

A close-up photograph of a railroad track. The focus is on a metal spring clip, which is a green, coiled metal component used to hold railroad ties in place. The clip is attached to a metal rail. The background shows a concrete track bed and a metal railing, slightly out of focus. The lighting is soft, suggesting an early morning or late afternoon setting.

Product Pocket Guide

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About Vossloh





Vossloh – Evolution of Excellence

1888

Eduard Vossloh company was founded, with headquarters in Werdohl

1967

Patent for the first elastic track fastening system (Sk1 1)

2023

Series production of M-Generation tension clamps

2024

Series production of Engineered Polymer Sleepers (EPS) made of *amalentic*

2026

Series production of Engineered Polymer Pads (EPP)

Vossloh – Global Impact in Rail Infrastructure

The group has more than 80 companies in 30 countries with more than 5,500 employees.

Over 50 million tension clamps produced annually at sites in Germany, China, Poland, and the USA.

Products are used in more than 100 countries.

Over 100 customers trust in screw-dowel systems.

More than 20,000 km of high-speed tracks are equipped with our systems.

Over 6,000 km of heavy haul tracks are fitted with our fastening solutions.

More than 3,000 km of urban railways have been installed with our systems.





Vossloh – Delivering Performance Worldwide

Etihad Rail in the United Arab Emirates counts on our W 30 heavy haul system. Elastic rail pads enable mixed transport on the 310 km track from Tarif to Sharjah. The track links two ports with the industrial city of Khalifa. Along this route, trains with axle loads of up to 32.5 tonnes reach speeds of 160 km/h, while passenger trains can travel at 200 km/h.



The **Melbourne Metro Tunnel** project in **Australia** is expanding the city's rail network with two 9 km tunnels through the city centre. We were chosen to design and install the tracks to meet strict noise and vibration requirements in the urban environment.



The 1,318-km high-speed line from Beijing to Shanghai in **China** is equipped with our System 300. With operating speeds of 350 km/h and test runs reaching 486 km/h, it is among the fastest railways world-wide. Our fastening technology ensures safety, stability, and passenger comfort on one of China's most important transport corridors.



Vossloh – Delivering Performance Worldwide

The switch to Vossloh protect in **Italy** represents a significant advance in conventional railway infrastructure. By using the W 14 system, this project aims to improve rail fastening solutions. This transition underscores our commitment to improving the safety and durability of rail systems and ensures the long-term performance and reliability of the Italian rail network.



Our Engineered Polymer Sleepers (EPS) made of amaleptic were installed on the **Tammerkoski bridge** in **Finland** using the KS 12 system and UGP Guard Rail fastening system with SKL 14 clamps. By providing the sleepers with pre-assembled fastening systems, individually configured height blocks and pre-drilled holes for fixation on the steel girder bridge, we ensured a faster and more efficient installation on-site.



On railway **line 95** in Przylasek Rusiecki, **Poland**, a new section was constructed using our innovative System 300 MFlex on slab track – marking the first-ever installation of this kind in Poland. This milestone project not only improves local access to rail transport, but also sets a new standard for future rail infrastructure across the country. With reduced CO₂ emissions, optimized transport logistics and simplified on-site handling, it's a clear step forward in sustainable mobility.



In Crawford, Nebraska in the **USA**, one of the toughest heavy-haul sections of the **BNSF Railway**, Vossloh fastening systems have been in use since 2007. The line features a steep 1.31 % grade and back-to-back tight curves, creating extremely high demands on the track. Over the years, our systems – most recently the MFlex 9 – have proven their reliability under loads of up to 150 MGT.





Vossloh – Enabling Green Mobility

Sustainability is more than a promise – it's a guiding principle deeply embedded in everything we do. Driven by our principle **Enabling Green Mobility**, we continuously develop innovative and sustainable solutions that support climate-friendly, safe, and efficient rail transport to shape the future of rail infrastructure. Sustainability is an essential part of our work – embedded in our products, processes, and mindset. Our efforts focus on strengthening our positive impact on the environment and society while increasing transparency and efficiency across all activities.



OUR SUSTAINABILITY INITIATIVES AT A GLANCE

Group-wide sustainability strategy with the goal of carbon neutrality by 2030 in line with the 1.5°C target.

Solar panels at production sites in Germany, China and Poland generate 6,947,000 kWh annually, saving approx. 3,245.664 t CO₂.

State-of-the-art production for rail fastening systems in Werdohl guided by a strong sustainability concept including energy-efficient infrastructure, digital process optimization, and waste reduction.

Strategic switch to green steel in fastener production to reduce lifecycle emissions of core products.

High-efficiency processes to reduce resource use and emissions.

ISO 14001 certified: 79 % of employees work at certified locations; 64 % of operational companies are certified.

UN Global Compact: Active member since 2020, supporting the 17 Sustainable Development Goals (SDGs).

EU Taxonomy aligned: Since 2021, business activities evaluated for ecological sustainability – confirming a green business model.





Types of Tracks

BALLASTED TRACK

The ballast track has been the most used track construction method for generations, thanks to its simple yet highly effective design. It absorbs dynamic forces, protects the track components and ensures even force transfer to the subgrade.

Our fastening systems are absorbing the growing loads caused by higher speeds and axle loads. They increase elasticity, extend maintenance intervals and ensure long-term cost efficiency of the infrastructure.



SLAB TRACK

The slab track consists of a solid substructure made of in situ concrete or precast support points, ensuring maximum stability and precise track position in the long term. It is particularly low-maintenance, durable and ideal for heavily trafficked and difficult-to-access sections of track.

Since there is no elasticity in the sub-structure, our fastening systems must reliably dampen loads. Even under constant heavy traffic or high speeds, they compensate for vibrations, minimize ground borne noise and ensure safety.





