SEAL ABLE

pioneers in profiles



SEALABLE TRACKBED MATS

Structure-borne noise insulation for rail traffic



SEAL
ABLE
pioneers in profiles

Already during the planning of a new railway line, the future urban development along the tracks must be considered, because: „You made your bed, now sleep in it...“.

TRACKBED MATS COMFORTABLE TRAINS NEED A COMFORTABLE TRACK BED

SEALABLE's high-quality ballast mats for mainline, suburban, underground and urban railway lines effectively reduce operational vibrations and structure-borne noise emissions. For more than 50 years, these products have proven themselves in practical use without any complaints.

An experienced team of specialists from various fields developed the comprehensive system technology. Trackbed mats from SEALABLE therefore not only meet all the requirements of modern track systems, but can also be adapted to individual requirements and conditions. A coordinated range of accessories enables cost-effective installation.

Independent test institutes have examined the SEALABLE trackbed mats for their suitability. All types have been approved in accordance with DBS 918071 (formerly TL 918071) of DB AG for a wide range of applications - including high-speed lines. Certification as a Q1 supplier of DB AG with regard to performance, production and quality-related parameters has also been obtained. SEALABLE ballast mats are functional and durable capital goods that have gained worldwide acceptance. This internationally established image can be proven by the references for both the new construction and renovation of rail transport routes.

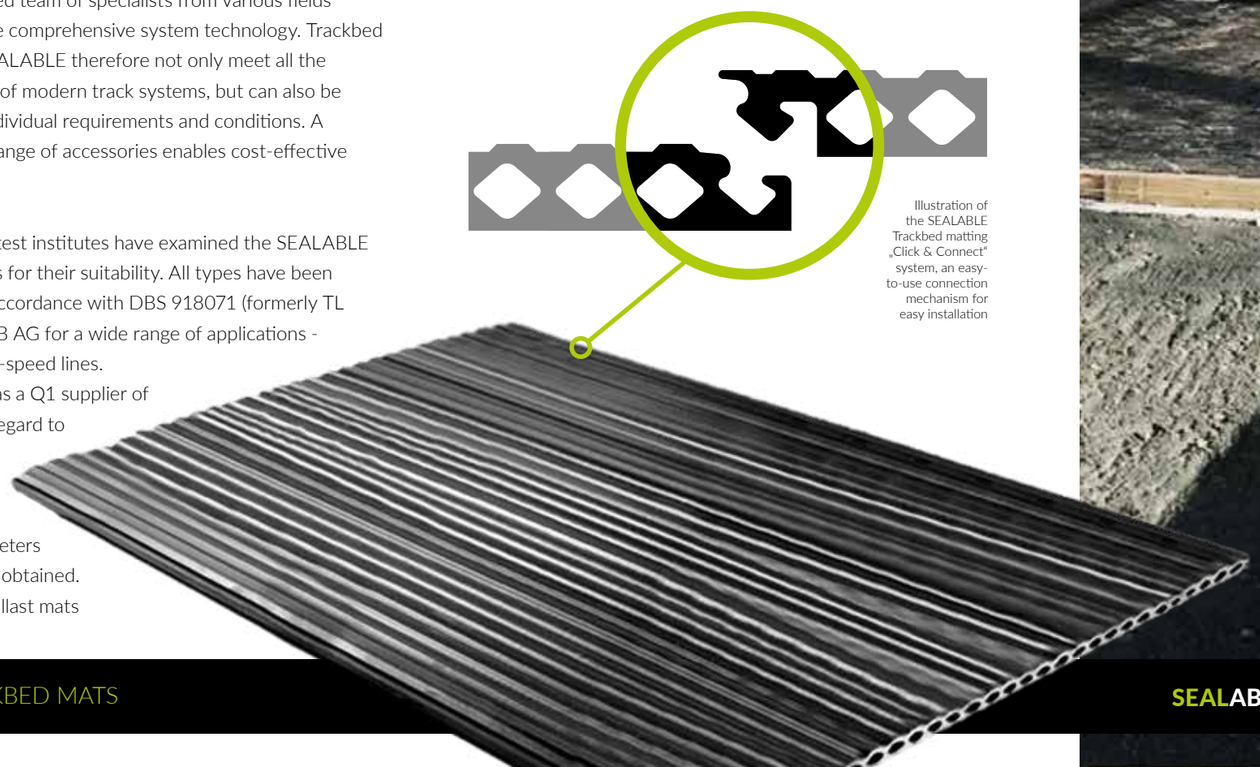


Illustration of the SEALABLE Trackbed matting „Click & Connect“ system, an easy-to-use connection mechanism for easy installation



WE ARE INNOVATION.
Together with you, we develop ideas up to product maturity and support you throughout the entire product life cycle.

