

1. Application Sector

DAMTEC® SBM K 10 is an isolation and protection mat for railway track constructions, proofed in accordance to DIN 45673-5 - mechanical vibrations – resilient element used in railway tracks – part 5: laboratory test procedures for under ballast mats.

Regarding the technical information of DB Netz AG the typical application for thickness 10mm is approved for main line railway with axle loads less than 25 tons and speeds higher than 200 km/h.

Higher axle loads up to 40 tons are suitable if speed is below 80 km/h. Other speeds have to be clarified if the material pressure on the UBM will be higher than 0.30 N/mm².

The sub ballast mat K mat absorbs vibrations and reduces acoustic emission as well as structure borne sound transmission. It is also effective in reducing the frequency of the ballast maintenance requirement through reduced vibration and better-balanced loading. It protects construction and waterproofing.



The quality capability of the manufacturer's product range „Under Ballast Mats“ were classified as Q1 by Deutsche Bahn AG.

2. Approval

The user releasing as a controlled design of the under ballast mat **DAMTEC® SBM K 10** for ballasted track was approved by DB Netz AG from superstructure technical point of view under the TM-titel 4-2015-10511 I.NPF 1 to Ril 804,820,824.

3. Material

Special mixture of PU foam and high-quality rubber granulates with a PU elastomer bonding agent.

4. Appearance

colour: multi coloured
surface: granular texture

5. Dimensions/Tolerances

width:	1,250 mm	± 1.5 %
length:	6,000 mm	± 1.5 %
thickness:	10 mm	± 1.0 mm
area weight:	6 - 7 kg/m ²	

(slabs and other lengths are possible on request for special projects)

6. Aptitude Test

Test in accordance to E DIN 45673-5 (DBS 918071) at Technical University Munich, Technical University Dresden and at Müller BBM in Planegg.

7. Installation

The installation has to be in accordance to installation instructions **DAMTEC® SBM K**. Note that with application and installation for DB AG (German Railway) guidelines for sub ballast mats, „Unterschottermatten einbauen“ (824.1510), have to be observed. For structure borne noise insulation and isolation of secondary airborne noise an adhesion is not necessary.

8. Test Data

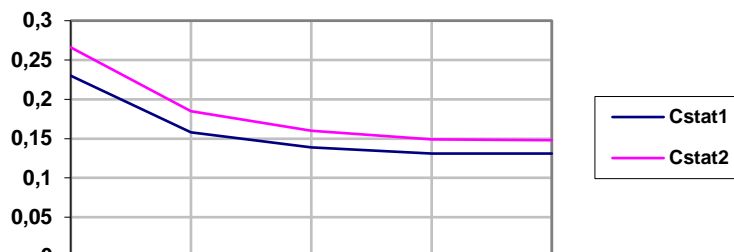
tensile strength:	0.15 – 0.55 N/mm ²	(ISO 1798)
elongation at break:	40 - 70 %	(ISO 1798)
burning behaviour:	E _{fl}	(EN 13501-1)
thermal resistance:	- 30°C to + 80°C	
chemical resistance:	conditionally resistant to acids and bases	
environmental resistance:	oil-, aging-, rot-resistant and water-resistant	
static bedding modulus (C _{stat1}):	= 0.12 N/mm ³	± 0.02 N/mm ³
static bedding modulus (C _{stat2}):	< 0.149 N/mm ³	

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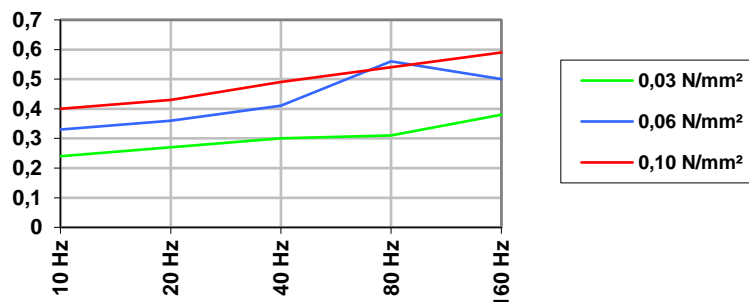
influence of temperature on C_{stat} :



