5 February 2015



Prestige Surfaces Australia Pty Ltd
PO Box 418
Burwood VIC 3125

Attention: Mr Matt Nash

#JUSTSEALIT Plus Sealer

Determination of water repellency and resistance to salt attack

Client reference: Req. Mr. M Nash

Our reference: PSA0615-1 PT2

Investigating officers: James P Mann, Mark Milevski, Kate Tonkin & Graham Baggs

Report prepared by: Graham Baggs & James P. Mann

James P Mann
Laboratory Manager

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1 INTRODUCTION

Stone Initiatives received a request from the client to evaluate #JUSTSEALIT Plus sealer. The aim of the testing was determine:

- the reduction in absorption rate of moisture into a sample of sandstone.
- the effectiveness of the products in reducing the decay (i.e. weight loss) by salt attack.

2 TEST PROGRAM

Two sets of sandstone specimens were provided for testing. The sets were identified as follows:

- Control – unsealed 4 pieces (our reference Q565)
- #JUSTSEALIT Plus - 5 pieces (our reference Q567)

2.1 Water Absorption

The sealed specimens were allowed to air-dry for a minimum of 24 hours and then weighed prior to commencement of testing.

The dimensions of each specimen were determined (±0.1mm) to allow calculation of the surface area and subsequent calculation of water absorption rate per square metre.

The specimens were immersed in potable water at 20±2°C to a cover of 20mm. The water absorption rate was determined by weighing the samples at the following elapsed times:

- 30 minutes, 1hour, 2 hours, 3 hours, 5 hours, & 48 hours

Water absorption weights and surface area measurements were used to determine absorption over the surface area of each sample (ml / square metre) at each elapsed time.

2.2 Resistance to Salt Attack (Durability)

The resistance to salt attack of the sealed and unsealed specimens was determined according to Method A of AS/NZS 4456.10:2003 "Masonry Units and Segmental Pavers- Methods of Test - Method 10: Determining Resistance to Salt Attack". This involved subjecting the specimens to 15 cycles of soaking in a 6.2% sodium sulphate solution for a period of 2 hours followed by overnight drying at 65˚C.

3 TEST RESULTS

3.1 Water Absorption Rate

The effect of treatment of the sandstone with the sealer is summarized in the charts below.

Table 1 below shows the volume of water absorbed per square metre of surface area at each time interval.

Elapsed Time (Hours)	Total absorption - ml/m² - Mean (Range)	
	Control - Unsealed	Sealer #JUSTSEALIT Plus
0.50	0.9 (0.7 - 1.2)	0.0 (0.0 - 0.0)
1.00	1.0 (0.8 - 1.2)	0.0 (0.0 - 0.1)
2.00	1.1 (0.9 - 1.2)	0.1 (0.0 - 0.1)
3.00	1.1 (1.0 - 1.2)	0.1 (0.1 - 0.1)
5.00	1.1 (1.0 - 1.2)	0.2 (0.1 - 0.2)
48.00	1.2 (1.0 - 1.3)	0.7 (0.7 - 0.7)

Table 1 – Total Water Absorption

The charts below show the individual absorption rate for each specimen.