Fields of Application

URBAN TRANSPORTATION

Urban transportation faces specific challenges, including frequent braking and acceleration, as well as the need to minimize vibration and ground borne noise emissions. Our innovative rail fastening systems feature highly elastic components that improve ride comfort, damp vibration and ground borne noise, and ensure a long service life for both slab and ballasted tracks.

Slab track: 100 MFlex, 200 MFlex, 300 MFlex



HIGH-SPEED

As a leading company in the field of high-speed rail transport with speeds of over 250 km/h, we have developed fastening systems that ideally divert all forces acting on the rails into the substructure. Our fastening solutions absorb vibrations, improve ride comfort, and maximize safety, ensuring durability and cost-effectiveness for both slab tracks and ballasted tracks.

Slab track: 100 MFlex, 300 MFlex, 300

Ballasted track: MFlex 7, W 14, W 21



CONVENTIONAL RAIL

Conventional railway lines need to withstand increasing loads, meet the high comfort requirements of passenger transport or a combination of both. We offer innovative rail fastening systems with highly elastic components that minimize vibrations, extend the service life of the infrastructure, increase track stability and optimize both safety and ride comfort.

Slab track: 100 MFlex, 300 MFlex, 300

Ballasted track: MFlex 7, MFlex 9, W 14, W 21, W 30, W 40



HEAVY HAUL

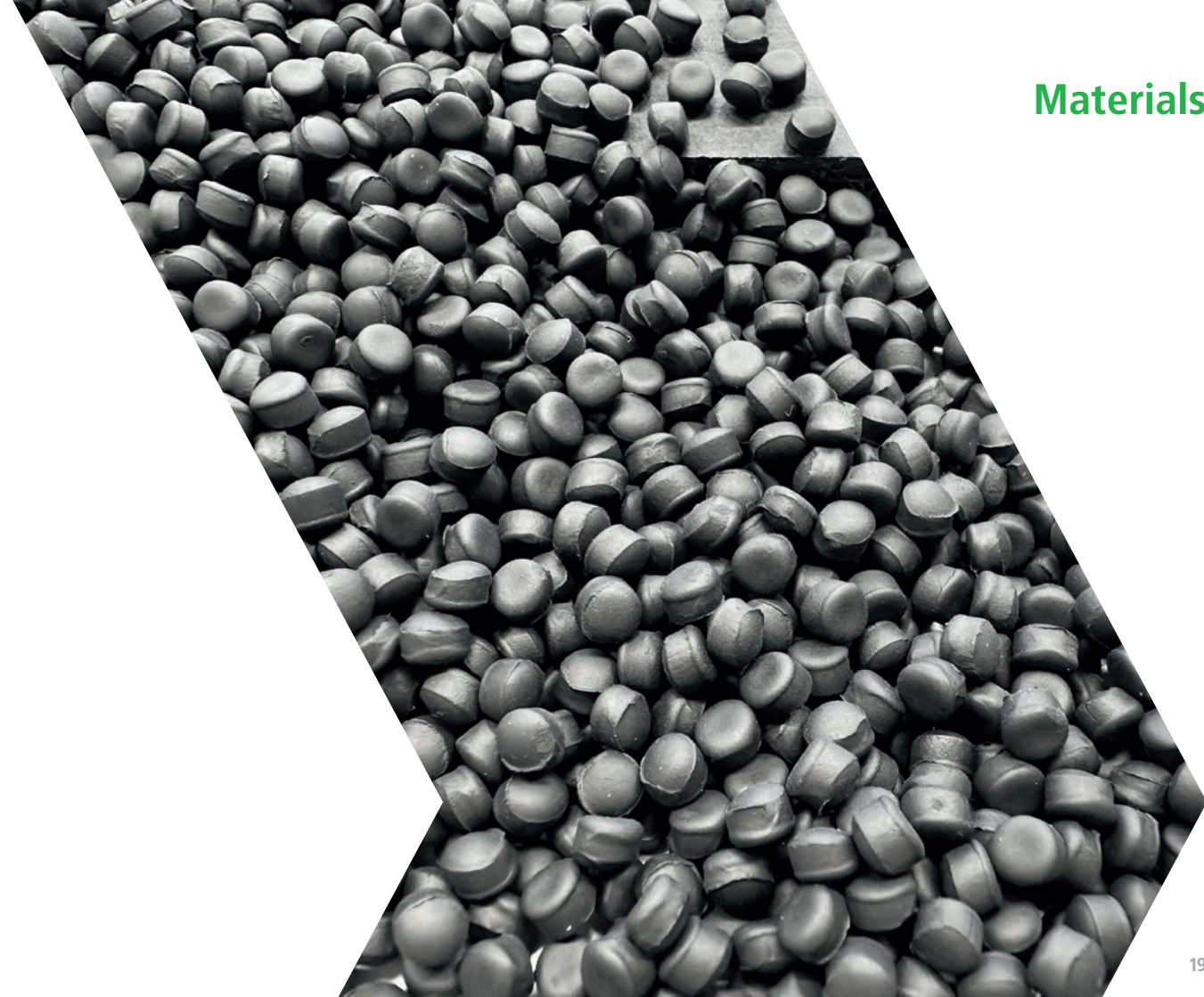
The components of our fastening system have been proven for all regions and climate zones worldwide, ensuring maximum reliability and durability. We offer specially developed and extremely robust rail fastening systems, which provide maximum stability under axle loads of more than 26 t, protecting the track infrastructure from material fatigue, and remain reliable even under increased loads, even in the most demanding environments.

Slab track: 300 MFlex

Ballasted track: MFlex 9, W 14, W 30, W 40



Materials





Vossloh *protect*

For Longer Coating

CHALLENGE

High-strength steel components, such as clamps, are subject to significant corrosion. Therefore, effective protection must act as a barrier and actively protect the base material in the event of defects, all while remaining economical in terms of installation and operation.

