



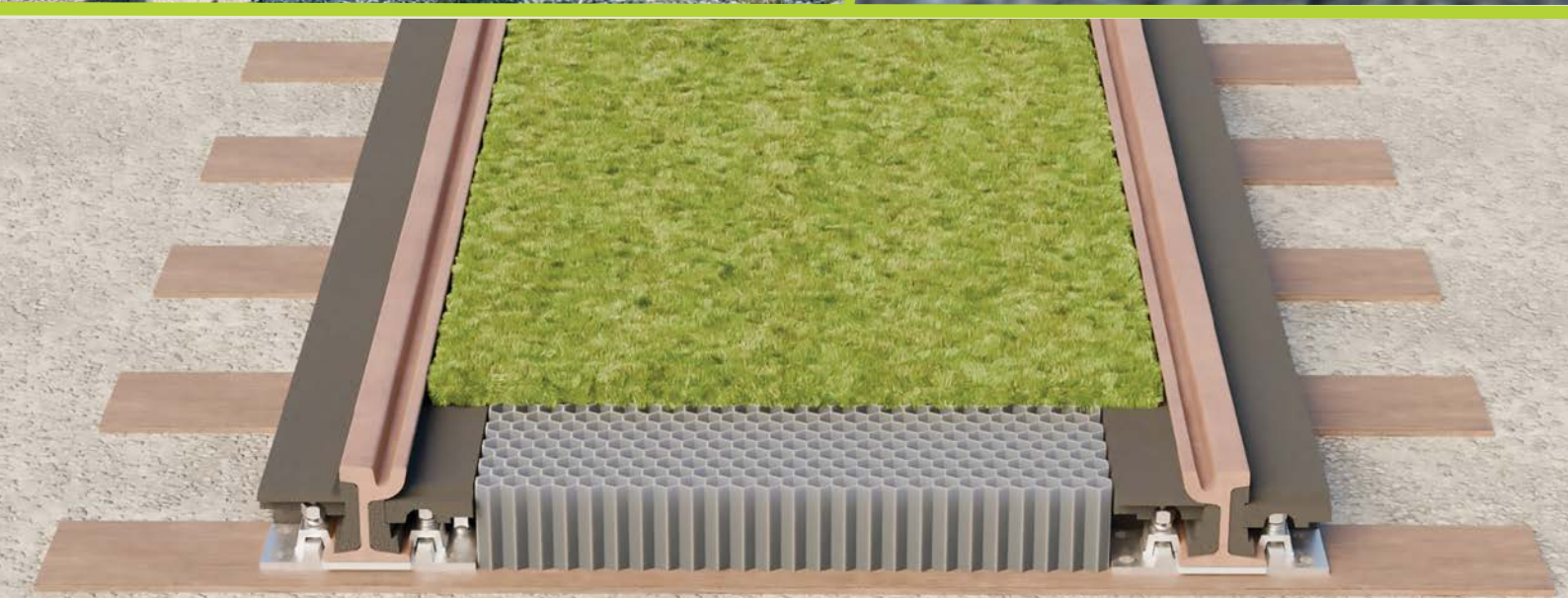
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AWARD 2026

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RAILFIX
comb

Biodiverse Green Tramways

BERA[®]

INTRODUCTION

BERA proudly presents a groundbreaking solution for greening urban tramways.

Combining over 15 years of INTERTECH Plus's expertise in **comprehensive noise reduction for tram and railway systems** with BERA's commitment to **environmentally sustainable solutions** that conserve water for future generations, this partnership marks a new chapter in urban infrastructure innovation.

Introducing **BERA® RailFix** – Powered by INTERTECH Plus:

An innovative approach to silent, green, and biodiverse tramway integration.



In July 2024, the Joint Research Centre (JRC) of the European Union identified **Urban Heat Islands (UHI)** and **urban overheating**—resulting from prolonged periods of extreme temperatures—as a significant and growing effect of climate change. In urban environments, sealed surfaces such as roads and buildings absorb heat throughout the day and release it at night. This not only causes discomfort but also poses **serious health risks**, including dehydration, heatstroke, and worsened air quality due to trapped pollution.

