DECKMASTER SYSTEM R

BSEN 1504-2

BRE TEST REPORTS

DECKMASTER SYSTEM R

BRE TEST REPORTS

REPORT: 243982/R1a

- **Determination of Water Vapour Transmission Properties**
- Job Reference: 243982
- Date of Issue: 02/03/09

REPORT: 243982/R2a

- **Determination of Carbon Dioxide Transmission Properties**
- Job Reference: 243982
- Date of Issue: 31/03/09

REPORT: 243982/R3a

- **Determination of Resistance to Abrasion: Taber Abrader**
- Job Reference: 243982
- Date of Issue: 19/03/09

REPORT: 243982/R4a

- **Determination & Classification of Liquid Water Transmission Rate**
- Job Reference: 243982
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REPORT: 243982/R5a

- **Determination of Compatibility on Wet Concrete**
- Job Reference: 243982
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- Job Reference: 243982
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- Job Reference: 243982
- Date of Issue: 31/03/09

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- **Method of Measurement of Slip/Skid Resistance TRL Pendulum**
- Job Reference: 243982
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R E P O R T : 2 4 3 9 8 2 / R 9 a

- **Determination of Crack Bridging Properties Method B Class 4.2 40^0C**
- Job Reference: 243982
- Date of Issue: 25/03/09

R E P O R T : 2 4 3 9 8 2 / R 1 0 a

- **Determination of Crack Bridging Properties Method B Class 4.2 -10^0C**
- Job Reference: 243982
- Date of Issue: 25/03/09

R E P O R T : 2 4 3 9 8 2 / R 1 1 a

- **Determination of Thermal Compatibility Resistance to Temperature Shock**
- Job Reference: 243982
- Date of Issue: 15/04/09

R E P O R T : 2 4 3 9 8 2 / R 1 2 a

- **Determination of Resistance to Liquids Chemical Resistance**
- Job Reference: 243982
- Date of Issue: 31/03/09

R E P O R T : 2 4 3 9 8 2 / R 1 3 a

- **Determination of Exposure to UV and Moisture**
- Job Reference: 243982
- Date of Issue: 31/03/09

R E P O R T : 2 4 3 9 8 2 / R 1 4 a

- **Determination of Rapide Deformation Impact Resistance**
- Job Reference: 243982
- Date of Issue: 15/04/09

R E P O R T : 2 4 3 9 8 2 / R 1 5 a

- **Determination of Electrical Resistance**
- Job Reference: 243982
- Date of Issue: 15/04/09

R E P O R T : 2 5 2 2 2 7 a

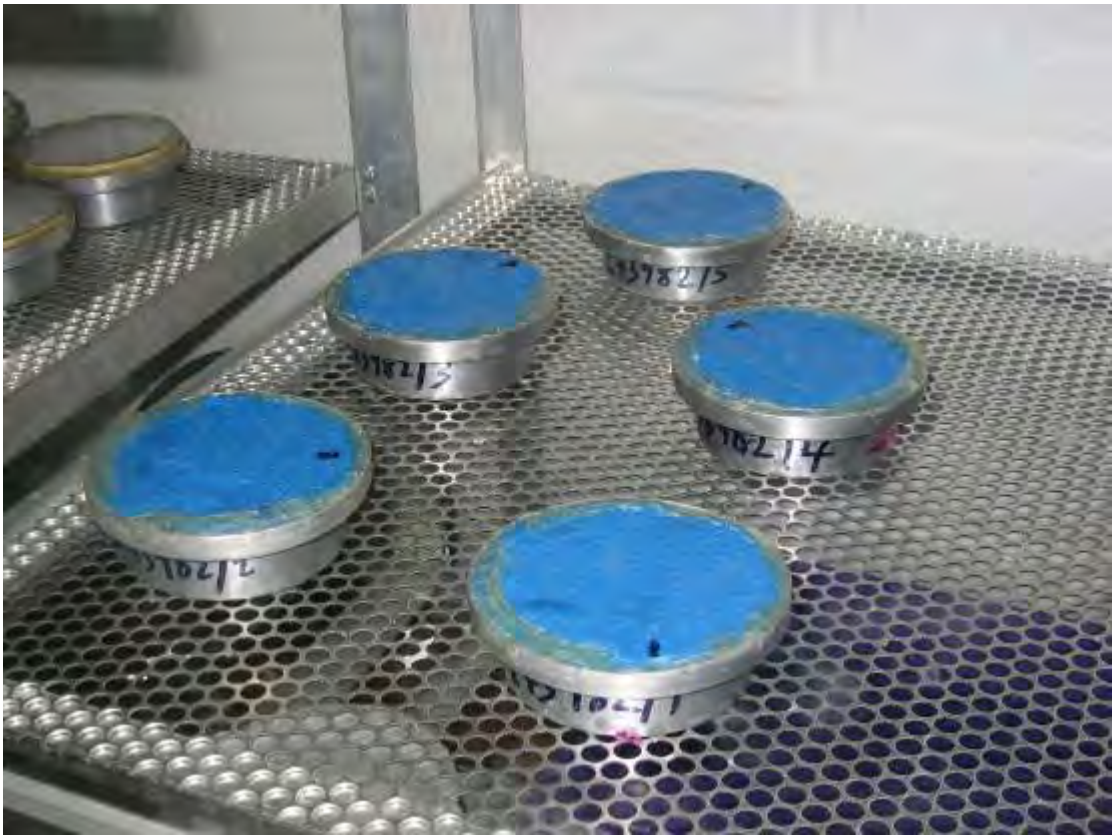
- **Classification of reaction to fire performance BSEN 13501-1: 2007**
- Job Reference: 243982
- Date of Issue: 19/03/09

R E P O R T : 2 5 2 2 2 9 a

- **Reaction to fire tests BSEN ISO 11925-2: 2002**
- Job Reference: 243982
- Date of Issue: 02/03/09

R E P O R T : 2 4 3 9 8 2 / R 1 a

- **Determination of Water Vapour Transmission Properties**
- Job Reference: 243982
- Date of Issue: 02/03/09



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Lab Report Number: 243982/R1a
Job Reference: 243982
Date of Issue: 02/03/09

Commercial in Confidence

Determination of Water-Vapour Transmission Properties

bre

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	K.Lardner, Building Technology Group
Test standard/method:	BS EN ISO 12572:2001, with Condition 'C' - 50/93%RH
Date samples received:	Prepared August 2008
Date tested:	19/12/08 to 16/01/09
Number of specimens tested:	5
Specimen dimensions (mm):	90mm diameter (exposed test area 80mm diameter)

Results Summary

Detailed results are given on page 2

Mean Water Vapour Permeability in g/m^2/day:	0.17
Mean Water Vapour Resistance in MNs/g:	1189
Mean Water Vapour Flow Rate (g) in kg/m^2/s:	2.02E-09
Mean Water Vapour Resistance Factor (μ):	21919
Mean Water-Vapour Diffusion-Equivalent Air Layer Thickness (S_d) in m:	88

Table 5 of BS EN 1504-2 would classify the water vapour permeability as ClassIII, S_d > 50metres (not permeable to water vapour)

Approved on behalf of BRE by: Martyn Webb. Date: 02/03/09

Name: Martyn Webb Martyn Webb Position: Associate Director

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Determination of Water-Vapour Transmission Properties

