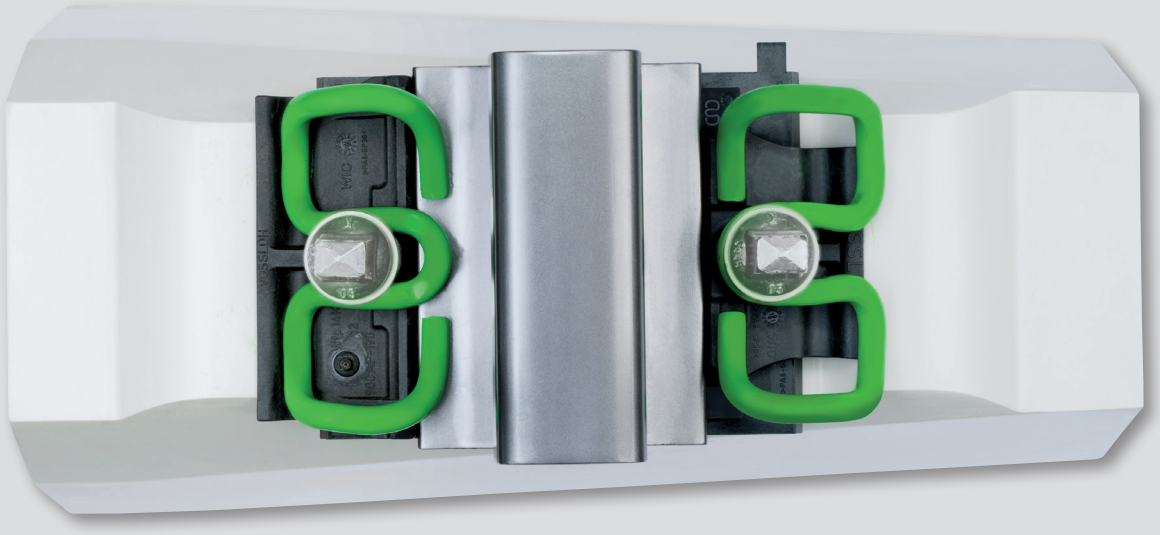
vossloh



System W 30 HH

Elastic rail fastening for heavy haul –
the resistant solution for ballasted track with concrete sleepers

Vossloh fastening systems

Based on our experience we are setting standards of the future.

Heavy Haul – Heavy loads are transported safely

Axle loads of more than 26 t mean extreme loads for the track. Resistant fastening systems provide safe and durable connections and simultaneously allow fast and easy maintenance.

System W 30 HH – resistant solution for concrete sleepers on ballasted tracks

The combination of concrete sleepers on ballast is the most frequently used railway track structure all over the world. In the so-called W-track, sleeper shoulders provide stability for track and fastening system and allow the transfer of forces generated by traffic. The ballast bed is flexible and transfers these loads homogeneously into the substructure. Furthermore, it absorbs noise and vibration caused by rolling stock. The W 30 HH system forms a complete optimum railway track for heavy haul traffic.

Rising to the challenges of heavy haul tracks ...

The W 30 HH system is designed for high axle loads of up to 35 t. It combines all approved advantages of the W-system family with those of the tension clamp Skl 30: It has a greater diameter and optimized geometry to provide high toe loads, high dynamic fatigue strength and a high creep resistance. This permits safe travelling also under extreme conditions at temperatures of –60 to + 50 degrees Celsius. Additionally, rail pad, angled guide plate and screwed dowel made of plastic provide electrical insulation thus ensuring an additional insulator between tension clamp and rail is not required.

... and of tracks for mixed traffic

By the use of a more elastic railpad (160 kN), the W 30 HH is also suitable for tracks that serve both heavy haul and passenger traffic. For instance in the United Arabic Emirates: Here, freight trains with an axle load of 32.5 t run at a speed of 120 km/h, while passenger trains (axle load 25 t) reach speeds up to 200 km/h.

