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Slip resistance testing in the wet condition:

AS 4586: 2013

Resene Paints: ProSelect AntiSlip

Testing and reporting by Tiffany Lester

Review by Iain McIver

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SLIP RESISTANCE TESTING IN THE WET CONDITION	
NAME	RESENE PAINTS: PROSELECT ANTISLIP
Description	ProSelect AntiSlip coating, described as waterborne PU with medium-coarse silica beads, applied to hardwood flooring substrate.
Sampling	One specimen was prepared and supplied by the client. The ProSelect Antislip product was applied to a section of hardwood flooring approximately 1,220 x 110 mm. Tests were conducted and spaced along the length of the specimen.

TESTING IN THE WET CONDITIONS			
Test and report	Tiffany Lester	**Review**	Iain McIver
Date of testing	13 November 2017	**Location**	Opus Research, Petone
Slider	Slider 96	**Conditions**	20 °C, 47 % RH
Method	**AS 4586: 2013 Slip resistance classification of new pedestrian surface materials Appendix A Wet Pendulum Test Method (A6 for laboratory testing).** The mean British Pendulum Number (BPN) for each test specimen is reported and the Slip Resistance Value (SRV) is the mean BPN value for the sample. The SRV is reported and classified using AS 4586: 2013 Table 2 “Classification of Pedestrian Surface Materials According to the AS 4586 Wet Pendulum Test”.		
Information on the pedestrian slip resistance testing and requirements is on following pages.			

RESULTS: PROSELECT ANTISLIP					
Specimen	1	2	3	4	5
Mean BPN	48	49	49	47	47
THE PROSELECT ANTISLIP SAMPLE **SRV IS 48** AND THE SAMPLE IS CLASSIFIED AS **P4**.					

COMMENTS
These results are only valid for these samples for the condition in which they were received and tested. Factors such as application rates or techniques, pedestrian or other trafficking, wear, contamination, dirtying, and/or maintenance procedures may alter the in-service friction characteristics.
Tests were conducted only along the specimen. It is judged that consistent product application would be homogenous in terms of directionality of testing and its wet pedestrian slip resistance.

The following information is provided to direct users of this test report to some of the more relevant documents. It does not necessarily represent all slip resistance requirements potentially applicable and it is not intended to replace reading of the documents referred to.

New Zealand Building Code Clause D1: Access Routes

An "access route" is defined in the New Zealand Building Code (NZBC) as "a continuous route that permits people and goods to move between the apron or construction edge of the building to spaces within a building, and between spaces within a building." NZBC Clause D1 section 2.1.2 states level access routes expected to become wet with water in normal use shall have a **slip resistance value (SRV) of not less than 39** when tested as described in Appendix A of AS 4586 using the Slider 96 rubber.

AS 4586: 2013

The testing that was applied was in accordance with the Australian Standard AS 4586: 2013 "Slip resistance classification of new pedestrian surface materials". Handbook HB 198 "Guide to the specification testing of slip resistance of pedestrian surfaces" provides guidance on slip resistance of pedestrian surfaces including guidance and commentary on AS 4586: 2013.

AS 4586: 2013 provides test methods for classifying pedestrian surface materials according to their frictional characteristics. The test methods enable characteristics of surface materials to be determined in either wet or dry conditions. If a pedestrian surface is liable to become wet, and remain wet and unattended for any significant length of time, it should be tested and classified for the wet condition. There is little or no correlation between a surface's pedestrian slip resistance performance in the dry condition and that performance in the wet condition.

AS 4586: 2013 provides four test methods:

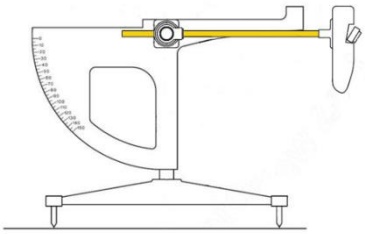
- Wet pendulum test method;
- Dry floor friction test method;
- Wet-barefoot inclining platform test method; and
- Oil-wet inclining platform test method.