BENEFITS

- Sustainably coated
- Maximum resistance under extreme conditions
- Increased safety & reduced material fatigue

PROOF OF CONCEPT

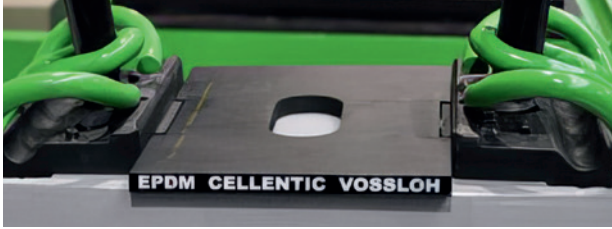
- **Environmental friendliness:** Chrome-free, extra thin, and efficiently usable coating, which saves material and helps the environment long term
- **Durability:** Combination of base and top coat protects against chemicals; while cathodic protection prevents corrosion of the base material; coating moves with the clamp without cracking or flaking

- **Maximum component safety:** Vossloh *protect* is hydrogen-free, eliminating the risk of hydrogen embrittlement; not only preventing microcracks but also complete breakages and extending the service life of critical components

SPECIFICATIONS

- 10 µm coating thickness
- Zinc and aluminum lamellas
- C5-H (1440 h rust-free) according to corrosivity category in line with ISO 12944
- Corrosion protection remains fully effective under light exposure





cellentic

For Rail Pads and Intermediate Plates

CHALLENGE

Tight curves, high speeds, and dynamic loads cause enormous forces acting on the rails and the entire superstructure every time a train passes. These forces must be distributed evenly and absorbed more efficiently.

BENEFITS

- Less vibration in the track
- High dimensional stability
- Lower life cycle costs

PROOF OF CONCEPT

- **More safety & comfort:** Interlayers ensure optimal load distribution and dampen vibrations caused by uneven road surfaces and wheels

- **Durable & stable:** Thanks to the closed pores in EPDM, *cellentic* works into its own structure under load and hardly deforms
- **Cost-efficient from start to finish:** Maintenance and repair costs are reduced as a result of the elastic absorption

SPECIFICATIONS

- Low frequency dependence in the 1- 40 Hz range
- Material stiffness of
 - ≥ 8 kN/mm for intermediate plate
 - ≥ 30 kN/mm for rail pad



amalentic

For Engineered Polymer Sleepers (EPS)

CHALLENGE

Wood is increasingly restricted by regulations in regards of the corresponding impregnations, requires higher maintenance, and the long-term availability of wooden sleepers are uncertain.

BENEFITS

- Long service life with low maintenance
- 100 % recyclable & eco-friendly
- Safe & easy to process

PROOF OF CONCEPT

- **Durable & low-maintenance:** Material composition ensures long-term resistance to extreme climatic conditions resulting in low life cycle costs

- **Environmentally friendly:** Recycled polymers, 100 % recyclable, and free from harmful impregnations or hazardous dust during processing
- **Versatile & safe in use:** Suitable for a wide range of applications, no environmental impact and safe mechanical processing (no glass fibres) without additional safety equipment

SPECIFICATIONS

- Applications: tracks, turnouts, tunnels, bridges, slab track
- Water absorption: ~ 0.1 %
- Fire behavior: flame-retardant, low smoke production



Track Innovations





M-Generation

CHALLENGE

Higher loads and increasing demands – such as rising track temperatures – are pushing existing fastening systems to their limits, threatening long-term track stability and safety.

BENEFITS

- Higher track availability due to higher robustness
- Increased track stability & operational safety
- Higher sustainability

PROOF OF CONCEPT

- **Lower life cycle costs:** Natural frequency of 900 - 1500 Hz enables the use of more robust tension clamps, reducing maintenance needs and total cost of ownership
- **Enhanced track stability:** 100 % improved torsional resistance and excellent mechanical performance ensure long-term stability under extreme conditions
- **Sustainable manufacturing:** Use of green steel and optimized production process support environmental responsibility; reduces CO₂ emissions by up to 65 %



M1

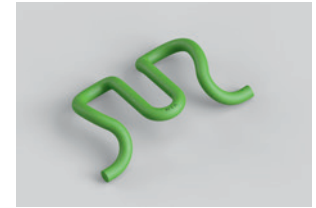
Alternative to Skl 25, 25DD

FIELDS OF APPLICATION

Urban Transportation

SPECIFICATIONS

- Fatigue strength: ≥ 2.0 mm
- Spring deflection: ≥ 10 mm using two spring arms
- Toe Load: ≥ 5 kN
- Frequency: ≥ 900 Hz



M3

Alternative to Skl 15

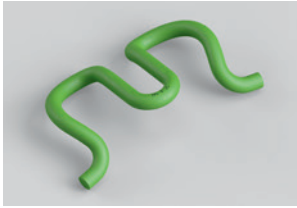
FIELDS OF APPLICATION

High-Speed, Urban Transportation, Conventional Rail

SPECIFICATIONS

- Fatigue strength: ≥ 3.0 mm
- Spring deflection: ≥ 26 mm using two spring arms
- Toe load: ≥ 9 kN
- Frequency: ≥ 900 Hz

The technical data show the performance of the clamp as an example, but is always dependent on the system composition and individual factors and influences.



