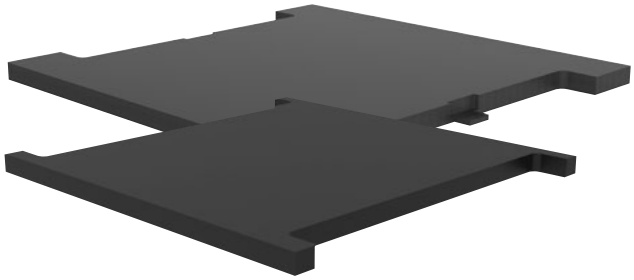
CALENBERG



The optimum elastomer solution for every railway track

ELASTIC

RAIL PADS AND BASE PLATE PADS

for high-speed traffic and conventional lines

A LISEGA Group Company

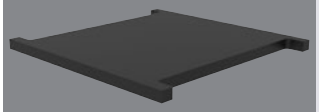
SECURELY AND EVENLY BEDDED

PROTECT TRACK BED STRUCTURES WITH CALENBERG

Our EPDM elastomers ensure high elasticity in track bed structures and protect the overall bed structure system thanks to the properties in the material.
This reduces maintenance and repair costs for our clients substantially.

RAIL PADS

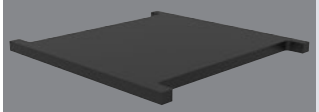
CHARACTERISTICS



Our rail pads and base plate pads reduce any vibrations and structureborne sound produced in modern track bed structures. The perfect emission protection for your projects.

- Excellent rebound elasticity (> 60 %) – immediately ready to absorb the following wheel
- Exceptional structure-borne sound dampening
- Minimal water absorption thanks closed cell structure
- Comparatively minor change in spring rate within the operation temperature range (-40 °C and +100 °C)
- Exceptional ageing and weather resistance
- Excellent UV and ozone stability (saturated molecular chain)
- Low frequency response between 1 Hz and 30 Hz – dynamic stiffening with stiffening factor of about 1.1
- Excellent resistance to hydrolysis – water, acids, road salts, detergents and aqueous solutions with alkali
- Rigidities between 5 and 200 kN/mm depending on the specific area of use
- Customised manufacture
- Complies with all relevant test criteria as specified in applicable standards

TEST RESULTS



DBS 918 235 / DIN EN 13481-2

- **Determination of fatigue strength in rail pads in W21 1000 rail fastening system.**

  Tested according to DIN EN 13146-4 (fatigue test), the change in vertical static support point stiffness according to DIN EN 13481-2 may be max. 25 %. According to a current system test of the W21 system with our EPDM products, the following is true the deformation after the fatigue test is 3.3%, i.e. there are no signs of fatigue.

- **Determination of static and dynamic rigidity and water absorptive capacity in rail pads.**
  According to [DBS 918 235] item 4.4, the permissible stiffening factor of the rail pads at test frequencies of 5, 10 and 20 Hz at room temperature may be max. 1.5. The stiffening factor of our Rail Pads is ≤ 1,1.

  The deviation from the static nominal value of the stiffness may be max. 15 % and the permissible stiffening factor of the Rail Pads at the test temperatures of +23°C and +50°C max. 1.5 and at a test temperature of -20°C max. 2.5. The stiffening factor of our Rail Pads is much lower at all specified test temperatures.

  The water absorption capacity of our EPDM elastomers is 0.36 g/dm^3

Rail Pads and Base Plate Pads

Reduce high stress loads with elastomers

When trains travel past, they cause vibrations and structure-borne sound due to the moved load, rough surfaces on wheels and rails, and local oscillations in the track assembly stability. In such cases, highfrequency impacts are primarily due to vehicle and track system interactions (discrepancies in wheel ovality, ripples, incorrect track positions, rail corrugations and similar) while low-frequency impacts are caused by wheelset loads, travel speed, and carriage, axle and bogie gaps.

This largely characterises the load on the overall system. Using highly elastic materials such as special microcellular EPDM, natural rubber and CR composite materials in vibration-optimised bed structure shapes can efficiently limit vibrations entering the sub-structure on a permanent basis.

Cost reduction and track bed structure protection using rail pads and base plate pads

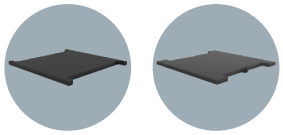
Our elastomer bearings for track fastening systems optimally meet the requirements of modern railway tracks on a permanent basis. Featuring our highly elastic elastomers made of microcellular EPDM and with a very wide spring rigidity range to minimise structure-borne sound from track vibrations, our products help to greatly reduce loads in track bed structures. This protects the overall track structure system, thus reducing our clients' costs for maintenance and repair immensely.

