

# Installation Guideline

## Under Ballast Mats with 2 elastic layers

### 1. General Description

Getzner Under Ballast Mats (UBM) passed all serviceability tests in accordance with DIN 45673-5 (2010).

A few rules must be followed during installation in order to enable hassle-free installation and the highest possible performance.

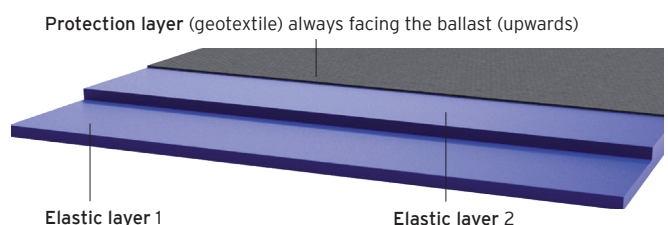


### 2. Transport and Storage

Getzner UBM corresponding to the type, their thickness and weight are delivered in rolls and therefore are very easy to handle. The side of the mats facing the ballast is protected by a geotextile. This geotextile has practically two functions - as a protective layer against ballast grain penetration of the spring layer as well as a load distribution layer throughout the load bearing area.

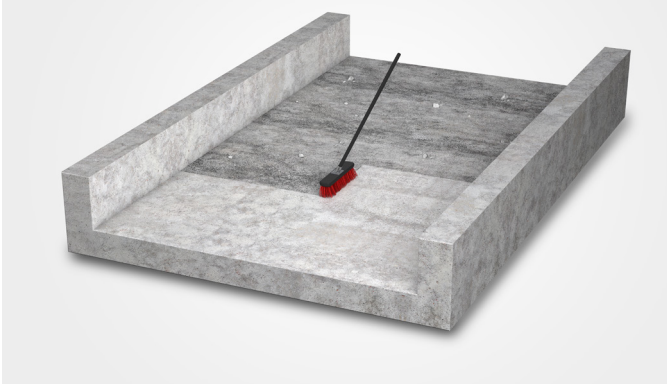
The UBM are delivered in a width of 1500 mm. The length of the mats usually meets the width of the track bed and is clarified with the client in advance. Getzner UBM for the highest demands on vibration mitigation are delivered with 2 elastic layers and the upper layer is equipped with the geotextile to protect the high elastic layers from the ballast. The same principle applies to Getzner sidewall mats usually mounted and glued on slanting and vertical/perpendicular surfaces. The standard length of the Getzner sidewall mats is 1500 mm, whilst the width depends on the ballast depth or banking and needs coordination with the client in advance.

To ensure fast installation Getzner ballast mats have to be kept dry and clean. The rolls must be stored upright. The adhesive has to be stored frost-free. Ballast mats have to be protected against strong ultraviolet radiation. Therefore the continuous direct exposure to sunlight has to be avoided.



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### 3. Installation

In general, the following applies: The installation is carried out according to the installation guideline respectively installation instructions. The guidelines of the railway operator must be followed.

#### 3.1 Preparation of the substructure

The substructure has to be free of dust, grease, frost-free and dry as well as free of depressions and sharp-edged elevations. Loose objects, e. g. grit, have to be removed.

#### 3.2 General procedure for multi-layer design

Multi-layer UBM can generally be handled the same as single-layer mats. Each layer should be installed and glued separately. The detailed procedure is described in chapter 3.4 and 3.5. To ensure optimum functionality, the lower and upper layer are installed with an offset of minimum 100 mm. For practical reasons, an offset of 1/2 mat width (approx. 75 cm) is recommended.

#### 3.3 Placing of UBM

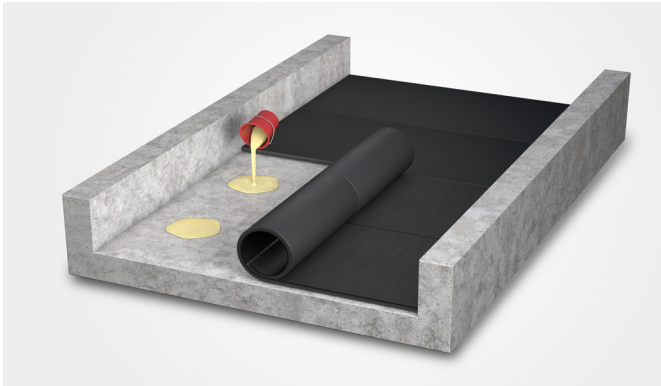
The first layer of UBM (without geotextile) should be placed followed by the second layer (with geotextile).

The geotextile protection layer of the mats represents the surface. According to the installation plan, the UBM are unrolled transversely to the track axis in order to avoid joints under or parallel to the rail. When exposed to extreme temperatures and differences in temperature, the UBM should at first be unrolled, placed in position and left to settle for a few hours before gluing. This allows the material to recover from compression. Changes in length of the mats due to temperature are a physical process and are completely reversible. If necessary, these can be compensated by either pulling or cutting.

In the case of very tight curves (and thus large angular deviations), the mats can be adjusted on site by cutting the long side in a wedge shape.