M5

Supplement to M3

FIELDS OF APPLICATION

High-Speed (≥ 380 km/h and higher dynamic loads), Heavy Haul (25 % higher toe loads and high rail creep resistance)

SPECIFICATIONS

- Fatigue strength: ≥ 3 mm
- Spring deflection: ≥ 26 mm using two spring arms
- Toe load: ≥ 10 kN
- Frequency: ≥ 900 Hz

M7

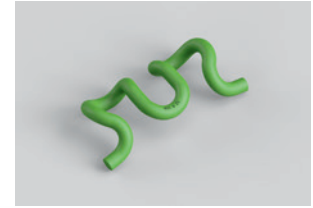
Alternative to Skl 1, Skl 14, Skl 21

FIELDS OF APPLICATION

High-Speed, Urban Transportation, Conventional Rail

SPECIFICATIONS

- Fatigue strength: ≥ 2.6 mm
- Spring deflection: ≥ 16 mm using two spring arms
- Toe load: ≥ 10 kN
- Frequency: $\geq 1,500$ Hz



M9

Alternative to Skl 14 R, Skl 30, Skl 40 and Skl 42

FIELDS OF APPLICATION

Heavy Haul

SPECIFICATIONS

- Fatigue strength: ≥ 2.8 mm
- Spring deflection: ≥ 20 mm using two spring arms
- Toe load: ≥ 12 kN
- Frequency: $\geq 1,200$ Hz

M11

Alternative to Skl 3, Skl 12 and Skl 24

FIELDS OF APPLICATION

Urban Transportation, Conventional Rail

SPECIFICATIONS

- Fatigue strength: ≥ 2 mm
- Spring deflection: ≥ 13 mm using two spring arms
- Toe load: ≥ 10 kN
- Frequency: $\geq 1,000$ Hz

The technical data show the performance of the clamp as an example, but is always dependent on the system composition and individual factors and influences.

The technical data show the performance of the clamp as an example, but is always dependent on the system composition and individual factors and influences.



Wfp High Torsional Resistance (HTR)

CHALLENGE

Extreme temperatures, tight curves, and dynamic loads increase the risk of track buckling and accelerate track wear. Fastening systems therefore need to not only stabilize the track, but also ensure safety, durability, and unrestricted availability without requiring additional construction work.

BENEFITS

- Increased safety & track availability
- Longer service life
- Economical & resource-efficient

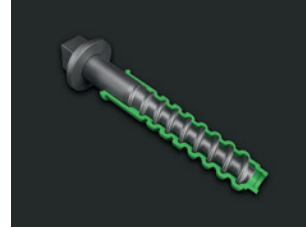
PROOF OF CONCEPT

- **Greater track stability:** Improved torsional stiffness noticeably increases safety, which is particularly important on bridges, in transition areas, or in tight curves

- **Higher reliability:** Increased lateral track stability eliminates the need to reduce speed after tamping, which means greater operational efficiency
- **Cost-efficient:** Use as an alternative to ballast widening or in problematic areas such as mud spots saves material, time, and maintenance costs

SPECIFICATIONS

- Successfully tested according to DIN EN 13481-2
- Torsional resistance improved by at least 400 %
- Increased moment of inertia of track grid, determined according to specifications of TU Munich
- High lateral stiffness
- Suitable for rail pads with a thickness of 5 to 10 mm



Screw-Dowel Combination

CHALLENGE

In highly stressed tracks, it is essential to prevent fastening components from loosening due to transverse forces or dynamic loads. At the same time, operation requires a permanently stable rail position.

BENEFITS

- Permanent tension
- Negligible water absorption
- Improved load distribution in the sleeper

PROOF OF CONCEPT

- **Reduced maintenance:** Improved load distribution in the sleeper
- **Simplicity:** Precise dowel positioning during sleeper production and pre-assembled components on delivery

- **Resource-saving solution:** Screws and dowels consume less energy during production, thereby reducing CO₂ emissions

SPECIFICATIONS

- Tangential forces are primarily introduced into the bottom of the threshold
- High pull-out forces of up to 150 kN
- Material: POM (Polyoxymethylene)





Engineered Polymer Sleeper (EPS) made of *amalentic*

Application: Track

CHALLENGE

Need of higher durability, lower maintenance requirements, and better resistance to moisture, pests, and weather conditions.

BENEFITS

- Highly customizable
- Cost-efficient with direct fastening
- Maximum safety

PROOF OF CONCEPT

- **Flexible fastening & compatibility:** Supports both direct and indirect fastening, considering different inclinations, rail profiles and track gauges without additional machining
- **Ease of installation & adjustment:** Delivered with precisely positioned core holes, allowing quick installation and later adjustments or repairs, while direct fastening reduces both costs and installation time
- **Enhanced safety:** Integrated steel reinforcement increases structural stability and operational safety

SPECIFICATIONS

Direct & Indirect Fastening:

- Dimensions: 0.16 x 0.26 x 2.6 m
- Weight: 170 to 175 kg
- Density: ~ 1.55 g/cm³
- Coefficient of thermal expansion: $20.1 \times 10^{-6} \text{ K}^{-1}$
- Modulus of elasticity: 5,000 - 6,000 MPa
- Anchoring pull-out forces for standard sleeper screws:
 - > 70 kN (drilled screw hole)
 - > 85 kN (prefabricated screw hole)





Engineered Polymer Sleeper (EPS) made of *amalentic*

Application: Turnout

CHALLENGE

High mechanical and static loads as well as complex geometries require maximum precision, dimensional stability, and load-supporting capacity of the turnout bearer.

BENEFITS

- High track stability
- Flexible & precise processing
- Customizable turnout compatibility

PROOF OF CONCEPT

- **Improved track stability:** Higher lateral sleeper resistance increases safety in track
- **Flexible installation:** Precise processing options and customizable lengths (up to 5 m) support easy accurate assembly; while stable track gauge and

thermal expansion performance ensure safety in track

- **Maximum compatibility:** Replacing sleepers by maintaining the original turnout dimensions and elasticity while enhancing durability

SPECIFICATIONS

- Dimensions: 0.16 x 0.26 x 2.2-5.0 m
- Weight: 74 kg/m;
- Density: ~ 1.55 g/cm³
- Coefficient of thermal expansion: $17.5 \times 10^{-6} \text{ K}^{-1}$
- Modulus of elasticity: 5,000 - 7,500 MPa
- Anchoring pull-out forces for standard sleeper screws: > 70 kN (drilled screw hole)



Engineered Polymer Sleeper (EPS) made of *amalentic*

Application: Bridge

CHALLENGE

Ensuring precise fit and long-term performance under bridge-specific structural and environmental conditions, while meeting all regulatory and operational requirements.

