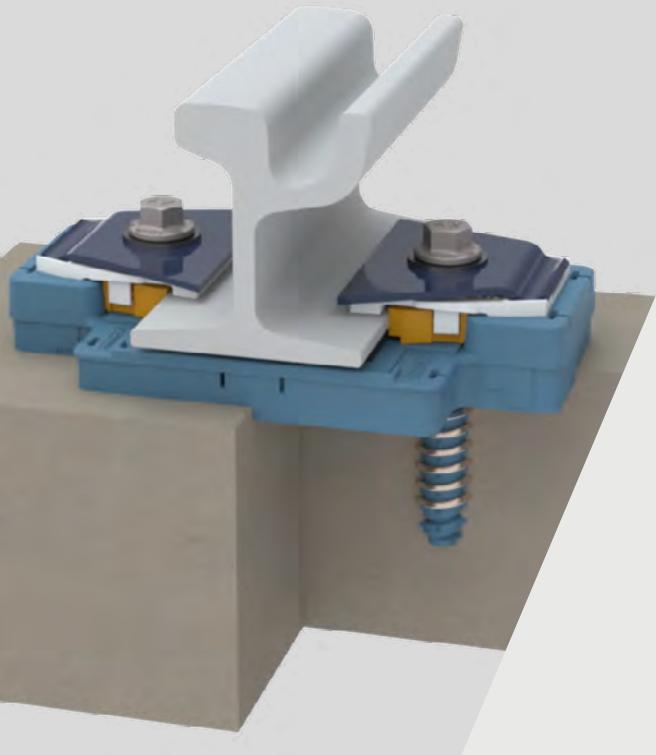


Nabla Tram

Fastening Systems

Adding Value

The Nabla Tram baseplate design allows for effective insertion into a dry mix or fresh concrete.



Nabla Tram is a cost-effective fastening system for trams and light rail systems that is comprised of a lightweight plastic baseplate and Nabla Evolution components.

Combining ease of application with high-performance levels, Nabla Tram is compatible with both top-down and bottom-up construction methods, depending on the project's requirements. The baseplate is designed to allow effective insertion into a dry mix or fresh concrete, thanks to an air evacuation system consisting of blowholes and channels.

The Nabla Tram fastening system is designed for use on state-of-the-art tramway track, conforming with EN Standard 13481-5. Over 450,000 Nabla Tram systems have been installed across Europe.

→ TECHNICAL FEATURES

Embedded baseplate

The plastic baseplate is partially embedded in the concrete to withstand the lateral and longitudinal loading. It is engineered to allow trapped air and water to escape, ensuring a solid fill of concrete under the rail seat.

Direct fastening

Nabla Tram is a direct fastening system. The rail is attached to the baseplate and the baseplate to the supporting base structure using the same method.

Automatic installation

The baseplate system has been optimised for automatic machine installation on slip paved fresh concrete. Its shapes, dimensions and weight allow for easy,

economical installation.

Protective cover

The fastening system comes with a plastic cover designed to prevent concrete contamination, and improve electrical, mechanical and thermal resistance, allowing for road traffic.

Air evacuation

The Nabla air evacuation system prevents trapped air getting under the baseplate.

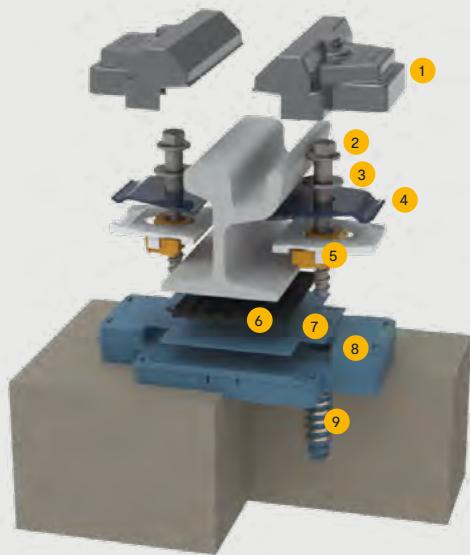
Electrical insulation

Nabla Tram provides electrical insulation higher than 20 K Ohms (EN13146-5:2012), providing safety from stray currents.

→ ADVANTAGES

- Nabla Tram has been designed for ease of installation using either bottom-up or top-down construction methods, into either a dry mix or fresh concrete.
- Covers are compatible with grass, pavement, concrete and bitumen surfaces. They increase the insulation and protect the fastening system from concrete contamination.
- The baseplate allows trapped air and water to escape, increasing the system's reliability.

- Nabla Tram's GS anchorage provides pull-out resistance of 90 kN and higher, allowing a good transfer of loads towards the concrete slab.
- The system can be adjusted to provide a wide range of stiffnesses (from 35 MN/m up to 150 MN/m) and vibration attenuation better than -10dB.
- Nabla Tram is suitable for use in conjunction with Pandrol's FTrack sustainable resilient system for embedded rail.



→ COMPONENTS

1. Clip cover
2. Coach screw
3. Flat washer
4. Nabla blade
5. Nabla Evolution insulator
6. Rail pad
7. Vertical adjustment shim
8. Composite baseplate
9. GS dowel

→ SPECIFICATIONS

Assembly performance data

Recommended category	A
Type of track	Slab
Rail inclination	No inclination
System type	Nabla Evolution
Static stiffness	35 MN/m – 150 MN/m
Vertical adjustment	-2/+3 mm (optional ± 4 mm)
Gauge adjustment	± 15 mm
Electrical insulation	22 k Ω

For any other configuration, please contact us.

Standard compliance

- EN 13481
- EN 13146

→ LEARN MORE



www.pandrol.com