



System W 25

Elastic rail fastening for tram –
the optimum solution for slab track with biblock sleepers

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 W 25 – the tramway solution for grouted biblock sleepers

Slab tracks are capable of resisting loads generated by the rolling stock with an exceptional mechanical performance – the track doesn't lose geometry and maintenance costs are significantly reduced. The system W 25 is completely suitable to work under these conditions, combining the advantages of a concrete sleeper design into a slab track: lateral shoulders stabilize the system and distribute lateral forces imparted by the traffic. The elastomeric *cellentic* rail pad provides the elasticity the system requires to ensure an optimum load distribution throughout the rail seat area.

System W 25 – the smart solution for slab track

System W 25 was developed for tramways that use grouted biblock sleepers. One of the main advantages of this technology is the capability of being completely preassembled in the factory. The two concrete blocks of the sleeper are connected by a steel tie bar in order to build a defined gauge. Additionally, temporary rail supports at the installation site can be avoided using this technique. Due to the diagonal shoulder adjacent to the rail seat, wedge guide plates can be used to regulate the gauge in defined steps, without the need of dismantling the components – a significant advantage that simplifies the construction process and avoids the need of spare components in the event of track geometric regulations. The Skl 25 enables the installation of flat and hence more stable cover caps. Additionally, due to its slim design, the fastening system is suitable for projects with short rail webs and shallow concrete covering. In combination with the easy-to-produce grooveless sleepers, system W 25 offers an economical track solution for embedded tracks. More than 1.8 million fastening points of this system are installed worldwide, with the VLT Rio in Brazil being a reference project with approximately 20 km equipped with this specific fastening system.

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 W 25

Elastic. Safe. Resilient. Flexible.

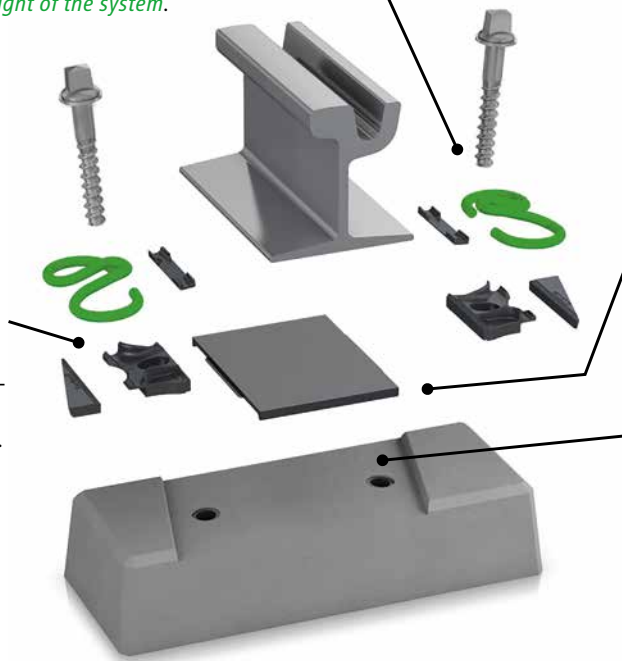
The W-shape of the Skl 25 provides safety

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. The flat shape of the Skl 25 allows a *low height of the system*.



Guide plates keep the rail in the track

The 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 guide plates additionally supports the *tilting protection*. With wedge guide plates, the *gauge* can be *adjusted* in defined steps, without the need of dismantling the components.



cellentic rail pad for high elasticity

The elasticity of the *cellentic* pad compensates the impacts of the vertical forces and with this, stable rail deflection; it also damps vibrations and *minimizes the structure-borne noise*.

Securely clamped with screw-dowel-combination



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

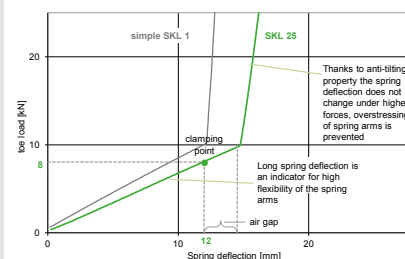
- All parts of the fastening system can be preassembled in the sleeper factory.
- At the construction site, it will only be required to lay the rail and clamp it. That way, fastening components cannot get lost.
- For welding of the rail, no fastening elements have to be removed from the support point.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

Safety. Comfort. Track protection.

Creep resistance and rail tilting protection

To allow optimum deflection for the rail, its fastening must respond in an elastic way. Therefore, the Skl 25 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. 12 mm and a toe load of approx. 8 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 25 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 W25 with tension clamp Skl 25		
Typical field of application	Urban transport/tram; slab track with sleepers	
Axle load	≤ 13 t	
Speed	≤ 100 km/h	
Curve radius	≥ 40 m	
Height adjustment	optional	
Gauge adjustment	± 10 mm	
Vertical fatigue strength of Skl 25	2 mm	
Static stiffness of <i>cellentic</i> rail pad	≥ 60 kN/mm	EN 13146-9: 2011
Relation of dyn. / stat. stiffness of <i>cellentic</i> rail pad	1.1	EN 13146-9: 2011
Toe load of Skl 25 (nominal)	8 kN	EN 13146-7: 2012
Electrical resistance	≥ 5 kΩ	EN 13146-5: 2003
Rail creep resistance	≥ 9 kN	EN 13146-1: 2012
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.