The inclining platform test methods require specialised equipment not widely available and not used in the testing reported here. The dry floor test method is set out in Appendix B of the Standard and utilises a floor friction tester. These methods and the equipment will not be discussed further in this report. The wet pendulum test method is set out in Appendix A of AS 4586: 2013. The method utilises a pendulum friction tester and provides the procedure for determining the Slip Resistance Value (SRV) for a sample. The SRV is classified according to Table 2 of AS 4586: 2013, reproduced here:

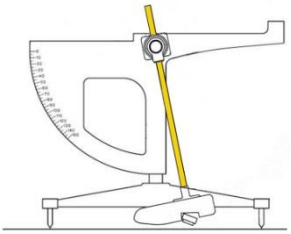
Classification of pedestrian surface materials according to the AS 4586 wet pendulum test		
Classification	Pendulum slip resistance value (SRV)	
	Slider 96	Slider 55
P5	> 54	> 44
P4	45 – 54	40 – 44
P3	35 – 44	35 – 39
P2	25 - 34	20 - 34
P1	12 – 24	< 20
P0	< 12	

The British Pendulum Tester

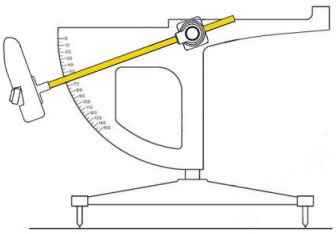
The particular type of pendulum friction tester used in the testing reported here is known as a British Pendulum Tester or the Transport Road Research Laboratory (TRRL) portable skid-resistance tester. The pendulum friction tester has a rigid swinging arm, approximately 450 mm long, which contacts the test surface with a spring-loaded rubber slider (about 75 mm by 20 mm) mounted on a weighted foot. The pendulum arm swings the foot downwards through 90°, so the foot strikes the test surface when the pendulum arm is near vertical. The pendulum arm length is set so the rubber slides along the test surface for a distance between 125 and 127 mm, losing energy as it does so, and that energy loss being related to the frictional resistance of the test surface. After sliding the rubber along the test surface, the pendulum arm then swings upwards alongside a scale to provide a direct reading of the British Pendulum Number (BPN). A higher BPN implies the surface has higher friction.



Pendulum arm horizontal ready to start swing



Rubber slider on pendulum arm about to contact ground



Height of pendulum arm swing against numerical scale

Rubber slider material

The wet pendulum test method brings a rubber slider in contact with the pedestrian surface under test. For AS 4586: 2013 wet pendulum test method, there are two possible rubber slider types that can be used; Slider 96 or Slider 55.

Slider 96 is harder than Slider 55. Slider 96 was specifically developed as a standard simulated shoe sole rubber. It is considered to provide greater discrimination between smoother pedestrian surfaces.

Slider 55 is softer than Slider 96. It has traditionally been used for testing outdoor surfaces. The performance of this softer rubber slider is dependent on temperature, producing higher results in temperatures below 18°C and lower results in temperatures 24°C and above. The wet floor test method in AS 4586: 2013 includes a table of temperature corrections for results obtained using the Slider 55.

For the wet pendulum test method, the rubber sliders are conditioned prior to testing of a sample. For the AS 4586: 2013 wet pendulum test method, the rubber slider is conditioned over Grade P 400 wet and dry abrasive paper followed by further conditioning over a 3 micron lapping film. The foreword to AS 4586: 2013 explains the lapping film conditioning enables better differentiation between pedestrian surfaces, particularly smoother surfaces.

Ramps/sloping surfaces

The wet pendulum test results represent the slip resistance for the test surface in the horizontal plane.

NZBC Clause D1 section 2.1.5 states AS 4586: 2013 Appendix F shall be used to derive the appropriate slip classification for walking surfaces at various slopes. AS 4586: 2013 Appendix F relates slip resistance required in the horizontal plane to that required on a sloped plane using the following relationship:

Frictional requirement for a ramp ≈ frictional requirement in the horizontal plane + 0.0125S

where S is the slope (%) of the walking surface. The original documents should be referred to for background and explanation of how this relationship is applied.