Results

Product name: Deckmaster System R

BRE specimen number	243982/1	243982/2	243982/3
Specimen thickness in mm:	4	4	4
Water Vapour Permeability in g/m^2/day	0.15	0.21	0.18
Water Vapour Resistance in MNs/g:	1341.03	966.47	1166.66
Water Vapour Flow Rate (g) in kg/m^2/s:	1.77E-09	2.46E-09	2.04E-09
Water Vapour Resistance Factor (μ):	24725.24	17819.19	21510.25
Water-Vapour Diffusion-Equivalent Air Layer Thickness (S_d) in m:	98.90	71.28	86.04

BRE specimen number	243982/4	243982/5
Specimen thickness in mm:	4	4
Water Vapour Permeability in g/m^2/day	0.16	0.17
Water Vapour Resistance in MNs/g:	1272.72	1197.32
Water Vapour Flow Rate (g) in kg/m^2/s:	1.87E-09	1.98E-09
Water Vapour Resistance Factor (μ):	23465.64	22075.42
Water-Vapour Diffusion-Equivalent Air Layer Thickness (S_d) in m:	93.86	88.30

Mean Water Vapour Permeability in g/m^2/day:	0.17
Mean Water Vapour Resistance in MNs/g:	1188.84
Mean Water Vapour Flow Rate (g) in kg/m^2/s:	2.02E-09
Mean Water Vapour Resistance Factor (μ):	21919.15
Mean Water-Vapour Diffusion-Equivalent Air Layer Thickness (S_d) in m:	87.68

R E P O R T : 2 4 3 9 8 2 / R 2 a

- **Determination of Carbon Dioxide Transmission Properties**
- Job Reference: 243982
- Date of Issue: 31/03/09

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Lab Report Number: 243982/R2a
Job Reference: 243982
Date of Issue: 31/03/09

Commercial in Confidence

Determination of Carbon Dioxide Transmission Properties

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	P.Wood & K Lardner, Building Technology Group
Test standard/method:	BS EN 1062-6:2002 Test Method A
Nature of substrate:	Unglazed ceramic tile
Product applied by:	Client
Date tested:	02/10/08 to 10/11/08
Number of specimens tested:	5*
Specimen dimensions (mm):	90mm diameter (exposed test area 80mm diameter)

Results Summary

Detailed results are given on page 2

Mean Overall thickness in mm:	4
Mean Carbon dioxide permeability in g/m^2/day:	4.55
Mean Diffusion equivalent air layer thickness (S_D) in m	54.76
Standard deviation (SD)	19.64
Mean Diffusion resistance number (μ):	0.014 x10^6

* One specimen excluded due to leaking test cup

Table 5 of BS EN 1504-2:2004 requires the S_D value to be > 50m

Final approval for and on behalf of BRE: Martyn Webb. Date: 31/03/09

Martyn Webb
Associate Director
Building Technology Group

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Determination of Carbon Dioxide Transmission Properties

Results

Client reference/Product name: Deckmaster System R

Specimen number	243982/6	243982/7	243982/8
Overall Thickness in mm:	4	4	4
Carbon dioxide Permeability in g/m^2/day:	Leaking test cup	5.87	2.83
Diffusion equivalent air layer thickness (S_D) in m	Leaking test cup	38.8	80.8
Diffusion resistance number (μ x 10^6):	Leaking test cup	0.010	0.020

Specimen number	243982/9	243982/10
Overall Thickness in mm:	4	4
Carbon dioxide Permeability in g/m^2/day:	3.87	5.64
Diffusion equivalent air layer thickness (S_D) in m	59.0	40.4
Diffusion resistance number (μ x 10^6):	0.015	0.010

Mean Overall Thickness in mm:	4
Mean Carbon dioxide Permeability in g/m^2/day:	4.55
Mean Diffusion equivalent air layer thickness (S_D) in m	54.8
Standard deviation (SD)	19.6
Mean Diffusion resistance number (μ):	0.014 x10^6

R E P O R T : 2 4 3 9 8 2 / R 3 a

- **Determination of Resistance to Abrasion: Taber Abrader**
- Job Reference: 243982
- Date of Issue: 19/03/09

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Lab Report Number: 243982/R3a
Job Reference: 243982
Date of Issue: 19/03/09

Commercial in Confidence

Determination of Resistance to Abrasion: Taber abrader

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	L. White, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN ISO 5470-1: 1999
Substrate type:	Concrete
Product applied by:	Client
Conditioning details:	BS EN ISO 5470-1: 1999
Date tested:	09/01/09
Number of specimens tested:	3
Size of test specimens:	Nominal 100mm x 100mm x 15mm
Load (g):	1000
Number of cycles:	1000
Wheel type:	Calibrade H22

Results summary

Mean weight loss after 1000 cycles at 1000g load (mg): 1423

Table 5 of BS EN 1504-2:2004 requires the weight loss to be less than 3000mg

Final approval for and on behalf of BRE: Martyn Webb. Date: 19/03/09

Martyn Webb
Associate Director
Building Technology Group

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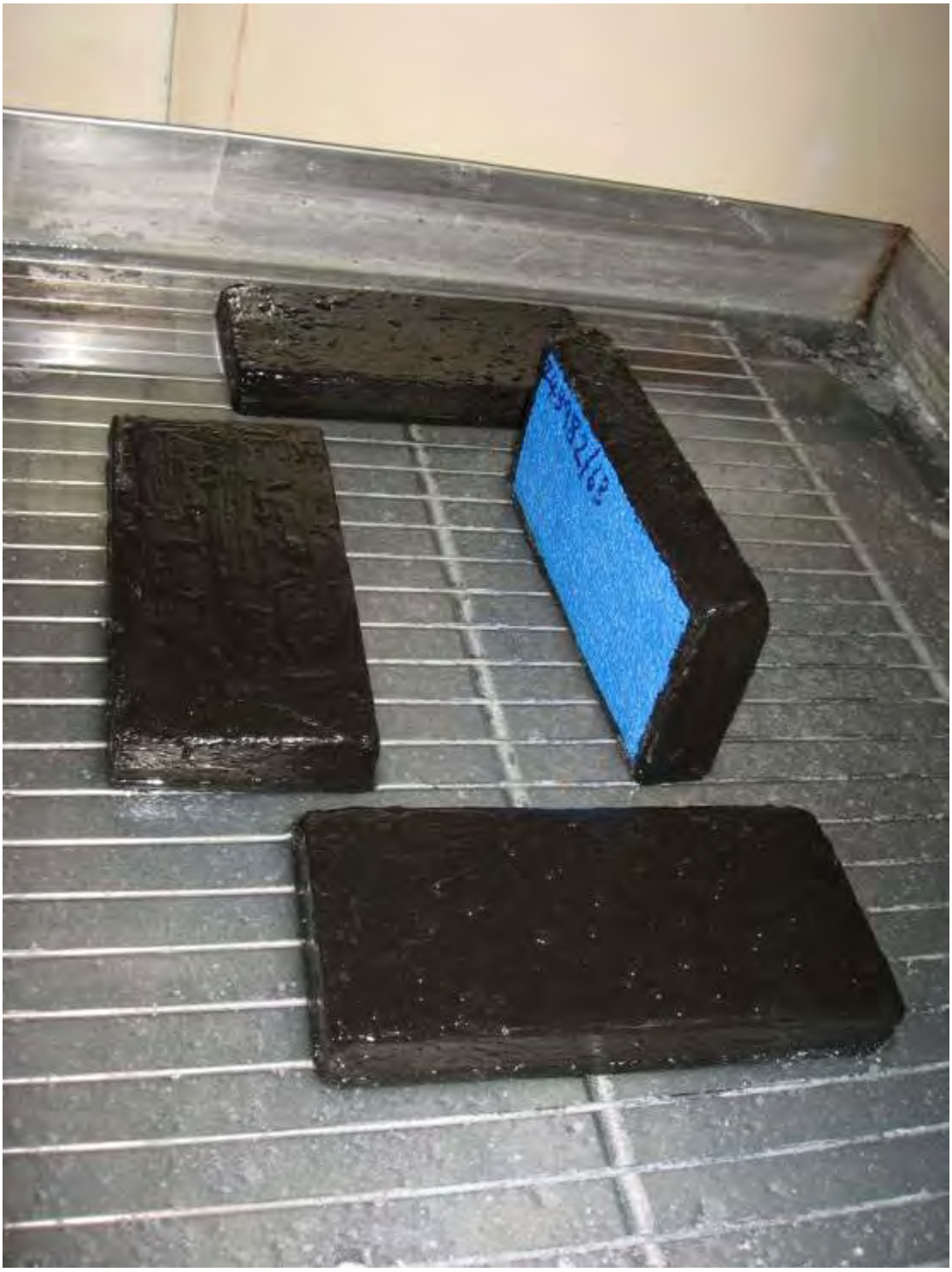
Results