BENEFITS

- Sustainable design concept
- High flexibility & adaptability
- High resistance to moisture

PROOF OF CONCEPT

- **Structural efficiency:** Optimized material use and significant reduction in material consumption, ensuring eco-friendly production while maintaining high performance and durability
- **Versatility & easy adjustment:** Integrated screw holes, enabling height adjustment with minimal machining and lateral shifting to

fit specific bridge girder widths and reduce installation time

- **Weather resistance & durability:** Impervious to environmental exposure and insect infestations, ensuring no degradation over time and protecting groundwater from harmful chemical leaching

SPECIFICATIONS

- Dimensions: 240 x 160 x 2,600 mm
- Weight: 170 to 200 kg
- Height-adjustment elements: 20 to 160 mm
- Anchoring pull-out forces for standard sleeper screws: > 70 kN (drilled screw hole), > 85 kN (prefabricated screw hole)





Sleeper Anchor

CHALLENGE

It is essential to effectively increase lateral track stability without affecting the ballast structure.

BENEFITS

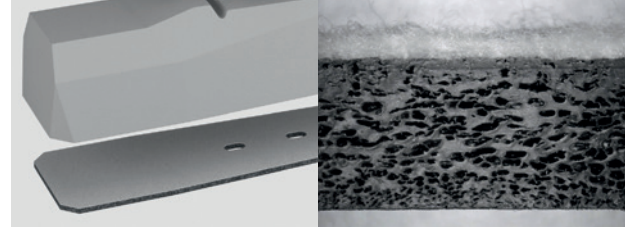
- Immediate increase in track stability
- Time savings & minimal intervention
- Reusable & universally applicable

PROOF OF CONCEPT

- **Reduced maintenance:** Continuous stability due to the leaf made of spring steel, meaning less readjustment and maintenance is required
- **Easy & quick:** Installation and dismantling are possible within a short time
- **Various possibilities:** Suitable for turnouts, curves, increasing speeds, bridge, and transition areas; for all types of sleepers; reusable

SPECIFICATIONS

- Increased lateral track resistance of approx. 50 %, determined according to test reports of TU Munich
- Spring arm elements made of hot rolled spring steel according to DIN EN 10089
- Shovels and light-weight parts made of steel S 235 JR according to DIN EN 10025



Engineered Polymer Pad (EPP)

CHALLENGE

Providing optimal load distribution and elasticity, minimizing ballast destruction and associated maintenance costs, withstanding environmental impacts.

BENEFITS

- Cost efficiency & improved availability
- Increased safety
- Sustainable product concept

PROOF OF CONCEPT

- **Functional versatility:** Multi-layer EPP structure ensures performance, leading to ballast protection and reduced maintenance intervals; available in two standardized thicknesses
- **Improved track stability & safety:** Designed for higher lateral resistance, contributing to greater track stability and enhanced operational safety

- **Sustainable & recyclable:** Made from recycled materials, except the bonding layer, which guarantees a greater connection to concrete, and 100 % recyclable itself, while EPP can be easily separated at the end of the life cycle

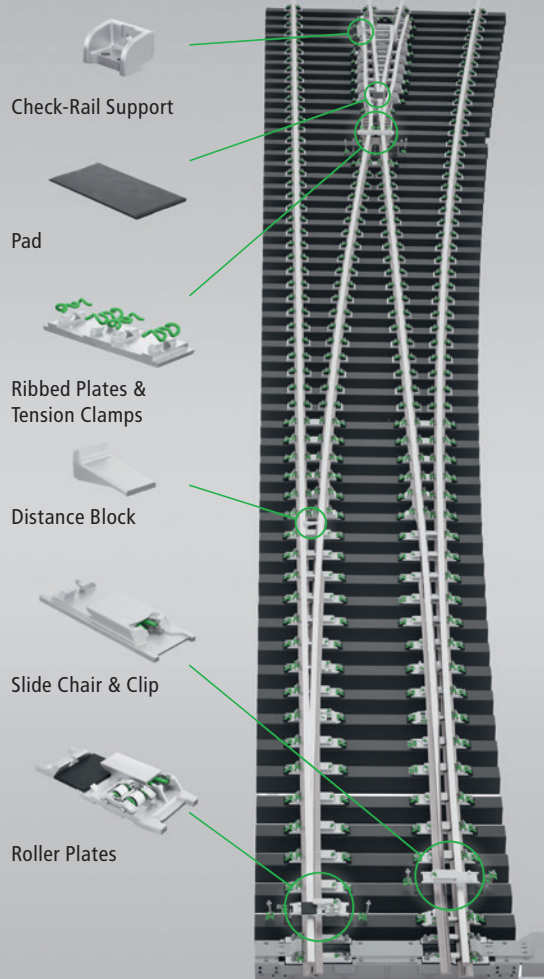
SPECIFICATIONS

- Thickness: 7 or 10 mm
- Static bedding module¹⁾: 0.2 - 1.0 N/mm³
- Mechanical fatigue strength (after 3 and after 8 million load cycles)¹⁾²⁾
- Tear resistance¹⁾: > 0.5 N/mm²
- Shear resistance²⁾: > 0.5 N/mm²
- Freeze-thaw test (from -15° C to +60° C)¹⁾
- Stackability (equivalent to 15 sleepers)¹⁾

1) Tested in accordance with DIN EN 16730

2) Tested in accordance with customer-specific requirements





Turnout Components

CHALLENGE

Switch systems are complex key points in the rail network. The main challenges are to optimally coordinate all components, comply with national standards, and at the same time ensure sustainable solutions.