The W 30 HH AP system includes an additional abrasion plate (AP) that sits between rail seat and rail pad to protect both. The plate made of glass-fibre reinforced polyamide is abrasion-resistant and can be loaded with high contact pressure. Its special design avoids penetration of sand:

This has been verified by constant load tests performed on the system in accordance with the US-directive AREMA chapter 30 - at changing tempe- ratures and using a sand-water mixture. Up to now, the W 30 HH system has been installed on approx. 700 km heavy haul tracks, amongst others in the desert of the United Arabic Emirates and the USA.



Vossloh *protect:*

The new coating for tension clamps, sleeper screws and T-head bolts (incl. nuts ans wahsers) – for a consistent and high coating quality.

Advantages

- Conventional barrier protection **plus** cathodic corrosion protection, preventing the base material from corroding in the event of damages, e.g. caused by flying ballast.
- Withstands extreme conditions such as high temperature fluctuations, high humidity and industrial climate (acid rains).

System W 30 HH

Elastic. Safe. Resilient. Flexible.

The W-shape of the Skl 30 provides safety

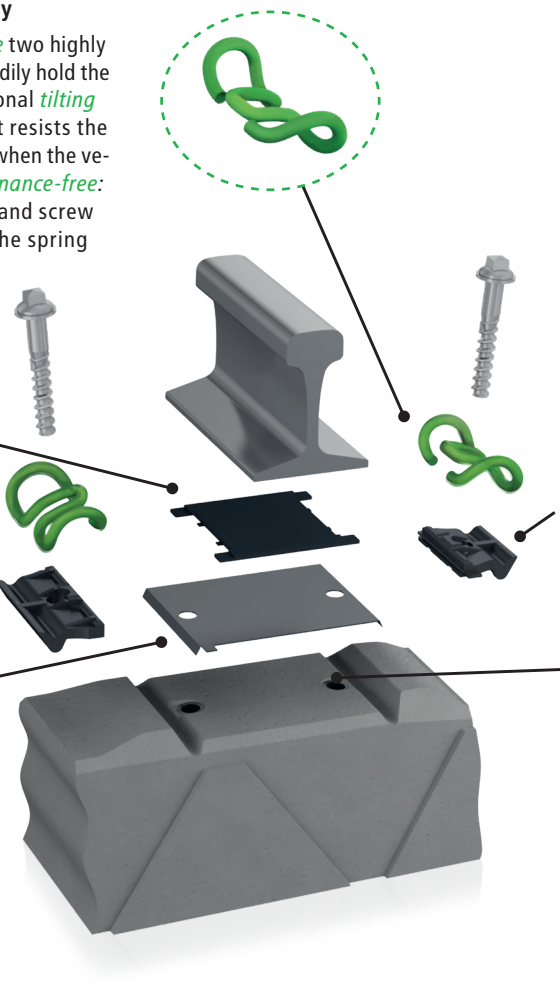
For meeting the required *rail creep resistance* two highly elastic, independently acting spring arms steadily hold the rail down; the middle bend acts as an additional *tilting protection*. With its high fatigue strength, it resists the dynamic vertical movements that are caused when the vehicle rolls over the rail. The system is *maintenance-free:* Due to the permanently acting tension, Skl and screw cannot loosen, the middle bend prevents the spring arms from plastic deformation.

Rail pads of TPU resist high axle loads

The *resistive* material and the special *heavy haul design* of the rail pad make sure that the system withstands the high pressure of the traffic loads.

Less abrasion – higher durability

Abrasion Plate protects rail seat and rail pad *and impedes the penetration of sand*.