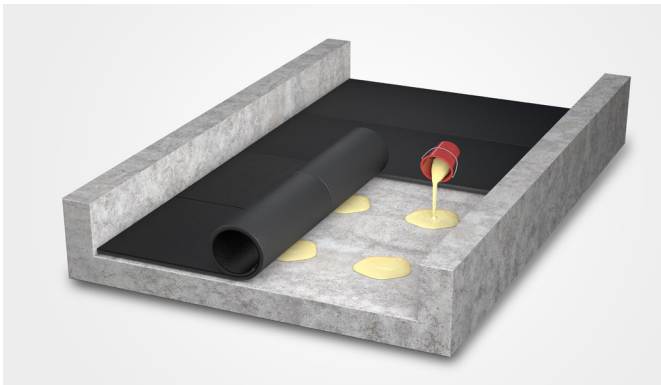
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### 3.4 Adhesion to the substructure

To avoid displacement during ballasting, the mats have to be glued to the substructure - if required by the infrastructure operator in accordance with the installation instructions. Ideally a two-component solvent-free polyurethane adhesive (approx. 0.4 kg/m<sup>2</sup> USM) is used. A suitable adhesive can be supplied directly by Getzner Werkstoffe. The surface temperature should be at least +5 °C at the time of gluing.



The pot life depends on the amount and temperature of the mixture (adhesive + hardener). Please refer to the manufacturer's data sheet regarding the processing temperature and curing time of the adhesive.

The adhesive is applied in dots in order to enable proper drainage underneath the UBM. Firstly one half of the UBM is folded from one sidewall to the other one in order to apply the glue. Immediately afterwards, the mat is folded back again. After this half is glued, the same steps are repeated for the other half.



### 3.5 Connection of UBM / sealing of joints

The mats are connected with approx. 9 cm wide geotextile strips, which are supplied by Getzner Werkstoffe. These strips are either fixed with a hot air welding machine (Getzner Weld-Jet) or glued with UBM adhesive. Thus, the butt joints are covered completely. Please refer to the operating instructions for the Getzner Weld-Jet.

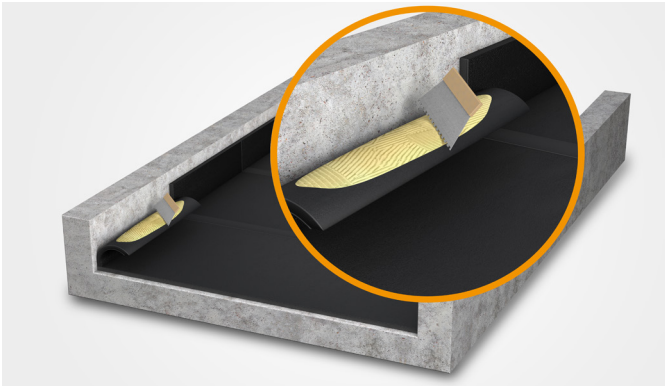
To illustrate this, the geotextile strips on the left are coloured in orange.

It must be ensured that after completing this section of the installation the sealed mat joints are visually checked again.



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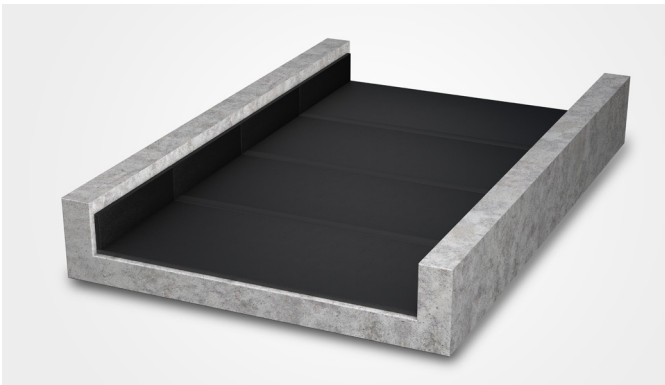


### 3.6 Installation of side mats

The side mats are fully glued to the vertical parts of the structure. A two-component polyurethane adhesive or a two-component bitumen compound (solvent-free, cement-bound) is recommended. The adhesive requirement is approx. 1.0 kg/m<sup>2</sup> side mat.

Butt joints of side mats are not sealed with geotextile strips.

Optionally, the side mats can be fastened with a Z-profile. For applications on the open track, due to fluctuations in the ambient temperature or solar radiation, a distance of approx. 33 cm between the fastening points of the Z-profiles should be considered. For applications with constant ambient temperature and without direct sunlight, such as in tunnels, a correspondingly larger distance between the fastening points can be considered (e. g. one fastening point per linear metre).



### 3.7 Supply of ballast

Ballasting should be carried out as soon as possible after welding the butt joints and attaching the side mats (at the end of the shift at the latest).

Provided they are glued to the substructure and the adhesive has cured, Getzner UBM may be driven over at walking speed by rubber-tyred vehicles. Construction machines with crawlers are not permitted.

Sudden breaking, acceleration and strong steering must be avoided.



### 3.8 Continuation of works

After the UBM is consistently covered with at least 20 cm of ballast, all further superstructure work can be carried out - even using heavy machinery.



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### 4. Recycling

Unused UBM or pieces thereof (off-cuts) can be disposed of for recycling via standard plastic waste containers.

All our materials are non-hazardous to the environment.

### 5. Disclaimer

This guideline only serves to support the customer or his authorised specialist in the installation of Getzner UBM. Getzner Werkstoffe draws the attention to known demands and problems. This guideline was compiled with the utmost care based on Getzner's current knowledge.

Due to the large number of different construction designs and requirements, Getzner Werkstoffe accepts no liability for the completeness of the installation guideline. In particular, Getzner Werkstoffe is not responsible for the proper installation of Getzner UBM and the resulting negative effects on the condition / quality of Getzner UBM or its performance. It is recommended that the installation is carried out by a specialist.

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