320*	0.10-0.30	0.80-1.80	1.20-1.80	≤ 0.025	≤ 0.025	0.30-0.80	≤ 0.004	–	≤ 2.0	≥ 950	≥ 12	340-380
	Premium: HP335	0.87-0.97	0.75-1.00	0.75-1.00	≤ 0.020	0.008-0.020	≤ 0.10	≤ 0.004	0.09-0.13	≤ 2.5	≥ 1175	≥ 8	335-375

*Available by agreement – please contact us to discuss your requirements.

Conductor rail grade

		Chemical composition % by mass									Electrical properties
Specification	Grade	C	Si	Mn	P	S	Cr	Al	V	H2 (ppm)	Resistance (μΩ.cm)
BS 7865	Conductor rail	≤ 0.08	≤ 0.05	≤ 0.30	≤ 0.05	≤ 0.05	–	–	–	–	<11.04

Other rail grades may be available – please contact us to discuss your requirements.

2 HP RANGE

2 HP RANGE

Excellent wear and RCF resistance

Our High Performance non heat-treated rails are our most wear-resistant grades:

- Designed for curved track and other high duty areas
- Metallurgically engineered to offer improved resistance to wear and rolling contact fatigue (RCF) compared to standard grade rail, greatly reducing the need for rail grinding and track maintenance
- Uniform through-hardness for consistent performance throughout the life of the rail
- Delivering extended rail life and reduced rail life cycle costs
- Our HP range meets all the quality, production and dimensional requirements set out in the EN 13674-1 standard for rails – the next revision of EN 13674-1 is due to include HP335 as a new grade, with the CEN technical committee working draft including HP335 under the name R335V
- HP335 can be supplied, by agreement, as HP350 with an enhanced hardness equivalent to that usually only found in heat treated rails – suitable for heavy duty freight lines

Mechanical properties

Specification	Grade	Rm (MPa)	Elongation (%)	HBW running surface
British Steel	HP335	≥ 1,150	≥ 8	335-375
British Steel	HP350	≥ 1,175	≥ 8	350-390

Chemical composition

Specification	Grade	C	Si	Mn	P	S	Cr	Al	V	H2 (ppm)
British Steel	HP335/ HP350	0.87-0.97	0.75-1.00	0.75-1.00	≤ 0.020	0.008-0.020	≤ 0.10	≤ 0.004	0.09-0.13	≤ 2.5

3 ZINOCO®

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Unbeatable corrosion protection

Our Zinoco® coated rail offers superior protection against corrosion for longer rail life.
Ideal for corrosive conditions e.g. tunnels, level crossings, salt pans and areas of stray current.
Developed in partnership with UK customer Network Rail who required a durable coating to withstand corrosion.

Zinoco offers 2 lines of defence:

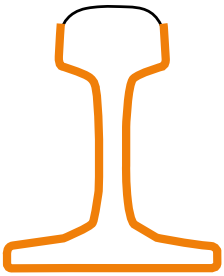
- Durable barrier to combat corrosion
- Provides sacrificial protection, so still works if the coating is damaged

Zinoco coated rail protects against corrosion in the orange areas highlighted in the diagram below, enabling the rail to resist pitting, gall and general loss of section due to corrosion.

Currently being used by Network Rail (UK) and RATP (France), and approved for use by Irish Rail (Ireland) and London Underground (UK).

Performance against current competition

Coating	Sacrificial protection	Stray current protection	Abrasion resistance	Impact resistance	Coating removal (for welding)
Zinoco®	Yes	Excellent	Excellent	Good	Moderate
Railcote®	Yes	Excellent	Moderate	Moderate	Easy
Aluminium metal spray	No	Poor	Very good	Good	Difficult/hazardous
Glass flake epoxy	No	Poor once damaged	Very poor	Very poor	Difficult/hazardous
Glass flake polyester	No	Poor once damaged	Poor	Poor	Difficult/hazardous



4 STEEL SLEEPERS

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Lower lifetime costs with efficient logistics

Our steel sleepers are designed for use in all types of application, from metre gauge railways to mainline passenger and heavy haul routes.

They require less ballast than traditional concrete sleepers, leading to reduced track construction and renewal costs.

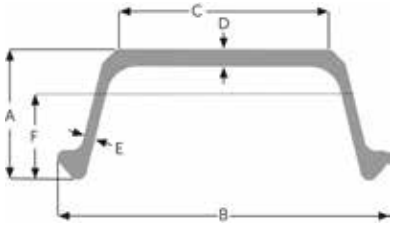
Once installed, steel sleepers don't rot or suffer from insect attacks. They also survive well in wet tropical climates where wood decays rapidly.

Being fully recyclable, our steel sleepers also benefit from a smaller carbon footprint, making it easier to hit your sustainability targets.

Steel sleepers are stackable and because they are lighter than concrete sleepers, can be moved in bundles by a forklift (or manually handled if regulations allow).

Often requiring only a third of the vehicle movements needed by concrete sleepers, using our steel sleepers helps to keep transportation costs to a minimum.

Our steel sleepers can be delivered with all fastening systems pre-installed, helping to keep your installation times to a minimum.



Steel sleeper dimensions

Sleeper profile	Plate weight kg/m	Section height mm (A)	Section width mm (B)	Rail seat width mm (C)	Rail seat thickness mm (D)	Leg thickness mm (E)	Moment of inertia Ixx cm^4	Section modulus cm^3	Height of neutral axis from base mm (F)
202	22.10	82	240	160	7.5/12.0	6.75	200.0	34.4	58.1
300	28.36	92	254	160	12.0	7.0	283.3	42.3	67.0
402	28.54	100	260	168	10.0	7.0	426.0	62.8	67.1
436	31.69	100	260	168	12.0	7.0	432.8	65.8	68.4
600	39.53	115	280	168	14.5	7.6	654.7	81.3	80.5

Notes:
Can be supplied for all rail sizes and with the inclination required for your network.
Can be tailored to any rail gauge – 1,000mm, 1,067mm (3' 6"), standard and broadgauge.

Steel sleeper grade

		Chemical composition % by mass									Mechanical properties	
Specification	Grade	C	Si	Mn	P	S	Cr	Al	V	H2 (ppm)	Rm (MPa)	Elongation (%)
EN 10025	S275	≤ 0.21	0.14-0.25	≤ 1.50	≤ 0.035	≤ 0.035	–	≤ 0.008	–	–	410-560	≥ 23

5 CONTACTS

6 CONTACTS

If you want to find out more about our product range and how we can help you, please get in touch.

The contact details listed here are correct at the time of publication. For the latest details of your nearest location, please visit britishsteel.co.uk/locations.

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