Multiple research studies and publications have confirmed that these health risks are further amplified by **additional urban heat sources**, such as air conditioning units, transportation emissions, **fine dust**, and **noise pollution**. The impact is not limited to human health—it also places an increasing burden on healthcare systems and public budgets.

Compounding the issue is the **lack of rainwater absorption** in urban areas. During and after heavy storms, insufficient infiltration reduces the natural cooling capacity of city environments and overloads sewer systems.

In Germany, the Grüngleisnetzwerk guidelines for tramway greening have clearly documented the **environmental and operational benefits** of integrating green infrastructure into tram tracks. Greening tramways not only improves urban climate resilience but also **reduces maintenance needs** by decreasing the frequency of tamping required for ballasted tracks.

All these critical aspects have been integrated into the development of the **patented** solution:

BERA® RailFix

Developed in collaboration with leading specialists from INTERTECH Plus, the University of Brno (Czech Republic), and proven through pilot implementations.

Key Benefits of BERA® RailFix:

- Enhances rainwater management and drainage
- Mitigates the Urban Heat Island Effect
- Reduces noise pollution
- Captures and reduces fine dust
- Boosts urban biodiversity
- Cools and purifies the air
- Lowers maintenance costs for tram operators

Sources:

https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/urban-heat-islands-managing-extreme-heat-keep-cities-cool-2024-07-22_en

<http://www.gruengleisnetzwerk.de/index.html>

RAILFIX
comb





BERA® RailFix – A Complete Urban Greening Solution for Tramways

What is BERA® RailFix

BERA® RailFix is an innovative modular system designed to **green urban tramways** while delivering a wide range of **environmental, structural, and operational benefits**.

The system consists of:

- **High-strength, driveable cellular modules** with excellent **water retention capacity**
- Integrated **sound-reducing rubber elements**
- A low-maintenance **biodiverse surface**, planted with **local succulents** such as sedum

These modules are installed **between and alongside tram tracks**, maximizing their ecological impact. All components are made from **96% recycled materials** and are **fully recyclable** at the end of their lifespan.

Advantages for Operators

RailFix offers minimal maintenance requirements, with modules that are quickly dismantled and reinstalled after track tamping or repairs—no complex machinery or prolonged downtime needed.

Key Benefits

- **Rainwater management** - Full drainage provided of more than 270 l/m² per hour. Rainwater retention layer is optional
- **Accessibility** - Fully accessible for emergency vehicles, no risk getting stuck in muddy surfaces
- **Biodiversity** - Attractive sedums coloring nicely through seasons, providing vital nectar for pollinators, food for birds, and habitat in urban spaces
- **Noise** - Effective attenuation of 5-8 dB(A) by the system, further additional noise reduction available, project based
- **Fine dust** - Sedum plants capture fine dust from the air straight from the source: the wheels and brakes of trams. Healthier air quality!
- **UHI** - Sedum surfaces provide lower ambient temperatures by blocking solar heat, and releasing evapotranspiration, helping Urban Heat Island effects
- **Maintenance** - Operators experience lower maintenance. No more mowing of grass, but also the incorporated hoisting facility in RailFix for fast repair and re-installation

For any tram- or light rail track BERA® RailFix can be applied. The rubber elements come for any rail profile or any type of structure. The cellular modules come in multiple standard size, different heights to accommodate the specific situation. Custom made sizes are available to match specific areas like curves, and platforms.

Grassed tram tracks often suffer from drought in summer, or saturation in winter due to heavy rain or melting snow. Also, frozen soil layers block the required drainage. Emergency vehicles often get stuck or get damaged in such cases. Now BERA RailFix provides solutions to avoid all of this, with proven records since 2024 in Czech Republic and The Netherlands.

