

ELASTIC SOLUTIONS FOR

Urban transportation

Vossloh rail fastening systems for urban passenger traffic



We develop urban mobility for the megacities of the future.

Almost 150 years ago, electric tramways set new standards in urban passenger transportation. Now urban rail transportation is on the threshold of another global transformation. The fact that rail traffic has a superior carbon footprint means that even more people will switch from cars to rail in the future – and the result will be an increased burden on the rail network. Vossloh is leading the way as a driver of innovation with rail fastening systems that go the extra mile in reducing vibration – on both slab and ballasted track.

Rail fastening systems for slab track







System DFF 300



System DFF 200



System W 25 Tram



System 336 Urban transportation System 336 Classic configuration



Rail fastening systems for slab and ballasted track







Rail fastening systems for ballasted track



System W 14

System W 21



Urban transportation for cities that never sleep – but still need rest.

In addition to constant braking and accelerating again, the greatest challenge for rail fastening systems in urban transportation is the need to minimise vibration. The ride must be kept as smooth as possible for passengers and material fatigue has to be prevented. It is also important to reduce noise emissions. Structure-borne noise in particular – in other words, the spread of vibration through solid bodies like buildings – needs to be effectively countered.





An elastic solution to vibration

To achieve the ideal results, we work with local traffic planners to develop individual solutions for each city. Because our systems have a modular structure, special components for minimising vibration in critical areas like underground rail tunnels can be singled out for reinforcement. Our broad portfolio and partnerships with sister companies within the Vossloh Group allow us to offer customised solutions, even away from the urban road network. Because concrete beds score by maintaining a stable rail position and keeping maintenance costs down, the slab track option is becoming increasingly popular. That makes it essential, however, to use materials that will reduce vibration. With this specific issue in mind, we developed components using *cellentic*, a microcellular elastomer. Elements made from this high-tech material eliminate critical vibrations between one and 30 Hertz and ensure maximum comfort, a high level of operational safety, and reduced noise pollution for axle loads of up to 18 tonnes (metro) or 13 tonnes in the case of trams.



Sustainable protection for an environmentally friendly means of transportation

Whether it is heat, temperature fluctuations, corrosive sea air, or exposure to chemicals in industrial environments – all kinds of environmental conditions can manifest in the urban sector. We have developed the new premium zinc coating Vossloh *protect* to ensure that everything functions smoothly and lasts for a long time. It offers long-term protection for all steel components in our rail fastening systems. The top coating provides barrier protection from chemicals, while cathodic corrosion protection keeps them rust-free even in the event of damage. Vossloh *protect* also substantially reduces the risk of material fatigue.

A number of high-tech materials ensure that our rail fastenings are highly weather-resistant and have a long service life:

- The premium coating Vossloh protect comes with the highest protection class (C5-L) in accordance with ISO 12944 and contains no heavy metals, making it appropriate for safe use worldwide.
- Specifically designed Vossloh tension clamps provide additional tilt protection and rail creep resistance even under heavy loads.
- Cellentic elastomers reliably cushion vibration and lose none of their rigidity or elasticity, even when used in uninterrupted service in cities. They ensure quiet running and protect the track from wear and material fatigue.
- > Additional angle guide plates keep the rails in the right position at all times.



Travelling safely in Bangkok – with corrosion protection from Vossloh

Since 1994 we have been equipping urban transportation systems in Bangkok with our fastening solutions. More than half a million of them now make urban transportation safer in the Thai capital. And for the Bangkok Skytrain overhead rail system, we went so far as to reinvent corrosion protection, and we worked with local partners to develop a track system that's easy to install and is more cost-efficient.

With 1,000 km of track for tramways and 1,500 km for metro lines, Vossloh offers a wealth of experience in the field of urban transportation. There are also many transit lines that urban transportation systems share with conventional rail traffic.



Using our systems keeps both labour and other costs low, and that applies to new infrastructure as well as upgrades and maintenance. And if there are new requirements for a section of track during an upgrade – even individual parts of the fastening system down to a single dowel – they can be retrofitted fast and at a low cost. This means that you can bring existing lines up to the latest standards quickly and without major expense. Another point for greater cost-effectiveness: On request, the selected components can be pre-assembled for delivery ex-factory, for example, already attached to concrete sleepers. Not only does that save a lot of time and make work on-site easier, it also has a positive impact on availability. On urban lines with tightly scheduled services in particular, that is a major advantage.

