



HIGH-ELASTICITY RAIL FASTENING

System DFF 200

The specialist for conventional rail and urban transportation, turnouts and covered track

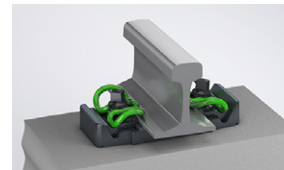


System DFF 200: A fixture for slab track

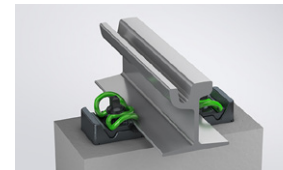
System DFF 200 from Vossloh has been at home on tracks worldwide for decades. During this time it has been continuously refined and kept at the forefront of technical development. This system is a proven solution for slab track and represents the ideal solution for directly fastening single support points for conventional rail and urban transportation – and especially on covered track for tram lines. The system is used whenever the best spring characteristics, an ideal load distribution and maximum reliability and availability are required.



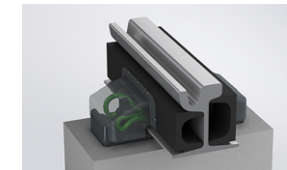
See the following pages to discover the many application and configuration options, as well as interesting details on construction and materials!



Conventional rail, urban transportation (emphasis on metro services)



Urban transportation (emphasis on tram services)



Urban transportation (emphasis on tram services with covered track)

Direct fastening for single support points

Previous designation

System DFF 21
System W-Tram

New designation

System DFF 200 – Conventional rail, urban transport configuration
System DFF 200 – Urban transport configuration

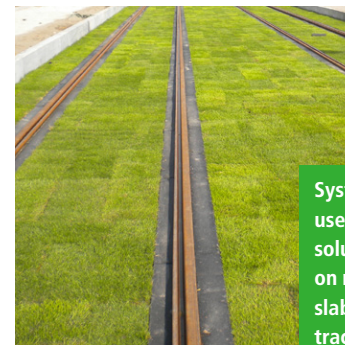


Adding flexibility to the rails

Slab track systems have a particular challenge to overcome: The rail fastening systems must provide the elasticity originally offered by ballasted track. Their task is to deflect the forces generated by rolling trains into the ground as smoothly as possible, with minimum impact on materials. With System DFF 200, Vossloh offers a system that permits highly elastic rail fastening and thus provides the ideal single support points for the slab track.

System DFF 200 offers impressive versatility, whether in use in conventional rail and urban transportation or in covered rail and turnouts. Direct fastenings can be flexibly used as single support points, and can be installed both top-down and bottom-up. That reduces overhead, makes replacement

easier, and cuts maintenance costs. If the nature of the ground demands a special solution, the system can be scaled, individually configured, and adapted to suit requirements. That not only makes the system especially flexible but also economical.



System DFF 200 can be used whenever a flexible solution that goes easy on resources is needed for slab track, and covered track in particular.

SYSTEM DFF 200

Direct fastening for single support points



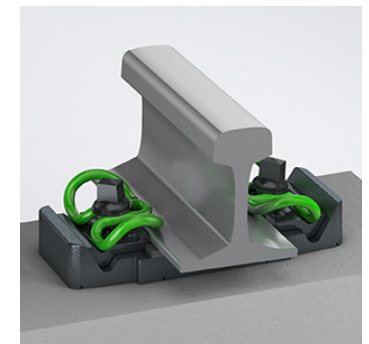


Ideal single support point for conventional rail and urban transportation (emphasis on metro services)

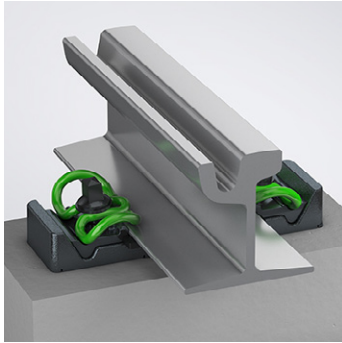
Easy to handle for installation and track maintenance – with single support points, the washers in the fastening systems take over the task of the concrete sleepers and their shoulders. That makes the tasks of installation and replacement easier.

