



Industrial Research Services

Manufacturing & Infrastructure Technology, Graham Road (PO Box 56), Highett, Victoria, Australia 3190
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Registered Testing Authority - Building Code of Australia

28 April 2006

Our Ref. EN13 / 485 03/0212

TEST REPORT No. 3541.2s

Requested by: Malaysian Mosaics Berhad
on (date): 21 April 2006
Manufacturer: Malaysian Mosaics Berhad
Product Desc.: Star Crest Series, Colour R60 (Grey, ZXC), dust-pressed,
unglazed homogeneous tiles, 300 x 600mm

Sampling details:
Where: Delivered
Date: 24 April 2006
By whom: Courier
How (methods): N/A

The results reported relate only to the sample(s) tested and the information received. No responsibility is taken for the accuracy of the sampling unless it is done under our own supervision. CSIRO cannot accept responsibility for deviations in the manufactured quality and performance of the product. While CSIRO takes care in preparing the reports it provides to clients, it does not warrant that the information in this particular report will be free of errors or omissions or that it will be suitable for the client's purposes. CSIRO will not be responsible for the results of any actions taken by the client or any other person on the basis of the information contained in the report or any opinions expressed in it. The reproduction of this test report is only authorised in the form of a complete photographic facsimile. Our written approval is necessary for any partial reproduction.

This test report consists of 5 pages

SUMMARY OF SLIP RESISTANCE TESTS PERFORMED:

		Result	Class
AS/NZS 4586:2004	Slip resistance classification of new pedestrian surface materials Appendix A: WET Pendulum (Four S slider): Mean BPN:	37	X
AS/NZS 4586:2004	Slip resistance classification of new pedestrian surface materials Appendix C: WET/BAREFOOT Ramp Mean angle of inclination:	20°	B
AS/NZS 4586:2004	Slip resistance classification of new pedestrian surface materials, Appendix D: OIL-WET Ramp Mean overall acceptance angle:	12.6°	R 10

In order to interpret the classifications, please refer to Standards Australia Handbook 197, An Introductory Guide to the Slip Resistance of Pedestrian Surface Materials, which recommends minimum classifications for a wide variety of locations.

It is important to realise that test results obtained on unused factory-fresh samples may not be directly applicable in service, where proprietary surface coatings, contamination, wear and subsequent cleaning all influence the behaviour of the pedestrian surface.

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SLIP RESISTANCE CLASSIFICATION OF NEW PEDESTRIAN SURFACE MATERIALS

WET PENDULUM TEST METHOD

TEST CARRIED OUT IN ACCORDANCE WITH
 AS/NZS 4586:2004 (Appendix A)

Test Date: 24 April 2006

RESULTS: Location: Slip Resistance Laboratory
 Sample: Unfixed
 Cleaning: Acetone
 Temperature: 23°C
 Rubber slider used: Four S
 Conditioned with grade P400 paper, dry

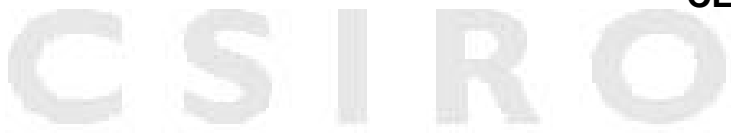
Pendulum Friction Tester: Stanley (S/N: 9234, calibrated 13/6/05)
 Test conducted by: David Weeks

	Specimen				
	1	2	3	4	5
Last 3 swings	35	35	42	36	36
	35	35	42	36	36
	35	35	41	36	36
Averages	35	35	42	36	36

Mean BPN : 37

CLASS :

X



Comments:
 Assessment of the tiles samples 90 degrees to the pattern produces higher slip resistance.



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SLIP RESISTANCE CLASSIFICATION OF NEW PEDESTRIAN SURFACE MATERIALS

WET/BAREFOOT RAMP TEST METHOD

TEST CARRIED OUT IN ACCORDANCE WITH
AS/NZS 4586:2004 (Appendix C)

Test Date: 26 April 2006

Location: Slip Resistance Laboratory

Sample Fixed

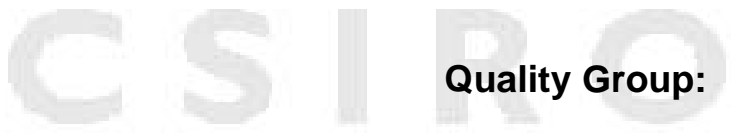
Joint width: mm

Surface structure: Smooth
 Profiled
 Structured

RESULTS

		Actual mean	Reported mean
Mean angle of inclination:	Calibration Board A:	11.98 °	12 °
	Calibration Board B:	17.01 °	17 °
	Calibration Board C:	24.34 °	24 °
Mean angle of inclination of Test Board:		19.93 °	20 °

CLASSIFICATION:



Quality Group:

B

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SLIP RESISTANCE CLASSIFICATION OF NEW PEDESTRIAN SURFACE MATERIALS

OIL-WET RAMP TEST METHOD

TEST CARRIED OUT IN ACCORDANCE WITH
AS/NZS 4586:2004 (Appendix D)

Test Date: 26 April 2006

Location: Slip Resistance Laboratory

Sample Fixed

Joint width: mm

Surface structure: Smooth
 Profiled
 Structured

RESULTS

Mean overall acceptance angle: 12.6 °

Displacement space: not tested

CLASSIFICATION:

Slip Resistance Assessment Group:

R 10

Displacement Space Assessment Group:

-



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Date and Place 28 April 2006, Highett, Vic

Name, Title and Digital Signature:



DAVID WEEKS
Technical Officer

Tel: 61 3 92526064
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Consulting services are available if further detailed analysis of the test results are required.

PR:W280406-10:56:16



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DETERMINATION OF Rz SURFACE ROUGHNESS

(Using a Taylor-Hobson Surtronic Duo roughness meter using a 0.8mm cut off length)

Test Date: 24 April 2006

RESULTS

Location: Slip Resistance Laboratory

Rz values

1	32.3
2	25.9
3	29.6
4	25.1
5	32.0
6	23.2
7	29.4
8	31.3
9	31.5
10	23.8

Surface Roughness (Rz) mean = 28.4 microns

BS 7976:2002, Pendulum Testers, requires a different test foot preparation (lapping paper) for pedestrian surfaces that have a Rz roughness of less than 15 microns. This lapping paper tends to reduce the pendulum result, sometimes appreciably. CSIRO recommends the use of this procedure (CSIRO COF1) as an adjunct to AS/NZS 4586. It helps to discriminate among products that have marginal wet slip resistance and to identify those that may be dangerous if wet.

The measurement of the various aspects of surface roughness is complex given the number of potential roughness parameters. While there is still some uncertainty as to exactly what type of roughness needs to be measured, peak-to-trough roughness (Rz) gives a useful guide to the likely slip resistance in wet conditions. Research has suggested that hard floors need to have a slightly higher Rz roughness than polymeric floors for the same degree of safety in wet conditions, but whatever flooring material is used an Rz roughness value of at least 10 microns is required where wet slip resistance may be required. In circumstances where wetness is normal or expected, this figure should be increased by a factor of 2 or more.

Greater peak surface roughnesses are likely to be required where floors slope or where the floor is likely to become contaminated with high viscosity liquids.