BENEFITS

- Extensive portfolio for entire turnout
- Reduction of switch failures for higher availability
- Ensured compliance, sustainability & high quality

PROOF OF CONCEPT

- **Maximum availability & operational reliability:** Fully coordinated turnout components that work together reliably, for minimized interface problems as well as installation and maintenance costs
- **Planning reliability:** Due to world-wide production and logistics structures, as well as digital batch tracking, every delivery is on time and fully documented

- **No additional testing:** Ensuring that all regulations and criteria are met; fulfilling the highest sustainability, safety, and environmental standards

SPECIFICATIONS

- Usable on all available rail profiles (old / new) with all tongue rail variants. Integrated tensioning using SSb 2 elastic clip
- Coating: corrosion- and lubrication-free molybdenum sealed with glide wax
- Slide chairs and roller plates are mainly manufactured from ductile iron and ready for installation. Versions are compatible with all rail fastening systems
- Stepless height adjustment of the rolling device from 0.5 to 6 mm
- Guaranteeing smooth tongue movement
- Tamping work is not affected by the use of roller plates
- Reduction of changeover forces of up to 50 %

The technical data are referring to the performance of Vossloh Roller Devices.



Systems



100 MFlex



CHALLENGE

The growing use of automated trains with repetitive stop–start points demands supporting solutions to withstand concentrated loads. Tight curves further require components with high resistance to rail movements and lateral forces. On high-traffic lines, from Urban Transportation to High-Speed, limited track closures call for systems that install quickly and easy as well as perform reliably across all applications.

BENEFITS

- Customizable & durable design
- Flexible & fast installation
- Maximum stability & robustness

PROOF OF CONCEPT

- **Resource-saving design:** Upgradeable small-scale system fits into minimal track cover while allowing High-Speed applications with a single rail pad
- **Easy installation:** Lightweight, pre-assembled components enable fast and efficient on-site assembly. Available as a single support point (DFF)
- **High stability & safety:** Specialized components withstand extreme weather, repetitive loads from autonomous trains, and the challenges of urban rail infrastructure as well as High-Speed applications



SPECIFICATIONS

	UTS Tram, covered track	CR/UTS Metro	CR/HS
Axle Load	≤ 13 t	≤ 26 t	≤ 26 t
Speed	≤ 100 km/h	≤ 250 km/h	CR: ≤ 250 km/h HS: ≤ 350 km/h
Curve Radius	≥ 40 m	≥ 150 m	CR: ≥ 150 m HS: ≥ 400 m
Height Adjustment	+ 20 mm	+ 20 mm	- 5 / + 26 mm (0-30 mm)
Gauge Adjustment	± 10 mm	± 10 mm	± 10 mm

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-5; other applications are proven and can be provided based on request.

200 MFlex



CHALLENGE

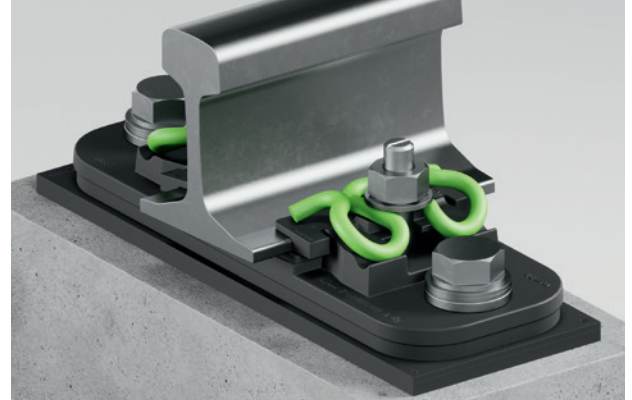
Slab track systems in Urban Transportation face a double challenge. They have to compensate for the lack of elasticity of the ballast superstructure and at the same time withstand extremely dynamic stresses caused by constant stop-and-go.

BENEFITS

- Higher track stability during maximum elasticity
- Flexible & low-maintenance solution
- Compatibility with wide range of slab designs

PROOF OF CONCEPT

- **Highest robustness:** Higher natural frequency and spring arm force ensures permanent stability during acceleration, in curves or in turnouts
- **Simplified handling:** Pre-assembled support points on slab bearers and flexible installation methods make it easy to install in any situation and maintenance-free
- **Maximum elasticity:** *cellentic* ensures excellent rail deflection and vibration damping with up to 10 dB additional structure-borne noise reduction



SPECIFICATIONS

	UTS
Axle Load	≤ 18 t
Speed	≤ 140 km/h
Curve Radius	≥ 80 m
Height Adjustment	+ 20 mm
Gauge Adjustment	more than ± 12 mm

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-5; other applications are proven and can be provided based on request.



300 MFlex



CHALLENGE

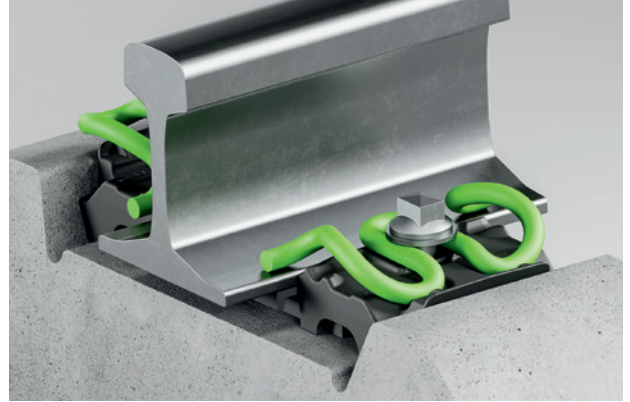
The system faces ever-increasing loads from train operations, especially at high speeds and heavy track utilisation. On slab tracks, where all forces act directly on the rail and substructure without the natural elasticity of ballast, fastening systems must deliver exceptional performance: ensuring maximum stability, effectively absorbing vibrations, and maintaining precise track alignment.