TECHNICAL SPECIFICATIONS*

GENERAL

Material	: 100% recycled polypropylene, 100% recyclable
Manufacturing technique	: High Precision Green Injection Moulding
Manufacturing standards	: ISO9001, 16949 Lloyds, REACH, EPD pending
Manufacturing location	: European Union
Colour	: Grey
Cell structure	: Hexagonal 42mm
Membrane	: DuPont™ Tytar® – 68 g/m²
Drainability	: EN ISO 11058 : 180 liter / (m².s)
UV and frost	: UV and frost resistant

PHYSICAL DATA

Model	RailFix, size L	RailFix, size M	RailFix, size X (customized)
Dimensions L x W	1176 x 764 mm	1085 x 764 mm	Any size > 300 mm
Height	64, 96, 128, 160 or 192 mm	64, 96, 128, 160 or 192 mm	64, 96, 128, 160 or 192 mm
Surface module only	0.9 m²	0.83 m²	as per customized design
Surface installed (30 mm gap)	0.93 m²	0.86 m²	as per customized design
Wall thickness, tapered	0.8 - 1.4 mm	0.8 - 1.4 mm	0.8 - 1.4 mm
Weight empty	3 - 10 kg	2.8 - 9.2 kg	as per customized design
Split filling volume per m²	64, 96, 128, 160 or 192 liter	64, 96, 128, 160 or 192 liter	as per customized design
Split size, recommended	4 - 8 mm	4 - 8 mm	4 - 8 mm
Vertical strength	>300 T/m²	>300 T/m²	>300 T/m²

* All data is subject to change without prior notice by the manufacturer

GEOTEXTILE DuPont™ Tytar® TECHNICAL DATA

Essential characteristics	Test Method	Unit	Performance
Tensile Strength T ^{max}	EN ISO 10319	kN/m	MD 3.7 (- 0.8) CMD 3.4 (- 0.8)
Dynamic Perforation Resistance D	EN ISO 13433	kN/m	50 (+ 0)
Resistance to Static Puncture F	EN ISO 12236	mm	0.500 (-0.08)
Opening Size O ⁹⁰	EN ISO 12956	kN	225 (+/- 40)
Water Permeability V ^{H50}	EN ISO 11058	m/s	180 x 10 ⁻³ (- 40 + 10 ⁻³)
Durability in accordance with Annex B	Predicted to be durable for more than 100 years in all natural soils with temperatures <25 °C on the basis of a durability assessment (Typargeo Report 070)		

Source: DuPont™ Tytar® SF20 Declaration of Performance

Sustainability guaranteed

BERA is synonymous for its ground reinforcement products, all EPD certified. In continuation of this, the patented BERA® RailFix system is manufactured out of 96.3% recycled material, 100% recyclable at the end of lifespan. EPD certification of the system is pending.

Laboratory-Verified Strength

The 130 mm-high RailFix L-type cellular module was tested 'empty' by the Institute of Building Structures at the Faculty of Civil Engineering, Brno University of Technology. Depending on the base a strength was measured between 137 and 150 T/m². Filled with the 4/8 mm gravel / split the strength is expected to be way above 300 T/m².

Laboratory-Verified Reduction of Rail Noise

The RailFix system can include double-sided rail absorbers installed along the rail web. Their acoustic properties were laboratory-tested by the AdMaS Centre and the Faculty of Civil Engineering at Brno University of Technology using an NT1 grooved tram rail. The test was performed using the impact excitation method. A steel ball with a diameter of 38 mm was dropped from a height of 60 cm onto the running surface of the rail. The acoustic response was recorded by a microphone positioned one metre from the test specimen. Each configuration was measured six times. The tests performed in 2024 are available upon request.

INSTALLATION



BEFORE



AFTER

BERA® RailFix scope of supply and general installation guidance:

1. Rubber, noise reducing profiles, for lateral fixation to the rails (glued or mechanical fixing)
2. Rubber expansion fittings
3. RailFix module, installed in between and aside of the track including hoisting system
4. Vegetation layer such as sedum, available on request or to be supplied by local nursery

LOW NOISE BARRIER



ADDITIONAL NOISE & VIBRATION REDUCING OPTIONS

In addition to the noise reduction achieved by **BERA® RailFix**, there are optional methods to further reduce noise and/or vibration by these products:

1. Low Noise Barrier (LNB) in L or T configuration, reducing up to 6 dB(A)
2. Anti-vibration mats (CONIRAP)
3. Rail Noise Absorbers

For more info, please check the following pages.