Interested in in-depth consulting? Call us on +49 (0) 23 92 / 52-0

The perfect system combines **quality and cost-effectiveness**

Decades of experience mean that rail fastenings from Vossloh are well-designed system solutions that can be custom-configured for all conceivable applications, and they are available quickly and at a reasonable price in large or small quantities. The elastic rail bearing with fatigue-resistant tensioning significantly reduces rail wear, offering a long service life with minimal maintenance requirements.



A wealth of experience behind the **new generation**

As a successor to the "high-tension spring washer" patented by Karl Vossloh in 1927, the tension clamp for rail fastening was introduced by Professor Hermann Meier in 1967. Following successful tests, Vossloh took over the general licence to manufacture the clamps. The basic principle proved extremely adaptable and enabled constant progress to be made over the years. The billionth tension clamp was manufactured on 22 July 2020, with no end to production in sight: The next generation of tension clamps is already in progress.





Allow us to introduce ... our latest generation of Vossloh tension clamps!

Thanks to growing demand and increasing loads in rail transportation, we have made the new M-generation clamps more robust to help to ensure that tracks remain safe into the future. This new development is being produced in Werdohl, Germany, using state-of-the-art process technology.

Benefits offered by the new generation:

- > More compact and lighter design
- > More robust thanks to a higher natural frequency
- > Ultramodern production facility
- > Reduced logistical costs
- > Easier on resources



Fastening systems for urban passenger traffic: **Specifications** at a glance



Â		Rail fastening systems for slab track					Rail fastening systems for ballasted track			Â	
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Product	System 300	System DFF 300	System DFF 200	System W 25 Tram	System 336 Urban transportation	System 336 Classic configuration		System W 14	System W 21		System W 25 N
xle load	≤ 18 t	≤ 18 t	≤ 13 t (Tram)	≤ 13 t	≤ 18 t	≤ 18 t		≤ 26 t	≤ 26 t		≤ 18 t
peed	≥ 140 km/h	≤ 140 km/h	≤ 100 km/h	≤ 100 km/h	≤ 160 km/h	≤ 140 km/h		≤ 250 km/h	≤ 250 km/h		≤ 80 km/h
Curve radius	≥ 80 m	≥ 80 m	≥ 40 m	≥ 40 m	≥ 80 m	≥ 80 m		≥ 150 m	≥ 150 m		≥ 80 m
leight adjustment	+ 30 mm	+ 30 mm	+ 20 mm	optional	+ 40 mm	+ 20 mm		optional	optional		-
Gauge adjustment	± 10 mm	± 10 mm	± 10 mm	± 10 mm	± 12 mm	± 10 mm		± 10 mm	± 10 mm		± 10 mm

Note: Content, figures, and specifications in this brochure reflect the performance of the fastening system under ideal conditions, but this will always depend on external factors and influences. Contact us so we can work with you to develop a solution tailored to your project and your requirements. The information in this document represents the state of technical development at the time of publication; the product may have been updated since as a result of ongoing research and development work at Vossloh.



More **silence**, **comfort**, **and sustainability** – our rail fastening systems are in demand worldwide.

A typical example of increased demand in the field of urban transportation: For traffic planners in Budapest, Hungary's capital, preventing structure-borne noise was a key factor in the construction of their new M4 metro line. That's why, following in-depth consultation, they opted for a rail fastening solution from Vossloh that offered extremely good anti-vibration properties. At the heart of this system is an intermediate plate made of the high-tech material *cellentic*. This product was developed in-house by Vossloh and is extremely reliable in absorbing low-frequency vibration between one and 30 Hertz. Rail fasteners thus equipped prevent booming bass frequencies from being transmitted from the metro tunnel to the foundations of adjacent buildings.



Suzhou: Vossloh as a one-stop shop Since 2015, passengers in Suzhou, a city of several million people, have been very happy with China's first state-of-the-art low-floor tram system. Vossloh equipped the 18-km doublerail route with fastening systems and turnouts. The route was built using embedded grass and an asphalt track.



Metro Santo Domingo

Metro Line 2 in Santo Domingo, the capital of the Dominican Republic, runs completely underground and was equipped with Vossloh fastenings over a track length of 11 km. At peak times the trains run at three-minute intervals and carry up to 200,000 passengers every day. Want to know more about our references? Drop us a line:





Interested in more products in the Vossloh portfolio for your rail infrastructure?

Take a look at our Product Finder, where you'll quickly find the solution that's right for you!



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