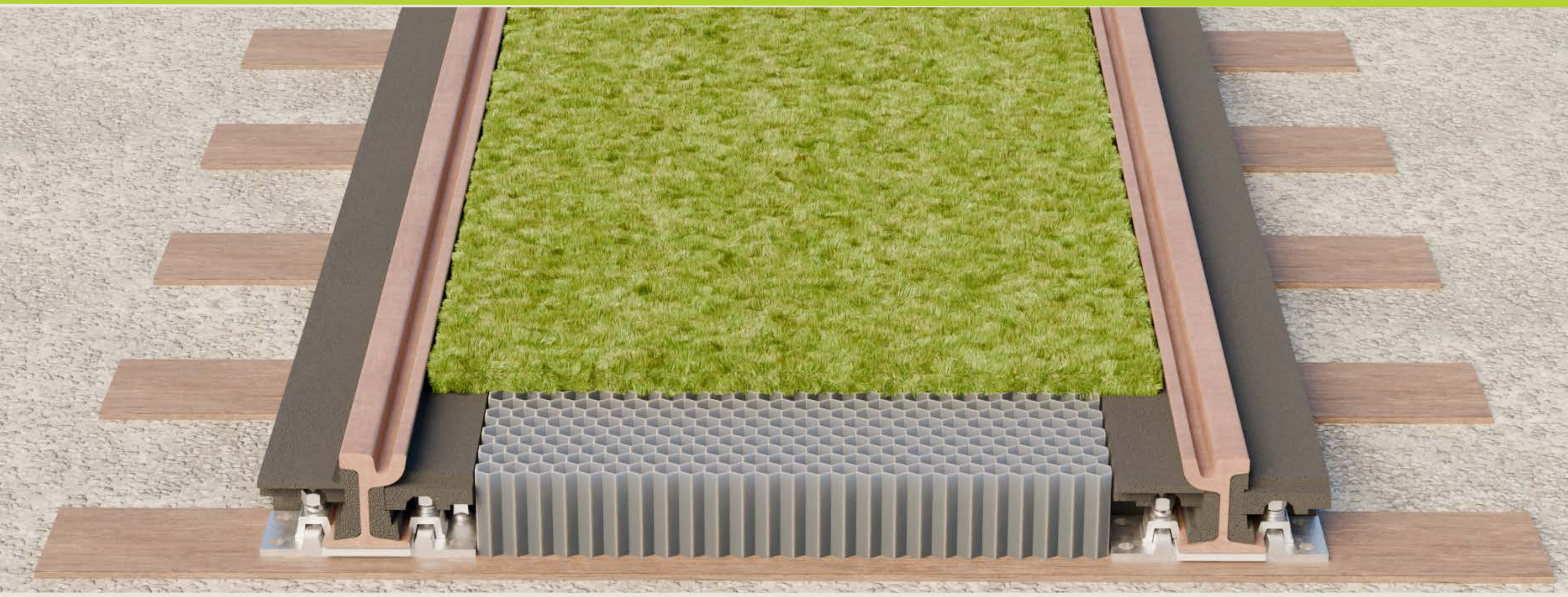


RAILFIX
comb

Urban Green Tramways

BERA®

INTRODUCTION

INTERTECH Plus and BERA proudly present 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 sustainable 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:

- Mitigates the Urban Heat Island Effect
- Reduces noise pollution
- Captures and reduces fine dust
- Enhances rainwater management
- 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

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 capacit**y
- Integrated **sound-reducing rubber elements**
- A low-maintenance **green 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—no complex machinery or prolonged downtime needed.

