ATTAR TEST REPORT NUMBER 14/8224.1

1 October 2014 Total Pages: 4

PAVER PROPERTIES

Job No: M14/8224

Prepared for:

SAI Sandstone
ATTENTION: Mr Bob Lu
5 Hamilton Street
OAKLEIGH VIC 3166

Subject:

SLIP RESISTANCE & SALT ATTACK PROPERTIES OF TUMBLED AND UNFILLED TRAVERTINE PAVERS

Introduction:

You requested that we carry out slip resistance testing and determining the resistance to salt attack on the travertine pavers you supplied.

Sample Description:

Classic Travertine Tumbled and Unfilled, 200x100x12 mm, Figure 1.

The tests requested on this sample were as follows:

- Wet Pendulum Test to AS 4586: 2013, Appendix A [1]
- Determining resistance to salt attack to AS/NZS 4456.10: 2003 [2]

The slip resistance testing was conducted by ATTAR and the full report is attached as Appendix 1. The resistance to salt attack testing was carried out by Brick & Mortar Research Laboratory (BMRL) and the full report is attached as Appendix 2. The results have been summarised on the following pages.

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Results:

Wet Pendulum Slip Resistance

The full report for the Wet pendulum Slip Resistance Test is attached in Appendix 1. The results may be summarised as follows.

Sample	Temp °C	British Pendulum Number						Classification
		Specimen Number					SRV^	
		1	2	3	4	5		
Classic Travertine Tumbled and Unfilled.	21	49	52	52	48	52	51	**P4**

These results apply only to the specimens and areas tested.
^ Slip Resistance Value (SRV).

Determining resistance to salt attack

The full report for the Resistance to Salt Attack is attached in Appendix 2. The results may be summarised as follows.

Sample	Test solution	Mass loss %						Rating
		Specimen Number					Mean	
		6	7	8	9	10		
Classic Travertine Tumbled and Unfilled.	Sodium sulfate	0.03	0.01	0.03	0.00	0.00	0.01	**Exposure grade***

*From Table 2.3, AS/NZS 4455.1: 2003.

NOTE: Any specimens supplied will be disposed of in two (2) months time, unless otherwise instructed.

ATTAR

Marcus Braché
Senior Engineering Technician

Reviewed by:

Daniel King BEng (Mats) Hons,
Materials and Testing Engineer

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References:

1. Australian Standard AS 4586: 2013 Slip Resistance Classification of New Pedestrian Surface Materials, Standards Australia, Sydney, NSW.

2. Australian and New Zealand Standard AS/NZS 4456.10: 2003 Masonry units and segmental pavers and flags - Methods of test - Determining resistance to salt attack, Standards Australia, Sydney, NSW.