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dynamic bedding modulus (C_{dyn1}): 0.189 N/mm³ to 0.256 N/mm³
(depends on material thickness, load and frequency)
(at -20°C) $C_{dyn1}(10\text{Hz}) = 0.674 \text{ N/mm}^3$
(at -10°C) $C_{dyn1}(10\text{Hz}) = 0.403 \text{ N/mm}^3$
(at ±0°C) $C_{dyn1}(10\text{Hz}) = 0.301 \text{ N/mm}^3$
(at +30°C) $C_{dyn1}(10\text{Hz}) = 0.219 \text{ N/mm}^3$

dynamic bedding modulus (C_{dyn2}):



[no difference within the results for $L_v = 100\text{dB}$ and $L_v = 90\text{dB}$]

horizontal static modulus (G_{stat}): 0.042 N/mm³
horizontal deflection: $s = 0.13\text{mm} < 0.4\text{mm}$
mechanical fatigue strength: Load phase 1 – $F_o/F_u = 75/10\text{kN}$ – 10 million load changes
Load phase 2 – $F_o/F_u = 100/10\text{kN}$ – 2.5 million load changes

[After 12.5 Mio. load changes **DAMTEC® sub ballast mat K** slightly impressions due to the contact with the ballast. Not any cracks and perforations could be detected with the naked eye.]

(before load phase 1) $C_{stat1} = 0.099N/mm^3$ $C_{stat2} = 0.123N/mm^3$
 (after load phase 1) $C_{stat1} = 0.093N/mm^3$ $C_{stat2} = 0.121N/mm^3$ - 6.1%
 (before load phase 2) $C_{stat1} = 0.093N/mm^3$ $C_{stat2} = 0.121N/mm^3$
 (after load phase 2) $C_{stat1} = 0.091N/mm^3$ $C_{stat2} = 0.119N/mm^3$ - 8.1%

water / frost resistance: -20 % for dynamic stiffness
 resistance for aging: change of static stiffness +6% at 23°C
 change of static stiffness +7% at -20°C
 change of weight -0,16%
 resistance to oil: After 7 days in mineral oil:
 tensile strength: average 0.31N/mm²
 elongation at break: average 43.16%
 frost / thaw resistance: (before test) $C_{dyn1} (5Hz) = 0.213N/mm^3$
 $C_{dyn1}(30Hz) = 0.252N/mm^3$
 (after three changes) $C_{dyn1} (5Hz) = 0.165N/mm^3$
 $C_{dyn1}(30Hz) = 0.200N/mm^3$

static stiffness for different load ranges:

max. load [N/mm ²]	secant modulus		C_{stat1} [N/mm ³]	secant modulus		C_{stat2} [N/mm ³]
	[N/mm ²]	[N/mm ²]		[N/mm ²]	[N/mm ²]	
0.15	0.02	0.06	0.12	0.02	0.12	0.14
0.20	0.02	0.08	0.12	0.02	0.16	0.14
0.25	0.02	0.10	0.12	0.02	0.20	0.14
0.35	0.02	0.14	0.12	0.02	0.28	0.14

9. Accessories if necessary

- adhesives for horizontal areas: Körapur 672 / Köracur TH 650
- adhesives for vertical area: Körapur 666 / Köracur TH 650
- adhesive tape: Gerband 613
- geotextile

DISCLAIMER:

This information is based on our tests and experiences and is provided to the best of our knowledge and beliefs. However, KRAIBURG RELASTEC does not guarantee in each individual case the use and processing results of its DAMTEC® products, due to the huge number of various fields of application as well as storage, processing or construction conditions which are beyond our control. Own tests are to be conducted. Please contact our technical customer service for any further advice.

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