



System W 42

Highly elastic rail fastening for all track requirements

Vossloh fastening systems

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

Suitable for almost all requirement profiles in passenger and freight transport.



Conventional Rail
Safety on standard routes



Heavy Haul
Large loads carried safely



High Speed
High speed on an elastic base



Urban Transport
Always smooth with stop and go



System W 42 – the modern concrete sleeper solution for 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 is flexible and transfers these loads homogeneously into the substructure, also absorbing noise and vibration caused by train movements. The W 42 system completes this railway track perfectly. An elastomer rail pad *cellentic* ensures optimal elasticity for conventional railway, urban transport and high speed lines.

Universal W-system for all route requirements

Thanks to the intelligent pairing of the elasticity of the *cellentic* rail pads and the newly developed tension clamp Skl 42 with high fatigue strength, the system can be used for all types of tracks for passenger transport – from urban transport, conventional lines to high-speed lines.

System W 42 also meets the highest demands of heavy haul tracks due to the use of angled guide plates and rail pads that are designed for high axle loads of over 26 t, and due to the high toe load of the tension clamp Skl 42.

Excursion

Tension clamp Skl 42 – the new all-rounder

Traffic loads that occur with the passage of trains, do not only affect the superstructure in the vertical direction, but also in lateral and longitudinal directions. Vossloh therefore optimised the Skl 42 for the best possible absorption of these loads.

A high **vertical fatigue strength** permits the use of high elastic components in both the ballasted track and in the slab track for optimal rail subsidence and load distribution.

A high degree of **fatigue strength in the longitudinal** direction allows the compensation of forces that, for instance occur with vehicles that accelerate and decelerate quickly.

The high **lateral fatigue strength** safely compensates the additional high lateral forces that occur, especially in tight track curves.

The newly developed SKI 42 thus fulfils the requirements of all application areas from heavy loads up to the high-speed track and also in urban transport.



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 42

Elastic. Safe. Resilient. Flexible.

The W-shape of the Skl 42 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 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.

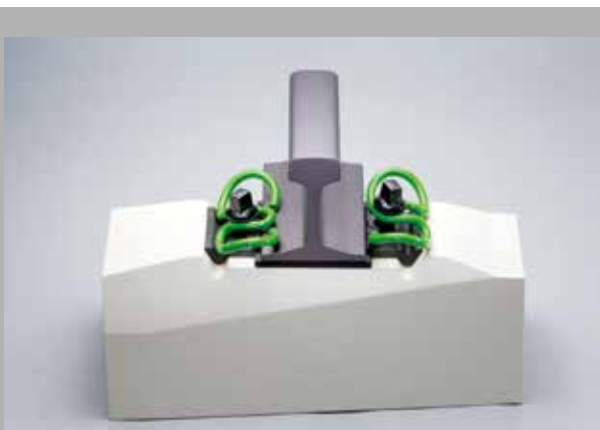
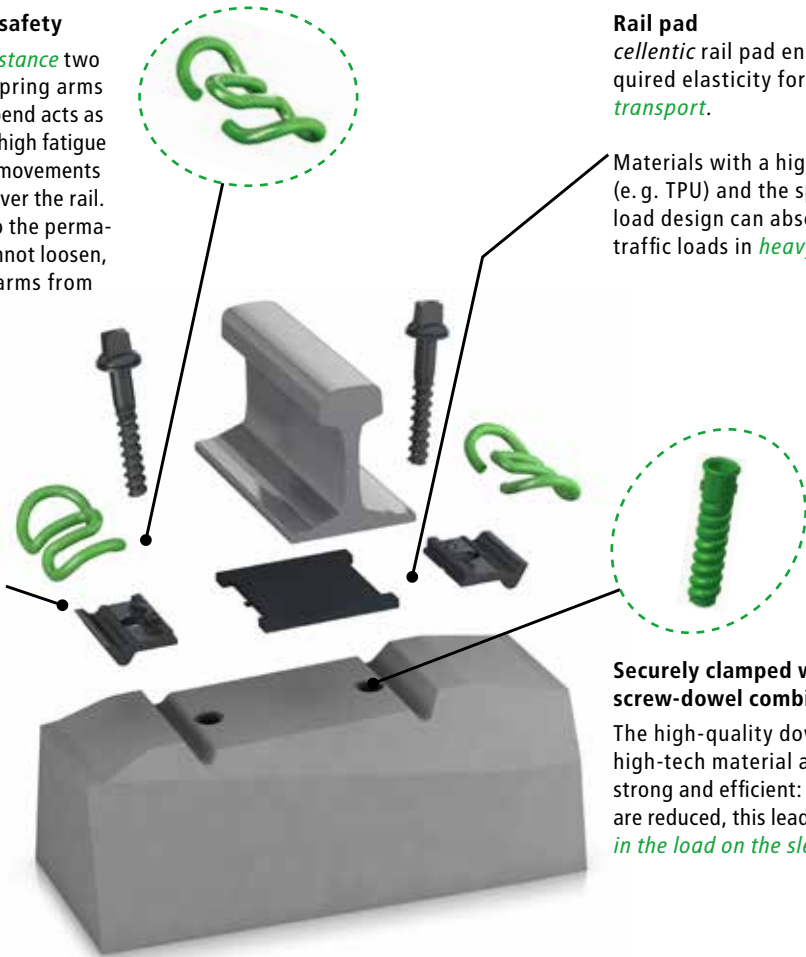
Rail pad

