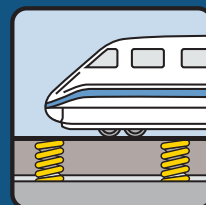


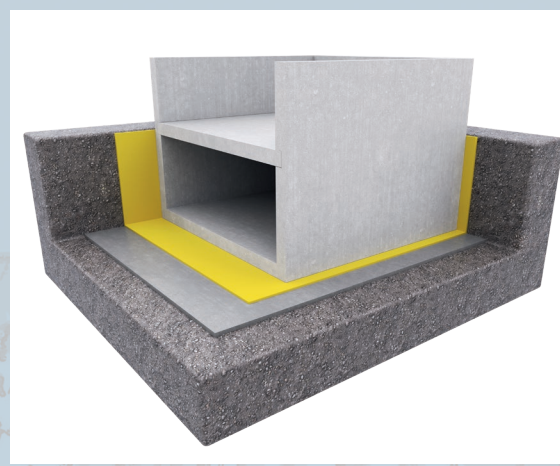
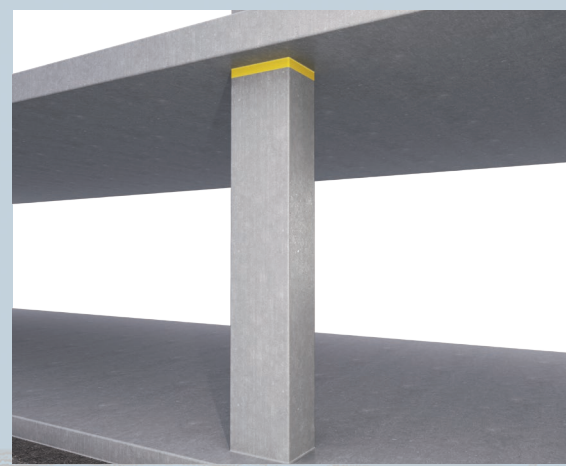
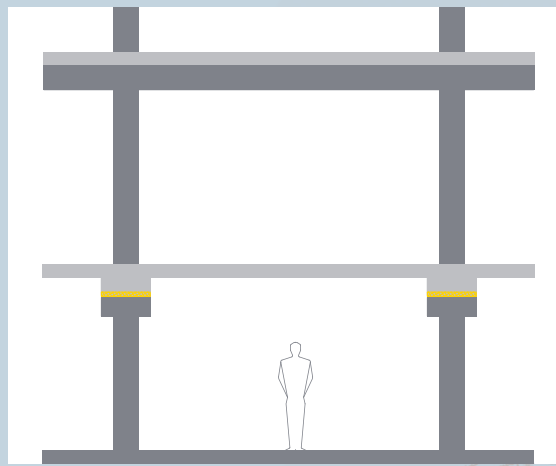
GERB

NOVODAMP®

**Closed-cell Polyurethane for
Building and Trackbed Isolation Systems**



Closed-cell Polyurethane Systems for the Isolation of Buildings & Trackbeds



+ BUILDINGS - BENEFITS

- + Low support frequencies
- + Adjustable to load variations
- + High efficiency in reduction of vibration
- + Suppression of structure-borne noise
- + Easy handling & installation
- + High vertical compression strength

CLOSED CELL POLYURETHANE
WATER, OIL, OZONE RESISTANT
HIGH RESISTANCE AGAINST CHEMICAL SUBSTANCES

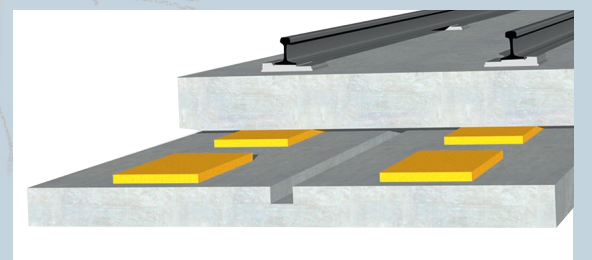
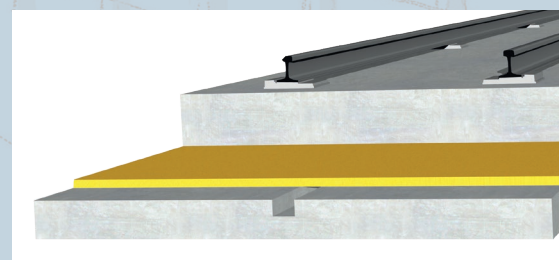
RESISTANT TO AGING
INTEGRATED AIR SPRINGS
HIGH ATTENUATION CAPACITY
VIBRATION CONTROL AND TRACK ELASTICITY
VARIOUS THICKNESSES AND SYSTEM FREQUENCIES
EASY ADAPTION TO DESIGN LOADS
GUARANTEED QUALITY AND PERFORMANCE

EASY INSTALLATION
COST-EFFECTIVE

PERMANENT HIGHLY ELASTIC SUPPORT OF BUILDINGS & TRACKBEDS

+ TRACKBEDS - BENEFITS

- + Efficient mitigation of structure-borne noise and vibration
- + Material thickness minimizes construction height
- + Low system frequencies
- + Easy installation
- + Constant mechanical properties over time
- + Low construction cost



NOVODAMP® - THE ELASTIC COMPONENT FOR EFFECTIVE VIBRATION CONTROL

NOVODAMP® is the latest innovation in elastic support of floating slab tracks (FST) and buildings of any size for stiffness modification and vibration isolation. Since 1908, GERB is committed to vibration control, pioneering the use of elastic materials, including springs, in applications worldwide.

