

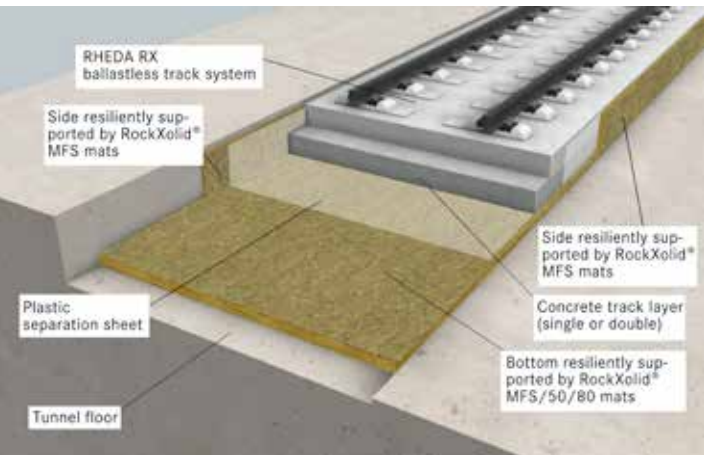
# ON SILENT FEET

RHEDA RX – UNIQUE PROTECTION  
FROM STRUCTURE-BORNE NOISE



# RHEDA RX – High efficiency mass-spring system

Mass rapid transit is one of the most essential enablers of modern individual mobility. Railtrack-implemented transport solutions are presently enjoying highly successful application in this context: in satisfying demands for high-performance infrastructure with advanced technologies and enhanced cost-effectiveness. For these challenges RAIL.ONE – together with RockDelta, part of the Rockwool Group – has developed a solution for mass transit systems that ensures an effective reduction of vibrations produced by passing metro trains. The new RHEDA RX system features full-contact RockXolid® resilient mats installed under the RHEDA track-support layer. These resilient mats, based on rock wool, are characterized by extremely long service life, simple installation and outstanding attenuation of vibration and structure-borne noise.



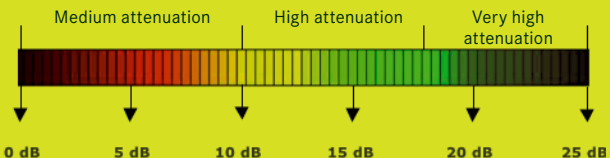
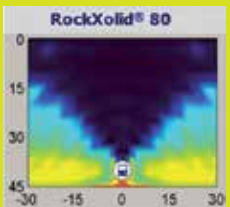
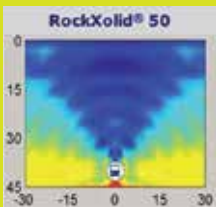
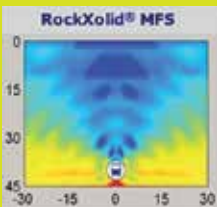
Track system principle: RHEDA RX mass-spring system with full-surface support based on RockXolid® technology

# Unique protection from structure-borne noise

RHEDA RX is a ballastless track designed as a mass-spring system with resilient support over its entire tunnel invert contact surface. This solution provides effective isolation against vibrations resulting from all types of passing trains. The system forms an effective mechanical filter in the track substructure – well below the track superstructure – which ensures outstanding insertion loss (IL) performance far beyond what is generally achievable with superstructure-based elasticity. The reason for this higher effectiveness is the greater mass above the resilient layer.

Final design of the system is always project-specific. Implementation includes consideration of a great number of vibration-relevant parameters, including the use of a highly advanced multi-degree-of-freedom (MDOF) dynamic track model that provides for a realistic prediction of IL at all critical frequencies: i.e., the degree of vibration isolation expected. Subsequently, the optimal combination of slab thickness and type of elastic mat can be defined.

Slab	Mat	Zero Crossing	IL @ 63 Hz
500	RockXolid® MFS	30 – 45 Hz	5 – 15 dB
500	RockXolid® 50	20 – 35 Hz	10 – 25 dB
500	RockXolid® 80	15 – 25 Hz	20 – 35 dB



## Solid as a rock

With the exception of the freely accessible rails and rail-fastening systems, no maintenance measures are required for RHEDA RX. This especially applies to the central component of the system: the full-contact stone-wool-based resilient mats installed between the concrete supporting layer and the tunnel invert. The resilient RockDelta mats demonstrate an outstanding degree of effectiveness and ultra-long service life. The resilient mats also allow the use of stiff – and therefore simpler – fastening systems from all leading manufacturers. This significantly reduces the loads placed on the fastenings and appreciably extends the service life cycle. Application of bi-block sleepers and proven top-down installation methods ensure extremely exact track geometry and thus help to ensure excellent riding comfort.

- The illustration shows a tunnel cross-section with generic rolling stock and soil data as well as three RHEDA RX track forms at a depth of 40 m from the at-grade level and at  $\pm 30$  m from the vertical track centre line.
- Based on IL predictions obtained via the Pipe-in-Pipe Model from the University of Cambridge, the colour scale denotes typical IL values as a function of the distance from the tunnel wall.

# Welcome to the future of urban transit

RHEDA RX effectively distributes and cushions the static and dynamic loads originating from all types of passing metro trains and uniquely mitigates undesirable structure-borne noise in nearby dwellings. All components of RHEDA RX can be recycled – which means that the system satisfies the expectations of ecological and, above all, sustainable passenger traffic of the 21st century.

- Ultra-high degree of vibration isolation at all critical frequencies
- Easy tuning of first trackform resonance
- No double resonance or amplification at higher frequencies
- IL independent of the type of rolling stock passing
- Great adaptability to all types of tunnel structures
- Constant high-precision track geometry
- Flexible and high-performance installation procedure





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