Rhino Linings®

TÜV SÜD Industrie Service

Mehr Sicherheit. Mehr Wert.

Material Test Certificate
According to DIN EN 10204 - 3.2, Material Inspection Certificate

Order No.	936385
Responsible:	Leutner
By order of:	Rhino Linings GmbH Otto-Hahn-Strasse 35 63303 Dreieich-Sprendlingen
Manufacturer:	Rhino Linings GmbH Otto-Hahn-Strasse 35 63303 Dreieich-Sprendlingen
Name and identification or lot number of product	Lining "Rhino Lining Tuff Stuff" Composition: according to application instructions (annex 1)
Date of product delivery:	Sample arrival on 16/04/2007 at Institut für Kunststoffe, Ridlerstrasse 57, 80686 Munich
Test date:	18/04/2007 and 23/04/2007
Tests to be performed:	Determination of wear resistance – BCA according to DIN EN 13813 section 5.2.3 (BCA tester according to DIN EN 13892-4) Determination of resistance to impact according to DIN EN 13813 section 5.2.13
Test piece:	Two test pieces (lining applied to concrete slabs of approx. 350 x 350 x 60mm) were supplied to TÜV SÜD Industrie Service GmbH, Institut für Kunststoffe, Ridlerstrasse 57, 80686 Munich, for testing.

Date: 01/03/2007

Our reference:
IS-ATA5-MUC/lt-kr
Document:
Rhinolinings-lt936.385
PUsystem
Befahrbarkeit 3.2
Zeugnis.doc

Report No. 957202-1

The test results apply solely to the examined test objects.

Seat: Munich
District Court: Munich
Commercial registry no.:
HRB 96 869

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Test procedure:

Rolling on the lined concrete slab was performed in the Institut für Kunststoffe on a BCA tester according to DIN EN 13892-4 (2002).
After 1, 10, 30 and 50 rolling cycles of 2850 revolutions using steel rollers the material thinning was measured according to EN 13892-4.

Evaluation of the wear resistance took place according to DIN EN 13813 section 5.2.3, table 5.

Testing activities:

- Rolling on with the BCA tester using a cycle of 2850 revolutions
- Measurement of material thinning depths
- Visual examination

Test results:

Rolling cycles of 2850 revolutions	Test slab 1 wear measurements [mm]									
	Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8	mean[mm]	mean[µm]
0	0.78	0.76	0.77	0.75	0.71	0.65	0.69	0.77	0.74	740
1	0.75	0.76	0.77	0.75	0.71	0.63	0.68	0.77	0.73	730
10	0.74	0.76	0.76	0.75	0.71	0.63	0.68	0.77	0.73	730
30	0.74	0.75	0.76	0.74	0.7	0.63	0.68	0.76	0.72	720
50	0.73	0.74	0.77	0.74	0.7	0.62	0.67	0.75	0.72	720

Rolling cycles of 2850 revolutions	Test slab 2 wear measurements [mm]									
	Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8	mean[mm]	mean[µm]
0	0.70	0.74	0.73	0.73	0.75	0.49	0.59	0.76	0.69	069
1	0.69	0.74	0.72	0.72	0.75	0.49	0.59	0.75	0.68	068
10	0.68	0.73	0.72	0.72	0.74	0.49	0.58	0.75	0.68	068
30	0.68	0.73	0.72	0.71	0.73	0.49	0.58	0.74	0.67	067
50	0.67	0.73	0.71	0.71	0.73	0.48	0.57	0.74	0.67	067

$$AR = d_w - d_o$$

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d_w Mean of depth measurements at all measuring points after conclusion of test run, in µm

d_o Mean of depth measurements at all measuring points before test run, in µm

After 1 cycle

	d_w [µm]	d_o [µm]	AR [µm]
Test slab 1	740	730	10
Test slab 2	690	680	10
		Mean value	10

The visual examination revealed no delaminations, disruptions, or cracks in the rolled-on area.

Based on the determined material thinning values (mean value 10µm) and after exposure to one cycle (2850 revolutions) on the BCA tester using steel rollers, the "Rhino Lining Tuff Stuff" lining system is to be classified into the

Wear resistance class AR 0.5

according to DIN EN 13813, section 5.2.3, table 5.

After 10 cycles

	d_w [µm]	d_o [µm]	AR [µm]
Test slab 1	740	730	10
Test slab 2	690	680	10
		Mean value	10

The visual examination revealed no delaminations, disruptions, or cracks in the rolled-on area.

Based on the determined material thinning values (mean value 10µm) and after exposure to 10 cycles (28,500 revolutions) on the BCA tester using steel rollers, the "Rhino Lining Tuff Stuff" lining system is to be classified into the

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Wear resistance class AR 0.5

according to DIN EN 13813, section 5.2.3, table 5.

After 30 cycles

	d_w [µm]	d_o [µm]	AR [µm]
Test slab 1	740	720	20
Test slab 2	690	670	20
		Mean value	20

The visual examination revealed no delaminations, disruptions, or cracks in the rolled-on area.

Based on the determined material thinning values (mean value 20µm) and after exposure to 30 cycles (85,500 revolutions) on the BCA tester using steel rollers, the "Rhino Lining Tuff Stuff" lining system is to be classified into the

Wear resistance class AR 0.5

according to DIN EN 13813, section 5.2.3, table 5.

After 50 cycles

	d_w [µm]	d_o [µm]	AR [µm]
Test slab 1	740	720	20
Test slab 2	690	670	20
		Mean value	20

The visual examination revealed no delaminations, disruptions, or cracks in the rolled-on area.

Based on the determined material thinning values (mean value 20µm) and after exposure to 50 cycles (142,500 revolutions) on the BCA tester using steel rollers, the "Rhino Lining Tuff Stuff" lining system is to be classified into the

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Wear resistance class AR 0.5

according to DIN EN 13813, section 5.2.3, table 5.

Impact resistance test

Testing of resistance to impact was performed using the classification method according to DIN EN ISO 6272, section 7.3.

Mass of weight piece: 10N and 20N, respectively
Fall height: 0.6m
Coating thickness: 4500 – 5200µm

Based on the determined height in conjunction with the employed mass of 20N and a fall height of 0.6m, the "Rhino Lining Tuff Stuff" lining system reached the

Impact resistance IR 12

class, according to DIN EN 13813, section 5.2.13.

Institut für Kunststoffe — Inspection representative

p. p. Zimmermann — Leutner