HSH® RAILS FOR TRAMWAYS

Track performance as a design criterion!

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HSH® RAILS FOR TRAMWAYS
TRACK PERFORMANCE AS A DESIGN CRITERION

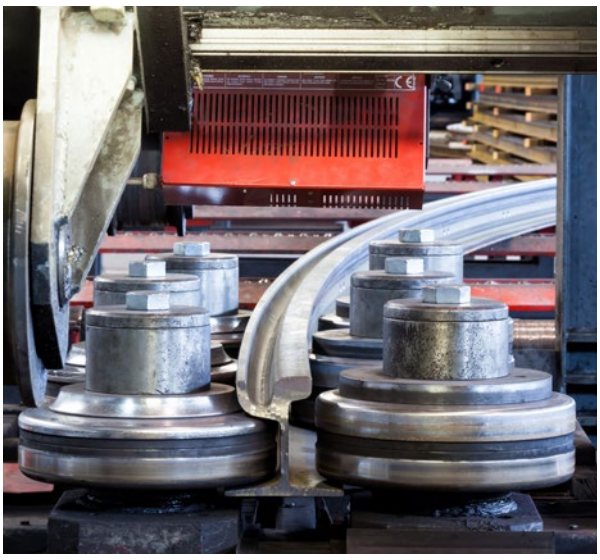
Trams form the backbone of public transport in many modern metropolitan areas. The ability to combine high transport capacities with competitive costs underlines the attractiveness of this transport system and defines the core requirements for tracks and rails: availability, cost efficiency, social responsibility and environmental awareness. With more than 100 years of experience, voestalpine Railway Systems offers a unique portfolio of rail steels and profiles for tramway applications. Our philosophy has always been based on customer focus and sustainable solutions.

Our HSH® grooved rails – developed for urban challenges

HSH® grooved rails were specifically designed to meet the constantly increasing demands of urban environments:

- 24/7 tram operation
- Rising sensitivity to noise
- Economic efficiency

Thanks to state-of-the-art steel design, our HSH® grooved rails enable long service lives while simultaneously reducing maintenance requirements.



HSH®- HEAT TREATMENT

By combining our HSH® heat-treatment concept with a specially adapted material design, rail steels can be produced to meet specific maintenance requirements.

The application of our HSH® heat-treatment technology to GHT steels results in grain refinement and significantly improved wear resistance — without negatively affecting weldability. In addition to increasing carbon content, HSH® heat treatment is the most efficient method to increase wear resistance.

HSH®- heat treatment

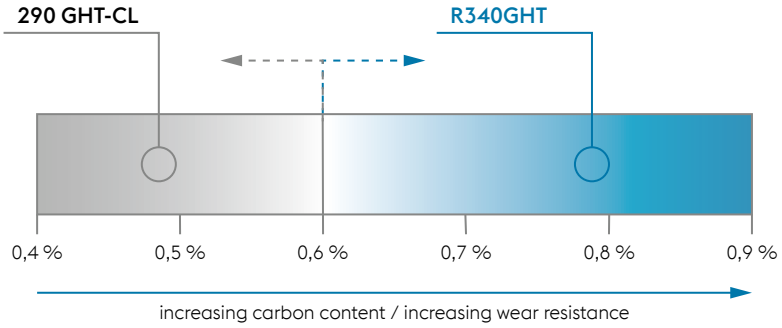
- Fine-pearlitic running and guiding head
- High wear resistance
- Consistant weldability
- High resistance to corrugation formation

Untreated web and foot of the rail

- Very high fatigue strength
- Minimal notch sensitivity

Material selection

Depending on individual conditions, the appropriate material concept can be selected to optimally meet requirements for machinability and maintainability. For gauge-corner repair welding, the carbon content (specified in the mill certificate) is decisive. A carbon content of up to max. 0.6% is considered process-stable and suitable for build-up welding without preheating.



HSH® Grooved Rails – Your advantages

Despite the comparatively low axle loads of tram vehicles, tight curves in tram networks belong to the most demanding applications in the wheel–rail contact.

Corresponding to these demanding requirements, HSH® grooved rails offer decisive advantages.

