vossloh

System 300 UTS

Highly elastic rail fastening for metro – the optimum solution for slab track

Vossloh fastening systems

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

Urban Transport – Always smooth with stop and go

Frequent starting and stoppings at many stops within the shortest time characterize urban transport. In this case, highly elastic components provide for comfortable travelling at high operating safety and reduced noise – at axle loads of up to 18 t (Metro) / 13 t (Tram).

System 300 UTS – the urban transit solution for prefabricated members

Slab track systems optimally resist forces that are caused by trains – the track does not displace and maintenance costs are reduced.

The system 300 UTS combines these characteristics with the advantages of concrete sleepers: Sleeper shoulders stabilize the system and deflect the forces generated by the traffic. The 300 UTS system achieves the elasticity required for the railway tracks by its elastomer intermediate plate made of *cellentic* that rests on the rail seat and ensures optimum distribution of load.

System 300 UTS – the individual solution for slab track

The system 300 UTS has been further developed on the basis of the approved system 300 especially for urban transport and was tested as per requirements given by metro: The height of the concrete shoulder optimal-ly resists the lateral forces generated under metro conditions. The system is a cost-efficient solution for contoured track plates as well as also for pre-fabricated concrete plinths and due to its modular design it can be configured to meet the customers' requirements. The 300 UTS has become increasingly popular and since 2007, it has been being used in urban transport projects all over the world; e.g. in Cologne, Bangkok and in the Australian project Gold Coast Rapid Transit.

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).

cellentic

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 UTS

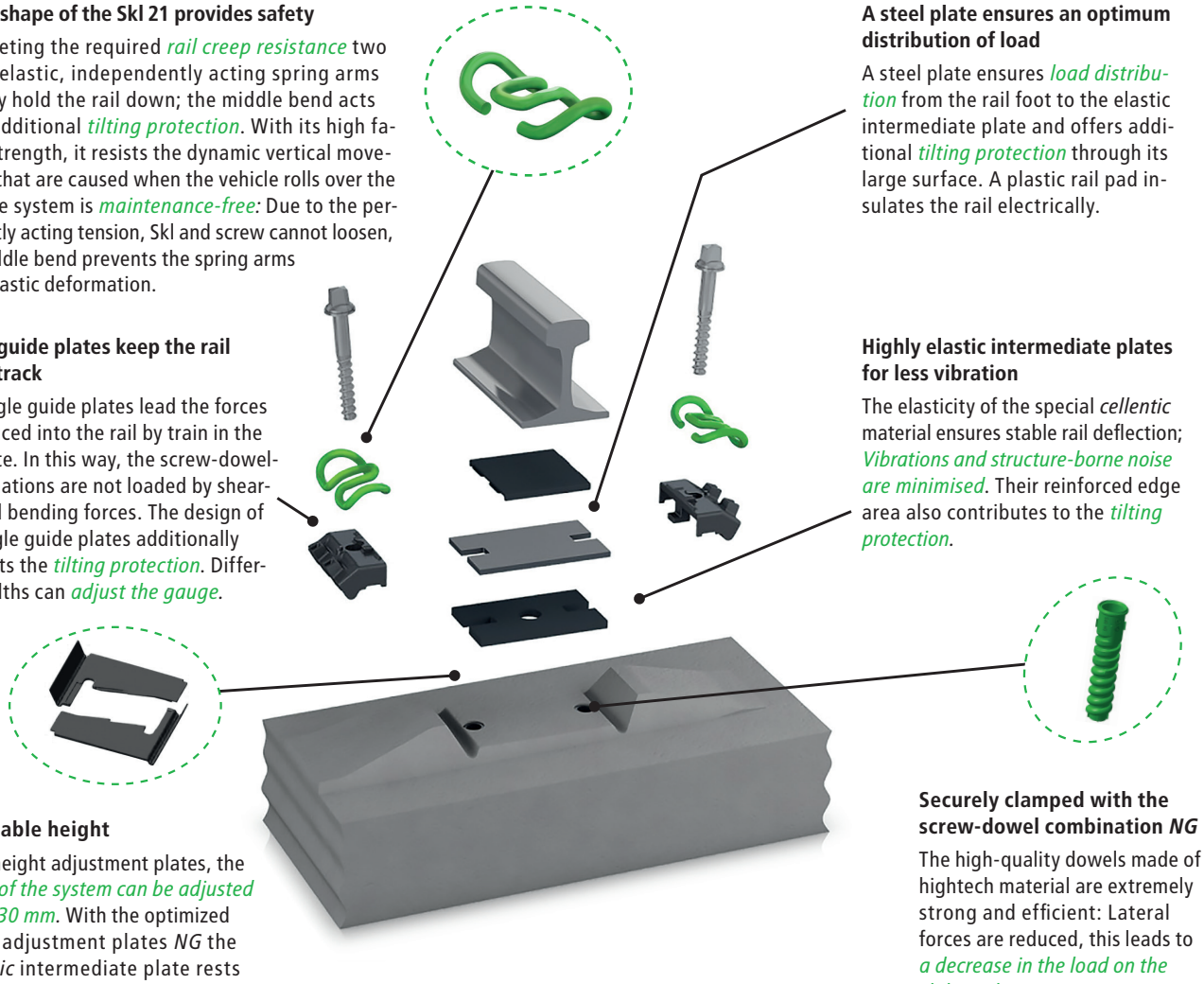
Elastic. Safe. Resilient. Flexible.