GERB offers a variety of NOVODAMP® pads and mats with different sizes and characteristics to provide track elasticity and vibration control for a broad range of applications. GERB NOVODAMP® pads are held to stringent quality control standards to meet industry demands.

The research and development team performs static and dynamic tests per international standards. Project specific quality assurance (QA) programs can be certificated by independent institutes.

The characteristics of NOVODAMP® do not change over time, by temperature, static or transient loads.

MATERIAL DETAILS

+ Closed-cell polyurethane

+ Mats, strips and discrete pads

+ Low water absorption

+ High static load capacity up to 19 N/mm² (1,740 PSI)

+ Low level of dynamic stiffening

+ Limited mechanical loss factor

+ Non-relevant creep effects

+ High fatigue resistance

+ Resistant to aging & sustainable

+ Easy installation

+ Cost-effective

BUILDINGS

NOVODAMP® class B is developed for the vibration isolation of buildings. The NOVODAMP® systems are designed for a support frequency ≥8 Hz. Load capacity of the pads up to 12 N/mm² (1,740 PSI). For an individual lower adjustment other types with a specific load capacity could be applied.

Depending on the shape factor, thickness and elasticity the dynamic properties may be adjusted for the specific application.

TRACKBEDS

NOVODAMP® class T is designed for elastic support of trackbeds. The elasticity is especially designed for today's demanding track applications. The material can be used as discrete pads, strips or as a full surface support. Reasonable frequency ranges are starting from 8 Hz and above.

CHEMICAL RESISTANCE

NOVODAMP® is chemically resistant to typical track substances such as oil, lubricants, grease, water and concrete. Detailed information is presented in the chemical resistance sheet.

MATERIAL GUIDE - TECHNICAL FEATURES

The following overview shows the different products and their related field of application, system frequencies, static and peak loads. Detailed information is available on request.

Product	Application	Support Frequency [Hz]	Static Load Limit [N/mm2]
B1200 B600 B300	Vibration Isolation of Buildings	≥ 8	12.0 6.0 3.0
T150 T125 T100 T075 T060 T045 T035 T025 T018	Vibration Isolation of Trackbeds FST/Discrete Bearings Strips Stiffness Transition Zones	≥ 8	1.40 0.98 0.70 0.51 0.40 0.31 0.27 0.20 0.16
T010 T008	Vibration Isolation of Trackbeds Under Ballast Mats FST/Full Surface Mats	≥ 10	0.067 0.050

Other materials are available on request. All data may become subject to change.

DIMENSIONING METHODS

GERB specialists use their extensive experience to suggest suitable elastic support solutions for vibration isolation as required to meet mitigation demands.

Same design methodology applied to steel springs can be adapted to specific NOVODAMP® material properties and its non-linear elastic curves. For a better understanding, dimensioning methodology is derived from vibration control theory and elasticity laws.

CALCULATIONS

Based on general equation of motion:

$$m \cdot \ddot{x} + c \cdot \dot{x} + k \cdot x = 0$$

The natural frequency of an elastic system can be derived:

$$f = 15.76 \cdot \sqrt{\frac{E_{dyn}}{d \cdot \sigma}}$$

f

Natural frequency (H)

E_{dyn}

Dynamic elasticity modulus (N/mm²)

d

Thickness of NOVODAMP® support (mm)

σ

Specific load (N/mm²)

All range of calculations can be performed by our specialists on enquiry.

PHYSICAL PROPERTIES

Characteristics of the load deflection curve vary due to the product type and their application as a pad or as a mat. This should be considered in the design stage.

Standard curves according to code allowing for standardized sample dimensions are represented in the diagrams. Pads show an approximately linear deflection curve up to the recommended loading. Mats provide a partially digressive curve, which means they become softer first and later stiffer at a progressive stage. Different system frequencies can be achieved from this behavior of material elastic line. The material is generally not sensitive to peak loads, that means the mat or pad has minimal plastic deformation due to the integrated air springs. The compression set (similar to creep effect) is usually lower than 5 % thus exhibiting no permanent deformations over time.

MECHANICAL PROPERTIES

Dynamic Loading/Fatigue

All NOVODAMP® products are tested under dynamic loading. The recommended loading is presented in the data sheets. The compliance of the recommended loading ensures the proper function of pads and mats.

Mechanical Loss Factor

NOVODAMP® naturally provides integrated material damping. Mechanical work is transformed into heat by internal damping effects. The amount can be described by the mechanical loss factor which ranges between 0.05 and 0.12 for NOVODAMP®. The specific value for each class is presented in the data sheet.