Single support points are anchored using a screw-dowel combination. No fastening elements have to be removed from the support point when welding the rails, which saves time and costs. Stability is also guaranteed at all times. The reinforced base plate of System DFF 200 can withstand axle loads of up to 26 tonnes, and is thus especially suitable for metro and conventional rail projects. It can also be used with covered rail and for turnouts. The height adjustment plates enable the system to

be adapted perfectly to all tracks. Rails are kept in the track and dynamic forces are deflected into the substructure. The high proportion of long-lasting plastic ensures protection against corrosion and also provides electrical insulation. Unlike steel, the lighter material also offers logistical benefits and easier handling during installation. An intermediate plate made of cellentic elastomer also minimises vibration and structure-borne noise, which improves the lifecycle of the track components.



System DFF 200
(previously System DFF 21)



System DFF 200 (previously W-Tram)

For tram projects in particular, the railway track must be particularly elastic to compensate forces caused by running trains. This is where System DFF 200 reveals its strengths: The *cellentic* rail pad allows rail deflection and can optimally distribute occurring vertical forces. As a result, the track is protected against overloading. Additional components enable the system to be used with grooved rails on covered track.

The *cellentic* component also damps the vibrations caused by the unevenness of the track and the wheels; structure-borne track vibration is minimised. The result: travel comfort, safety through smooth running, as well as increased life-time of track components and vehicles. That also makes the system so economically appealing.

Travel comfort in urban transportation (emphasis on tram services)

A feature of urban transportation is regular braking and starting sequences at many stops and at short time intervals. High-elasticity components are used in order to ensure a high level of travel comfort with as little vibration as possible and reduced noise, combined with good operational safety.

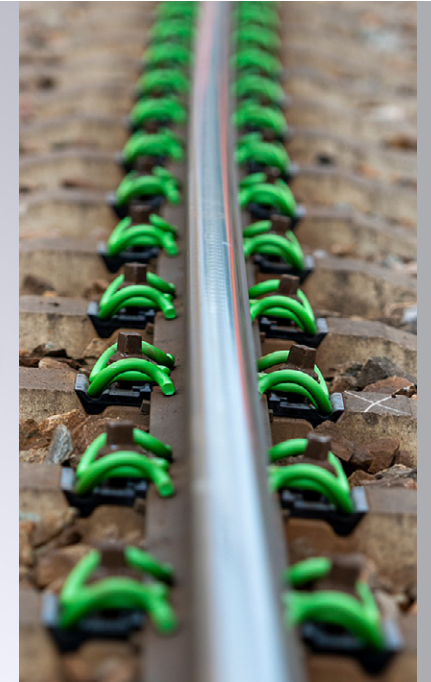
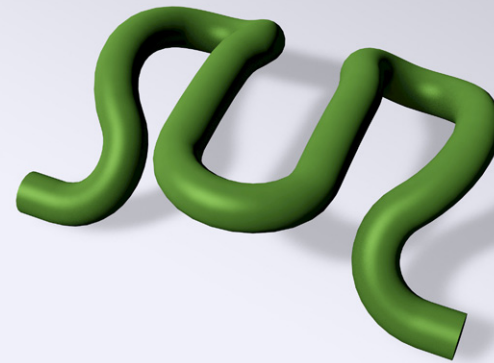


System components and specifications



Tension clamps: Generational change for improved resistance

Climate-friendly passenger transportation, reliable goods transportation, efficient logistics: Rail traffic is becoming increasingly important, and this places new demands on the rail network. The new generation of clamps was specifically developed to respond to the growing burden on rails and fasteners. The new M generation of Vossloh tension clamps is more robust and therefore guarantees safety on the track into the future, regardless of growing demands and higher loads. The tension clamps are manufactured using state-of-the-art processes at the new production facility in Werdohl. That is also where its more compact and lighter design was created, which both reduces logistical costs and saves resources.