Angled guide plates keep the rail in the track

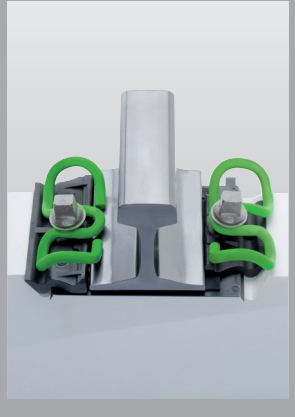
The angled guide plates lead the forces introduced into the rail by train in the concrete. In this way, the screw-dowel combinations are not loaded by shearing and bending forces. If high lateral forces apply, *trapezoid*, *angled guide plates* can be used to deflect these forces via a larger contact face. The design of the angled guide plates additionally supports the *tilting protection*. Different widths can *adjust the gauge*.



Securely clamped with the screw-dowel combination *NG*

The high-quality dowels made of high-tech material are extremely strong and efficient: Lateral forces are reduced, this leads to a *decrease in the load on the sleeper*.





Easy handling for installation and rail maintenance due to preassembly and exchangeability

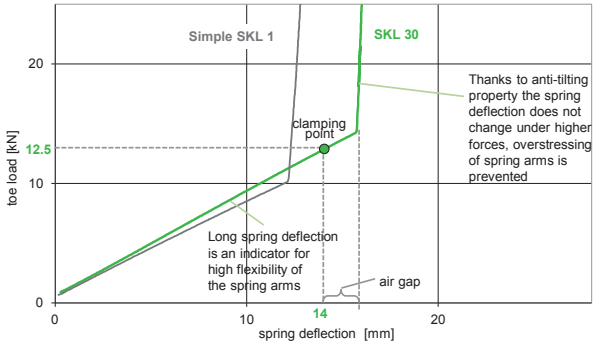
- All fastening components can be preassembled in the sleeper factory.
- At the construction site, it will only be required to lay the rail and clamp it. That way, fastening components cannot get lost.
- Due to the innovative tool VosMat Rapid, an automated installation of the system is possible.
- For welding of the rail, no fastening elements have to be removed from the support point.
- All components, including dowels, can be replaced easily. Replacement of sleepers can be avoided.

Safety. Comfort. Track protection.

Creep resistance and rail tilting protection

To allow optimum deflection for the rail, its fastening must response in an elastic way. Therefore, the Skl 30 has a long spring deflection: When forces are applied by a train, its spring arms remain in contact with the rail foot in each situation. For this purpose, the rail is continuously clamped in a force-fitted way by the two spring arms with a spring deflection of approx. 14 mm and a toe load force of approx. 12.5 kN. With this, also a high creep resistance is achieved: When the trains accelerate/decelerate, the rails remain in position, dangerous open fracture gaps due to broken rails are avoided. Simultaneously, a small gap between the middle bend and the rail foot of the rail has exactly the clearance required for operation. If the rail tilts excessively, e.g. in narrow curves, high forces are applied to the tension clamp. The Skl 30 is able to resist them: Rail movements are limited by the middle bend after the gap has been overcome, and the spring arms are not overstretched.

Load-deflection-curve



Rail fastening system W 30 HH with tension clamp Skl 30		
Typical field of application	Heavy Haul; ballasted track with concrete sleepers	
Axle load	≤ 35 t	
Speed	≤ 160 km/h	
Curve radius	≥ 400 m	
Height adjustment	optional	
Gauge adjustment	± 10 mm	
Vertical fatigue strength of Skl 30	2.2 mm	
Static stiffness of rail pad	≥ 400 kN/mm	EN 13146-9: 2011
Toe load of Skl 30 (nominal)	12.5 kN	EN 13146-7: 2012
Electrical resistance	≥ 5 kΩ	EN 13146-5: 2003
Rail creep resistance	≥ 9 kN	EN 13146-1: 2012
Corrosion protection category (Skl,Ss)	C5-L (1440 h stainless)	ISO 12944
System approval/homologation		EN 13481-2: 2012 AREMA Chap. 30

Remark: Contents, figures and technical data in this brochure display the performance of the fastening system, however, they always depend on external conditions. Please contact us to enable us to develop a solution for you that will be customized to your requirements. The information presented corresponds to the technical state at the time of printing; in the meantime, continuous research and development programmes at Vossloh could have caused adaptations of the product.

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