Key Benefits

- Green, accessible surfaces that enhance urban biodiversity
- Cooling effect during hot nights, reducing Urban Heat Island impact
- Efficient urban rainwater management
- Noise reduction of up to 5–8 dB(A)
- Capture and reduction of fine dust particles
- Lower maintenance costs thanks to fast reinstallation post-calibration

Versatile Applications

- Tramways on individual or segregated tracks
- Ballastless track systems
- Pedestrian crossings
- Emergency access zones
- Subsoil stabilization
- Compatible with various tram gauge standards

TECHNICAL

TECHNICAL SPECIFICATIONS*

GENERAL

Material	:	100% recycled or pure 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
Membrane	:	DuPont™ Typar® – 68 g/m²
Drainability	:	EN ISO 11058 : 180 liter / (m².s)
UV and frost	:	UV and frost resistant

PHYSICAL DATA

Model		**RailFix, size 1**
Dimensions L x W x H	:	1176 x 764 x 32 mm
Installed surface	:	0.9 m²
Wall tickness, tapered	:	0.8 - 1.4 mm
Weight	:	4.5 - 10 kg
Gravel/split volume/weight	:	50 l/m² = 75 kg/m² - size between 3 and 8 mm per layer
Vertical strength, empty	:	95 T/m²

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

GEOTEXTILE DuPont™Typar® 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 ºC on the basis of a durability assessment (Typargeo Report 070)		

Source: DuPont™ Typar® SF20 Declaration of Performance

INSTALLATION

BERA® RailFix scope of supply and general installation guidance:

1. BERA® RailFix scope of supply and general installation guidance:
2. Rubber noise reducing profiles, for lateral fixation to the rails (glued or mechanical fixing)
3. Rubber expansion fittings
4. RailFix module, installed in between and aside of the track
5. Vegetation layer such as sedum, to be supplied by others

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.

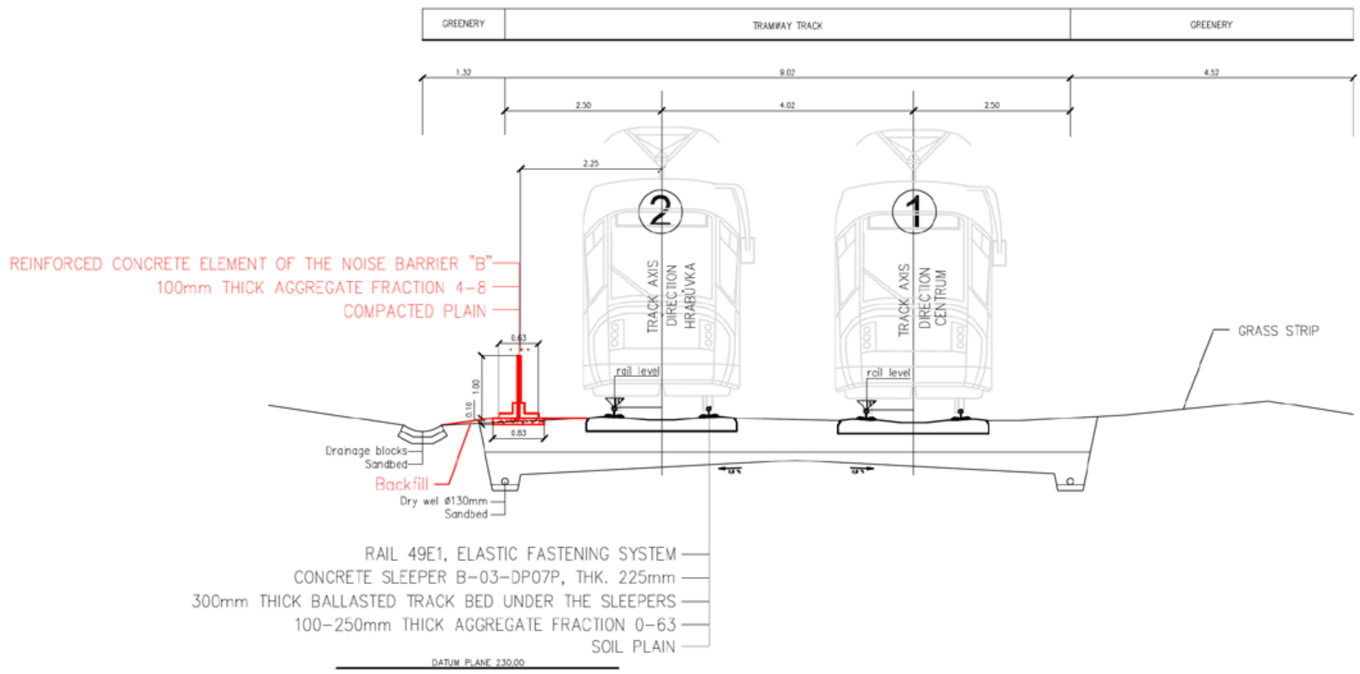
LNB – TYPE T

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.

