

THE NEW DIMENSION IN RAIL STEEL

340 Dobain® HSH®



340 Dobain® HSH® – MAXIMIZE TRACK AVAILABILITY

Rolling contact fatigue defects are fundamental issues. In times of increasing transportation, the demand for more safety and customer satisfaction is the foundation of economic and social responsibility. This is where voestalpine as a steel pioneer assists and offers optimized and sustainable solutions to our customers – reverting to more than 100 years of experience in rail production, an exceptional expertise of engineers and unique portfolio of profiles and steel grades.

The R&D focus of voestalpine Rail Technology GmbH has always been on the development of high quality steels adapted to the specific fields of application. Supported by close customer contact and the application of LCC and RAMS strategies for our customers, voestalpine is familiar with the daily business of operators and their problems.

This knowledge is collected and implemented in the development process of new rail steels – customer-based material design made in Donawitz.

Now it is time to set the next milestone by introducing the

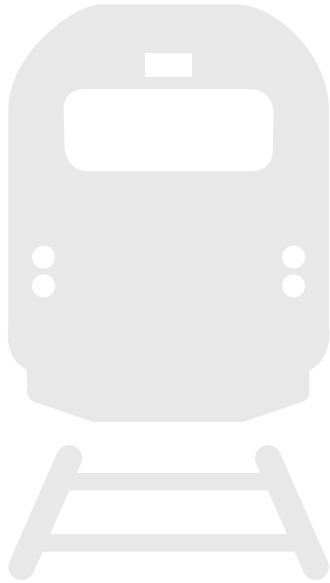
Head Check free rail **340 Dobain® HSH®**.

The 340 Dobain® HSH® is a rail steel developed and produced in Donawitz, Austria, representing a steel design preventing the initiation of Head Checks.

Customer benefits

- » Drastically reduced maintenance effort – no Head Checks.
- » Low total Life Cycle Costs
- » Evidently long service life
- » Easy-to-weld steel designs
- » Maximum safety

340 Dobain® HSH® – FACTS



Innovative multiphase steel design



Highest material resistance
--> No Head Checks



Microstructure-related polishing



Increased safety



Joint and repair welding with standard
welding equipment



Result of intensive research



Extensive full-size laboratory testing



Approved in track



Highest toughness against fracture

340 Dobain® HSH® PROVEN RESISTANCE AGAINST HEAD CHECKS

To ensure safety in track for our customers and their passengers, we performed comprehensive laboratory testing including various tests on a full-scale wheel-rail test rig and numerous performance tests in track together with our customers.



340 Dobain® HSH®



INSPIRED BY NATURE

Preventing Head Check initiation on a physical level.



340 Dobain® HSH® BREAK THE PATTERN

The ultimate goal of voestalpine is to provide a product according to the needs of our customers. Of course this is only possible if we know and understand the problem.

Due to their microstructure, conventional pearlitic rail steels are susceptible to rolling contact fatigue (RCF). While voestalpine's HSH® concept for pearlitic rail steels is able to improve the resistance against all typical rail defects and enables a delay of the Head Check initiation as well as crack growth, it is limited by its microstructure and steel design.

A SIMPLE MECHANISM

Nature knows many ways to adapt to harsh environments. One well known mechanism is self-cleaning or polishing – a feature some plants take advantage of to protect their surface and ensure their functionality.

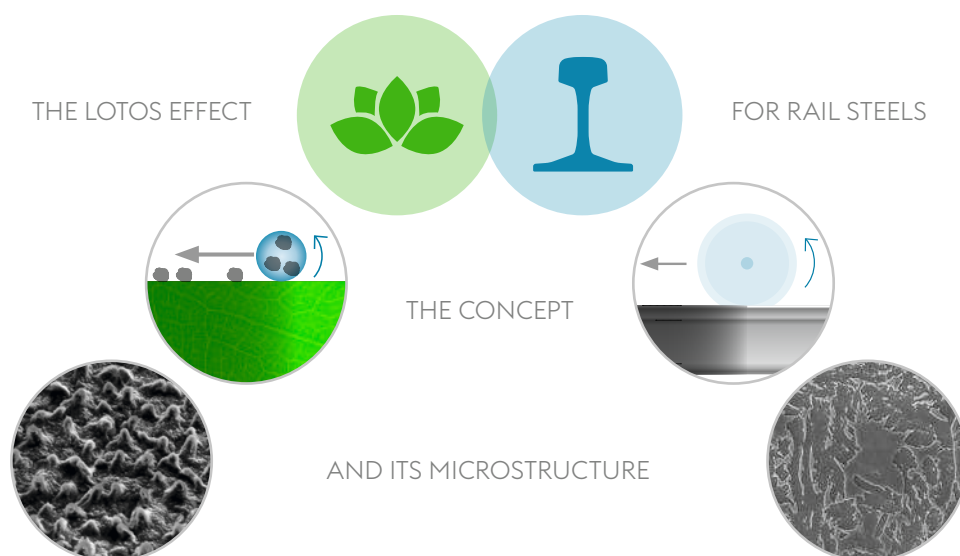
The so-called Lotos effect. voestalpine's highly experienced R&D team managed to apply this simple concept of nature to the rail development and launched a new dimension in rail steel.