The W-shape of the Skl 21 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.

Angle 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 angle guide plates additionally supports the *tilting protection*. Different widths can *adjust the gauge*.



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 plates for less vibration

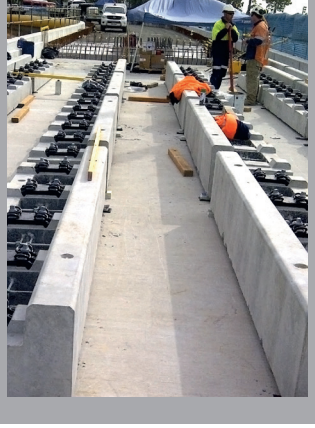
The elasticity of the special *cellentic* material ensures stable rail deflection; *Vibrations and structure-borne noise are minimised*. Their reinforced edge area also contributes to the *tilting protection*.

Adjustable height

Using height adjustment plates, the *height of the system can be adjusted within 30 mm*. With the optimized height adjustment plates *NG* the *cellentic* intermediate plate rests completely on the bearing face.

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

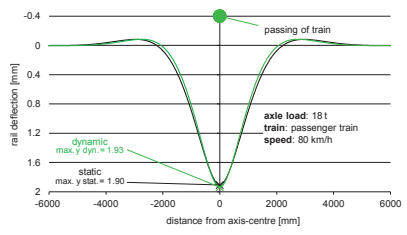
- All parts of the fastening system can be preassembled in the factory for sleepers and prefabricated elements.
- At the construction site, it will only be required to lay the rail and clamp it. That way, fastening components cannot get lost.
- Can be assembled on sleepers, bearing plates as well as on concrete bases.
- 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 UTS 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.

Zimmermann computation

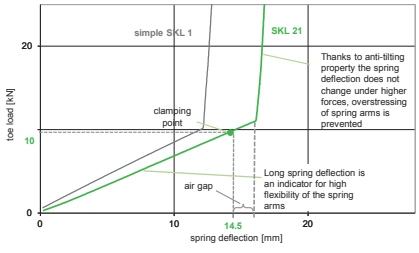


Simplified demonstration: one axle of a two axle bogie

Creep resistance and rail tilting protection

To allow optimum deflection for the rail, its fastening must response in an elastic way. Therefore, the Skl 21 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. 14.5 mm and a toe load of approx. 10 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 21 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.

Load-deflection-curve



Rail fastening system 300 UTS with tension clamp Skl 21		
Typical field of application	Urban transport / Transit; slab track with sleepers / supporting plates	
Axle load	≤ 18 t	
Speed	≤ 140 km/h	
Curve radius	≥ 80 m	
Height adjustment	+ 30 mm	
Gauge adjustment	± 10 mm	
Vertical fatigue strength of Skl 21	2.5 mm	
Static stiffness of *cellentic* intermediate plate	≥ 16 kN/mm	EN 13146-9: 2011
Relation of dyn. / stat. stiffness of *cellentic* intermediate plate	1.1	EN 13146-9: 2011
Toe load of Skl 21 (nominal)	10 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.

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www.vossloh.com

Vossloh Fastening Systems GmbH
Vosslohstraße 4
D-58791 Werdohl

Phone +49 (0) 23 92 52-0
Fax +49 (0) 23 92 52-448
E-Mail info.corecomponents@vossloh.com