cellentic rail pad ensure the required elasticity for *passenger transport*.

Materials with a high stiffness (e. g. TPU) and the special heavy load design can absorb the high traffic loads in *heavy haul tracks*.

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, this leads to a *decrease in the load on the sleeper*.



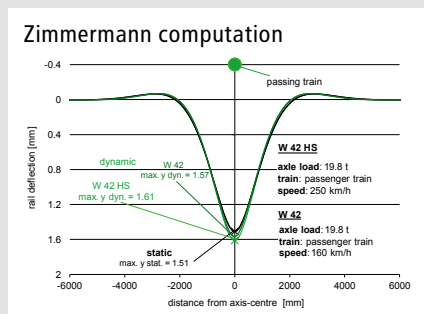
Easy handling for installation and rail maintenance due to preassembly and exchangeability

- 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. That 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 easily. 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 42 system with *cellentic* rail pad 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.

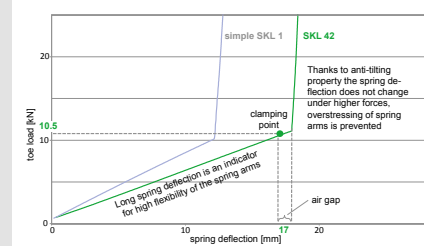


Simplified demonstration: one axle of a two axle bogie

Creep resistance and rail tilting protection

To allow optimum deflection for the rail, its fastening must respond in an elastic way. Therefore, the Skl 42 has a long spring deflection: When force is applied by a train, its spring arms remain in contact with the rail foot in each situation, also when the rail deflects. For this purpose, the rail is continuously clamped in a force-fitted way by the two spring arms with a deflection of approx. 17 mm and a toe load of approx. 10.5 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 curves, high forces are applied to the tension clamp. The Skl 42 is able to resist them: Rail movements are limited by the middle bend after the gap has been overcome, and the spring arms are not overstretched.

Load-deflection-curve



Rail fastening system W 42 with tension clamp Skl 42		
Typical field of application	High speed/Conventional rail; ballasted track with concrete sleepers	
Axle load	≤ 30 t	
Speed	For HS: ≥ 250 km/h // for CR: ≤ 250 km/h // for UTS: 140 km/h // for HH: 160 km/h	
Curve radius	For HS: ≥ 400 m // for CR: ≥ 150 m // for UTS: 80 m // for HH: 400 m	
Height adjustment	optional	
Gauge adjustment	± 10 mm	
Vertical fatigue strength of Skl 42	3.0 mm	
Static stiffness of <i>cellentic</i> rail pad	≥ 30 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 42 (nominal)	10.5 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 13481-2: 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.