Test track Tension clamp M7



Safety and track availability for all generations

The factor linking all tension clamps is their force-deflecting design: On all stretches of track, including on tight curves, the track remains in position while the trains accelerate and brake. The track bed does not move, and noise and vibration are contained. As a result, the tension clamps ensure maximum safety and track availability.

Old generation



Tension clamp Skl 21

- › Fatigue strength 2.5 mm
- › Spring deflection 14.5 mm through two spring arms
- › Toe load 10 kN
- › Frequency approx. 650 Hz



New generation



Tension clamp M7

- › Fatigue strength > 2.5 mm
- › Spring deflection > 16 mm through two spring arms
- › Toe load > 10 kN
- › Frequency > 1,000 Hz



The M7 tension clamp replaces the previous generation of tension clamps, and is optimised for a range of requirements.

The new M generation clamps are currently in the development stage. The values shown here are based on laboratory results, and the assessment following the initial operational trials is positive.

Comprehensive protection with *Vossloh protect*

High humidity levels and high salt content in the ambient air are just two examples of environmental impacts that will attack some components in rail fastening systems. That is why all tension clamps and sleeper screws and T-head bolts can be coated with *Vossloh protect* for optimal protection. This innovative coating provides traditional barrier and cathodic corrosion protection that prevents damage from loose ballast, among other things. This is an important factor when it comes to reducing lifecycle costs. The coated components also withstand aggressive environmental conditions such as acid rain, major temperature fluctuations, and other extreme conditions.



More information is available on our Web site:

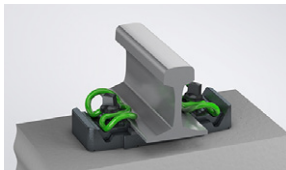
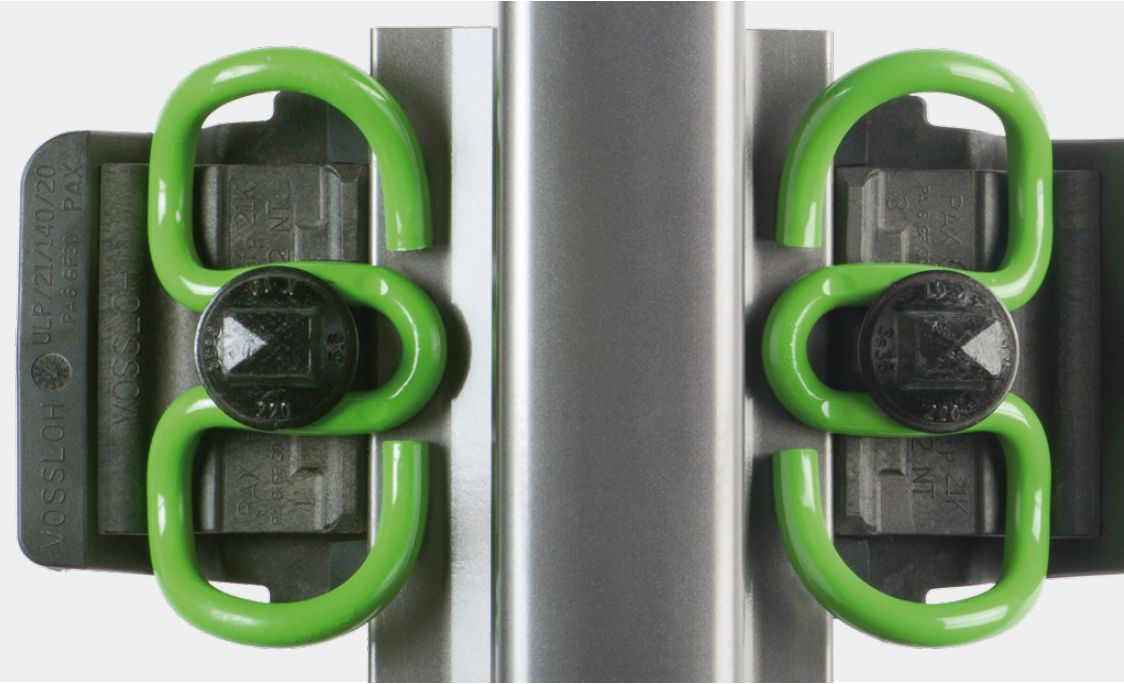