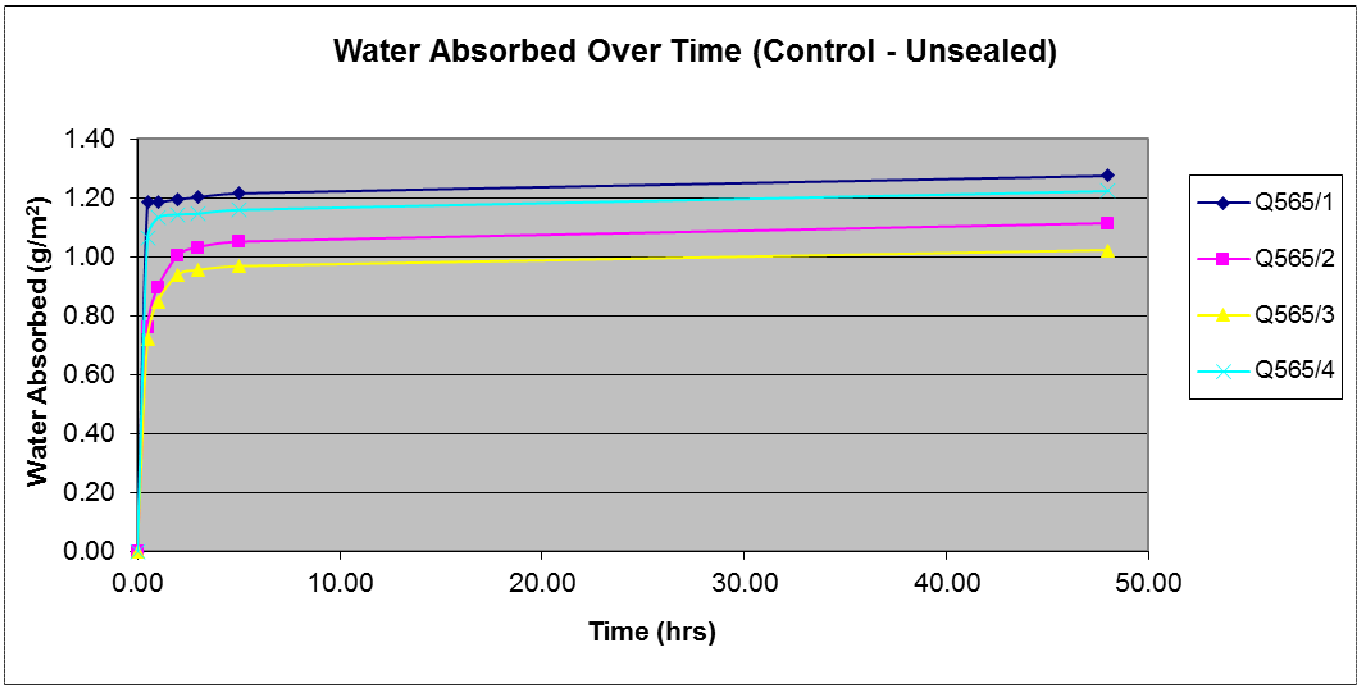


Chart 1 – Water absorption of control sample (unsealed)