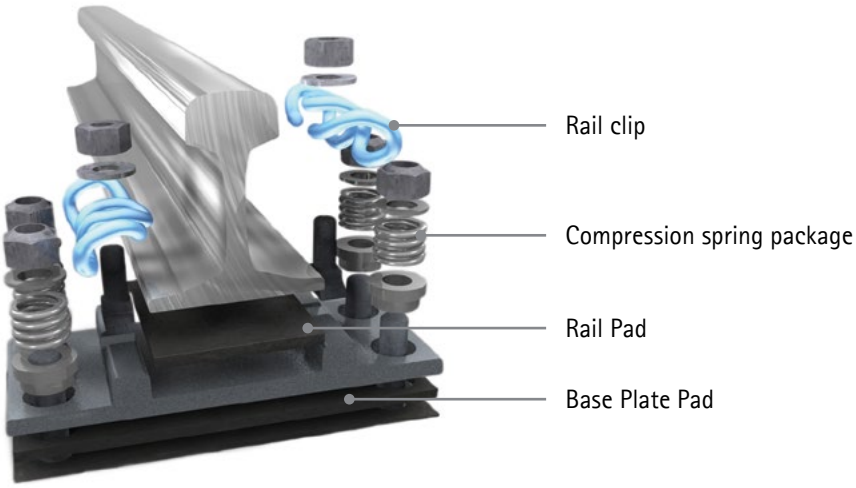
Installing elastic or highly elastic rail pads and base plate pads in special fastening systems makes use of the load transmission in rails. The acting forces are distributed across several support points in the triggered wheel load, so that the stress on the directly affected rail support point is greatly reduced.

Noise is also produced by factors such as friction resistance, uneven surfaces, ripples and rail corrugations and by the related vibrations caused by trains passing over. Noise is reduced to a minimum if the railway vehicle and railway lines are in good working order. Using elastic rail pads greatly reduces the impact of high-frequency vibrations transmitted into the ballast bed through the rail and sleeper. This counteracts shattering of ballast.

IMAGE

Possible elastic components a rail support point





Properties of microcellular EPDM elastomers

EPDM elastomers feature a saturated main polymer chain, which ensures high stability in the face of many chemical attacks. This explains the material's exceptional temperature, ageing and weathering behaviour and its outstanding resistance to polar media. It is possible to provide an adjustable spring rigidity defined according to the client's needs based on the foam level in the pore formation and the number of pores in a closed-cell foamed design. The vulcanisation film visible on the outside protects the highly elastic bearing against mechanical impacts on the surface.

Vibration and structure-borne sound dampening – High load capacity with matched elasticity – Long life cycle – Elastomers with a rigidity between 5–200 kN / mm, depending on area of use – High temperature resistance

Areas of use

Elastic **RAIL PADS** are installed directly beneath the rail base to protect the track bed structure and increase elasticity in ballast beds. Elastic EPDM rail pads can be manufactured in a variety of dimensions for different rigidities as per client requirements for different needs, ranging from metros and tramways through to high-speed traffic, thanks to their microcellular structures (c = 20–200 kN/mm).

The elasticity required for ballastless track systems is guaranteed by highly elastic **BASE PLATE PADS** and installed between the ribbed base plates and the supporting concrete slab with a spring rigidity of c = 5 - 60 kN/ mm. This ensures a load-spreading effect in the rails and greatly reduces any vibrations and structure-borne sound.

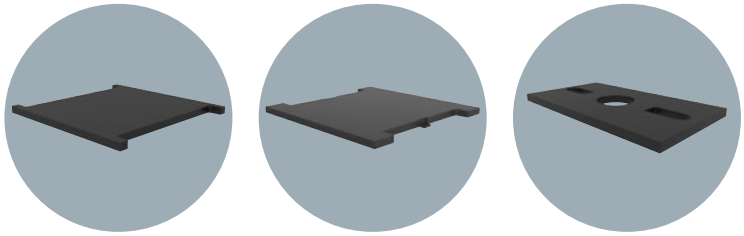
Our products are quickly and easily installed directly beneath the ribbed base plate. The support point manufacturer's instructions must be followed when doing so.

State-of-the-art in-house test equipment

The new 160 kN servo-hydraulic test machine can be used to perform static and dynamic tests on our EPDM elastomers between -40 °C and +100 °C as per EN 13146-9, EN 13481, DBS 918235:2017 and DIN 45673.

The test machine features a special thermal cabinet, meaning all relevant material properties can be reliably tested and documented. It is mandatory for us to arrange comparative measurements on a rotating basis with technical universities and testing institutions.

Extract from our client reference projects



ELASTIC RAIL PADS AND BASE PLATE PADS IN LOCAL PUBLIC TRANSPORT

- Doha Metro, Qatar
- The Hague Metro, Netherlands
- Moscow Metro, Russia
- Tampere, Finland
- Germany: Berlin, Cologne, Leipzig, Augsburg, Karlsruhe, Heidelberg, Hanover, Chemnitz, Mannheim, Dresden, Darmstadt and other locations.
- NÖVOG, Austria
- Busan Metro, South Korea

The Hague Metro, Netherlands

RAIL PADS AND BASE PLATE PADS IN THE HIGH-SPEED SECTOR AND ON CONVENTIONAL LINES

- Ulsan high-speed link, Pohang, South Korea
- Stuttgart 21, Germany
- German Kassel–Würzburg high-speed line, Germany
- Azerbaijan Railways, Azerbaijan
- Wonju-Jecheon Project, South Korea

Ulsan high-speed link, Pohang, South Korea

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