Horizontal Stiffness

The horizontal stiffness is usually lower than the vertical stiffness. The ratio is usually up to 0.4 between shear (horizontal) stiffness and compression (vertical) stiffness.

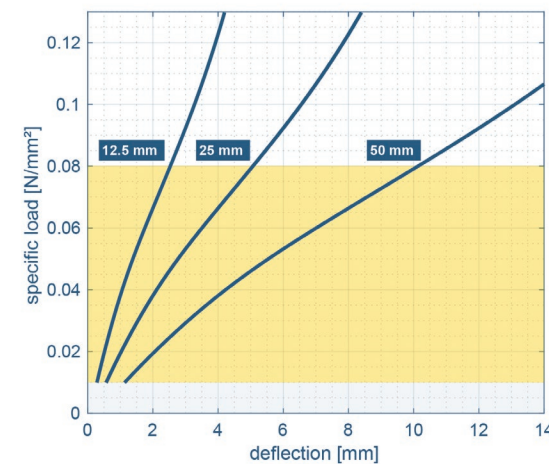
Temperature Stability Range

The NOVODAMP® material is designed to work within a temperature range from -25 °C to +55 °C (-13 °F to +131 °F).

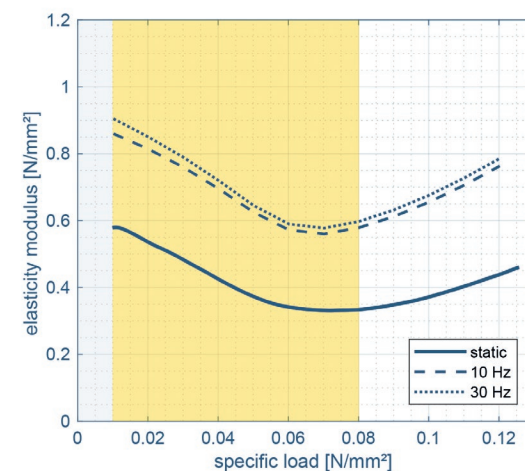
Shape Factor

The deflection under loading is influenced by the shape factor which describes the ratio of the loaded surface to

Mechanical properties are summarized in the Load/deflection characteristic curves of NOVODAMP® T008



The elasticity modulus E of NOVODAMP® T008



the perimeter surface. The greater the shape factor the stiffer the material. The shape factor varies from low density to compact. Therefore, for each product application a different shape factor yields a slightly different elastic curve. For this reason, our solutions are always project specific, resulting thus in a tailored elastic behavior depicted in the product data sheet and the quality assurance plan.

Flammability

NOVODAMP® meets the requirements according to DIN EN ISO 11925-2. This is categorized to class E (normal flammability). In the event of fire, no corrosive gases are generated.

APPLICATION AREA

Based on material standards efficient elastic solutions can be implemented for vibration isolation, the mitigation of structure-borne noise and smoothing of transition zones.

NOVODAMP® can be used under compression and shear in construction, railway tracks and industrial areas. Depending on the application, we supply discrete bearings or full surface solutions to attenuate vibrations and structure-borne noise. For high performance attenuation GERB can provide solutions with both steel springs and NOVODAMP® elastomeric materials. In the following please find an excerpt of application area in buildings and trackbeds.

+ APPLICATION AREA

BUILDINGS

- + Residential and office buildings
- + Historical buildings and monuments
- + Cultural facilities, e.g. theatres, concert halls
- + Hotels, hospitals, ...

TRACKBEDS

- + Subways/metro systems
- + Tramways
- + High speed railway tracks
- + Railway tracks for heavy haul trains
- + Transition zones

SERVICE & QUOTATION

We offer a wide range of NOVODAMP® products for application areas such as track elasticity control, track and building vibration and structure-borne noise attenuation. Our engineers support in dimensioning an appropriate solution for every application. Detailed installation procedures, instruction programs and on-site training for a subsequent installation can be provided. To assure a perfect installation and an optimal attenuation performance our scope of services includes the selection of a suitable product type and the definition of a proper elastic support system.

+ BUILDINGS

- + Source emission
- + Admissible noise and vibration level in building
- + Required natural frequency / predicted insertion loss
- + Loads
- + Soil parameters
- + Delivery time

+ SERVICES

- + Consultancy on a suitable attenuation
- + Layout of support system
- + Structural analysis and final design
- + Installation/training/supervising

After receiving an enquiry, we perform a technical evaluation, resulting in a project specific solution. Please find below basic data required for an engineered solution.

+ TRACKBEDS

- + Track alignment with track geometry
- + Rolling stock features such as axle load and distribution
- + Track cross section / tunnel clearance
- + Required natural frequency / predicted insertion loss
- + Delivery time

GERB

worldwide



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Certified: DIN EN ISO 9001 et al.

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Vibrations can be controlled
wherever they occur

Interested in detailed information or
individual consulting service?
Please contact us!