Product name: Deckmaster System R

BRE specimen number	243982/1	243982/2	243982/3
Initial weight (g)	299.126	297.181	289.966
Final weight (g)	297.05	296.00	288.95
Weight loss (g)	2.075	1.177	1.018
Mean weight loss (mg)	1423		

R E P O R T : 2 4 3 9 8 2 / R 4 a

- **Determination & Classification of Liquid Water Transmission Rate**
- Job Reference: 243982
- Date of Issue: 19/03/09



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Report Number: 243982/R4a
Lab Reference: 243982
Date of Issue: 19/03/09

Commercial-in-confidence

Coating Materials & Coating Systems for Exterior Masonry & Concrete Determination & Classification of Liquid Water Transmission Rate

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	K.Lardner, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN 1062-3:2008
Nature of substrate:	Cut sections of clay brick
Product applied by:	Client
Conditioning details:	Cured in ambient conditions for 7 days after application Then conditioned at 23°C, 50% RH before testing commenced
Date(s) tested:	05 & 06/02/09
Number of specimens tested:	4
Size of test specimens:	Nominally 212mm x 100mm x 25mm before sealing

Results summary

Mean Coefficient of Liquid Water Transmission Rate ($kg/m^2h^{0.5}$) **0.0013**

Table 5 of BS EN 1504-2:2004 requires the liquid water transmission rate to be < $0.1 kg/m^2h^{0.5}$

Final approval for and on behalf of BRE: Martyn Webb. Date: 19/03/09

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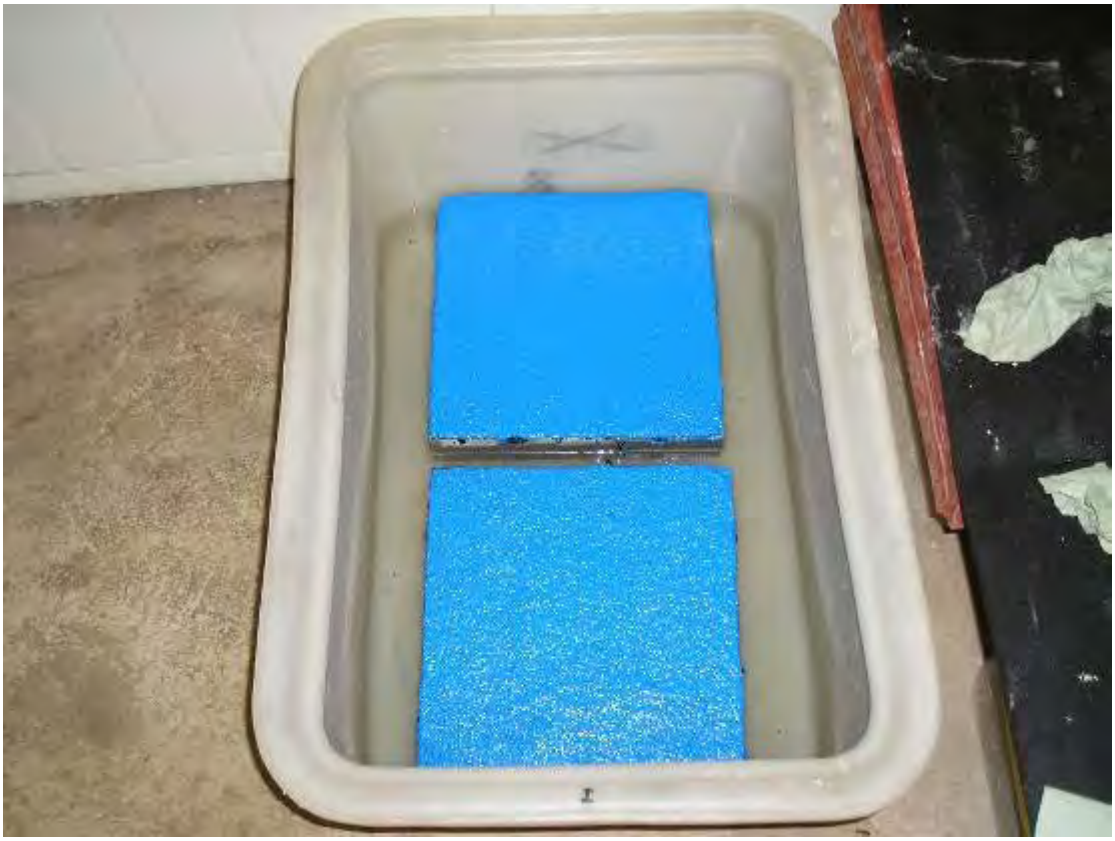
Results

Product name: Deckmaster System R

BRE specimen number	243982/63	243982/64	243982/65	243982/66
Coefficient of liquid water transmission rate ($kg/m^2h^{0.5}$)	0.0013	0.0012	0.0012	0.0015
Mean coefficient of liquid water transmission rate ($kg/m^2h^{0.5}$)	0.0013			

R E P O R T : 2 4 3 9 8 2 / R 5 a

- **Determination of Compatibility on Wet Concrete**
- Job Reference: 243982
- Date of Issue: 19/03/09



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Report Number: 243982/R5a
Lab Reference: 243982
Date of Issue: 19/03/09

Commercial-in-confidence

Products and Systems for the Protection & Repair of Concrete Structures
Compatibility on Wet Concrete

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	K.Lardner, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN 13578: 2003
Concrete substrate type:	MC 0.40 to BS EN 1766: 2000
Substrate reference:	A08/8112
Product applied by:	Client
Application temperature:	6°C
Conditioning details:	BS EN 13578: 2003
Test equipment:	PAT pull-off adhesion tester, model GM04
Date(s) tested:	18 & 19/03/09
Number of specimens tested:	4 (2 No. reference, 2 No. test)