LNB – TYPE T

The **Inverted T-Type Low Noise Barrier (LNB-T)** is composed of **three prefabricated components** that are assembled on-site to form an effective acoustic barrier. Its **inverted T-shape** provides a **self-supporting structure**, eliminating the need for additional anchoring.

The barrier is manufactured from **100% recycled rubber**, encased in **concrete base profiles** for stability and topped with a **stainless-steel cap** for enhanced durability and a refined appearance.

The **LNB-T** can be installed either as a **stand-alone unit between tram or rail tracks**, or **alongside** the tracks, depending on project requirements. For improved visual integration, **greenery or vegetation** can be added to enhance aesthetics for nearby residents.



LNB - TYPE L

The **LNB-L** is a robust, **L-shaped low noise barrier** constructed from solid concrete. Its track-facing side is covered with a **corrugated rubber layer**, specifically designed to enhance noise absorption and minimize sound reflection.

The **LNB-L** is installed **alongside the track**, offering an effective and durable solution for reducing rail-related noise. For improved visual integration in urban environments, **greenery or vegetation** can be added to enhance the aesthetic appeal for nearby residents.

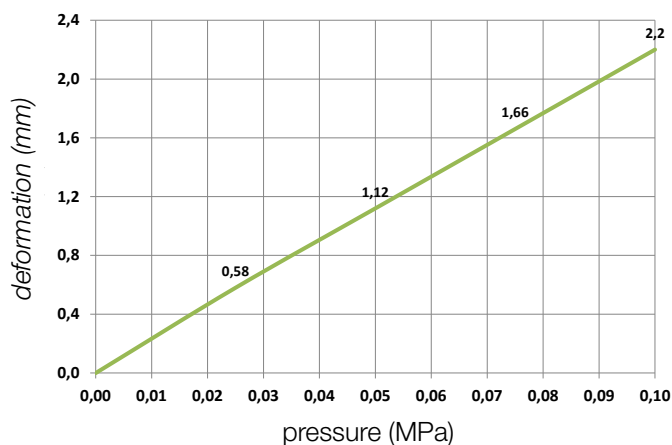
ANTI-VIBRATION MATS

The comprehensive system range of CONIRAP anti-vibration mats helps to eliminate noise transmitted from train bogies on surface and underground tracks and thus contributes to improvement of the environment. They can be used under gravel or concrete beds or for specially adapted systems for installation on rails.

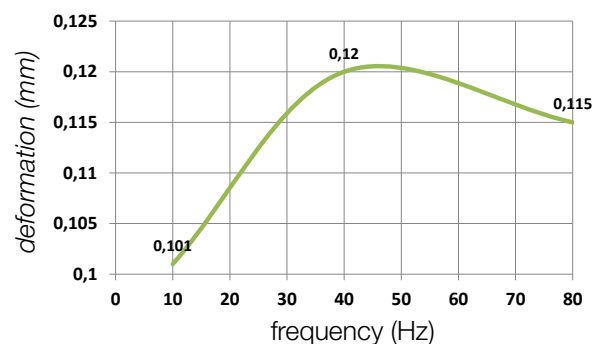
FOR FIXED LANE

Name	Conirap 0,1 modification 670
Dimensions	2000 x 1000 x 24 mm, tolerance <1.5%
Specific weight	approx. 0.670 g/cm ³
Temperature stability	-40...+80 °C
Pressure load capacity	0,1 - 0,4 N/mm ² according to DIN 53454
Coefficient of longitudinal expansion	(144...157) · 10 ⁻⁶ K ⁻¹ according to DIN 53752
Thermal conductivity	0.178...0.205 W · K ⁻¹ · m ⁻¹ according to DIN 52616 (at 20...60 °C)
Water absorption	about 20%
Sound insulation	42 dB according to EN ISO 140-3[2]
Improving of impact sound insulation	22 dB according to DIN 52210 part 3
Reshaping Module	22,3 MPa
Static stiffness	0,046 N/mm ³
Dynamic stiffness	10 Hz= 0,101 N/mm ³ 40 Hz= 0,120 N/mm ³ 80 Hz= 0,115 N/mm ³
E static	1,104 [MPa]
E dynamic	10 Hz = 2,424 [MPa] 40 Hz = 2,88 [MPa] 80 Hz = 2,76 [MPa]