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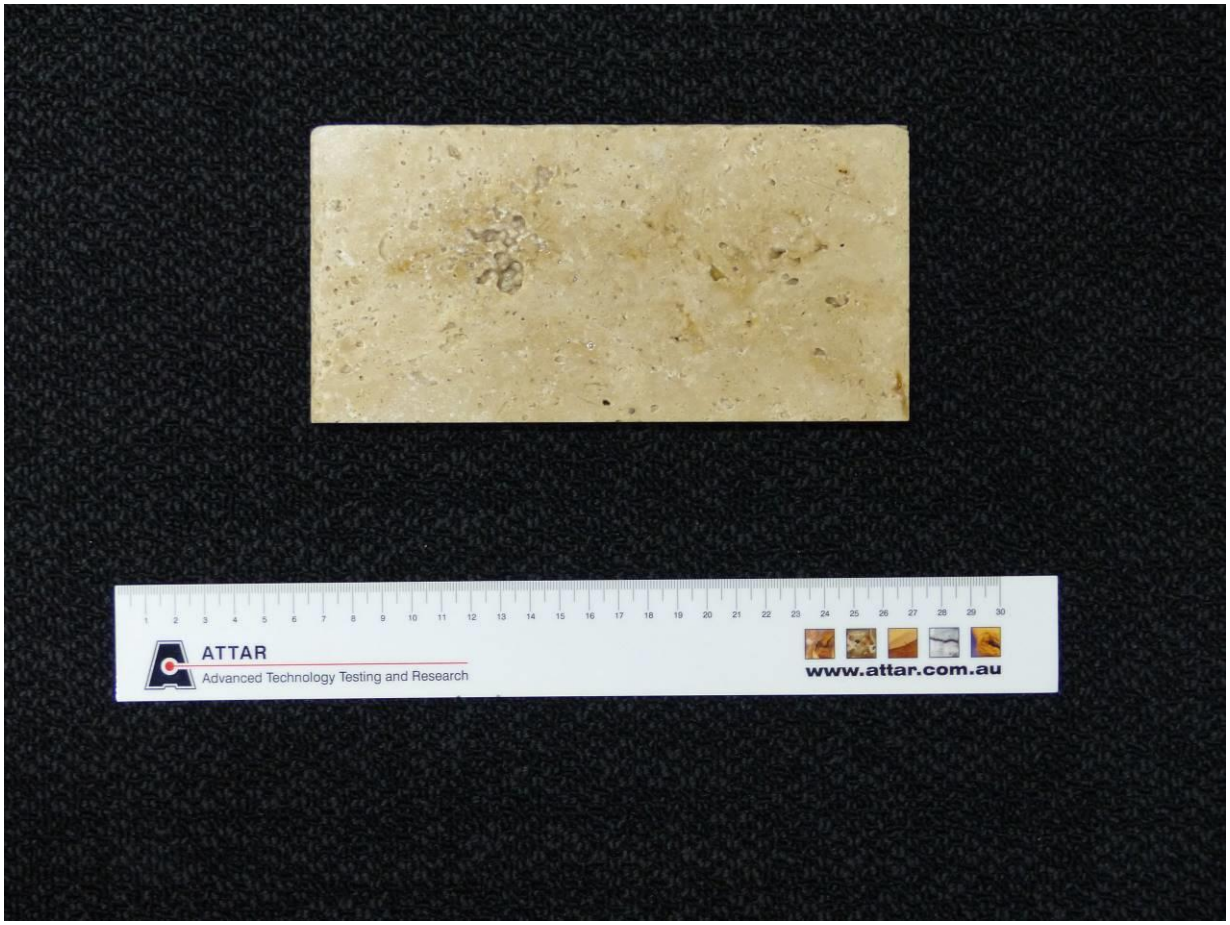

Figure 1: Classic Travertine Tumbled and Unfilled.

APPENDIX 1

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1 October 2014

Total Pages: 2

WET PENDULUM SLIP RESISTANCE

Job No: M14/8224

Prepared for:	SAI Sandstone 5 Hamilton Street OAKLEIGH VIC 3166
Attention:	Bob Lu
Test Site:	ATTAR, Unit 1, 64 Bridge Road, Keysborough.
Test Date:	24 September 2014
Test Specimens, Size & Quantity:	Classic Travertine Tumbled and Unfilled tile, 200mm x 100mm, 6 off supplied, 5 off tested.
Sampling & Direction of Testing:	Sampling conducted by client. Test direction not applicable.
Test Personnel:	Chris Peake
Preparation:	Washed with water and methylated spirits, rinsed then dried.
Fixed/Unfixed:	Unfixed.
Air Temperature:	21°C
Test Equipment:	Munro Stanley Skid Resistance Tester (Pendulum) Serial Number 0320, Calibrated 16/10/2013.
Test Standard:	AS 4586: 2013 Slip resistance classification of new pedestrian surface materials – Appendix A.
Slider Rubber:	Slider 96 Batch No. #54 prepared on P400 & 3µm lapping film.
Classification Criteria:	Refer to Classification Criteria attached.

British Pendulum Number	**Specimen Number**					**SRV**
	1	**2**	**3**	**4**	**5**	
	49	52	52	48	52	51
Classification:	**P4**					

These results apply only to the specimens tested and it is recommended that before selection of flooring or paving materials the effect of service conditions, including maintenance procedures and wear on their slip-resistance be checked.

NOTE: Any specimens supplied will be disposed of in two (2) months time, unless otherwise instructed.