Results Summary

Mean adhesive strength **1.6 MPa**

There was no blistering, cracking or flaking in accordance with BS EN ISO 4628:2003

Table 5 of BS EN 1504-2:2004 requires:
Mean adhesive strength ≥ 1.5MPa with failure > 50% as concrete rupture

Final approval for and on behalf of BRE: Martyn Webb. Date: 19/03/09

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Associate Director
Building Technology Group

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Results

Reference samples		
BRE substrate reference	A08/8112/1	A08/8112/2
BRE specimen reference	243982/42	243982/43
Size/degree of cracking	None	None
Size/degree of blistering	None	None
Size/degree of flaking	None	None
Adhesive strength (MPa)	1.9 - 100% 'B'	1.2 - 100% 'A/B'
	1.8 - 50% 'B', 50% 'A/B'	1.0 - 100% 'A/B'
	1.6 - 100% 'B'	0.9 - 100% 'A/B'
	1.8 - 50% 'B', 50% 'A/B'	1.3 - 100% 'A/B'
	1.9 - 100% 'B'	1.2 - 100% 'A/B'
Mean adhesive strength (MPa)	1.5	

'B' type failure - cohesion failure in the first layer

'A/B' type failure - Adhesion failure between the substrate and the first layer

Results (cont)

Test samples		
BRE substrate reference	A08/8112/3	A08/8112/4
BRE specimen reference	243982/44	243982/45
Size/degree of cracking	None	None
Size/degree of blistering	None	None
Size/degree of flaking	None	None
Adhesive strength (MPa)	1.5 - 100% 'A/B'	1.8 - 100% 'A/B'
	1.6 - 100% 'A/B'	2.0 - 75% 'A/B', 15% 'B'
	1.3 - 100% 'A/B'	1.8 - 100% 'A/B'
	1.3 - 100% 'A/B'	1.8 - 100% 'A/B'
	1.4 - 100% 'A/B'	1.9 - 100% 'A/B'
Mean adhesive strength (MPa)	1.6	

'B' type failure - cohesion failure in the first layer

'A/B' type failure - adhesion failure between the substrate and the first layer

R E P O R T : 2 4 3 9 8 2 / R 6 a

- **Determination of Measurement of Bond Strength by Pull Off**
- Job Reference: 243982
- Date of Issue: 26/03/09

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Report Number: 243982/R6a
Lab Reference: 243982
Date of Issue: 26/03/09

Commercial-in-confidence

Product and systems for the protection and repair of concrete stuctures
Measurement of bond strength by pull-off

bre

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	K.Lardner, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN 1542: 1999
Concrete substrate type:	MC 0.40 to BS EN 1766: 2000
Substrate reference:	A08/8138/3
Product applied by:	Client
Conditioning details:	BS EN 1542: 1999
Test equipment:	PAT pull-off adhesion tester, model GM04
Date(s) tested:	18 & 19/03/09
Number of specimens tested:	1

Results Summary

Mean adhesive strength **2.3 MPa**

Table 5 of BS EN 1504-2:2004 requires:
Mean adhesive strength (Flexible system with trafficking) ≥ 1.5MPa, no single value below 1.0MPa

Final approval for and on behalf of BRE: Martyn Webb. Date: 26/03/09

Martyn Webb
Associate Director
Building Technology Group

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Results

Deckmaster System R	
BRE substrate reference	A08/8138/3
BRE specimen reference	243982/41
Adhesive strength (MPa)	2.2 - 100% 'A/B'
	1.9 - 100% 'A/B'
	3.0 - 90% 'A/B' , 10% 'A'
	1.9 - 95% 'A/B', 5% 'A'
	2.3 - 90% 'A/B' , 10% 'A'
Mean adhesive strength (MPa)	2.3

'A' type failure - cohesion failure in the concrete substrate

'A/B' type failure - Adhesion failure between the substrate and the first layer

R E P O R T : 2 4 3 9 8 2 / R 7 a

- **Determination of Thermal Compatibility**
- Job Reference: 243982
- Date of Issue: 31/03/09

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Report Number: 243982/R7a
Lab Reference: 243982
Date of Issue: 31/03/09

Commercial-in-confidence

Product and Systems for the Protection and Repair of Concrete Structures Determination of Thermal Compatibility

bre

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Project reference:	Deckmaster Ltd

Testing

Tested by:	K Lardner, Centre for Materials & Engineering
Checked by:	M Webb, Centre for Materials & Engineering
Test standard/method:	BS EN 13687-1 & 2: 2002
Concrete substrate type:	MC 0.40 to BS EN 1766: 2000
Substrate reference:	A08/8138/1 & 2
Product applied by:	Client
Exposure details:	BS EN 13687-2 (10 cycles) BS EN 13687-1 (50 cycles including deicing salt)
Date tested:	Jan-March 2009
Number of specimens tested:	3, including reference specimen
Size of test specimens:	300mm x 300mm x 100mm
Test equipment used:	PAT pull-off adhesion tester, model GM04
Temperature at test (°C):	20
Relative humidity at test (%):	60

Results summary

Mean Adhesive Bond Strength:	**1.7 MPa**
Standard Deviation:	**0.2 MPa**

Table 5 of BS EN 1504-2:2004 requires:
Mean adhesive strength (Flexible system with trafficking) ≥ 1.5MPa, no single value below 1.0MPa with no bubbles, cracks and delamination

Final approval for and on behalf of BRE: Martyn Webb. Date: 31/03/09

Martyn Webb
Associate Director
Building Technology Group

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Results

Specimen No. 243982/18

Position	1	2	3	4	5
Pull-off strength (MPa)	1.8	1.3	1.4	1.9	1.9
Mean strength (MPa)	1.7				
Failure mode	A/B	Y/Z	A/B	A:A/B	Y/Z
Failure mode ratio	100%	100%	100%	10% A	1.00

Specimen No. 243982/19*

Position	1	2	3	4	5
Pull-off strength (MPa)	1.8	2.2	1.5	1.5	1.5
Mean strength (MPa)	1.7				
Failure mode	A/B	Y/Z	Y/Z	A:A/B	Y/Z
Failure mode ratio	100%	100%	100%	10% A	100%

* Specimen had two localised areas of debonding (with slight surface cracking) after completion of cycling

Failure mode categories

A	Cohesion failure in the concrete substrate
A/B	Adhesion failure between the substrate and the first layer (e.g. primer, bonding slurry or mortar)
B	Cohesion failure in the first layer
B/C	Adhesion failure between the first and second layer
C	Cohesion failure in the second layer
-/Y	Adhesion failure between the last layer and the adhesive layer (e.g. C/Y in a two layer repair system)
Y	Cohesive failure in the adhesive layer
Y/Z	Adhesive failure between the adhesive layer and the dolly

R E P O R T : 2 4 3 9 8 2 / R 8 a

- **Method of Measurement of Slip/Skid Resistance TRL Pendulum**
- Job Reference: 243982
- Date of Issue: 31/03/09

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Deckmaster Ltd
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Report Number: 243982/R8a
Lab Reference: 243982
Date of Issue: 31/03/09

Commercial-in-confidence

Road and Airfield Surface Characteristics
Method for Measurement of Slip/Skid Resistance
The Pendulum Test

bre

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Sample Spplied by:	Deckmaster Ltd