Extraordinary elasticity provided by *cellentic* intermediate plates

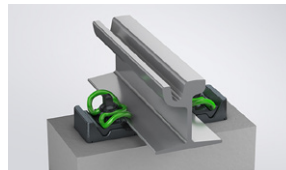
In these systems, *cellentic* intermediate plates help protect the tracks so they will require less frequent maintenance. The EPDM elastomer developed by Vossloh can provide optimal elasticity and rigidity in every application to ensure that loads are ideally distributed and vibration cushioned. It remains resistant to chemical substances, temperature fluctuations, and weathering even under challenging environmental conditions.

System DFF 200

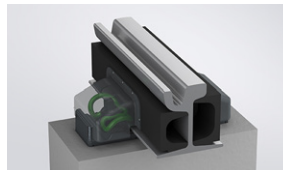
One system – configurable to suit your requirements



Conventional rail, urban transportation (emphasis on metro services)



Urban transportation (emphasis on tram services)



Urban transportation (emphasis on tram services with covered track)



SYSTEM DFF 200

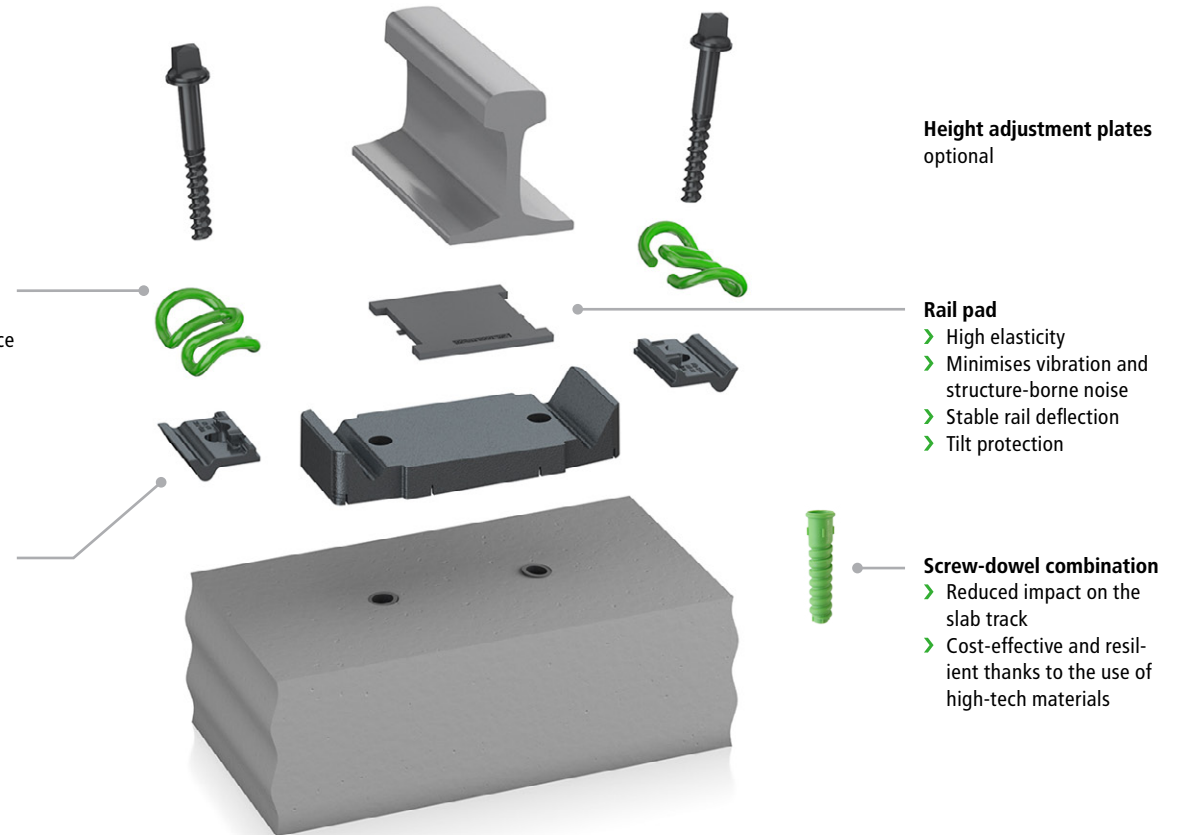
Ideal distribution of forces for conventional rail and urban transportation (emphasis on metro services)