SAMPLE CROSS SECTION VARIANT T

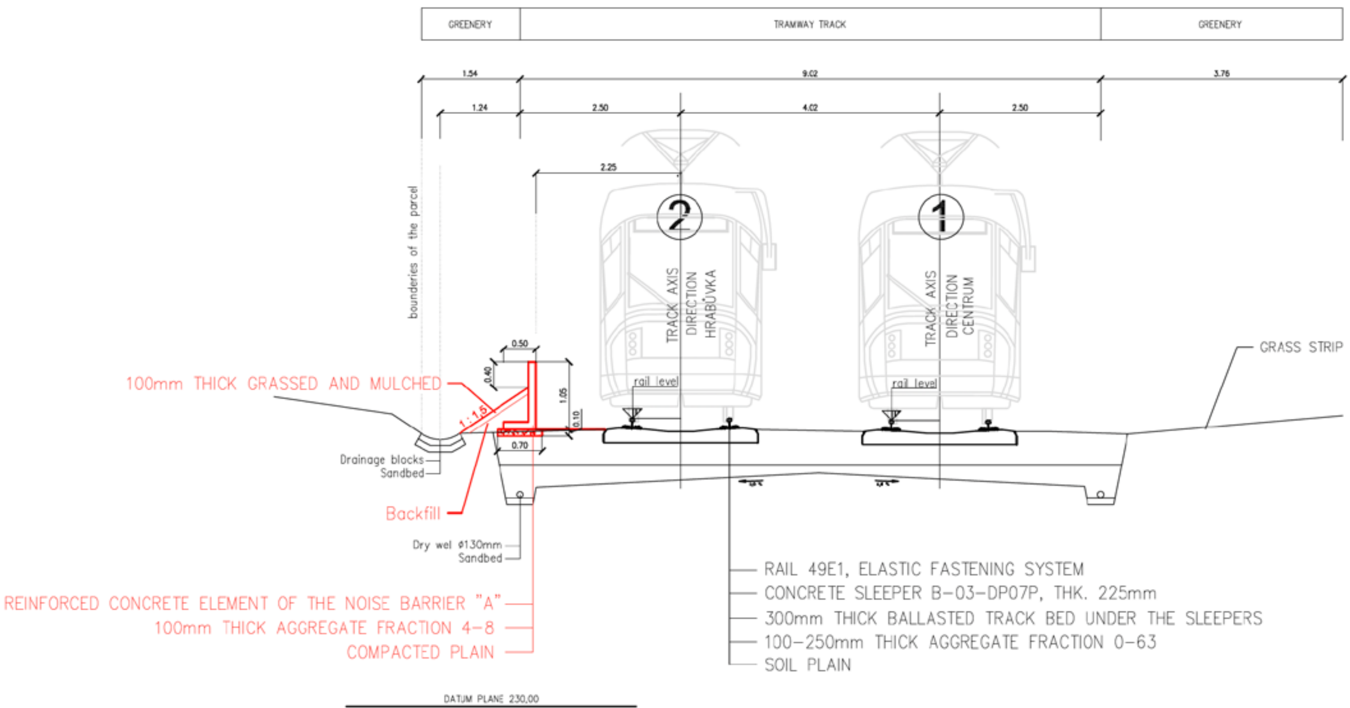


LNB - TYPE L

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.