Testing

Tested by:	I. Rance, Building Technology Group
Checked by:	M.Webb, Building Technology Group
Test standard/method:	BS EN 13036-4: 2003
Nature of substrate:	Concrete to Class MC0.40 of BS EN 1766
Specimen number:	243982/67
Product applied by:	Client
Conditioning details:	Conditioned at 21°C, 50% RH for 24 hrs before testing
Slider type:	CEN
Date tested:	17/03/09
Number of specimens tested:	1
Size of test specimens:	Nominally 300mm x 300mm x 100mm

Results summary

Mean Pendulum Test Value (Wet) 64

Table 5 of BS EN 1504-2:2004 requires the wet PTV value to be > 55 for outside use

Final approval for and on behalf of BRE: Martyn Webb. Date: 31/03/09

Martyn Webb
Associate Director
Building Technology Group

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Test results relate only to the items tested.
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Results

Product: Deckmaster System R

Test Condition	Dry	Wet
PTV 1	105	65
PTV 2	105	64
PTV 3	105	64
PTV 4	104	64
PTV 5	104	64
Mean PTV	**104**	**64**

R E P O R T : 2 4 3 9 8 2 / R 9 a

- **Determination of Crack Bridging Properties Method B Class 4.2 40^0C**
- Job Reference: 243982
- Date of Issue: 25/03/09

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Report Number: 243982/R9a
Lab Reference: 243982
Date of Issue: 25/03/09

Commercial-in-confidence

Paints and Varnishes
Coating Materials and Coating Systems for Exterior Masonry and Concrete
Determination of Crack-Bridging Properties

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	K.Lardner, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN 1062-7: 2004 Method B, Class 4.2
Test temperature:	40°C
Concrete substrate type:	MC 0.45 to BS EN 1766: 2000
Substrate reference:	A08/8139/1 to 3
Substrate dimensions:	150mm x 100mm x 25mm
Product applied by:	Client
Conditioning details:	Initial conditioning to BS EN 1062-11 (4.1) followed by testing at 40°C
Date(s) tested:	19/01/09 to 06/02/09
Number of specimens tested:	3

Results Summary

All three specimens showed evidence of limited surface cracking of the blue UVR topcoat. However, after specimens were cut longitudinally there was no cracking visible through the elastomeric membrane

Table 5 of BS EN 1504-2:2004 requires no failures at the required class

Final approval for and on behalf of BRE: Martyn Webb. Date: 25/03/09

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Building Technology Group

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Results

Product name: Deckmaster System R

Specimen number	**Result after dynamic crack-bridging to Class 4.2 at temperature of +40°C**
243982/34	Limited surface cracking of topcoat - no cracking within elastomeric membrane

243982/35	Limited surface cracking of topcoat - no cracking within elastomeric membrane

243982/36	Limited surface cracking of topcoat - no cracking within elastomeric membrane

R E P O R T : 2 4 3 9 8 2 / R 1 0 a

- **Determination of Crack Bridging Properties Method B Class 4.2 -10^{0}C**
- Job Reference: 243982
- Date of Issue: 25/03/09

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Report Number: 243982/R10a
Lab Reference: 243982
Date of Issue: 25/03/09

Commercial-in-confidence

Paints and Varnishes
Coating Materials and Coating Systems for Exterior Masonry and Concrete
Determination of Crack-Bridging Properties

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	K.Lardner, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN 1062-7: 2004 Method B, Class 4.2
Test temperature:	-10°C
Concrete substrate type:	MC 0.45 to BS EN 1766: 2000
Substrate reference:	A08/8139/1 to 3
Substrate dimensions:	150mm x 100mm x 25mm
Product applied by:	Client
Conditioning details:	Initial conditioning to BS EN 1062-11 (4.1) followed by testing at -10°C
Date(s) tested:	19/01/09 to 06/02/09
Number of specimens tested:	3

Results Summary

All three specimens showed evidence of limited surface cracking of the blue UVR topcoat. However, after specimens were cut longitudinally there was no cracking visible through the elastomeric membrane

Table 5 of BS EN 1504-2:2004 requires no failures at the required class

Final approval for and on behalf of BRE: Martyn Webb. Date: 25/03/09

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Results

Product name: Deckmaster System R

Specimen number	**Result after dynamic crack-bridging to Class 4.2 at temperature of -10°C**
243982/28	Limited surface cracking of topcoat - no cracking within elastomeric membrane

243982/29	Limited surface cracking of topcoat - no cracking within elastomeric membrane

243982/30	Limited surface cracking of topcoat - no cracking within elastomeric membrane

R E P O R T : 2 4 3 9 8 2 / R 1 1 a

- **Determination of Thermal Compatibility Resistance to Temperature Shock**
- Job Reference: 243982
- Date of Issue: 15/04/09

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Report Number: 243982/R11a
Lab Reference: 243982
Date of Issue: 15/04/09

Commercial-in-confidence

Product and Systems for the Protection and Repair of Concrete Structures
Determination of Thermal Compatibility
Resistance to Temperature Shock

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Pumadur CPD Membrane with Pumadur CPD UVR topcoat
Project reference:	Resdev Ltd

Testing

Tested by:	K.Lardner, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN 13687-5: 2002
Concrete substrate type:	MC 0.40 to BS EN 1766: 2000
Substrate reference:	A08/8137/6
Product applied by:	Client
Test details:	Asphalt at 253°C, 88°C after 60 minutes
Date tested:	01-02/04/09
Number of specimens tested:	1
Size of test specimens:	300mm x 300mm x 100mm
Test equipment used:	PAT pull-off adhesion tester, model GM04
Temperature at test (°C):	21
Relative humidity at test (%):	55

Results summary

Mean Adhesive Bond Strength:	**1.5 MPa**
Standard Deviation:	**0.1 MPa**

Table 5 of BS EN 1504-2:2004 requires:
Mean adhesive strength (Flexible system with trafficking) ≥ 1.5MPa, no single value below 1.0MPa with no bubbles, cracks and delamination

Final approval for and on behalf of BRE: Martyn Webb. Date: 15/04/09

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Results

Specimen No. **243982/68**

Position	**1**	**2**	**3**
Pull-off strength (MPa)	1.4	1.6	1.5
Mean strength (MPa)	1.5		
Failure mode	A/B	A/B	A/B:A
Failure mode ratio	100%	100%	95%:5%

There was no evidence of cracking, flaking, bubbling, spalling or de-bonding

Failure mode categories

A	Cohesion failure in the concrete substrate
A/B	Adhesion failure between the substrate and the first layer (e.g. primer, bonding slurry or mortar)
B	Cohesion failure in the first layer
B/C	Adhesion failure between the first and second layer
C	Cohesion failure in the second layer
-/Y	Adhesion failure between the last layer and the adhesive layer (e.g. C/Y in a two layer repair system)
Y	Cohesive failure in the adhesive layer
Y/Z	Adhesive failure between the adhesive layer and the dolly

R E P O R T : 2 4 3 9 8 2 / R 1 2 a

- **Determination of Resistance to Liquids Chemical Resistance**
- Job Reference: 243982
- Date of Issue: 31/03/09

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Report Number: 243982/R12a
Lab Reference: 243982
Date of Issue: 17/07/09

Commercial-in-confidence

Paints and Varnishes
Determination of Resistance to Liquids

bre

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	S. Lane, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN ISO 2812-1: 1995, with test liquids as described on page 2
Concrete substrate type:	MC 0.40 to BS EN 1766: 2000
Conditioning details:	Conditioned at 23°C, 50% RH for 7 days before testing
Product applied by:	Client
Date(s) tested:	Jan-Feb 09
Number of specimens tested:	6 coated panels, with 6 test areas per panel

Results Summary

After 30 days in contact with the coating the test liquids had no effect.