ATTAR

Daniel King BEng (Mats) Hons,
Materials and Testing Engineer
Approved Signatory

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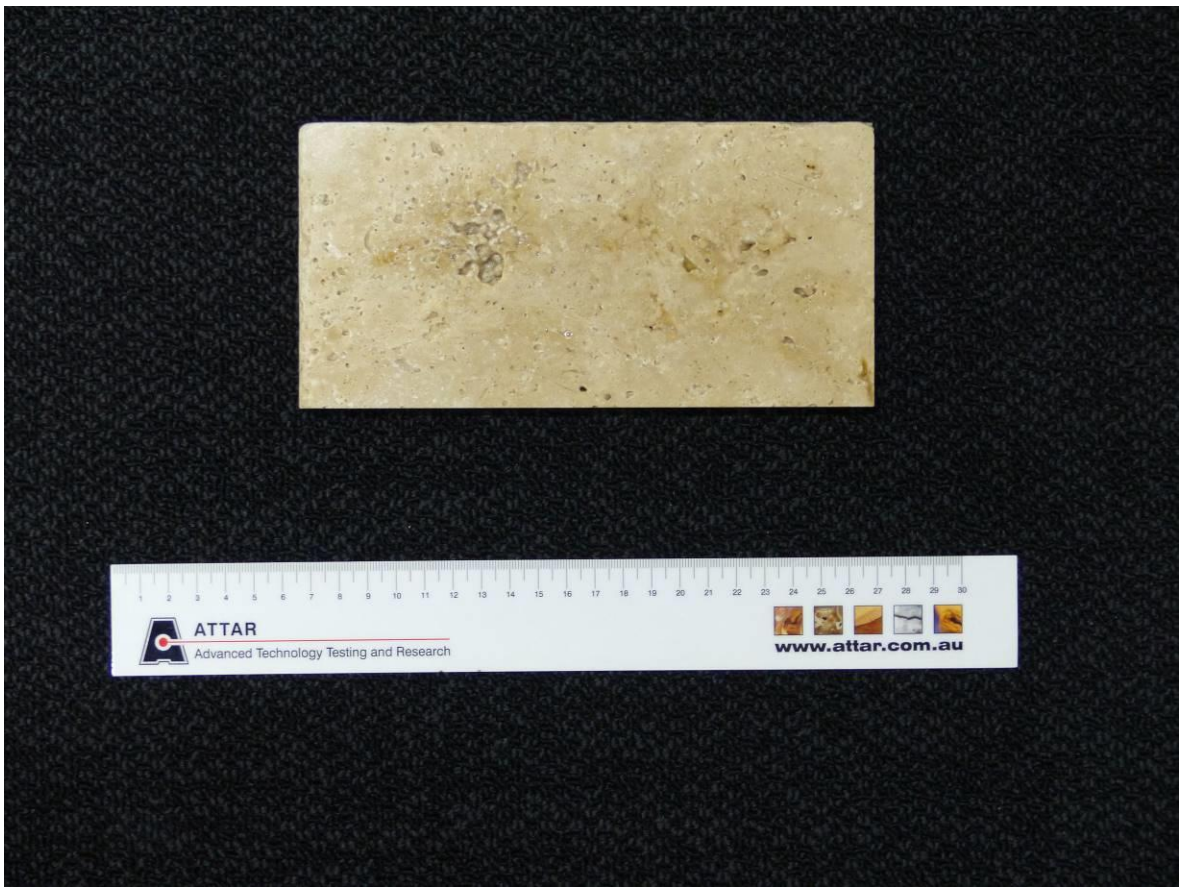

Figure 1: Classic Travertine Tumbled and Unfilled tile.

CLASSIFICATION CRITERIA – AS 4586 - 2013

Slip resistance

Pedestrian surfaces shall be classified using at least one of the combinations given in Table 1 and shall be reported as noted.

When this Standard is used for the testing and classification of the slip resistance of carpets (or carpet-like products) in potentially wet locations, the carpet shall be tested using the wet pendulum test method set out in Appendix A, and shall be reported as such.

When this Standard is used for the testing and classification of the slip resistance of carpets in dry locations, the test shall be carried out in the dry condition using the pendulum test method set out in Appendix A modified in accordance with Paragraph A2, and shall be reported as such.

The 'dry floor friction' test method in Appendix B is not suitable for heavily profiled surfaces or carpets.

Compliance

The surface shall comply with the stated classification for the test method and test rubber that is nominated and declared by the manufacturer or supplier.

The testing and classification of new pedestrian surface materials shall be in accordance with one or more of Tables 2, 3, 4 or 5.

TABLE 1

TEST AND CLASSIFICATIONS COMBINATIONS

Test conditions	Test method	Classification table to be used
Wet pendulum	Appendix A	Table 2
Wet pendulum and dry floor friction	Appendices A and B	Tables 2 and 3
Dry floor friction	Appendix B	Table 3
Wet-barefoot inclining platform	Appendix C	Table 4
Oil-wet inclining platform	Appendix D	Table 5

TABLE 2

CLASSIFICATION OF PEDESTRIAN SURFACE MATERIALS ACCORDING TO THE AS 4586 WET PENDULUM TEST

Class	Pendulum SRV (see Note 1)	
	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	

NOTES:
1 While Slider 96 or Slider 55 rubbers may be used, the test report shall specify the rubber that was used.
2 It is expected that these surfaces will have greater slip resistance when dry.
3 SDV may be calculated by using the tables that are given in Appendix F, and the minimum SRV that is considered appropriate for a level surface (see examples given in Appendix F).