BENEFITS

- Maximum safety
- Sustainable design
- Tailor-made & customizable

PROOF OF CONCEPT

- **Higher robustness:** Withstands higher loads thanks to load distribution plate and high volume elastic intermediate plate
- **Sustainable track construction:** Easily adjustable and highly sustainable with simple component replacement instead of full system exchange, saving costs and ensure maximum availability
- **High scalability:** Custom configuration to meet special requirements of each project, backed by a vast portfolio and modular toolkit delivering detail-oriented solutions



SPECIFICATIONS

	UTS	CR/HS	HH
Axle Load	≤ 18 t	≤ 26 t	≤ 35 t
Speed	140 km/h	CR: ≤ 250 km/h HS: ≥ 250 km/h	≤ 160 km/h
Curve Radius	≥ 80 m	CR: ≥ 150 m HS: ≥ 400 m	≥ 300 m
Height Adjustment	- 4 / + 56 mm	- 4 / + 76 mm	- 4 / + 26 mm
Gauge Adjustment	± 16 mm	± 16 mm	± 16 mm

Data include specifications of M3 and M7

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-5; other applications are proven and can be provided based on request.



MFlex 7



CHALLENGE

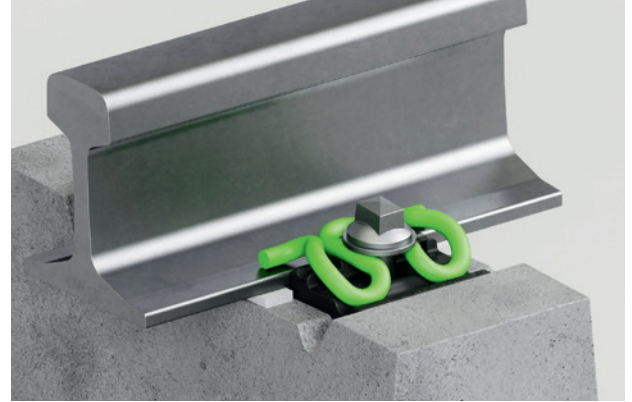
Increasing speeds, axle loads, and environmental impacts on ballasted tracks lead to higher wear, deformations, and maintenance efforts, while conventional fastening systems often lack the required elasticity, damping, stability, and durability. Therefore, ever more sustainable and future-oriented systems are needed to ensure greater safety, sustainability, and longevity.

BENEFITS

- Sustainable flexibility
- Highest stability & safety
- Durability & low maintenance

PROOF OF CONCEPT

- **Versatility & easy installation:** Adaptable to any application, delivered pre-assembled for quick installation, and allows precise height and gauge regulation with minimal effort
- **Maximum performance & reliability:** Secure and resilient fastening for highly frequented tracks also under extreme conditions to ensure long-lasting stability and safety
- **Low maintenance & long service life:** Individually replaceable components and durable design ensure permanently high track availability with minimal maintenance



SPECIFICATIONS

	CR	HS	HH
Axle Load	≤ 26 t	≤ 26 t	≤ 35 t
Speed	≤ 250 km/h	≥ 250 km/h	≤ 160 km/h
Curve Radius	≥ 150 m	≥ 400 m	≥ 400 m
Height Adjustment	optional	optional	optional
Gauge Adjustment	± 10 mm	± 10 mm	± 10 mm

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-2; other applications are proven and can be provided based on request.



MFlex 9



CHALLENGE

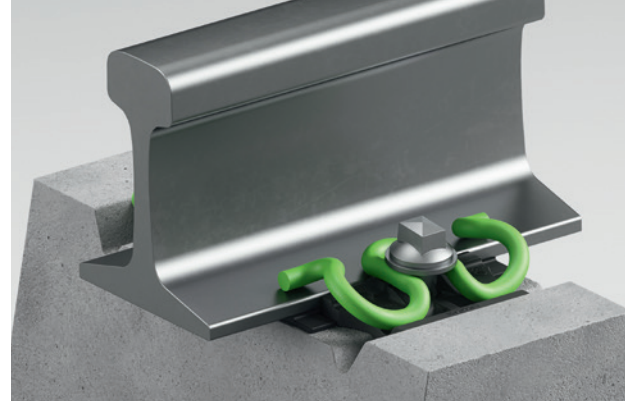
Extreme loads due to increasing axle loads, higher speeds, and climatic extremes confront rail fastenings with new challenges. Conventional systems are reaching their limits here, with consequences such as material fatigue, increased maintenance intensity, and shortened life cycles. At the same time, there is a growing call for sustainable solutions that secure both ecological and economic advantages.

BENEFITS

- Track stability & minimal maintenance
- Increased protection & resistance
- Resource-efficient & durable

PROOF OF CONCEPT

- **Fast & easy installation:** System features a modular design with replaceable components, saving time and costs; pre-assembled delivery option
- **Maximum strength & safety:** Remaining robust even in tight curves due to middle bend as additional tilting protection and secure screw-dowel connection
- **Durability & cost efficiency:** Less wear and optimized life-cycle costs due to the high natural frequency, optimized torsional resistance and improved load distribution



SPECIFICATIONS

	CR	HH
Axle Load	≤ 26 t	≤ 35 t
Speed	≤ 250 km/h	≤ 160 km/h
Curve Radius	≥ 400 m	≥ 150 m
Height Adjustment	optional	optional
Gauge Adjustment	± 10 mm	± 10 mm

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-2; other applications are proven and can be provided based on request.



W 14



CHALLENGE

Rising loads, speeds, and environmental stress on ballasted tracks cause wear, instability, and higher maintenance – traditional systems often lack the needed durability and flexibility.