Table 5 of BS EN 1504-2:2004 has no specific requirement for these test liquids.

Final approval for and on behalf of BRE: Martyn Webb. Date: 17/07/09

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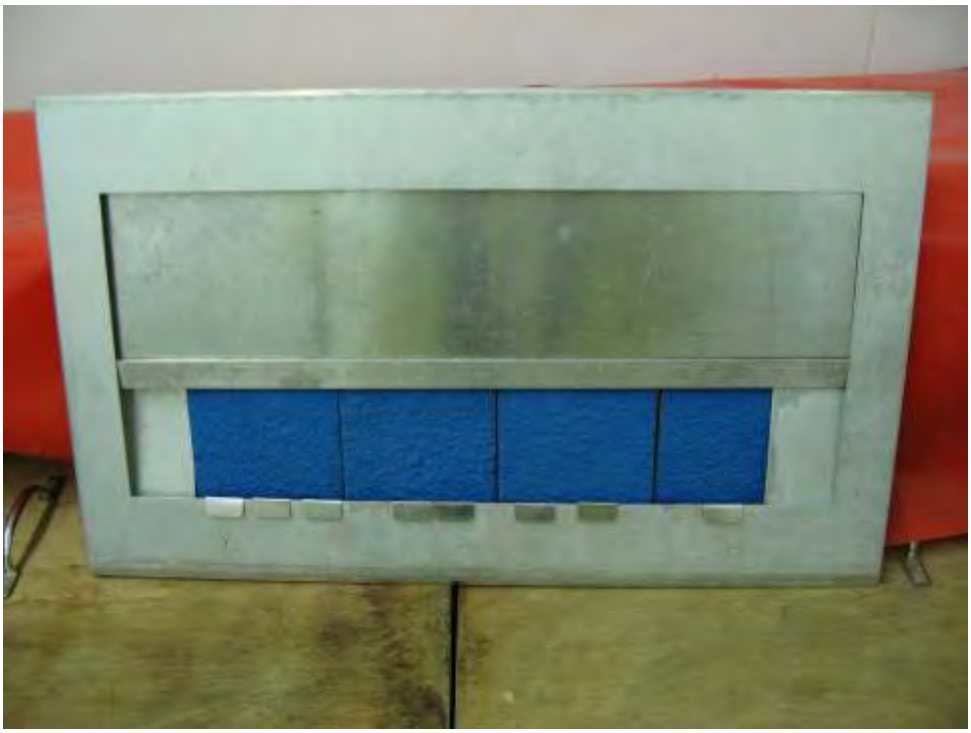
Results

For each test liquid, 3 No. circular test areas nominally 50mm diameter were ponded. The liquids were left in contact with the coating for up to 30 days, with these being topped up periodically to compensate for evaporation where appropriate. The unleaded petrol sample was ponded, sealed and left for the duration of the test.

Test Liquid	Effect on coating
Unleaded petrol	None
Diesel	None
Engine oil	None
Used engine oil	None
Manual gearbox oil	None
Automatic gearbox oil	None
Power steering fluid	None
Brake/clutch fluid	None
Antifreeze	None
Windscreen washer fluid	None
Deicer	None

R E P O R T : 2 4 3 9 8 2 / R 1 3 a

- **Determination of Exposure to UV and Moisture**
- Job Reference: 243982
- Date of Issue: 31/03/09



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Report Number: 243982/13a
Lab Reference: 243982
Date of Issue: 15/04/09

Commercial-in-confidence

Coating Materials & Coating Systems for Exterior Masonry & Concrete Methods of Conditioning before Testing

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	K.Lardner, Building Technology Group
Checked by:	M Webb, Building Technology Group
Test standard/method:	BS EN 1062-11
Product applied by:	Client
Conditioning details:	Exposure to UV and moisture in accordance with BS EN 1062-11 Section 4.2
Date tested:	Oct 08 to Jan 09
Nature of substrate:	Concrete to MC 0.40 to BS EN 1766: 2000
Number of specimens tested:	4
Size of test specimens:	Nominally 100mm x 100mm

Results summary

After exposure to UV and moisture in accordance with BS EN 1062-11 Section 4.2 a loss of gloss was evident with all specimens. There was no evidence of blistering, cracking or flaking.

Table 5 of BS EN 1504-2:2004 requires no blistering, cracking or flaking, but slight colour change, loss of gloss or chalking may be acceptable.

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Results

Specimen number: **243982/46**

After 2000 hours of exposure to UV and moisture in accordance with BS EN 1062-11 Section 4.2, there was evidence of loss of gloss (Figure 1).
There was no evidence of blistering, cracking or flaking.

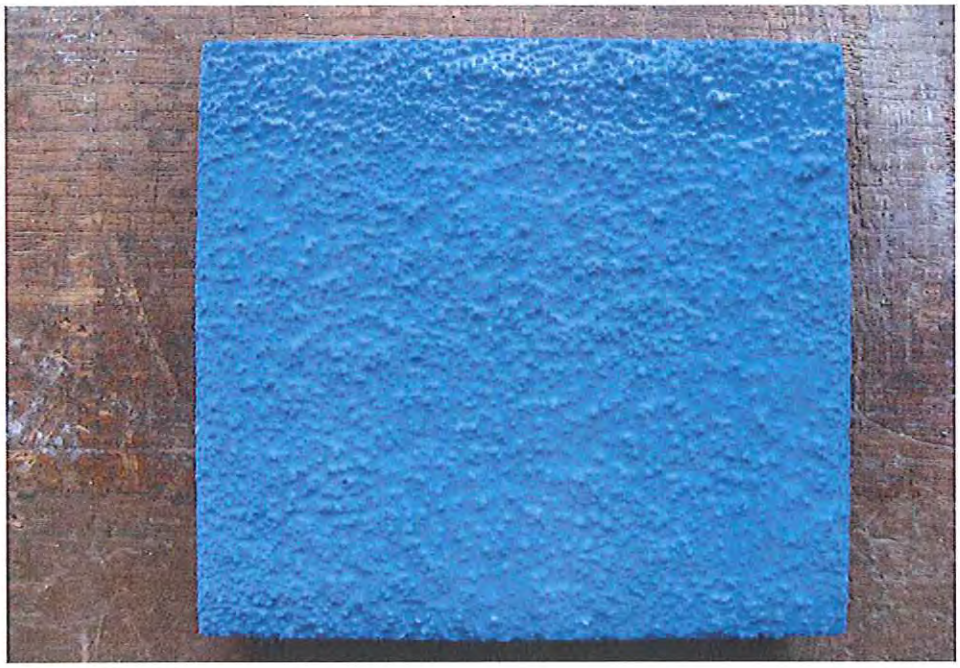

Figure 1. Image of specimen 243982/46 after artificial weathering

Results (cont)

Specimen number: **243982/47**

After 2000 hours of exposure to UV and moisture in accordance with BS EN 1062-11 Section 4.2, there was evidence of loss of gloss (Figure 2).
There was no evidence of blistering, cracking or flaking.