WE ARE EXPERTS.
You benefit from established resources, structures, and know-how through a trusting customer relationship.

WE ARE REGIONAL-GLOBAL.
Regional roots combined with a world-wide network of long-term partners offer you reliable service on-site.





WHY OUR TRACKBED MATS?

With urbanisation, cities are growing and with them rail-bound traffic is moving ever closer to the built-up area. Vibrations can have a significant impact on the environment and greatly impact the quality of life. For sensitive installations and equipment, even the smallest vibrations can lead to a loss of quality. We specialise in developing effective solutions for vibration reduction.

Our ballast mats increase the stability of track layers and thus reduce ballast pressure. With sub ballast mats it is possible to introduce a lot of elasticity into the superstructure. This makes it possible to defuse critical transfer points between ballast and bridge supporting structure or tunnel floor. Even on heavily used tracks, this reduces the maintenance effort to a minimum.

The set-up of the base mats and the use of side mats can be individually adapted to local conditions and requirements.

SEALABLE offers elastic trackbed mats which, due to high-quality materials, make a significant contribution to the mitigation of structure-borne noise in daily railway operations. They retain their function in the long term, regardless of environmental influences such as frost or heavy soiling of the ballast bed.

TBM ADVANTAGES AT A GLANCE

1 TRACK POSITION STABILITY

The introduction of ballast mats into the superstructure results in positive changes, particularly in the horizontal track position stability.

2 REDUCTION OF VIBRATIONS & STRUCTURE-BORNE NOISE

With the reduction of structure-borne noise by our trackbed mats, the surrounding infrastructure is protected and thus the quality of life for the residents is improved. Adaptation to your individual requirements enables ideal insulation of the track.

3 TESTS AND CERTIFICATIONS

Tested according to DIN 45673-5 and DIN 45673-7 as well as EN 17282

Manufacturer-related product qualification according to Deutsche Bahn Standard DBS 918071 (formerly TL 918071)

Certification according to DIN EN ISO 9001 as well as DIN EN ISO 14001, DIN EN ISO 50001 and DIN EN ISO 45001

4 EASY HANDLING DURING ASSEMBLY

Simple „Click & Connect“ system for easy installation. Ballast mats do not have to be glued to the underground.

5 MAINTENANCE AND SERVICE

The ageing-resistant, high-quality elastomer material ensures a permanent reduction in ballast stress.

6 BALLAST PROTECTION

Increase of contact area between subgrade and ballast possible

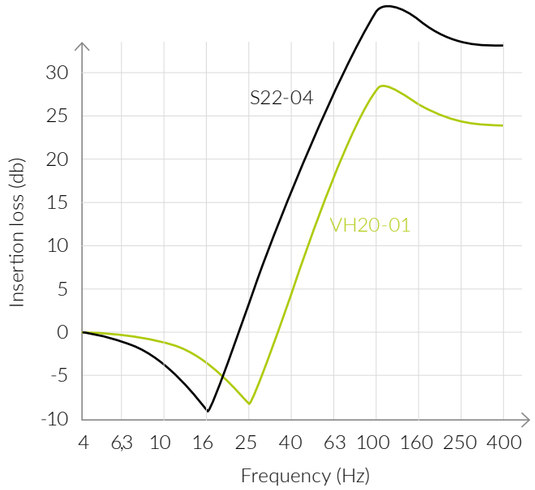
Sufficient elasticity to reduce the supporting point forces

STRUCTURE-BORNE NOISE

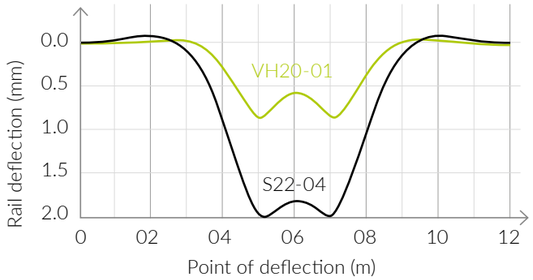
Structure-borne noise difference levels and insertion loss are the most important characteristics of the effectiveness of a ballast mat. Structure-borne noise levels are measured before and after. When determining the insertion loss and the structure-borne noise difference level, it is important that both are not only mathematically considering the trackbed mat itself. The subsoil, surroundings and measurement location must also be taken into account. Structure-borne noise problems may only be considered in the overall context - superstructure, substructure, adjacent buildings. Calculations are therefore only really meaningful in relation to the application. Only these results then lead to the correct selection of the optimum SEALABLE ballast mat. Various designs and special solutions for the superstructure allow a wide range of diversified requirements and/or customer wishes to be covered.

