

System W 30

Highly elastic rail fastening for conventional rail –
the resistant solution for ballasted track with concrete sleepers

Vossloh fastening systems

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



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.

W 30 – 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, however, is flexible and transfers these loads homogeneously into the substructure. Furthermore, it absorbs noise and vibration caused by train movements. The W 30 system completes this track perfectly because its elastomer rail pad made of *cellentic* optimizes the elasticity and with this, it contributes to the protection of the track bed.



Rising to the challenges of infrastructure projects

For many infrastructure projects, a major challenge is it to install and operate the railway tracks for passenger and freight traffic efficiently under difficult conditions, e.g. high temperature fluctuations and high humidity. Therefore, Vossloh has developed the W 30 system.

It combines all approved advantages of the W-system family with those of the tension clamp Skl 30 which 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. On the one hand, it is adapted to the challenging application conditions in deserts and steppe landscapes. On the other hand, it also resists extreme frozen conditions in sub-zero temperatures. The W 30 system proved to be successful for instance on 1,000 km in Russia.

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 30

Elastic. Safe. Resilient. Flexible.

The W-shape of the Skl 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, Skl and screw cannot loosen and therefore, they are *maintenance-free*.

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. 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 regulated*. With the optimized height adjustment plates *NG* the *cellentic* rail pad rests completely on the bearing face.

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 the screw-dowel combination NG

The high-quality dowels made of high-tech material are extremely strong and efficient: Lateral forces are reduced and with this, the *load on the sleeper is reduced*.



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

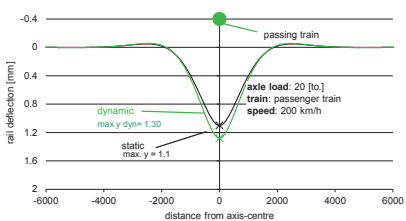
- All fastening components can be preassembled in the sleeper factory.
- At the construction site, it will only be required to lay the rail and clamp it. In this way, fastening components cannot get lost.
- Due to the innovative tool VosMat Rapid, an automated installation of the System is possible.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

Safety. Comfort. Track protection.

Travel comfort through optimum rail deflection

The railway track must be elastic to compensate forces caused by running trains. The highly elastic *cellentic* components of the fastening system take over this job in addition to the ballast. The W 30 system with *cellentic* rail pad allows rail deflection and can optimally distribute occurring vertical forces. The result: Care 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 life-time of track components and vehicles.

Zimmermann computation

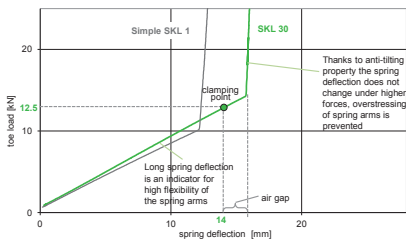


Simplified demonstration: one axle of a two axle bogie

Creep resistance and rail tilting protection

To allow optimum deflection for the rail, its fastening must response in an elastic way. Therefore, the Skl 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, 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 play required for operation. If the rail tilts excessively, e.g. in narrow bends, 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 gap has been overcome, and the spring arms are not overstretched.

Load-deflection-curve



Rail fastening system W 30 with tension clamp Skl 30		
Typical field of application	Conventional rail; ballasted track with concrete sleepers	
Axle load	≤ 26 t	
Speed	≤ 350 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 <i>cellentic</i> rail pad	≥ 50 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 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 cause adaptations of the product.