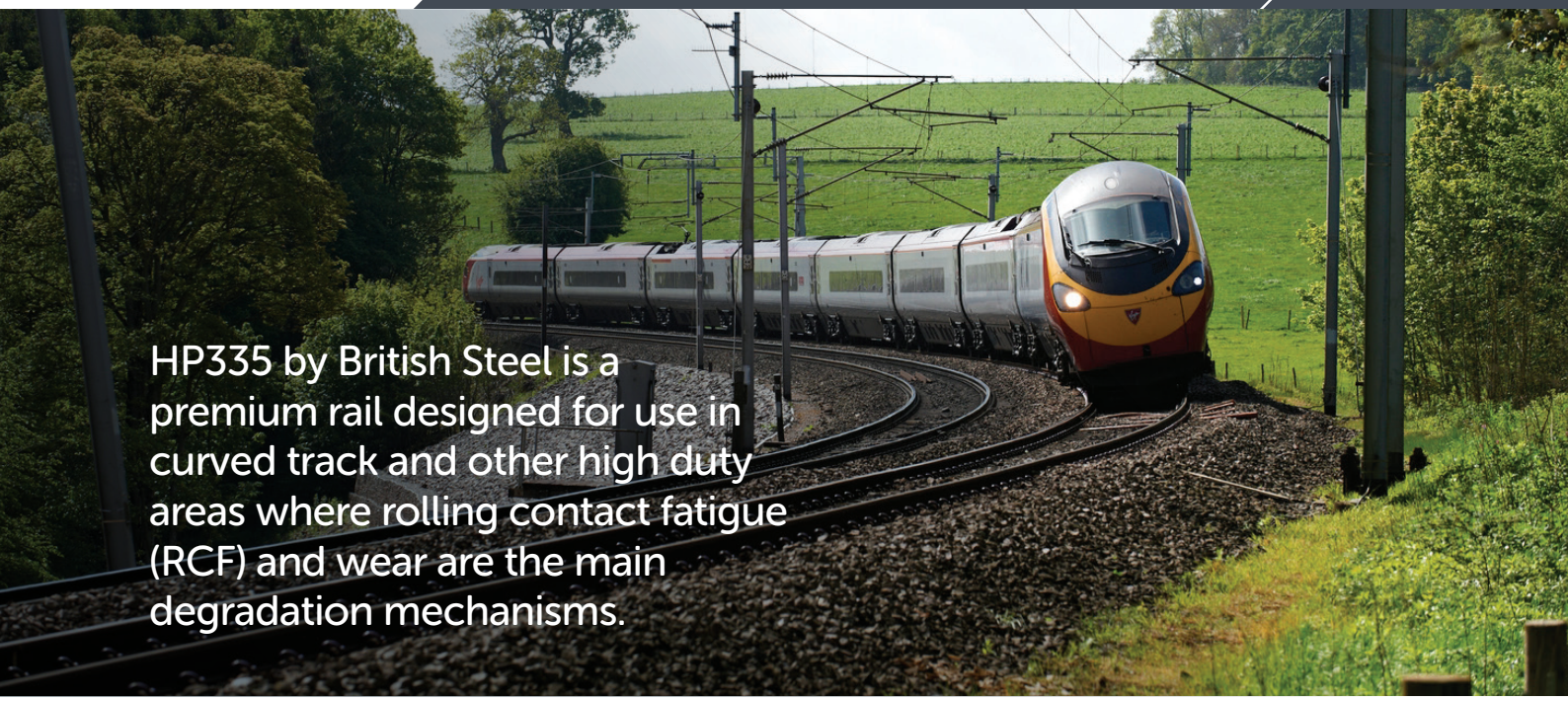
BRITISH STEEL

HP335

Rail for combatting rolling contact fatigue and wear

Technical datasheet

RAIL



HP335 by British Steel is a premium rail designed for use in curved track and other high duty areas where rolling contact fatigue (RCF) and wear are the main degradation mechanisms.

Our award-winning HP335 offers increased rail life and lower life cycle costs through reduced grinding frequency, compared to standard grade rails.

Working in partnership to meet customer needs

British Steel works in partnership with customers to understand the needs of the rail sector and develop innovative and value-adding products to directly address those needs.

Working closely with UK customer Network Rail, we have produced and tested HP335, responding to the industry's needs for improved rail life with reduced maintenance requirements.

The evaluation of HP335 was carried out firstly in laboratory conditions to prove its potential and suitability for testing in track. Secondly, working in partnership with Network Rail, it was assessed under real life conditions to demonstrate significant cost savings and rail life extension. The positive performance across all trial sites, combined with demonstrated rail life cycle cost savings – in some cases of over 60% – led to full product approval of HP335 by Network Rail in July 2012.

Metallurgically engineered for high performance

At British Steel, we have conducted a research programme to understand the fundamental metallurgical factors that affect the life of rails. This has drawn on the experience of destructive examination of RCF samples, site monitoring, laboratory testing and specialist metallographic examination.

Our improved understanding of rail degradation mechanisms enabled us to use our metallurgical expertise to microstructurally engineer and patent a new rail steel with uniform through-hardness, HP335.

In-track performance

To date, over 1,800km of HP335 have been installed in locations with various curve radii experiencing a range of the key degradation mechanisms, making up around 15% of UK rail demand.

Performance of rails has been extensively monitored since 2010. Selected monitoring locations have seen a reduction in the development of RCF on high rail and reduction in plastic deformation on low rail, compared to standard grade (R260), reducing the frequency of grinding required. A typical reduction in grinding by a factor of 3 has been observed.

Technical support

Our technical team is available to provide advice and support, helping you to optimise your 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.

HP335 steel grade

The tables below indicate the standard mechanical properties and chemical analysis limits for British Steel's HP335 steel grade.

Mechanical properties

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

Chemical composition

Specification	Grade	C	Si	Mn	P	S	Cr	Al	V	H2 (ppm)
British Steel	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

Resistance to degradation

Comparison with R260	HP335
Wear resistance	x3 improvement
RCF resistance	x3 improvement
Corrugation resistance	x3 improvement

Inclusion in standards

Our HP335 grade has been approved by CEN/TC 256/SC 1/WG 4 for inclusion in the Euro Norm standards.
The WG 4 drafting group working on the next revision of EN13674-1 has included HP335 as a new grade in the working draft under name R335V.

Weldability

HP335 can be both aluminothermically and electrically (flash butt) welded. Our technical team is available to provide references and/or assistance on the welding kits offered by various producers. Please contact us for more information.

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