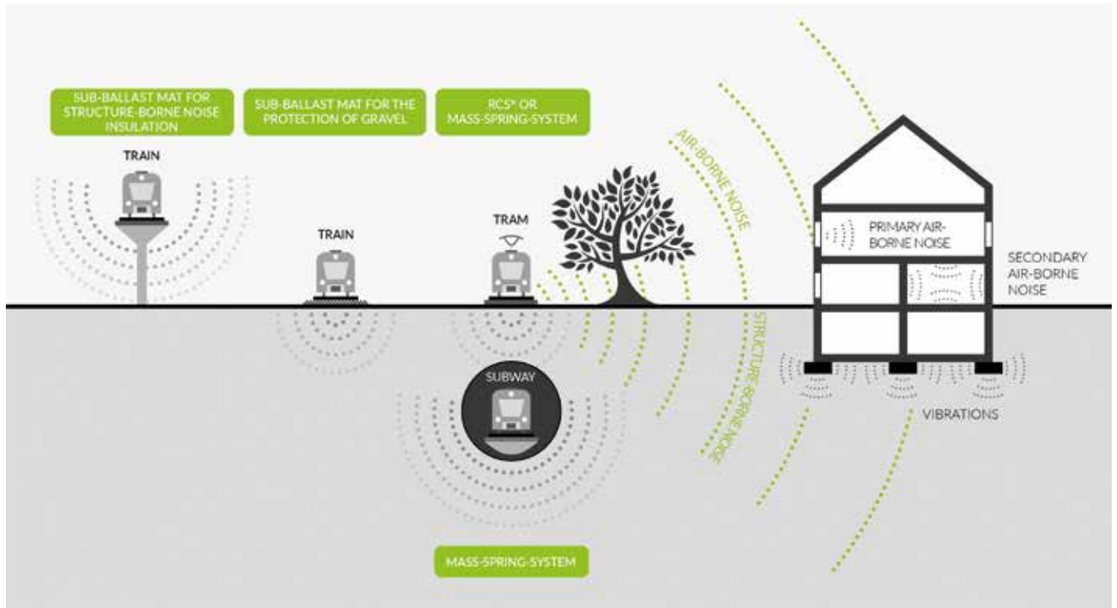
Rail deflection is an important calculation factor in addition to insertion insulation. The influence of the trackbed mat on the deformation affects the driving behaviour of the vehicles. The rail deformation can be calculated with the characteristic values of axle load, axle spacing and superstructure. The results prove that the maximum rail deflection recommended by the transport companies is complied with. The introduction of a ballast mat into the superstructure adds an elastic component to it. With the higher rail deflection, the load of the rail vehicle is distributed over a longer bending line and thus the load is shifted to more support points, i.e. the load-distributing effect of the rail is more strongly activated.

INSERTION LOSS



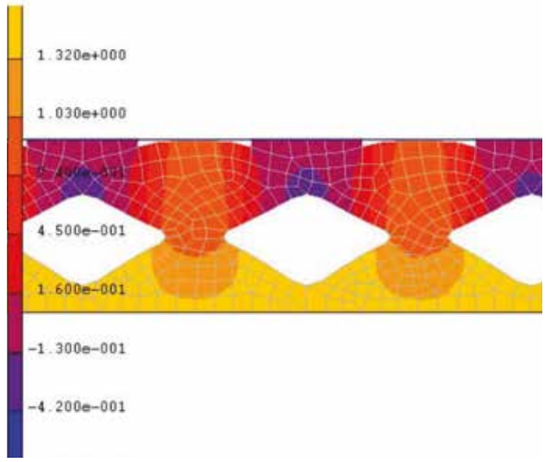
RAILDEFLECTION





FEM SIMULATION

With the help of FEM simulation, our products are constantly being further developed and optimised. This expertise enables a holistic approach that takes into account a wide range of influencing variables.
The finite element method is therefore extremely helpful in the development and optimisation of our trackbed mats. This type of simulation facilitates the combination of optimal insulation with optimal stiffness of the spring element introduced into the superstructure.
With SEALABLE ballast mats, it is thus possible to achieve a low fluctuation range of the structure-borne noise level as well as a uniform structure-borne noise level frequency spectrum during train crossings.