Skl 21

- › Maximum safety
- › Optimised rail creep resistance and tilt protection
- › Resistant to dynamic vertical movements
- › Maintenance-free system

Angle guide plates

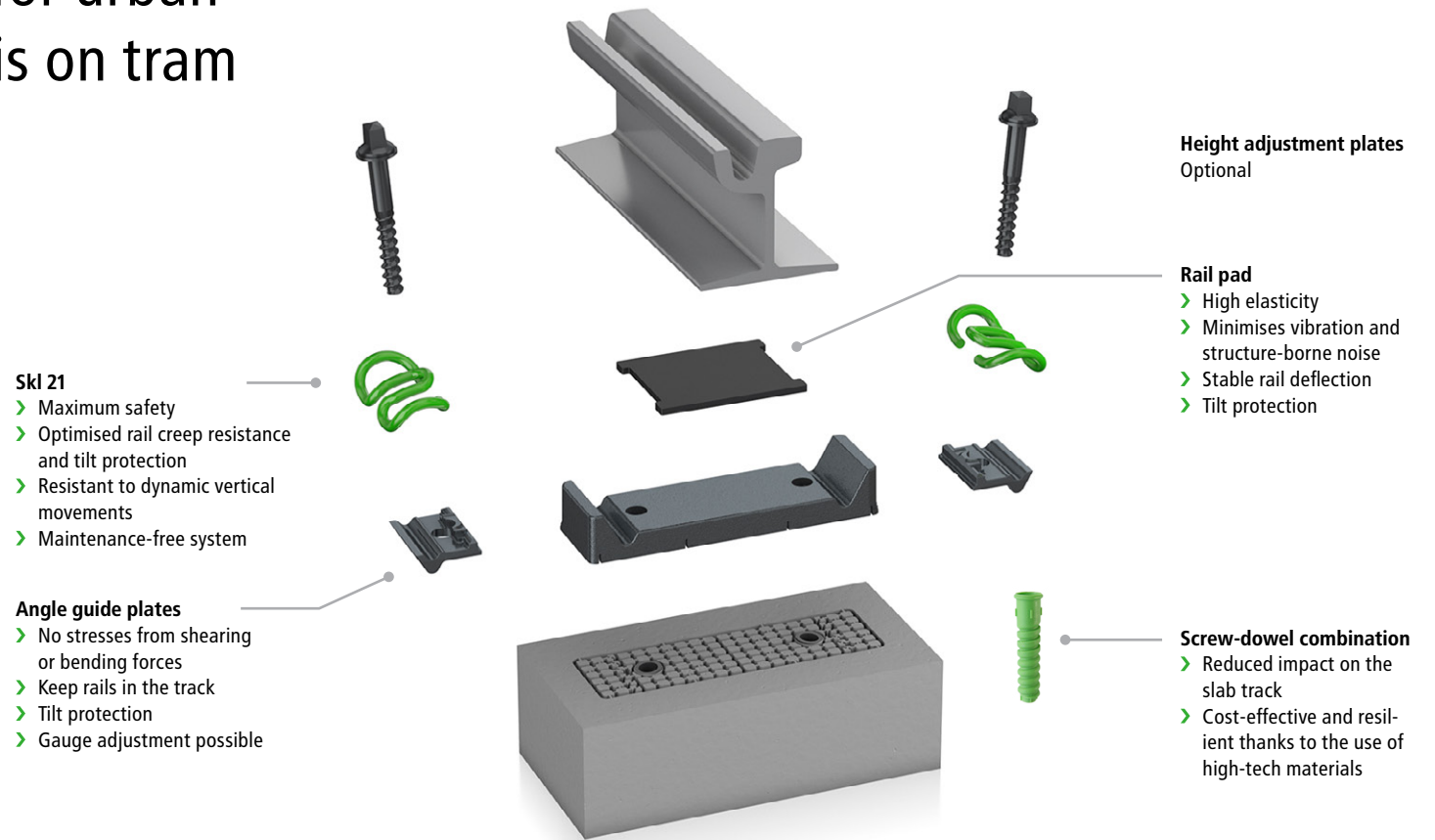
- › No stresses from shearing or bending forces
- › Keep rails in the track
- › Tilt protection
- › Gauge adjustment possible