SAMPLE CROSS SECTION VARIANT L



LNB ASSEMBLY

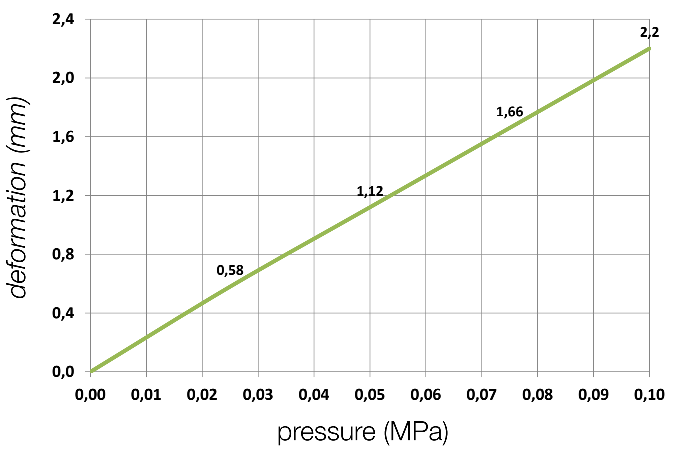
ANTI-VIBRATION MATS

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.

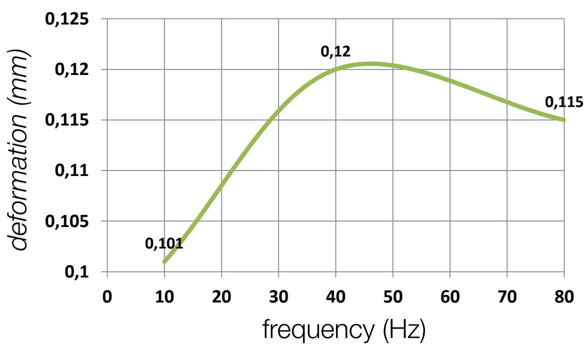
FOR FIXED LANE

Name	Conirap 0,1 modification 670
Dimensions	2000 x 1000 x 24 mm, tolerance <1.5%
Specific weight	approx. 0.670 g/cm3
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



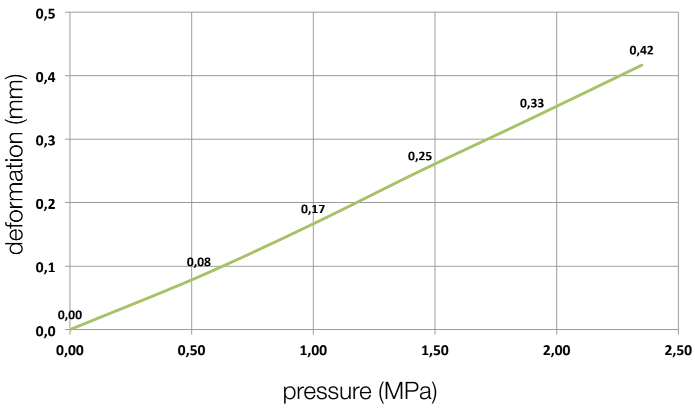
Dynamic stiffness



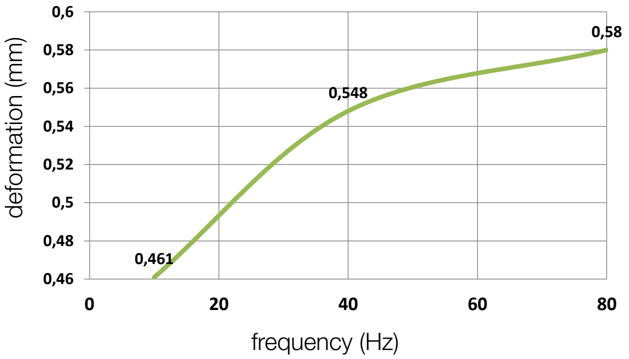
FOR GRAVEL BEDS

Name	Conirap 0,4
Dimensions	2000 x 1000 x 24 mm, tolerance <1.5%
Specific weight	approx. 0.870 g/cm3
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/mm³
Dynamic stiffness	10 Hz = 0,461 N/mm³ 40 Hz = 0,548 N/mm³ 80 Hz = 0,580 N/mm³
E static	4,104 [MPa]
E dynamic	10 Hz = 11,064 [MPa] 40 Hz = 13,152 [MPa] 80 Hz = 13,92 [MPa]