OUR SOLUTION

The new multiphase steel design of 340 Dobain® HSH® uses its microstructural features and prevents the formation of Head Checks. A self-polishing effect responds to the severe loading situation and reduces the deformation on the surface to a minimum. The Lotos effect applied to rails. As a result we are able to produce a rail with lowest maintenance needs.

INSPIRED BY NATURE

Our steel designers have been inspired by nature for your sustainable future. Following the systematics of the lotos leaf effect we present the 340 Dobain® HSH® as the first rail with microstructure polishing. For optimized life cycle costs.



CHOICE OF RAIL STEEL

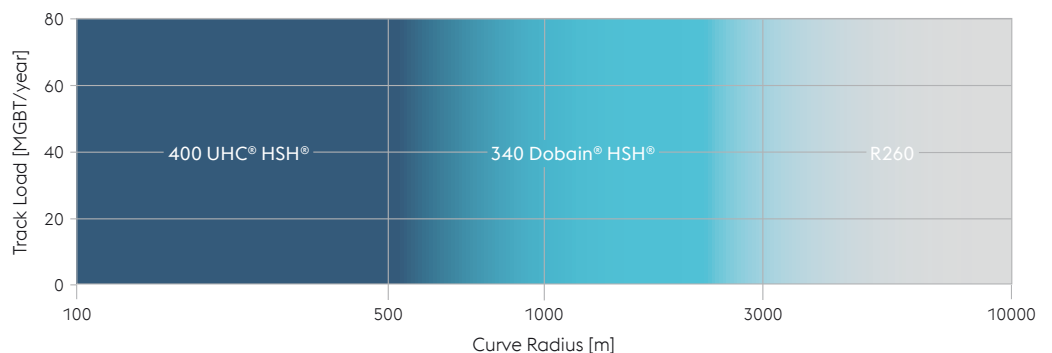
As a full-range rail supplier, voestalpine offers the widest range of rail profiles and rail steels suiting all fields of application and maintenance concepts by combining our HSH® heat treatment with adjusted and new material concepts.

RECOMMENDATION

Depending on the predominant rail defect mechanism we define suitable areas of application for our rail grades. For tracks susceptible to Head Checking the solution is our 340 Dobain® HSH®. In areas of increased wear and corrugation we recommend our other HSH® rails. Latest track

experiences show that this rail grade strategy leads to the longest service life and due to the reduced maintenance, ultimately to the lowest life cycle costs.

Following this rail grade recommendation leads to a technically, economically and ecologically optimized track.



STEEL TECHNOLOGY

For all premium rail steels, the HSH® technology allows for highest weldability and toughness by minimizing the amount of alloying elements.



HSH® TECHNOLOGY



EASY TO WELD



**NO HEAD CHECKING
(340 Dobain® HSH®)**



**LOWEST MAINTENANCE
NEEDS**



LOWEST LIFE CYCLE COSTS



**HIGH WEAR RESISTANCE
(400 UHC® HSH®)**

340 Dobain® HSH®

The Dobain® material concept combined with the well-established HSH® technology creates a unique microstructure that is able to solve the mechanism of Head Check initiation on a physical level.

400 UHC® HSH®

The UHC® steel design combined with the HSH® technology leads to a microstructure strengthening and refinement. The rail steel features highest resistance to degradation such as wear, corrugation and RCF.

voestalpine PREMIUM SERVICES

voestalpine offers a unique portfolio of additional customer services including



TECHNICAL SUPPORT TEAM

Our customer service team assists you in questions of:

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



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 offers also welding inspection to ensure high initial quality of rail welds



LOGISTICS

- » Our logistics department 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 over-sea deliveries



ISO 9001 Quality



ISO 14001 Environment
in accordance with EMAS II



ISO 45001 Safety



ISO 50001 Energy



AT-000183
Verified Environmental
Management

