

USM 4015

Sub-ballast mat for track bed structures | Special design for heavy haul transport

Application

This specially designed USM model with its unique shape comprises synthetic and natural rubber and has been tested for use with axle loads up to 35 t in this design with its rigidity. As with other USM models, this mat reduces vibration emissions from railway traffic effectively. When used for heavy freight traffic, the USM 4015 is also suitable for ensuring elasticity and ballasted track position stability, especially if solutions with surface drainage are required beneath the mat. With its greater rigidity, this model is also used as a transition mat to adjust the rigidity of varied adjacent track sections.

Description

Manufactured from premium rubber blends, the USM 4015 comprises a fabric-reinforced elastomer panel which features lens-shaped spring elements on its lower surface. Permanently weather-resistant, the mat can withstand high mechanical loads and absorbs virtually no water. It excels thanks to its high electrical insulation resistance and provides drainage on the mat level.


Installation

As a general rule, the USM 4015 is laid crosswise to the track axis. The required mat sections are cut to the necessary size on site. When used in concrete troughs, there is no need to lay the base and side mats separately. Instead, a special wedge is used to form the transition to the side walls (verges). The mat panels are laid loosely on the subsurface, with the vulcanized overlap strips covering the mat joints. The individual mat panels can be joined together with the overlap strips and, if necessary, additional fasteners. If required, the mat panels in the joint overlap area can be bonded together to make them water-tight.

Product information

MATERIAL CONSTANTS			SPECIFICATION	
Requirement	Cover layer	Natural rubber insulating layer	Recommended area of use in ballasted track	
Tear resistance (DIN 53504)	≥ 10 Mpa	≥ 20 MPa	Speed	> 200 km/h
Elongation at break (DIN 53504)	≥ 350%	≥ 450%	Axle load	≤ 350 kN
Resistance to further tearing (ISO 34-1:A)	≥ 5 N/mm	≥ 6 N/mm	Dimensions and weight	Values
Compression set (ISO 815-1)	≤ 30%	≤ 25%	Length max. [m]	≈ 200
After artificial ageing, 168 h at 70 °C (DIN 53508)			Width [mm]	≈ 1554
Tear resistance	-	≥ 17 MPa	Thickness [mm]	≈ 14
Elongation at break	-	≥ 350%	Weight [kg/m ²]	≈ 12.5

EN 17282 USM 4015 UP TO 35 T AXLE LOAD TRACK CATEGORY TC 4 SPECIAL CASE		
Static bedding modulus C_{stat}	Load range 0.02 - 0.164 N/mm ²	0.094 ± 15% N/mm ³
Dynamic bedding modulus C_{dyn} (evaluation range 0.02 - 0.164 N/mm ²)	5 Hz	0.117 ± 15% N/mm ³
	10 Hz	0.125 ± 15% N/mm ³
	20 Hz	0.129 ± 15% N/mm ³



Tested at: Technical University of Munich and Federal Institute for Materials Research and Testing (BAM) Berlin. Test reports are available on request.

The contents of this publication are the result of many years' research and experience gained in application technology. All information and instructions are based on the best knowledge available to us; they do not represent a warranty of suitability for particular tasks nor do they exempt the user from conducting their own checks, including verifying third-party property rights. No liability whatsoever will be accepted for damage arising from advice given in this publication, regardless of its nature and its legal basis. We reserve the right to make technical modifications in the course of product development.

© Copyright - Calenberg Ingenieure GmbH - 2024