Static stiffness



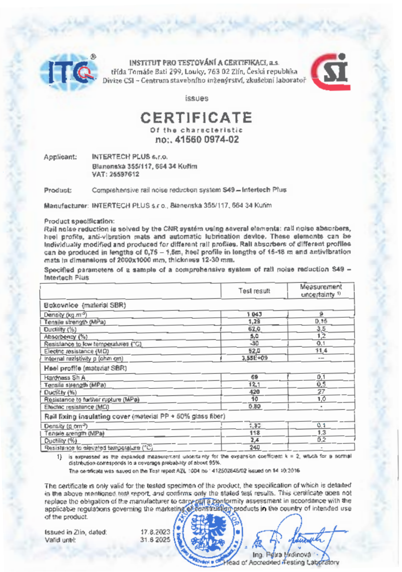
Dynamic stiffness



S49 RAIL NOISE ABSORBER

	Result of the test	Measurement uncertainty 1)
Rail noise absorbers (SBR material)		
Gross weight (kg.m(-) (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))	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%


INSTITUT PRO TESTOVÁNÍ A CERTIFIKACI, a.s.
třída Tomáše Bati 299, Louky, 763 02 Zlín, Česká republika
Divize CSI – Centrum stavebního inženýrství, zkušební laboratoř

issues

CERTIFICATE
Of the characteristic
no:. 41560 0974-02

Applicant: INTERTECH PLUS s.r.o.
Blanenska 355/117, 664 34 Kuřim
VAT: 25597612

Product: Comprehensive rail noise reduction system S49 – Intertech Plus

Manufacturer: INTERTECH PLUS s.r.o., Blanenska 355/117, 664 34 Kuřim

Product specification:
Rail noise reduction is solved by the CNR systém using several elements: rail noise absorbers, heel profile, anti-vibration mats and automatic lubrication device. These elements can be individually modified and produced for different rail profiles. Rail absorbers of different profiles can be produced in lengths of 0,75 – 1,5m, heel profile in lengths of 15-18 m and antivibration mats in dimensions of 2000x1000 mm, thickness 12-30 mm.

Specified parameters of a sample of a comprehensive system of rail noise reduction S49 – Intertech Plus

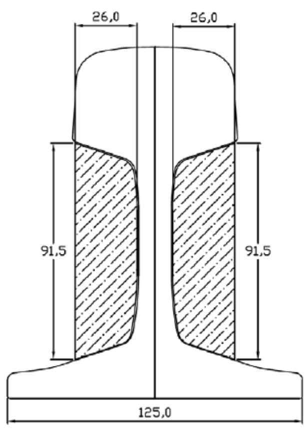
	Test result	Measurement uncertainty 1)
Bokovnice (material SBR)		
Density (kg.m⁻³)	1 043	9
Tensile strength (MPa)	1,29	0,15
Ductility (%)	62,0	3,5
Absorbency (%)	5,0	1,2
Resistance to low temperatures (°C)	-30	0,1
Electric resistance (MΩ)	52,0	11,4
Internal rezistivity ρ (ohm cm)	3,55E+09	--
Heel profile (material SBR)		
Hardness Sh A	69	0,1
Tensile strength (MPa)	12,1	0,5
Ductility (%)	420	27
Resistance to further rupture (MPa)	10	1,0
Electric resistance (MΩ)	0,80	-
Rail fixing insulating cover (material PP + 50% glass fiber)		
Density (g.cm⁻³)	1,33	0,1
Tensile strength (MPa)	118	1,3
Ductility (%)	2,4	0,2
Resistance to elevated temperature (°C)	240	-