Figure 2. Image of specimen 243982/47 after artificial weathering

Results (cont)

Specimen number: **243982/48**

After 2000 hours of exposure to UV and moisture in accordance with BS EN 1062-11 Section 4.2, there was evidence of loss of gloss (Figure 3).
There was no evidence of blistering, cracking or flaking.

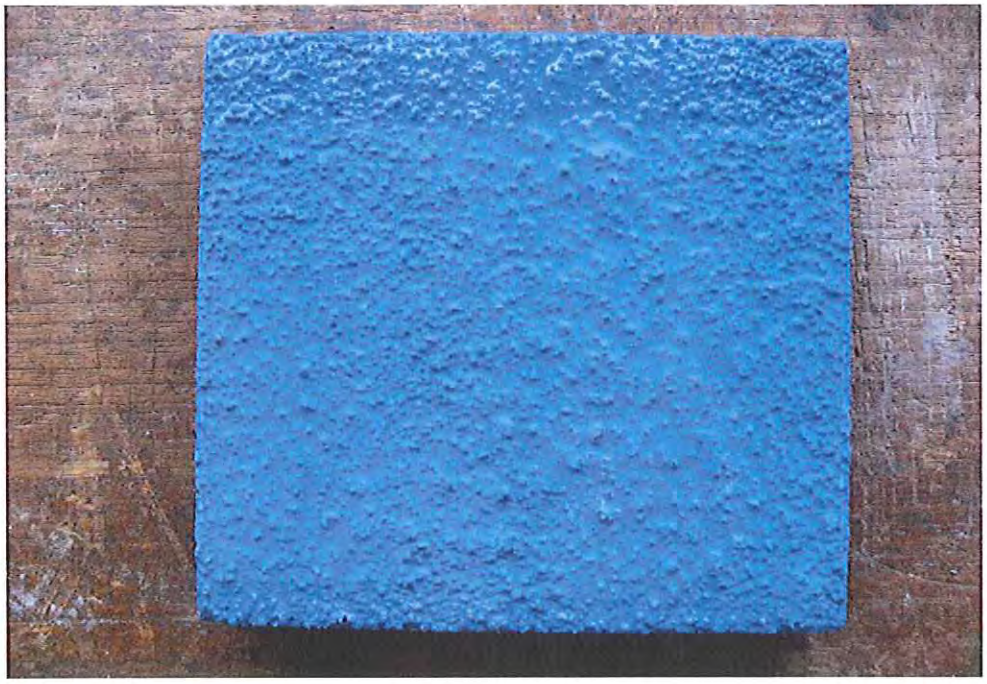

Figure 3. Image of specimen 243982/48 after artificial weathering

Results (cont)

Specimen number: **243982/49**

After 2000 hours of exposure to UV and moisture in accordance with BS EN 1062-11 Section 4.2, there was evidence of loss of gloss (Figure 4).
There was no evidence of blistering, cracking or flaking.

Figure 4. Image of specimen 243982/49 after artificial weathering

R E P O R T : 2 4 3 9 8 2 / R 1 4 a

- **Determination of Rapide Deformation Impact Resistance**
- Job Reference: 243982
- Date of Issue: 15/04/09

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Report Number: 243982/14a
Lab Reference: 243982
Date of Issue: 15/04/09

Commercial-in-confidence

Paints and Varnishes
Rapid Deformation Impact Resistance Tests
Falling Weight Test - Large Area Indenter

bre

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	J. Gadd, PRA Coatings Technology Centre
Test standard/method:	BS EN ISO 6272-1: 2004
Product applied by:	Client
Conditioning details:	In accordance with BS EN ISO 6272-1: 2004
Date tested:	16/01/09
Nature of substrate:	Concrete to MC 0.40 to BS EN 1766: 2000
Number of specimens tested:	1
Size of test specimens:	Nominally 300mm x 300mm x 100mm

Results summary

The product would be classified as Class III (≥ 20Nm)

Table 5 of BS EN 1504-2:2004 requires no cracks and delamination and the class to be stated:

Class I	≥ 4Nm
Class II	≥ 10Nm
Class III	≥ 20Nm

Final approval for and on behalf of BRE: Martyn Webb. Date: 15/04/09

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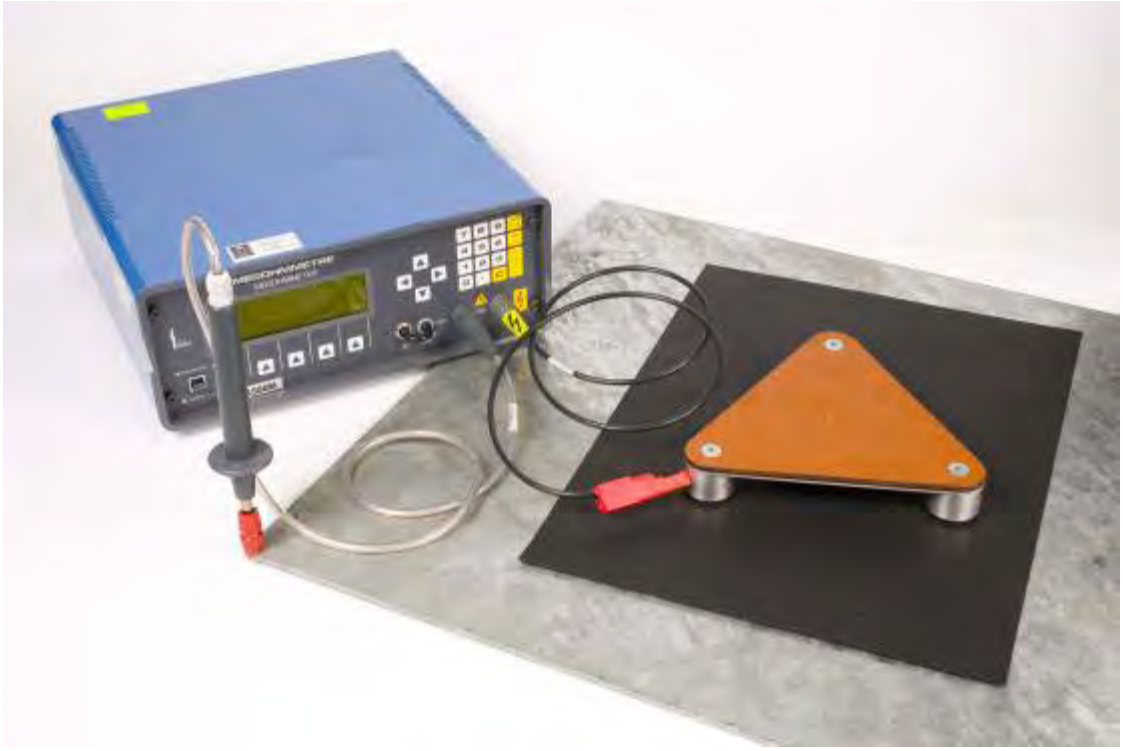
Results

Observations and conclusions

Despite suffering superficial surface damage throughout the entire test range due to the textured surface of the coating providing localised areas of raised stress upon impact, the underlying coating remains free from damage at a maximum test load of 40Nm. The coating would therefore be rated as Class III (≥ 20Nm) according to Table 5 of BS EN 1504-2: 2004.