Static stiffness



Dynamic stiffness

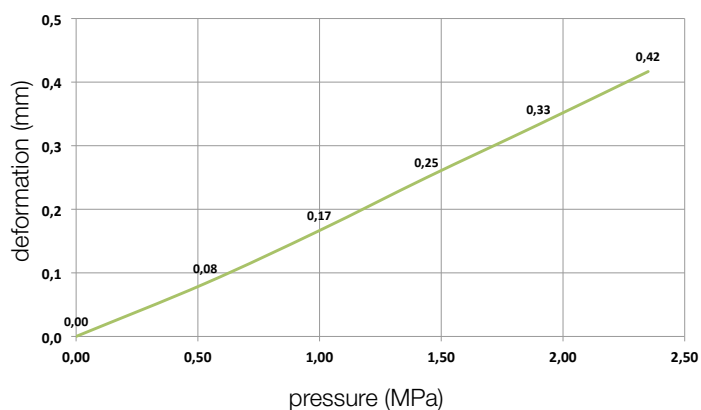




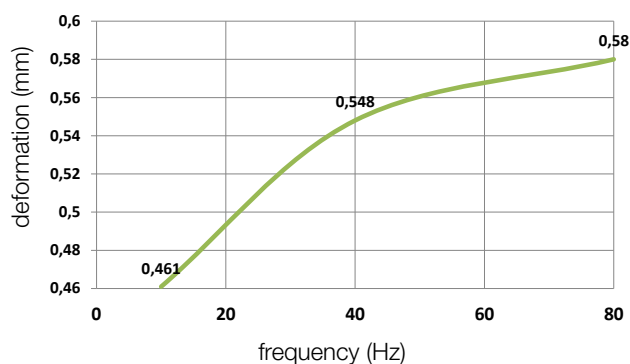
FOR GRAVEL BEDS

Name	Conirap 0,4
Dimensions	2000 x 1000 x 24 mm, tolerance <1.5%
Specific weight	approx. 0.870 g/cm ³
Temperature stability	-40...+80 °C
Pressure load capacity	0,1 - 0,4 N/mm ² according to DIN 53454
Coefficient of longitudinal expansion	(144...157) · 10 ⁻⁶ K ⁻¹ according to DIN 53752
Thermal conductivity	0,178...0,205 W · K ⁻¹ · m ⁻¹ according to DIN 52616 (at 20...60 °C)
Water absorption	about 20%
Sound insulation	42 dB according to EN ISO 140-3[2]
Improving of impact sound insulation	22 dB according to DIN 52210 part 3
Reshaping Module	22,3 MPa
Static stiffness	0,171 N/mm ³
Dynamic stiffness	10 Hz = 0,461 N/mm ³ 40 Hz = 0,548 N/mm ³ 80 Hz = 0,580 N/mm ³
E static	4,104 [MPa]
E dynamic	10 Hz = 11,064 [MPa] 40 Hz = 13,152 [MPa] 80 Hz = 13,92 [MPa]