- Long service lives
- Planned maintenance: easy-to-maintain or put-in-and-forget concepts
- Reduced corrugation — fewer vibrations and less noise
- Easy weldability
- Designed for short payback periods

HSH® QUALITY FOR EVERY TYPE OF APPLICATION

Considering individual maintenance strategies, voestalpine Rail Technology GmbH — a subsidiary of voestalpine Railway Systems — has developed tailor-made grooved-rail steels for every application:

easy-to-maintain

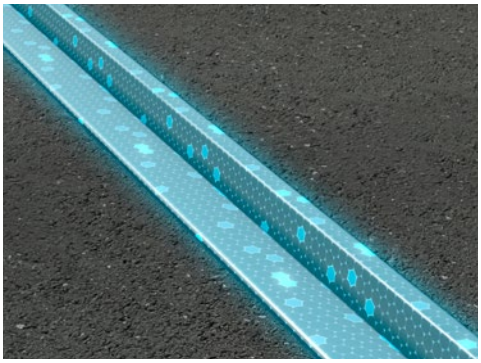
Under the “easy-to-maintain” premise, the grades R290GHT and 290GHT-CL were specially developed. Thanks to unique HSH® heat treatment, they offer high wear resistance while also allowing simple running-edge build-up welding.

Advantages

- Simple build-up welding
- Improved service life
- Effective reduction of corrugation

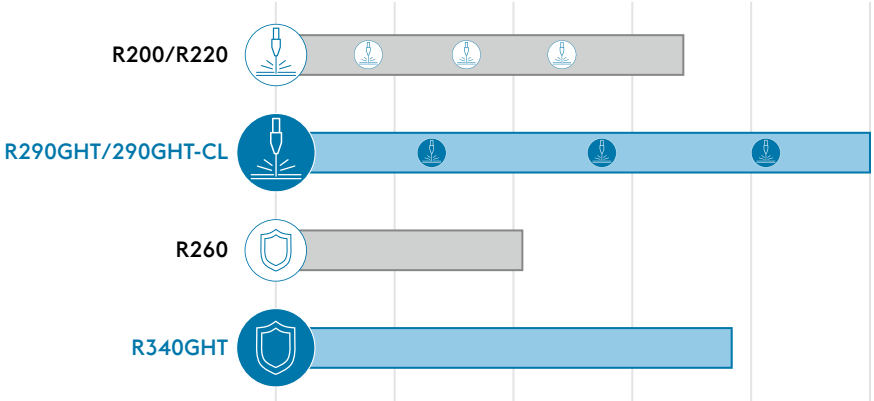
put-in-&-forget

The “put-in-&-forget” concept refers to the use of highly wear resistant rail steels. For this purpose, voestalpine Rail Technology GmbH developed the high-strength grade R340GHT. Thanks to its very high wear resistance, it enables long service lives without requiring running-edge build-up welding.



Advantages

- High natural wear resistance
- High resitance to corrugation
- Minimal maintenance effort — long service life without build-up welding



PRODUCT SPECIFICATION

Heat-treated HSH® grooved rails are available in all EN14811 profiles as well as special custom profiles. On request, rails can be pre-bent according to customer bending plans and drilled for tie-bar applications. They feature tight tolerances for profile, straightness, and flatness, as well as excellent surface quality. These properties are essential prerequisites for high-quality rail bending results and excellent track geometry.

Mechanical Properties

Product	Description	Hardness [HBW]	Tensile Strength R_m [MPa]	Elongation A_5 [%]	Marking
290GHT-CL	Unalloyed (C-Mn), HSH® heat-treated	300 ± 20	≥ 960	≥ 11	
R290GHT	Unalloyed (C-Mn), HSH® heat-treated	310 ± 20	≥ 960	≥ 10	
R340GHT	Unalloyed (C-Mn), HSH® heat-treated	360 ± 20	≥ 1.175	≥ 9	

Chemical Composition

Product	C [%]	Si [%]	Mn [%]	Cr [%]	P [%]	S [%]	H [ppm]
290GHT-CL	0,40 - 0,50*	0,15 - 0,58	0,70 - 1,20	≤ 0,15	≤ 0,02	≤ 0,025	≤ 2,00
R290GHT	0,50 - 0,55	0,15 - 0,58	1,00 - 1,25	≤ 0,15	≤ 0,02	≤ 0,025	≤ 2,00
R340GHT	0,62 - 0,80	0,15 - 0,58	0,70 - 1,20	≤ 0,15	≤ 0,02	≤ 0,025	≤ 2,00

