



## System DFF 30 HH

Elastic rail fastening for heavy haul –  
the optimum single support point for rail vehicles with  
extreme axle loads

# 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.

### DFF 30 HH – designed for extreme axle loads of crane railways

In container ports, the stress of the railway infrastructure is extremely high - due to the enormous loads of the container cranes and extreme weather conditions.

Especially for the requirements of heavy container crane systems in port terminals – with their high axle and lateral loads, as well as their extreme acceleration and brake forces – Vossloh has developed the DFF 30 HH system, a single support point solution for slab tracks based on the approved systems DFF 300 and W 30 HH.

The extreme loads are transmitted through the shoulders of the cast-iron baseplate and the reinforced glass fibre polyamid angled guide plates.

The rail pad made of thermoplastic polyurethane not only damps the loads but also ensures the durability required for extreme loads and ambient conditions.

The DFF 30 HH system offers a height adjustment of up to 80 mm and a gauge adjustment by 40 mm per support point, without disassembly of the whole system.

This is especially important to be able to respond on sagging of the ground – a problem typical for crane tracks, caused by the different ground textures in the port area and the extreme loads of the heavy cranes.

All steel parts are protected from corrosion, so that they can also be used under extreme weather conditions including aggressive saline maritime air.

The DFF 30 HH system is already being used in two Australian projects – Port of Brisbane as well as Port Botany in Sydney.



#### **Vossloh protect:**

The new coating for tension clamps, sleeper screws and T-head bolts (incl. nuts and washers) – 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 DFF 30 HH

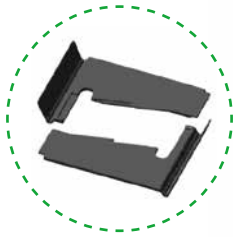
Elastic. Safe. Resilient. Flexible.

## The W-shape of the SKI 30 provides safety

For meeting the required *creep resistance* two highly elastic, independently acting spring arms steadily hold the rail down; the middle bend is used 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. Due to the permanently acting tension, SKI and screw cannot loosen and therefore, they are *maintenance-free*.

## Adjustable height

Using height adjustment plates, the *height of the system can be adjusted within 80 mm*. With the optimized height adjustment plates *NG* the rail pad rests completely on the bearing face.



## Safely tied

By means of T-headed bolts, the SKI tension clamps are safely mounted to the baseplate. The baseplate itself is fixed in the concrete track with anchor bolts.



## Angled guide plates keep the rail in the track

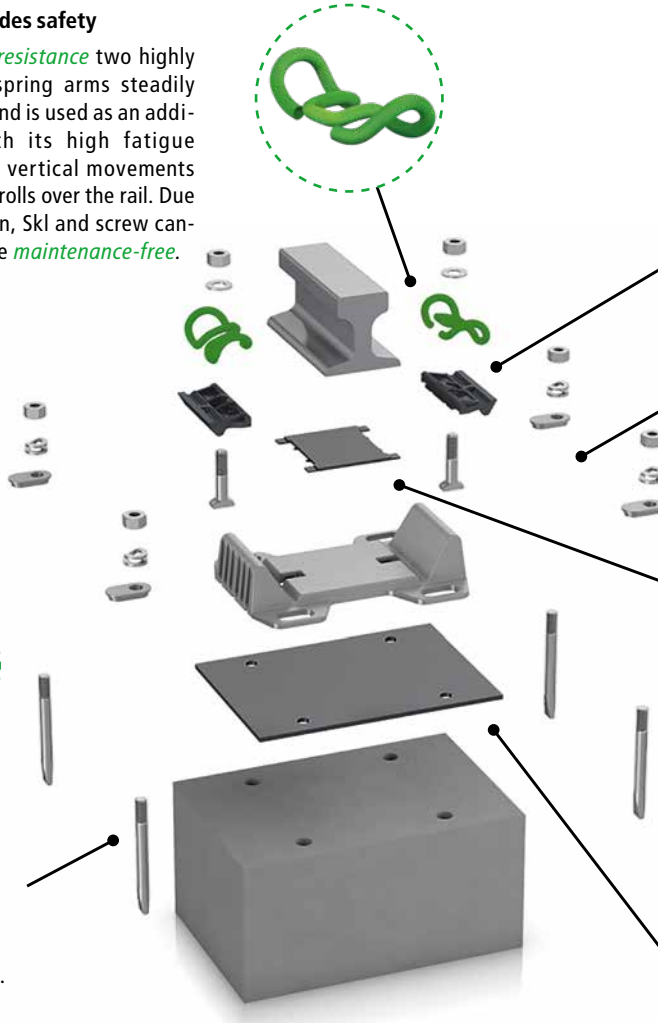
The angled guide plates lead the forces introduced into the rail by train in the baseplate made of cast iron. In this way, the T-headed bolts are not loaded by shearing and bending forces. The design of the angled guide plates additionally supports the *tilting protection*. Different widths can *adjust the gauge*.

The gauge can be adjusted using *adjusting plates*.

## Optimum distribution of extreme lateral loads

Due to its adapted shoulder of the cast-iron base plate, extreme *lateral loads can be deflected*. The rail pad made of thermoplastic polyurethane *not only damps the loads* but also ensures the required *durability*. Furthermore, it *electrically insulates* the baseplate from the rail.

Intermediate plate



## Easy handling for installation, rail maintenance and replacement

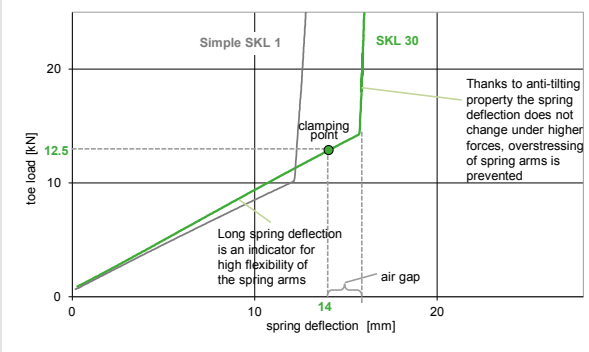
- Flexibly applicable as single supporting point: no special shoulders (e.g. as for concrete sleepers) required.
- Installation is possible both with top-down and with bottom-up method.
- For welding of the rail, no fastening elements have to be removed from the supporting point.
- All components can be replaced.

# Safety. Comfort. Track protection.

## Creep resistance and rail tilting protection

To allow optimum deflection for the rail, fastening must respond 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 of approx. 12.5 kN. With this, a high creep resistance is also 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 play that is 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 compensated by the middle bend after the air gap has been overcome, and the spring arms are not overstretched.

Load-deflection-curve



Rail fastening system DFF 30 HH with tension clamp Skl 30		
Typical field of application	Heavy haul /Crane trains; slab track	
Axle load	≤ 72 t	
Speed	≤ 80 km/h	
Curve radius	≥ 300 m	
Height adjustment	+ 80 mm	
Gauge adjustment	- 10/ + 70 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
System audit/homologation		EN 13481-5: 2012

## 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 cause adaptations of the product.