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Bearbeiter:  
Dipl.-Ing. P. Huth, OBR

Test-certificate. 44-00-1519/Hu/vGr

from 27.08.2001

subject.:                    **Testing of a Bitumen-waterproofing system, cold sprayed with  
coagulating agent**

order from 10.12.2000    by Fax /Haviv

delivered samples:        **FLEXIGUM-coating specimens**

type, given:                Latex-modified bituminous emulsion, ready sprayed

date of delivering:        23.11.2000

weight/size of samples:  10 coating prepared specimens about 40 x 40 cm, about 3 to 7 mm thick

### 1. Applications for testing

Sample testing in accordance with the AIB of German railway company and DIN 18195, part 2.

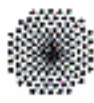
Remarks: -

Dieser Bericht umfaßt 3 Textseiten und 1 Beilagensseite, die letzte Textseite und die Beilagensseite sind mit unserem Dienstsiegel versehen.

DIE UNTERSUCHTEN PROBEN WERDEN OHNE ABSPRACHE NICHT AUFBEWAHRT.

Die Vervielfältigung und Veröffentlichung des Prüfungsberichtes sowohl in vollem als auch in gekürztem Wortlaut sowie die Verwendung zur Werbung ist nur mit unserer schriftlichen Genehmigung und nur innerhalb eines Zeitraumes von 2 Jahren nach der Ausstellung zulässig.

Gerichtsstand und Erfüllungsort: Stuttgart



## 2. Applied test methods and specifications

The delivered material of a latex-modified bituminous-waterproofing emulsion, cold sprayed, named

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was tested in its properties after the test methods and specifications of the following German standards or technical references/regulations:

#### 2.1 DB 835.9101

„Hinweise für die Abdichtung von Ingenieurbauwerken (AIB)“ der Deutschen Bahn, Anhang III, Ausgabe 9.99

- Technical references for waterproofing systems in civil engineering (AIB) of German railway-company, annex III, issue 9.99.

#### 2.2 DIN 18195-TO2

„Bauwerksabdichtungen, Stoffe“, Ausgabe 1983, Tabelle 3.5, Zeile Nr. 2 und Ausgabe 2000, Tabelle 9

- „Waterproofing of buildings, materials“, issue 1983, table 3.5, line No 2 and issue 2000, table 9.

#### 2.3 ASTM-D 412

Tensile Testing of Vulcanized Rubber

## 3. Performance of testing

The delivered coating prepared specimens were tested in their properties according to the given test methods named in chapter 2 of this certificate especially in the characteristics for trowel grade materials according to DIN 18195, part 2, and the AIB, because there are no German normative regulations for sprayed coated bituminous materials for water proofing systems.

## 4. Evaluation of the test results

The samples of the delivered bitumen-waterproofing emulsion, cold sprayed, named

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characterize a material, which meets the requirements of the specification in the AIB of the German Railway company (DB) and in DIN 18195, part 2 in the tested properties.



The material shows a high heat-resistance (+ 100°C) and better cold flexibility (- 15°C) than required in AIB. In testing of watertightness the conditions of AIB include the simulation of porous wallgrounds and crackbridging effects. In this testing manner the material in layers of 4,5 mm thickness resists under water pressure of 2,0 bar over 48 hours watertight according to the requirement.

Additional the tensile properties-testing meet a high elongation rate at low tensile strength and more than 80 % of recovery.

Section 44: Isolation, Bitumen- and Asphalttechnology

*Zatlouka*  *Huth*  
Analyst G. Zatlouka Head of section Dipl.-Ing. P. Huth, OBR



**Testing subject: FLEXIGUM- Latex modified bituminous emulsion, cold sprayed with coagulating agent in two nozzles spray-gum**

Titel of tested property	Tested sample	AIB 9.99 Annex III Column 5	DIN 18195-2 Issue 8.83, table 3.5 line No 2	DIN 18195-2 Issue 8.00, table 9
	<b>Test results</b>	<b>Bitumen-emulsion trowel grade, cold applied</b>		
<b>1. Characteristics</b>				
1.1 <u>Perceptible properties</u>	sprayed with coagulating agent through two nozzles in a spray-gun	trowel grade	-	-
1.2 <u>Softening point R.a.B (solid body waterfree)</u> °C	> 145	≥ 90	≥ 90	-
1.3 <u>Penetration at + 25°C</u>				
1.3.1 Needle-Penetration 0,1 mm	55	-	-	-
1.3.2 Cone-Penetration 0,1 mm	45	-	-	-
1.4 <u>Heat resistance</u> °C	+ 100	no flow at + 70	-	no flow at + 70
1.5 <u>Cold flexibility</u>				
1.5.1 AIB; 2 mm thick; diameter 20 mm °C	<u>3,6 / 5,6 mm:</u> - 15	no cracks at ± 0	-	-
1.5.2 DIN 18195, issue 8.00 ≥ 3 mm, diameter 30 mm °C	<u>3,6 / 5,6 mm:</u> - 15	-	-	no cracks at ≤ 0
1.6 <u>Watertightness</u>				
1.6.1 AIB; 3 mm thick on coating sieve, mash 0,1 mm	<u>4,5 mm:</u> tight over 48 hours at 2,0 bar	tight over 8 hours at 0,5 bar	-	-
1.6.2 DIN 18195, issue 8.00 slotted disc 1 mm, ≥ 4 mm thick	<u>4,5 mm:</u> tight over 48 hours at 2,0 bar	-	-	tight over 24 hours at 0,075 bar
<b>2. Tensile properties</b> ASTM-D 412 l <sub>0</sub> = 30 mm; with 10 mm; 500 mm/Min -				
2.1 Tensile strength kg/m <sup>2</sup> (N/mm <sup>2</sup> )	<u>3,2 / 4,5mm:</u> 3,63 (0,36)	-	-	-
2.2 Elongation %	1.806	-	-	-
2.3 Recovery R l <sub>0</sub> = 25 mm; with 15 mm; 500 mm/Min; elongation l <sub>R</sub> = 225 mm (900 %); 1 hour recovery $R = \frac{l_E - l_R}{l_E} \times 100$ %	87	-	-	-