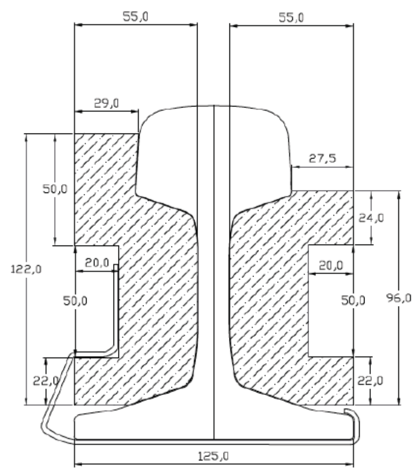
1) is expressed as the expanded measurement uncertainty for the expansion coefficient k = 2, which for a normal distribution corresponds to a coverage probability of about 95%.
The certificate was issued on the Test report AZL 1004 no: 412502645/02 issued on 14.10.2016

The certificate is only valid for the tested specimen of the product, the specification of which is detailed in the above mentioned test report, and confirms only the stated test results. This certificate does not replace the obligation of the manufacturer to carry out a conformity assessment in accordance with the applicable regulations governing the marketing of construction products in the country of intended use of the product.

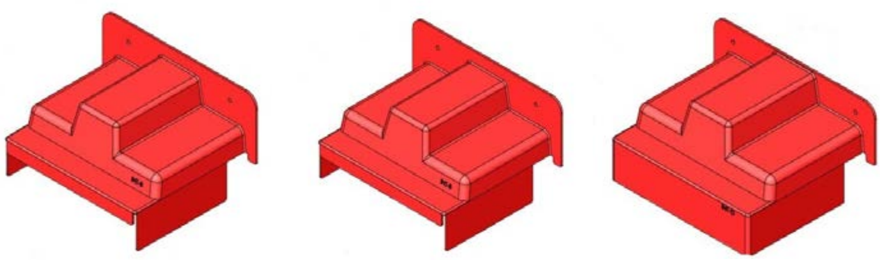
Issued in Zlín, dated: 17.8.2023
Valid until: 31.8.2025

Ing. Petra Hrdinová
Head of Accredited Testing Laboratory





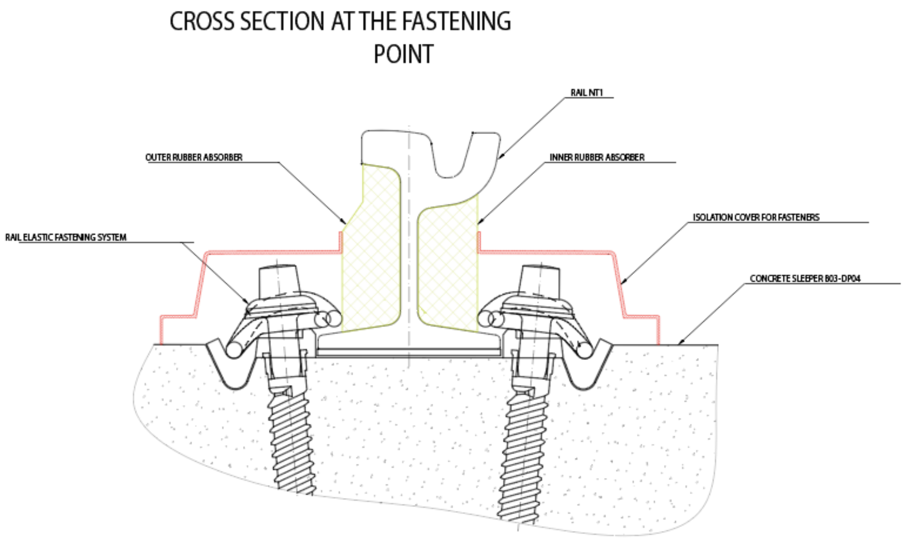
DIFFERENT VARIANTS OF INSULATING FASTENING COVERS

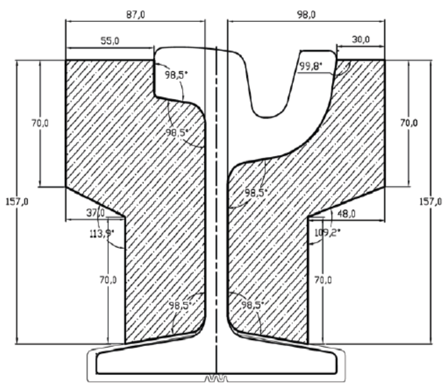


RAIL NOISE ABSORBER NT1

	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
Internal resistivity(ohm cm)	3,55E+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))	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%