SPRING CURVE

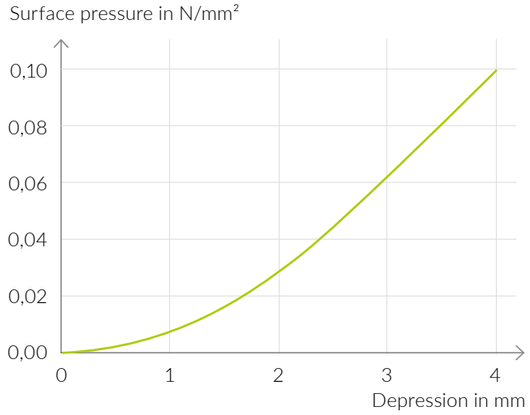
Static and dynamic spring curves are determined in an independent testing institute during the ballast mat approval process, for example in accordance with DBS 918071 (formerly TL 918071) of DB AG or DIN EN 17282. This test also includes the behaviour of the mats and their service life under ballast.

The static stiffness documents the spring behaviour under a single load (standing train). The evaluation is carried out according to DBS 918071, DIN 45673-5 or DIN EN 17282 as secant stiffness or according to DIN 45673-7 (Elastic elements in the superstructure of railways) at different preloads as tangent stiffness.

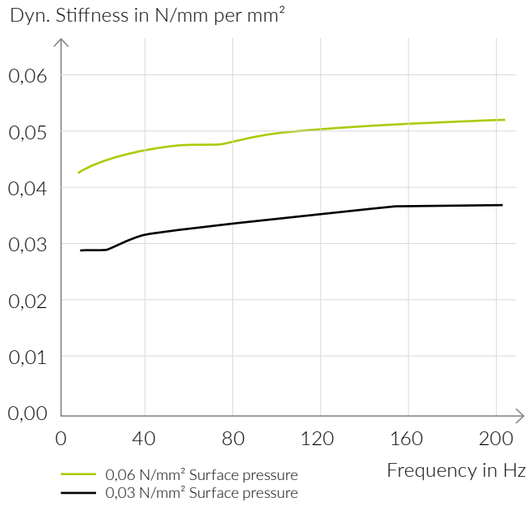
The dynamic stiffness shows during fast train passage, depending on the measuring method and frequency range, either the dynamic behaviour of the ballast mat in terms of ride comfort or in terms of vibration damping.
Therefore, when measuring the dynamic stiffness, the preload (underload and overload, if applicable), the amplitude and the frequency are varied.

With the values of this measurement, our SEALABLE engineers work out the optimal trackbed mat solution for each application.

STATIC SPRING CURVE



DYNAMIC SPRING CURVE









Weather-independent storage of the trackbed mats for fast processing on site

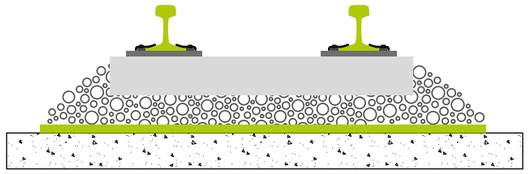
EASY HANDLING

The installation of SEALABLE trackbed mats is characterised by functionality and easy handling.

The rolls of mats, which are marked accordingly at the factory, are distributed and laid out at the destination according to the installation plan. Alternatively, the mats can be cut to size individually on site.
The special „Click & Connect“ system ensures ease of work and time savings. And: SEALABLE ballast mats do not necessarily have to be glued to the surface. The only prerequisite for easy installation is a well compacted ground surface.

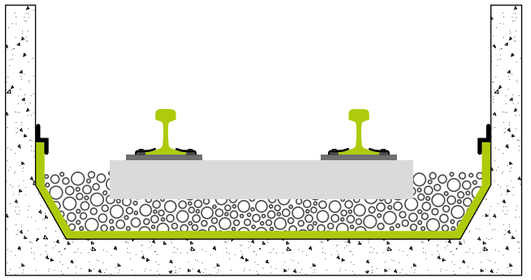
Another advantage is that the installation of the base mats and the use of side mats can be individually adapted to local conditions. Drainage devices can also be operated without any problems.