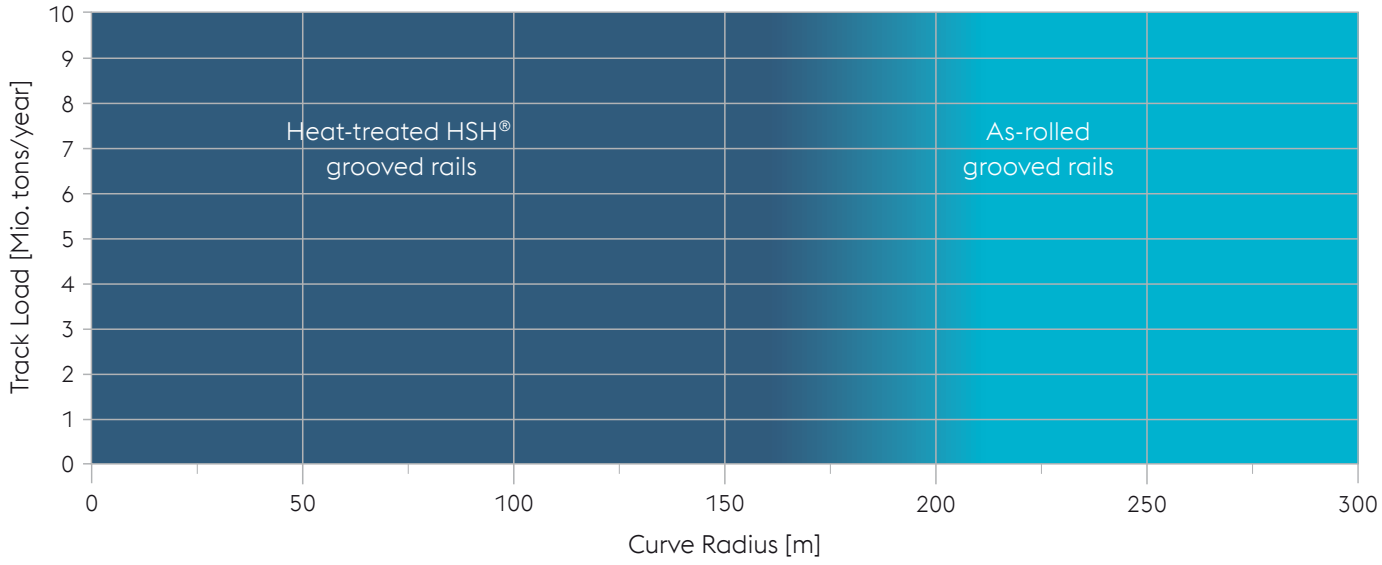
*Extra-low carbon content for optimal weldability (build-up welding)

APPLICATION RECOMMENDATION

We recommend the use of our HSH® grooved rails in areas with increased wear and corrugation formation. The specific application area varies from operator to operator, depending on numerous factors such as vehicle running behavior, track geometry, and local boundary conditions.

Tight curves with radii below 150 meters are particularly affected by increased wear and stronger corrugation formation.

Recommendation for the use of HSH® grooved rails



Detailed documents such as data sheets, profile drawings, and technical descriptions are available on request.

Product Management Contact: product_management@voestalpine.com

voestalpine RAILWAY SYSTEMS PREMIUM SERVICES

We offer a unique portfolio of additional costumer services, including:

Logistics

» Our logistics team guarantees smooth rail delivery to its destination by optimization of the entire logistics chain. Our specialities are just-in-time deliveries to any construction site in Europe, as well as overseas deliveries.

Welding

» Our experts from voestalpine Competence Center Welding (CCW) are constantly working jointly with renowned welding material suppliers to develop and improve rail welding technology.

» Beside trainings in our plant as well as on site, CCW also offers welding inspection to ensure high initial quality of rail welds.

Technical Support

Our customer service team assists you in questions of:

- In-track performance evaluation
- Whole track system optimization
- Wheel – Rail interface optimization
- RAMS & LCC consulting

ISO 9001 Quality

ISO 14001 Environment
in accordance with EMAS II

ISO 45001 Safety

ISO 50001 Energy

AT-000183
Verified Environmental
Management

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