BENEFITS

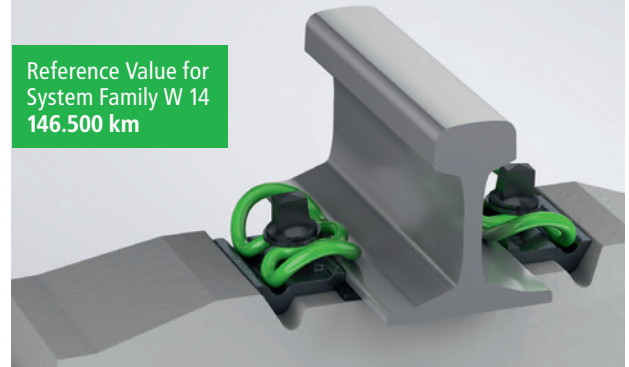
- Cost- & time-efficient installation
- Durability & safety
- High flexibility & performance

PROOF OF CONCEPT

- **Proven durability:** Over 30 years of reliable performance with the Skl 14 effectively reducing noise and vibration
- **High flexibility & performance:** Well proven under demanding conditions as well as in passenger lines with speeds up to 320 km/h
- **Efficient installation & maintenance:** Pre-assembly reduces installation time by up to 30 %, while improved load distribution minimizes rail breaks and maintenance needs



Reference Value for System Family W 14
146.500 km



SPECIFICATIONS

	CR	HS
Axle Load	≤ 26 t	≤ 26 t
Speed	≤ 250 km/h	≥ 250 km/h
Curve Radius	≥ 150 m	≥ 400 m
Height Adjustment	optional	optional
Gauge Adjustment	± 10 mm	± 10 mm

Upgrade from Skl 14 to M7

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-2; other applications are proven and can be provided based on request.

W 14



CHALLENGE

In heavy haul operations, extreme axle loads and dynamic forces lead to increased wear, rail deformation, material fatigue, and high maintenance costs. Conventional fastening systems often fail to meet the demands for durability, stability, and ride quality.

BENEFITS

- High durability
- Strong stability
- Effective load absorption & protection

PROOF OF CONCEPT

- **Durability:** Robust system design proven over decades with long service life
- **Excellent toe load & gauge widening protection:** Ensured by a combination of tension clamp with a continuous high toe load, engineered guide plate, and pad design made of durable material as TPU rail pad performance
- **Effectiveness:** TPU rail pad allows load-absorbing deflection; special pad design; proven by AREMA tests



Reference Value for System Family W 14
146.500 km

SPECIFICATIONS

	HH
Axle Load	≤ 35 t
Speed	≤ 160 km/h
Curve Radius	≥ 400 m
Height Adjustment	optional
Gauge Adjustment	± 10 mm

Upgrade from Skl 14 to M9

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-2; other applications are proven and can be provided based on request.

W 21



CHALLENGE

Higher speeds and loads on ballasted tracks require effective elasticity and damping.

BENEFITS

- Installation efficiency
- Operational stability
- Cost effectiveness

PROOF OF CONCEPT

- **Installation advantage:** Pre-assembled components allow on-site fitting, tensioning, and welding without removal
- **For every challenge:** High elasticity and reliable performance with durable *cellentic* rail pad
- **High durability:** Economical system ensures low maintenance and long service life thanks to its elasticity and therewith vibration damping



SPECIFICATIONS

	CR	HS
Axle Load	≤ 26 t	≤ 26 t
Speed	≤ 250 km/h	≥ 250 km/h
Curve Radius	≥ 150 m	≥ 400 m
Height Adjustment	optional	optional
Gauge Adjustment	± 10 mm	± 10 mm

Upgrade from Skl 21 to M7

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-2; other applications are proven and can be provided based on request.

W 30



CHALLENGE

Switches are considered one of the most technically demanding parts of the track. Especially difficult environmental conditions such as heat, cold, and humidity, fastening systems must provide maximum safety and durability.

BENEFITS

- Cost-effective solution
- Reliable performance under extreme conditions
- Saves time & resources

PROOF OF CONCEPT

- **Cost-effective adjustment:** Inclined plate creates a rail incline (1:20 or 1:40) even on non-inclined concrete sleepers – an economical alternative to ribbed plates, special bearers or custom-made products
- **Reliability in extreme conditions:** Designed for temperatures from -60 °C to +50 °C, with high corrosion resistance and permanent tensioning without loosening; reliable even in high humidity
- **Quick & easy on site:** Components can be delivered pre-assembled; only rails need to be inserted and tensioned on site. All parts, including dowels, are easily replaceable



Reference Value for
System Family W 30
7.500 km



SPECIFICATIONS

	CR	HS
Axle Load	≤ 26 t	≤ 35 t
Speed	≤ 250 km/h	≤ 160 km/h
Curve Radius	≥ 400 m	≥ 400 m
Height Adjustment	optional	optional
Gauge Adjustment	± 10 mm	± 10 mm

Upgrade from Skl 30 to M9

For ballasted tracks including concrete sleepers and EPS;
turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-2; other applications are proven and can be provided based on request.



CHALLENGE

On slab tracks, all forces from train operation act directly on the rail and substructure, without the natural elasticity of ballast. Especially on high-speed lines with speeds exceeding 350 km/h, fastening systems must not only guarantee maximum stability, but also dampen vibrations, permanently secure the track position, and be efficient to install.

BENEFITS

- Sustainable & resilient
- Stable at high speeds & peak loads
- Efficient assembly & usability

PROOF OF CONCEPT

- **Optimized force transmission:** Combination of load distribution plate and elastic high volume *cellentic* intermediate plate distributes vertical forces evenly, protecting the rail and substructure in both straight and curved sections
- **Track stability:** Skl 15 ensures dimensional stability under permanent stress, even during acceleration, deceleration or curving. Distribution plate reduces excessive rail movement, minimizing risk of tilting and wear
- **Efficient installation:** Concrete bearer with integrated shoulders stabilizes the system and supports standardized, time-saving installation processes



Reference Value for
System Family 300
21.500 km



SPECIFICATIONS

	CR	HS
Axle Load	≤ 26 t	≤ 26 t
Speed	≤ 250 km/h	≥ 250 km/h
Curve Radius	≥ 150 m	≥ 400 m
Height Adjustment	optional	optional
Gauge Adjustment	± 16 mm	± 16 mm

Upgrade from Skl 15 to M3

For ballasted tracks including concrete sleepers and EPS; turnouts and crossings with and without inclinations

The technical data demonstrate the performance of the fastening system with examples, although this always depends on external factors and influences. The reference values base on the requirement standard DIN EN 13481-5; other applications are proven and can be provided based on request.



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