AREAS OF APPLICATION



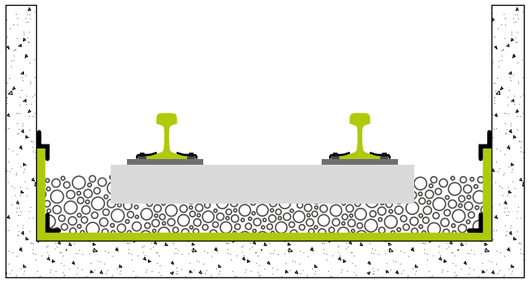
BALLAST SUPERSTRUCTURE

Acoustically effective trackbed mats underneath the ballast have other advantages in addition to reducing vibration emissions.
Due to the lower force stress on the ballast edges, the ballast stress is reduced and thus the long-term stability of the track system is increased.



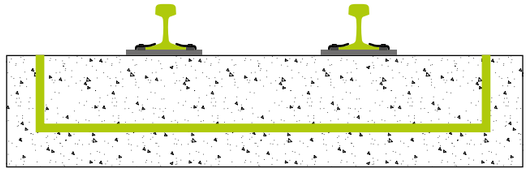
TUNNEL AREA

In the tunnel area, the trackbed mat serves to protect the ballast and extends the service life of the superstructure by reducing vibration emissions. In addition, buildings near tunnels are protected from vibrations and structure-borne noise.
Special fire protection regulations in tunnel construction are fulfilled by our ballast mat.



BRIDGES

In the bridge area, ballast mats also used to mitigate vibrations. On steel bridges, a ballast mat is necessary for the protection of the corrosion coating in addition to the reduction of sound radiation. On concrete bridges, a trackbed mat should always be installed to protect the ballast.
Thanks to the trackbed mats, the ballast height can be reduced and thus less weight presses on the bridge system.



MASS-SPRING SYSTEM

In a „light“ mass-spring system, trackbed mats are installed underneath the concrete. The installation of the elastic element increases the track elasticity and reduces the sound and vibration emissions considerably.

In addition to the mass-spring system, a rail bearing system (e.g. RCS®) can be installed to realise even better stray current insulation.

GEOMETRY	APPLICATION AREA	DESCRIPTION	AXLE LOAD t	v_{max} km/h	C_{stat} N/mm	THICKNESS mm	ELASTOMER	WIDTH
	Tramway	S 22-04/A	≤ 16	≤ 120	> 0,02	22	NK	625 ±15 mm
	Railway	S 22-02/A	≤ 25	≤ 120	> 0,03	22	NK	625 ±15 mm
	Railway	S 22-03	≤ 25	≤ 120	> 0,05	22	NK	625 ±15 mm
	Railway	VH 20-01	≤ 25	≤ 200	> 0,06	20	NK	625 ±15 mm
	Railway	VM 20-01	≤ 25	≤ 230	> 0,10	20	NK	625 ±15 mm
	Railway	VM 12-01	≤ 25	≤ 230	> 0,10	12	NK	650 ±15 mm

THE IDEAL MATERIALS

SEALABLE trackbed mats are manufactured using state-of-the-art technology with ageing-resistant, high-quality elastomer materials.

Performance-optimised natural and synthetic rubbers make it possible to use tried-and-tested material formulations to different requirements and delivery conditions, such as those of DB AG. These elastomer materials are also used successfully in other demanding areas such as structural and civil engineering, tunnel construction, hydraulic engineering and vehicle construction. Particularly noteworthy is the long-term behaviour, which ensures a consistently high level of effectiveness over decades.

ADVICE & SERVICE

We provide free of charge project-related prognosis calculations on the expected static and dynamic superstructure rail deflection, and structure-borne noise mitigation levels. In addition, we offer our customers the option of having an advisor on site to instruct the installation personnel in the case of an order.

Our Services:

- ✓ **Performance calculations**
- ✓ **Instruction of the installation personnel**
- ✓ **Project-specific advice**
- ✓ **Data sheets & installation instructions**

PLANNING ASSISTANCE

Here you can sketch your installation situation.