R E P O R T : 2 4 3 9 8 2 / R 1 5 a

- **Determination of Electrical Resistance**
- Job Reference: 243982
- Date of Issue: 15/04/09



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Report Number: 243982/15a
Lab Reference: 243982
Date of Issue: 15/04/09

Commercial-in-confidence

Resilient Floor Coverings
Determination of Electrical Resistance

Sample Description

Description:	Elastomeric Decking Membrane
Product name:	Deckmaster System R
Name of supplier:	Deckmaster Ltd

Testing

Tested by:	B. Powers & T. McNally, Satra Technology Centre
Test standard/method:	BS EN 1081: 1998: Method A
Product applied by:	Client
Conditioning details:	Conditioned at 23°C, 50% RH for 28 days before testing
Date tested:	14-15/01/09
Nature of substrate:	Concrete to MC 0.40 to BS EN 1766: 2000
Number of specimens tested:	3
Size of test specimens:	Nominally 500mm x 500mm x 50mm

Results summary

Average vertical resistance (Ω): 0.28×10^{12}

Table 5 of BS EN 1504-2:2004 requires :
Class I $> 10^4$ and $< 10^6\ \Omega$
Class II $> 10^6$ and $< 10^8\ \Omega$

Final approval for and on behalf of BRE: Martyn Webb. Date: 15/04/09

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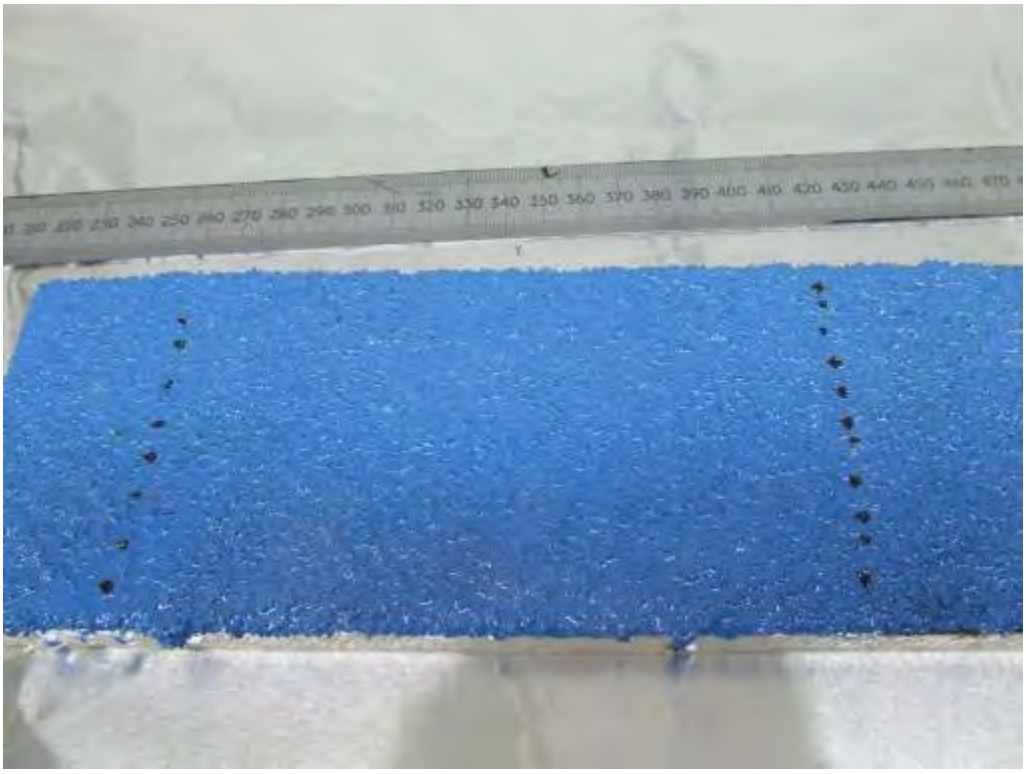
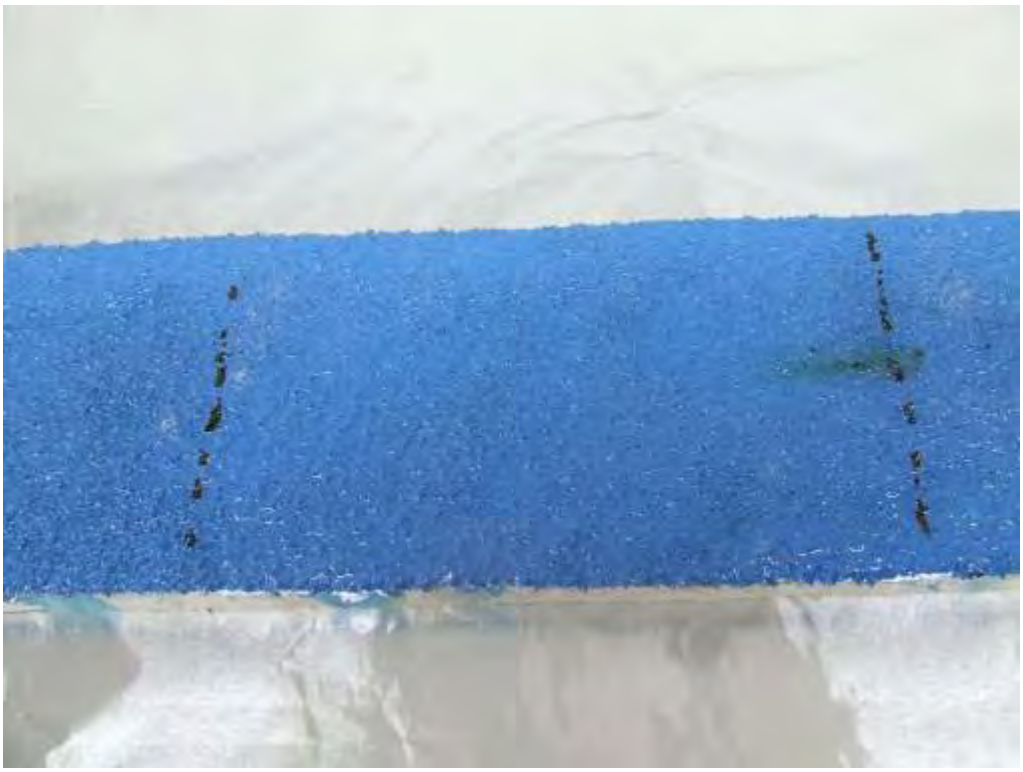
Results

Individual results (Ω)	Average (Ω)
0.242×10^{12} 0.279×10^{12} 0.308×10^{12} 0.256×10^{12} 0.301×10^{12} 0.279×10^{12}	**0.28×10^{12}**

R E P O R T : 2 5 2 2 2 7 a

- **Classification of reaction to fire performance BSEN 13501-1: 2007**
- Job Reference: 243982
- Date of Issue: 19/03/09





R E P O R T : 2 5 2 2 2 9 a

- **Reaction to fire tests BSEN ISO 11925-2: 2002**
- Job Reference: 243982
- Date of Issue: 02/03/09