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třída Tomáše Bati 299, Louky, 763 02 Zlín, Česká republika
Divize CSI - Centrum stavebního inženýrství, zkušební laboratoř

issues

CERTIFICATE
Of the characteristic
no.: 41560 0974-01

Applicant: INTERTECH PLUS s.r.o.
Blanenská 355/117, 664 34 Kuřim
VAT: 25597612

Product: Comprehensive rail noise reduction system NT1 – Intertech Plus

Manufacturer: INTERTECH PLUS s.r.o., Blanenská 355/117, 664 34 Kuřim

Product specification:
Rail noise reduction is solved by the CNR system using several elements: rail noise absorbers, heel profile, anti-vibration mats and automatic lubrication device. These elements can be individually modified and produced for different rail profiles. Rail absorbes of different profiles can be produced in lengths of 0,75 – 1,5m, heel profile in lengths of 15-18m and anti-vibration mats in dimensions of 2000 x 1000 mm, thickness 12-30 mm.

Specified parameters of a sample of a comprehensive system of rail noise reduction NT1 – Intertech Plus

	Test result	Measurement uncertainty 1)
Bokovnice (material SBR)		
Density ($kg.m^{-3}$)	1 043	9
Tensile strength (MPa)	1,29	0,15
Ductility(%)	62,0	3,5
Absorbency (%)	5,0	1,2
Resistance to low temperatures (°C)	-30	0,1
Electric resistance (MΩ)	52,0	11,4
Internal rezistivity ρ (ohm cm)	3,55E+09	---
Heel profile (material SBR)		
Hardness Sh A	69	0,1
Tensile strength (MPa)	12,1	0,5
Ductility (%)	420	27
Resistance to further rupture (MPa)	10	1,0
Electric resistance (MΩ)	0,80	-
Rail fixing insulating cover (material PP + 50% glass fiber)		
Density ($g.cm^{-3}$)	1,33	0,1
Tensile strength (MPa)	118	1,3
Ductility (%)	2,4	0,2
Resistance to elevated temperature (°C)	240	-

1) is expressed as the expanded measurement uncertainty for the expansion coefficient k = 2 which for a normal distribution corresponds to a coverage probability of about 95%.
The certificate was issued based on the Test report AZL 1004 no.. 41250264/01 issued on 14.10 2016.

The certificate is only valid for the tested specimen of the product, the specification of which is detailed in the above mentioned test report, and confirms only the stated test results. This certificate does not replace the obligation of the manufacturer to carry out a conformity assessment in accordance with the applicable regulations governing the marketing of construction products in the country of intended use of the product.

Issued in Zlín, dated: 17.8.2023
Valid until: 31.8.2025

Ing. Petra Hrdinová
Head of Accredited Testing Laboratory

Certificate

Systémové certifikace s.r.o., an accredited management systems certification body, No. 3209 of ČSN EN ISO/IEC 17021-1:2016, confirms that the company

INTERTECH
recycled rubber

INTERTECH PLUS s.r.o.
Blanenská 355/117, 664 34 Kuřim
place of business: Všechovická 22, 664 24 Drásov
company ID: 255 97 612

was checked and met the requirements for a quality control management system according to

ISO 9001:2015

for these fields:

Manufacturing and trade in area of recycled rubber

Registration certificate number: 906/2024/SC/Q
Validity of the certification: 24. 4. 2024 – 23. 4. 2027
Date of issue of the certificate: 24. 4. 2024

IAF S 3209

Ivana Čížková
Head of the certification body

Systémové certifikace s.r.o., Lipová 433, Svinov, 721 00 Ostrava
tel.: +420 722 231 115, e-mail: info@systemovecertifikace.cz, www.systemovecertifikace.cz

SC-BRF-EN-08-25

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

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