



System 300 *New Generation*

Highly elastic rail fastening for high speed and conventional rail –
the sustainable solution for slab track

Vossloh fastening systems

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



High Speed on an elastic base

High speed means high dynamic forces – a test of stamina for the rail fastening system. Vossloh tension clamps for high speed traffic with more than 250 km/h ensure safe tensioning. Components with high elasticity are able to balance the dynamic track forces out in an outstanding way.



Conventional Rail – Safety on standard routes

Safety and comfort are important for rail traffic. Our tension clamps provide a stable fastening solution for types of track with a permissible axle load of up to 26 t. The highly elastic components additionally ensure a comfortable journey.

System 300 NG – the optimized sleeper solution for slab tracks

Slab track systems optimally resist forces that are caused by high speed trains – the track bed course does not displace and maintenance costs are reduced. The 300 NG system combines these characteristics with the advantages of concrete sleepers: Sleeper shoulders stabilize the system and deflect the forces generated by the traffic. The 300 NG system achieves the elasticity required for the railway tracks by its elastomer intermediate plate made of *cellentic* that rests on the rail seat and provides for optimum distribution of load.

Approved quality system – sustainably optimized

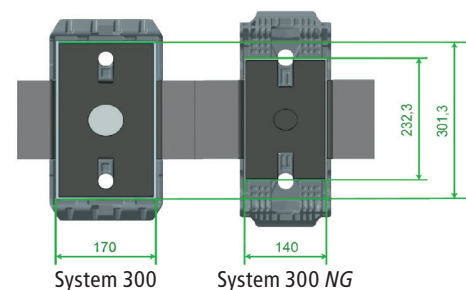
Reliable functionality and stability with resource-saving design – this is provided by the new generation of the Vossloh rail fastening systems. The new 300 NG system is a further developed design of the approved system 300 and the result of 40 years of experience in high-speed traffic. New angled guide plates, intermediate plates and load distribution plates are harmonised with one another. At the same time, it can be used for existing track and sleeper designs of the system 300 and is offering constant functionality and stability. Optimized usage of material does not only save the environment but also reduces logistics costs. The new components are developed from the approved Vossloh tension clamp Skl 15 to ensure already established characteristics, e.g. high fatigue strength and high toe load. The highly elastic *cellentic* intermediate plate guarantees saving of the track by optimum load distribution.

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).



cellentic is an elastomer made of EPDM that ensures high stability against many types of chemical attacks. The advantage: the material provides excellent resistance to temperature, aging, and weather conditions as well as it is very stable under permanent load. *cellentic* components optimize the elasticity for a reduction of vibrations and the protection of track.

System 300 NG

Elastic. Safe. Resilient. Flexible.

The W-shape of the Skl 15 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.

Angled guide plates keep the rail in the track

The angle 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. The design of the angled guide plates additionally supports the *tilting protection*. Different widths can *adjust the gauge*.

Adjustable height

Using height adjustment plates, the *height of the system can be adjusted within 76 mm*. With the optimized height adjustment plates *NG* the *cellentic* intermediate plate rests completely on the bearing face.

A steel plate ensures an optimum distribution of load

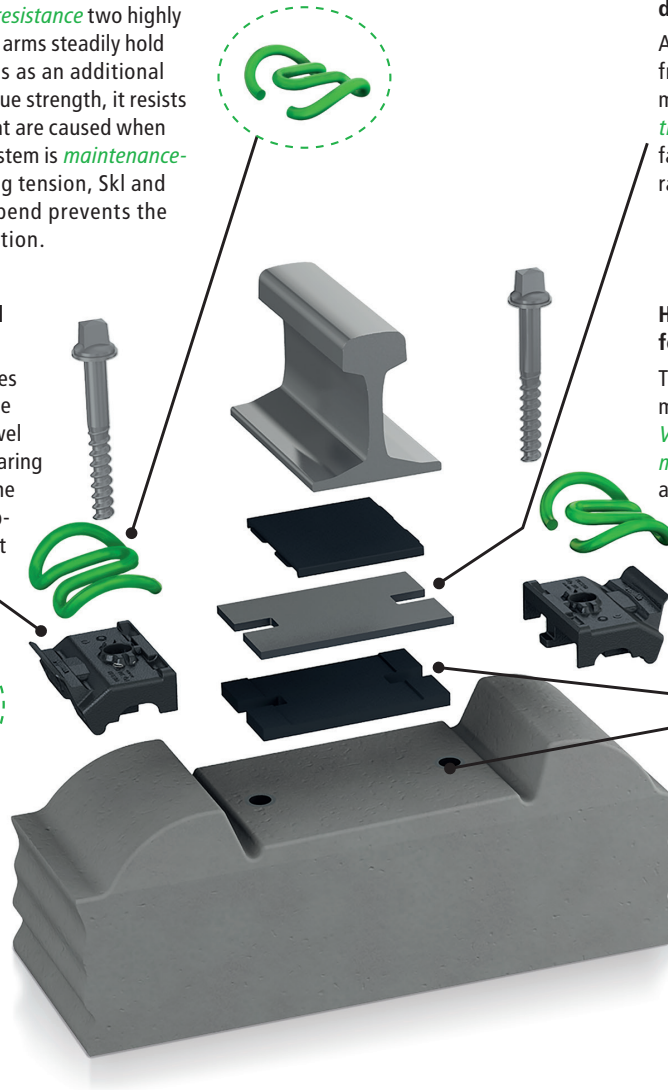
A steel plate ensures *load distribution* from the rail foot to the elastic intermediate plate and offers additional *tilting protection* through its large surface. A plastic rail pad insulates the rail electrically.

