



# Industrial Research Services

Materials Science & Engineering, Graham Road (PO Box 56), Highett, Victoria, Australia 3190  
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## Registered Testing Authority - CSIRO

7 September 2009

Our Ref. EN13 / 1836 03/0212

### TEST REPORT No. 5050s

Requested by: PPM Enterprises Pty Ltd  
on (date): 2 September 2009  
Manufacturer: PPM Enterprises Pty Ltd  
Product Desc.: Basalt - sawn cut  
300x600

Sampling details:  
Where: Delivered  
Date: 3 September 2009  
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 4 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:	68	V [HIGH*]
AS/NZS 4586:2004	Slip resistance classification of new pedestrian surface materials, Appendix D: OIL-WET Ramp Mean overall acceptance angle:	31.5°	R 12 [MEDIUM*]

\* = CSIRO classification

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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Page 2 of 4

## 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: 4 September 2009

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

Pendulum Friction Tester: Munro-Stanley (S/N: 9234, calibrated 13/09/07)  
Test conducted by: David Weeks

	Specimen				
	1	2	3	4	5
Last 3 swings	69	69	70	70	67
	68	69	69	69	66
	68	68	69	69	66
Averages	68	69	69	69	66

Mean BPN : 68

CLASS :

V [HIGH\*]

\* = CSIRO classification

Where products are to be used in wet barefoot areas, it is more appropriate to test to Appendix C of AS/NZS 4586 (which is technically equivalent to DIN 51097).

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Page 3 of 4

**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: 7 September 2009

Location: Slip Resistance Laboratory

Sample Fixed

Joint width: 0 mm

Surface structure:  Smooth  
 Profiled  
 Structured

**RESULTS**

**Mean overall acceptance angle:** 31.5 °

**Displacement space:** not tested

**CLASSIFICATION:**

**Slip Resistance Assessment Group:**

**R 12 [MEDIUM\*]**

**Displacement Space Assessment Group:**

-

\* = CSIRO classification

REPORT NO: 5050s  
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Page 4 of 4

Date and Place 7 September 2009, Highett, Vic

Name, Title and Digital Signature:



**DAVID WEEKS**  
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 Email: David.Weeks@csiro.au

**\*CSIRO recommended classification of Slip Resistance as determined from:  
 AS/NZS 4586: 2004 Slip Resistance Classification of New Pedestrian Surface Materials (Appendices A & D).**

Wet Pendulum Class	BPN 4S Rubber	CSIRO Class LOW	CSIRO Class MEDIUM	CSIRO Class HIGH
V	>54	54-57	58-61	>61
W	45-54	45-48	49-51	52-54
X	35-44	35-38	39-41	42-44
Y	25-34	25-28	29-31	32-34
Z	<25	<18	18-21	22-25
Oil Wet Ramp Class	Angle (degrees)	CSIRO Class LOW	CSIRO Class MEDIUM	CSIRO Class HIGH
R9	≥6 to <10	≥6 to 7.5	7.6 to 9	9.1 to 9.9
R10	≥10 to <19	≥10 to 12	12.1 to 15	15.1 to 18.9
R11	≥19 to <27	≥19 to 21	21.1 to 24	24.1 to 26.9
R12	≥27 to <35	≥27 to 29	29.1 to 32	32.1 to 34.9
R13	≥35	≥35 to 36	36.1 to 38	≥38.1

This table should not be read or relied upon without reference to the CSIRO/Standards Australia publication:  
 AS/NZS 4586 Slip Resistance Classification of New Pedestrian Surface Materials (Appendices A & D).

CSIRO has categorized the AS4586 classifications into sub-groups Low, Medium & High. The slip resistance test classification is still determined according to AS 4586 Australian Standard (Appendices A & D). The added information of Low, Medium and High allows professionals to make a better judgement of pedestrian floor requirements.



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Addendum

## DETERMINATION OF Rz SURFACE ROUGHNESS

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

Test Date: 4 September 2009

### RESULTS

Location: Slip Resistance Laboratory

#### Rz values

1	17.9
2	28.1
3	20.8
4	34.7
5	26.1
6	37.8
7	32.4
8	43.3
9	33.8
10	29.6

**Surface Roughness (Rz) mean = 30.5 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.