TABLE 3

CLASSIFICATION OF PEDESTRIAN SURFACE MATERIALS ACCORDING TO THE DRY FLOOR FRICTION TEST

Classification	Floor friction tester mean value
D1	≥0.40
D0	<0.40

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TABLE 4

CLASSIFICATION OF PEDESTRIAN SURFACE MATERIALS ACCORDING TO THE WET-BAREFOOT INCLINING PLATFORM TEST

Classification	Angle, degrees
No Classification	$<\alpha_{barefoot}$ Verification Surface A
A	$>\alpha_{barefoot}$ Verification Surface A $<\alpha_{barefoot}$ Verification Surface B
B	$\geq\alpha_{barefoot}$ Verification Surface B $<\alpha_{barefoot}$ Verification Surface C
C	$\geq\alpha_{barefoot}$ Verification Surface C

TABLE 5

CLASSIFICATION OF PEDESTRIAN SURFACE MATERIALS ACCORDINGTO THE OIL-WET INCLINING PLATFORM TEST

Classification	Angle, degrees
No Classification	<6
R9	≥6 <10
R10	≥10 <19
R11	≥19 <27
R12	≥27 <35
R13	≥35

Means of demonstrating compliance

Pedestrian surfaces that are classified in accordance with Table 2 and, where appropriate, Table 3 shall meet the following criteria:

(a) The mean test results shall be as follows:

(i) For the classifications in Table 2, the mean of the test results shall be—
(A) within the relevant criteria set out in the table; and
(B) each individual result shall be equal to or above the lower limit for the classification or, if below the classification, within the mean of the result minus 20%.

If either criteria is not met, the lot shall be considered to be of lower classification.

(ii) For Classification D1 in Table 3—
(A) the mean of the test results shall be equal to or greater than 0.4; and
(B) each individual slope corrected result shall be equal to or greater than 0.35.

If either of these criteria is not met, the lot shall be considered to be Classification D0.

(b) The classification in accordance with Table 2 or 3 shall be determined by—

(i) selecting and testing at least five specimens at random as specified in Appendices A and B; or

(ii) carrying out continuous testing and process control in accordance with AS 3942.

(c) When testing individual lots, if a particular test fails to produce the expected classification it shall be permissible to—

(i) disregard the first sample, resample a minimum of 10 specimens from the whole lot, retest and apply the criteria to the new sample; or

(ii) subdivide the lot into smaller lots of different quality, resample, retest and reclassify each of the smaller lots.

APPENDIX 2

BMRL

BRICK & MORTAR RESEARCH LABORATORY

A trading division of Sharp & Howells Pty Ltd ACN 004 782 996 ABN 26 004 782 996

NATA Accredited Laboratory No 658

FACTORY 2, 2 HORNE ST HOPPERS CROSSING VIC 3029 PH/FAX: (03) 9369 8018 MOB: 0419 592 838 EMAIL: bmrl@bigpond.com WEBSITE: bmrl.com.au

TEST CERTIFICATE NO 8340b

DATE: 30/9/14

EVALUATION OF TRAVERTINE

CLIENT: ATTAR
Unit 1, 64 Bridge Rd
Keysborough Vic 3173

SAMPLE: Pieces of 12 mm thick travertine, tumbled & unfilled

SAMPLER: Client

RECEIVED: 3/9/14

DATE OF TESTING: 8 to 30 September 2014

TEST	METHOD OF TEST
Determination of:	
Resistance to salt attack	AS/NZS 4456.10-2003

NATA Accredited Laboratory Number 658

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian / national standards.
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

Stuart Errey
MRACI, C Chem
Manager

Test Certificate No 8340b 30/9/14

RESISTANCE TO SALT ATTACK

Test solution: sodium sulfate
Test method: method A

Specimen no	6	7	8	9	10
Mass loss, %	0.03	0.01	0.03	0.00	0.00

Mean mass loss: 0.01%.

Rating: ***Exposure grade*** *(from Table 2.3, AS/NZS 4455.1-2003)*