For a quick and smooth processing of your request, the following information is helpful:

- ✓ Dimensions of the place of use
- ✓ Environmental conditions (subsoil, bridge, tunnel, ...)
- ✓ Future use or traffic on the rails

For optimal preparation, feel free to sketch the installation situation on the adjacent template and add the above information.



REFERENCE PROJECT „NEUFAHRNER NORDKURVE“

The aim of this construction project was to improve the rail connection to Munich Airport and to add other rail line services beside the existing S-Bahn connection. Since 2017, the airport can be reached directly from north-eastern Bavaria and south-eastern Bavaria by regional transport. In addition, the new rail connection improved the S-Bahn frequency to and from the state capital Munich. An elementary component of this improvement was the new construction of the „Neufahrn Nordkurve“. With the new construction of the double-track, electrified „Neufahrn Nordkurve“, the lines „Munich - Regensburg“ and „Neufahrn - Munich Airport“ were connected via the two newly constructed branch points Neufahrn North and Neufahrn East.
For SEALABLE, this was the first DB project with the VM 12-01 sub ballast mat. We received the manufacturer-related product qualification for this mat type according to Deutsche Bahn standard DBS 918071 as Q1 supplier, so that we can also carry out future projects with railway operators.
The main task of ballast mats on concrete bridges is to prevent ballast abrasion in the load-bearing area of the sleepers and consequently to reduce the maintenance effort to a minimum. 2,342 m2 of mats were installed for this purpose.

REFERENCE PROJECTS MUNICH

„Stadtwerke München“ planned to renew the tracks of underground line 3 between the underground stops „Münchner Freiheit“ and „Scheidplatz“. Due to unacceptable vibration emissions in the neighbouring buildings of the tunnel line, the residents demanded the installation of a ballasted track with sub-ballast mat. The aim of using sub-ballast mats is to reduce vibration emissions in the neighbourhood.
I.B.U. GmbH has already carried out vibration measurements in the tunnel and inside selected buildings. Based on these measurement results, the required insertion insulation could be determined.

In 2016, in the course of the track renewal, the sound insulation in the aforementioned underground tunnel was carried out with our SEALABLE trackbed mats (type S 22-04). A total of 10,096 m^2 of track bed was equipped with them. Due to the individual lengths of the mats, it was possible to reduce the cutting to a minimum. Thanks to the ballast mats, vibration emissions could be significantly reduced and they also serve to protect the ballast. In order to comply with the fire protection regulation, an end profile is used to cover the ballast mats.

As a follow-up order, the switch system in „Implerstraße“ was upgraded with 2,350 m2 of trackbed mats in 2022.



More than fifty years of market experience provide the foundation for our range of high quality sealing solutions to meet every challenge in your project.

WE ARE EXPERTS IN THE FIELD OF PROFILES AND SEALING.

It all began more than 200 years ago with the production of fire hoses. Combined with product diversification, our expertise in elastomer profiles and know-how in processing various types of rubber have grown over the past 50 years.

Through various stations and ownership relationships starting with PHOENIX AG, ContiTech AG, later PHOENIX Dichtungstechnik GmbH and finally DÄTWYLER Sealing Technologies Deutschland GmbH, our organization developed into an internationally operating company.
In 2018 we received the Thuringian Innovation Award in the “Tradition & Future” category for our product “Bicycle safe track”, we also have 43 patents.

With the management buy-out in May 2020, SEALABLE Solutions GmbH now operates as a Thuringian company with a global network.

Our premise is not only global sales; above all, trusting and close contact with our customers and partners is our top priority. This means that our partnerships are sustainable and often include an entire product life cycle.

IHRE ANSPRECHPARTNER



Matthias Klug
matthias.klug@seal-able.com
Mobile: +49 151 146 488 42

Languages: ENG / GER
Managing Director



Robert Wörfel
robert.woerfel@seal-able.com
Mobile: +49 171 5324 301

Languages: ENG / GER
Product Manager



Tino Garbe
tino.garbe@seal-able.com
Mobile: +49 171 314 5754

Languages: ENG / GER
Product Development Manager

www.seal-able.com
You can find the contact persons for individual countries or regions on our website.

SEALABLE Solutions GmbH
Eisenacher Landstraße 70
99880 Waltershausen
Germany

Phone +49 3622 2076-100
info@seal-able.com
www.seal-able.com

Stay informed and get the latest product information and news in the area of tunnel construction, vibration isolation in railway construction and industry with one scan.