SYSTEM DFF 200

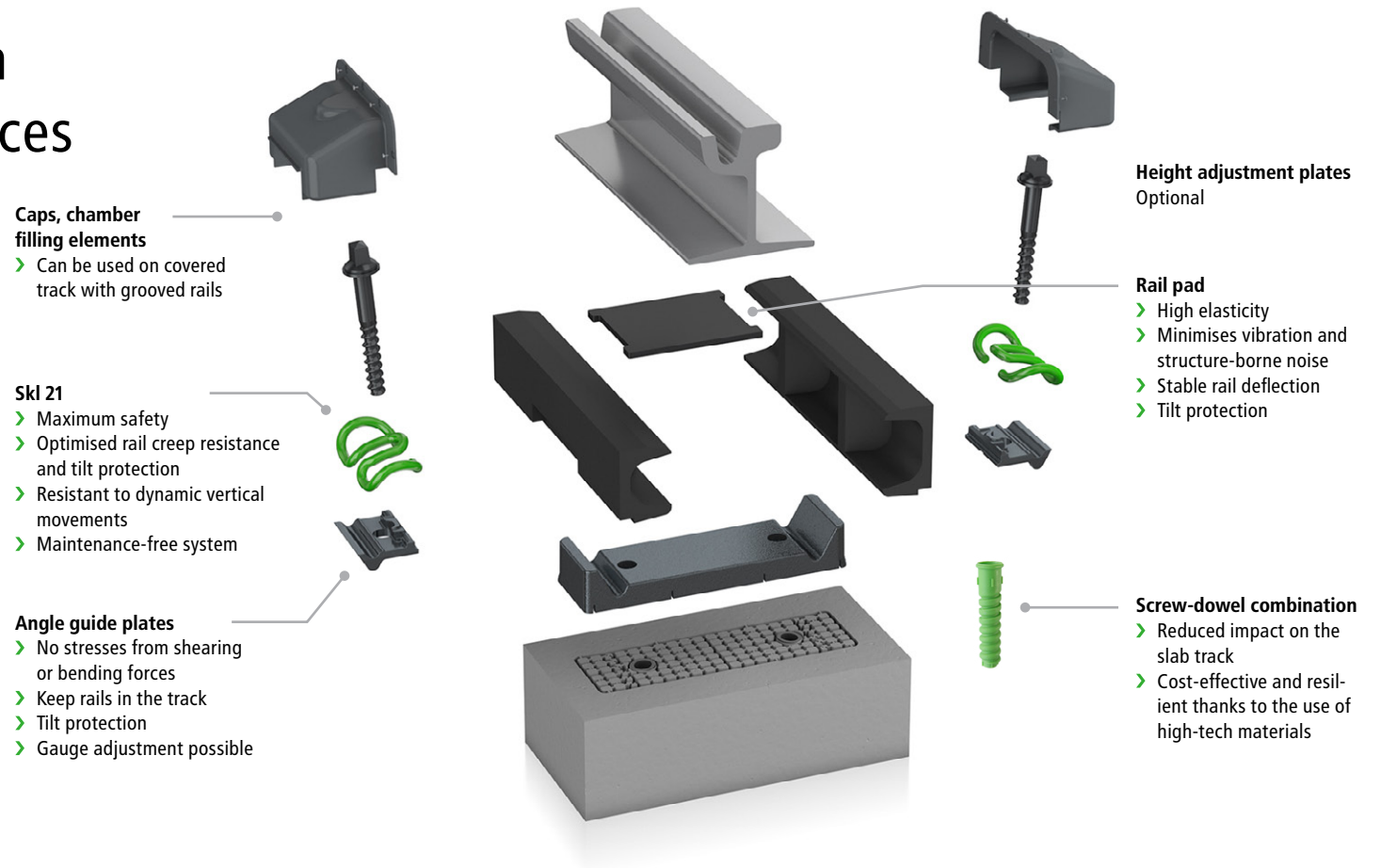
High-elasticity solution for urban transportation (emphasis on tram services)