Highly elastic intermediate plate for less vibration

The elasticity of the special *cellentic* material ensures stable rail deflection; *Vibrations and structure-borne noise are minimised*. Their reinforced edge area also contributes to the *tilting protection*.

Securely clamped with the screw-dowel combination NG

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



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

- All parts of the fastening system can be preassembled in the factory for sleepers and prefabricated elements.
- At the construction site, it will only be required to lay the rail and clamp it. That way, fastening components cannot get lost.
- For welding of the rail, no fastening elements have to be removed from the support point.
- All components, including dowels, can be replaced.

Safety. Comfort. Track protection.

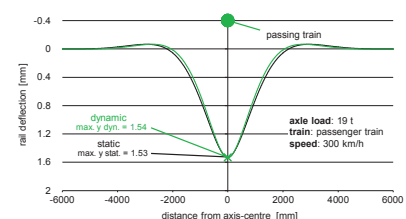
Travel comfort through optimum rail deflection

The railway track must be elastic to compensate forces caused by running trains. Because ballast is not used for slab tracks, the highly elastic *cellentic* components of the rail fastening system are designed to undertake this job. The 300 NG system with *cellentic* intermediate plate allows rail deflection and can optimally distribute occurring vertical forces. The result: Protection of track. Its elasticity is adapted to the traffic load to achieve optimum rail deflection: load distribution is at the maximum without overloading the rail. Furthermore, the *cellentic* component damps the vibrations caused by the unevenness of the track and the wheels; structure-borne track vibration is minimized. The result: travel comfort, safety through smooth running, as well as increased lifetime of track components and vehicles.

Creep resistance and rail tilting protection

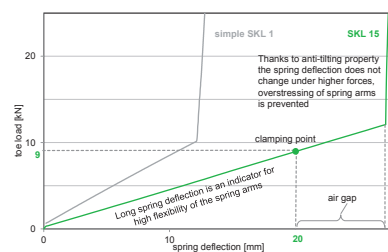
To allow optimum deflection for the rail, its fastening must respond in an elastic way. Therefore, the Skl 15 has a long spring deflection: When forces are applied by a train, its spring arms remain in contact with the rail foot in each situation. For this purpose, the rail is continuously clamped in a force-fitted way by the two spring arms with a spring deflection of approx. 20 mm and a toe load of approx. 9 kN. With this, a high rail 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 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 15 is able to resist them: Rail movements are limited by the middle bend after the air gap has been overcome, and the spring arms are not overstretched.

Zimmermann computation



Simplified demonstration: one axle of a two axle bogie

Load-deflection-curve



Rail fastening system 300 NG with tension clamp Skl 15		
Typical field of application	High speed/Conventional rail; slab track with sleepers/supporting plates	
Axle load	≤ 26 t	
Speed	For HS: ≥ 250 km/h // for CR: ≤ 250 km/h	
Curve radius	For HS: ≥ 400 m // for CR: ≥ 150 m	
Height adjustment	- 4 mm / + 76 mm	
Gauge adjustment	± 16 mm	
Vertical fatigue strength of Skl 15	3.0 mm	
Static stiffness of <i>cellentic</i> intermediate plate	≥ 17 kN/mm	EN 13146-9: 2011
Relation of dyn. / stat. stiffness of <i>cellentic</i> intermediate plate	1.1	EN 13146-9: 2011
Toe load of Skl 15 (nominal)	9 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 13481-5: 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 have caused adaptations of the product.