Static stiffness



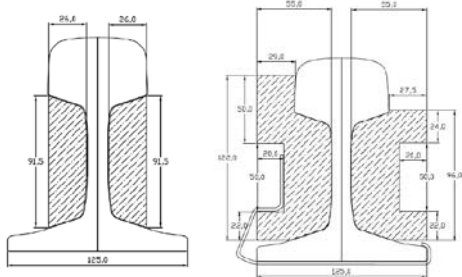
Dynamic stiffness



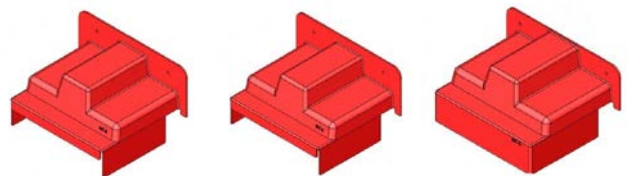
S49 RAIL NOISE ABSORBER

	Result of the test	Measurement uncertainty ¹⁾
Rail noise absorbers (SBR material)		
Gross weight (kg.m ⁻¹) (3))	1 043	9
Tensile strength (MPa)	1,29	0,15
Tensility (%)	62,0	3,5
Absorbency (%)	5,0	1,2
Low temperature resistance (°C)	-30	0,1
Electrical resistance (MΩ)	52,0	11,4
Internal resistivity(ohm cm)	4,57E+09	-
Foot profile (SBR material)		
Hardness Sh A	69	0,1
Tensile strength (MPa)	12,1	0,5
Tensility (%)	420	27
Resistance to further breakage (MPa)	10	1,0
Electrical resistance (MΩ)	0,80	-
Insulating cover for rail mounting (material PP+ 50% glass fiber)		
Density (g.cm ⁻³) (3))	1,33	0,1
Tensile strength (MPa)	188	1,3
Tensility (%)	2,4	0,2
Resistance to elevated temperature (°C)	240	-

1) is expressed as the expanded uncertainty of the measurement for an expansion coefficient k= 2, which for a normal distribution corresponds to a coverage probability of about 95%



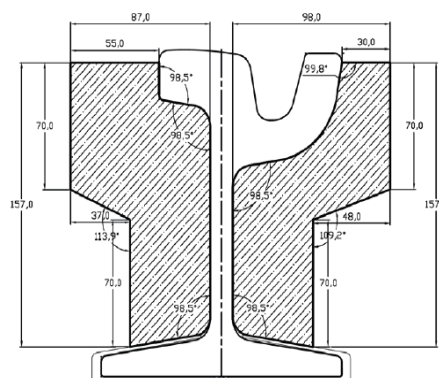
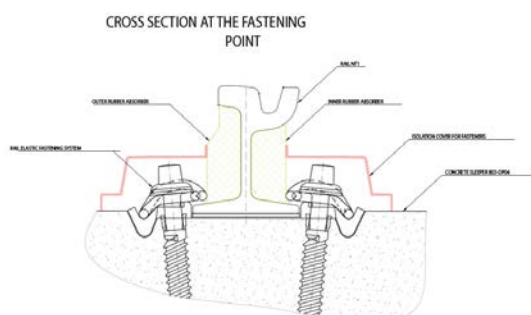
DIFFERENT VARIANTS OF INSULATING FASTENING COVERS



RAIL NOISE ABSORBER NT1

	Result of the test	Measurement uncertainty ¹⁾
Rail noise absorbers (SBR material)		
Gross weight (kg.m(-) (3))	1 043	9
Tensile strength (MPa)	1,29	0,15
Tensility (%)	62,0	3,5
Absorbency (%)	5,0	1,2
Low temperature resistance (°C)	-30	0,1
Electrical resistance (MΩ)	52,0	11,4
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BERA® is the trademark of BERA B.V. registered in The Netherlands, a company which develops ground reinforcement systems, and water saving solutions for gardens and landscapes, as well as for the urban spaces. With the company's historical roots & wealth of know-how in landscaping and architectural fields, they create innovative and environmentally sustainable solutions, supplied throughout Europe, the Middle-East, Africa, Central America and S-E Asia regions.

Contact us

HEADQUARTER

BERA B.V. (THE NETHERLANDS)

T: +31 (0) 33 257 0302

E: info@bera-bv.com

SALES OFFICES

Belgium

T: +32 474 980 273

E: raphael@bera-bv.com

Czech Republic

T: +420 777 484 937

E: beracz@bera-bv.com

France

T: +33 (0) 9 81 12 76 58

E: info@bera-sarl.fr

Germany

T: +49 (0) 30 78 71 68 85

E: kontakt@bera-bv.com

Scandinavia

T: +479 502 6000

E: karsten@bera-bv.com

Slovakia

T: +421 910 705 706

E: slovakia@bera-bv.com

Centro América

T: +(506) 87039731

E: centro.america@bera-bv.com

South Africa

T: +27 83 449 3954

E: franko@bera-bv.com



www.bera-bv.com