SYSTEM DFF 200

High-elasticity solution for urban transportation (emphasis on tram services with covered track)





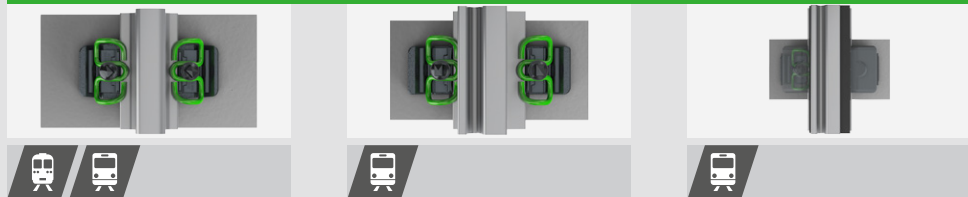
System DFF 200: Specifications at a glance



You can also use our Product Finder on our Web site:



System DFF 200



Field of application

Conventional rail, urban transportation (emphasis on metro services)

Urban transportation (emphasis on tram services)

Urban transportation (emphasis on tram services with covered track)

Axle load

≤ 26 t

≤ 13 t (Tram)

≤ 13 t (Tram)

Speed

≤ 250 km/h

≤ 100 km/h

≤ 100 km/h

Curve radius

≥ 150 m

≥ 40 m

≥ 40 m

Height adjustment

+ 20 mm

+ 20 mm

+ 20 mm

Gauge adjustment

± 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.



At home in many cities worldwide

System DFF 200 began its success story more than 40 years ago, under the name W-System. These long-lasting fastenings are used especially in urban tramways. The list of places covers the globe: Algeria, Austria, Belgium, China, Czech Republic, Germany, Italy, the Netherlands, Romania, Spain, Sweden, Switzerland, Tunisia, Turkey, the UK and the United Arab Emirates.

Want to know more
about our references?
Drop us a line:



Qatar

State-of-the-art infrastructure for a desert city

Lusail tram network

Expansion to include four new lines, 2022

Length: 15 km

7 underground stops



China

Suzhou Tram

China's first state-of-the-art low-floor tram

Opened: 2015

18 km long, double-rail route

Embedded grass and asphalt track

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!

Click here to directly
access the Product Finder



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