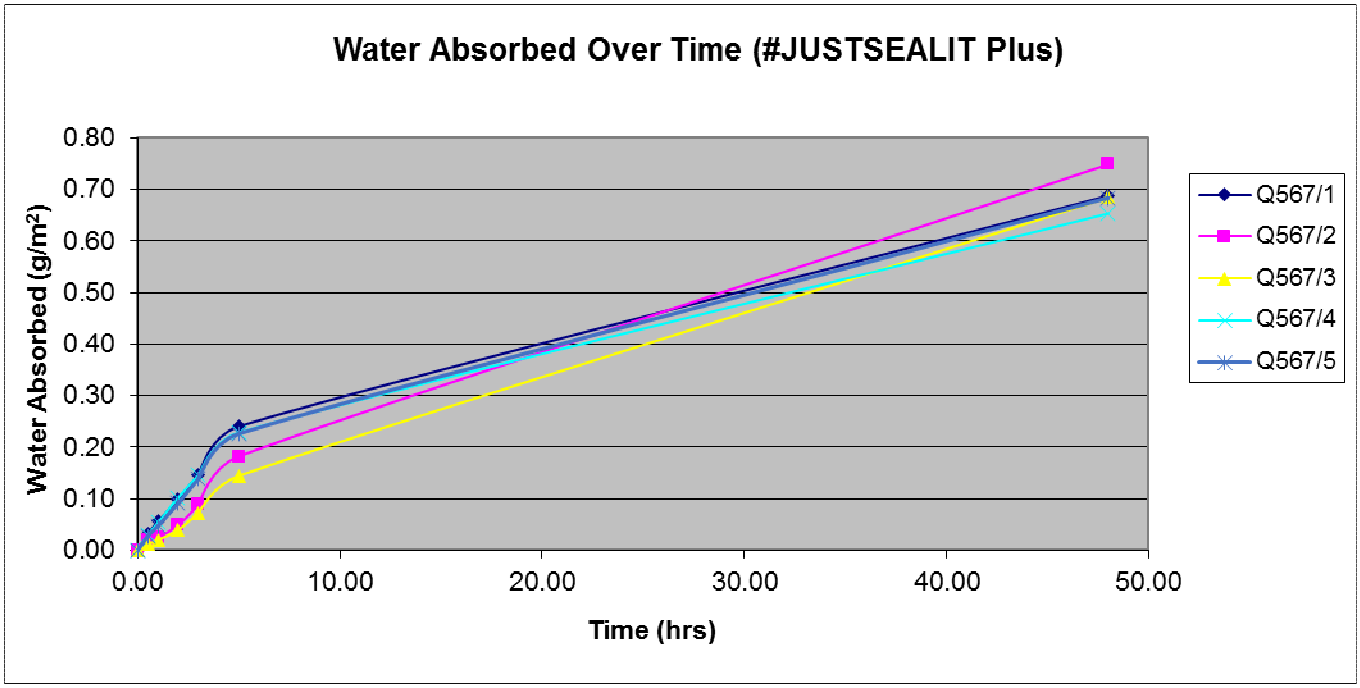


Chart 2 – Water absorption of sample – sealed with #JUSTSEALIT Plus

3.2 Discussion

3.2.1 Short Term (less than 1 hour)

The #JUSTSEALIIT Plus sealer significantly improved the resistance to water when compared to the unsealed control. The reduction in water uptake is *approximately* 90%.

3.2.2 Medium Term (up to 5 hours)

Over the medium term dwell, the #JUSTSEALIT Plus sealer provided significant resistance to water uptake, providing approximately 82% reduction in water uptake compared to the unsealed control sample.

3.2.3 Long Term (up to 2 days)

In the long term, the #JUSTSEALIT Plus sealer provided a 42% reduction in water uptake.

4 Resistance to Salt Attack

The effect of the application of the sealer in reducing the decay by salt attack (determined by weight loss of the samples) is shown in the tables below. Full test results are detailed in Appendix A of this report.

Resistance to Salt Attack	Unsealed control	#JUSTSEALIT Plus
• Weight loss (%)	6.7	0.1
Mode of decay	Severe surface pitting and moderate to severe crumbling of edges	Slight to moderate surface pitting

Discussion

According to the Australian standard[1] the durability of pavers and flags is determined by evaluating its resistance to salt attack and is quantified by the mass lost by the sample on completion of the test.

The unsealed control sandstone specimens suffered a 6.7% loss from attack by salt. The specimens that were treated on all six sides with #JUSTSEALIT Plus suffered just 0.1% mass lost to salt attack which represents approximately 98% improvement in durability when compared to the unsealed control specimens.

[1] AS NZS 4455.2-2010 Masonry units pavers flags and segmental retaining wall units - Pavers and flags

Appendix A

Test Certificates

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ASTM INTERNATIONAL MEMBER

RESISTANCE TO SALT ATTACK - SODIUM SULPHATE

Test Certificate

TEST METHOD	AS/NZS 4456.10-2003 Method A		
TEST DATE	27-Jun-15 to 20-Jul-15		
CLIENT	Prestige Surfaces Australia Pty Ltd		
OUR REFERENCE	PSA0615-1		
SAMPLE	Unsealed Sandstone (Control)		
SURFACE FINISH	Sawn		
SAMPLE ORIGIN	Not Known		
SAMPLING DATE	Not Known	**SAMPLE LOCATION**	Not Known
SHAPE and NOMINAL SIZE	Prism: 50mm x 100mm		
WORK SIZE	N/A - Raw material evaluation		
SOLUTION USED	6.2% Sodium Sulphate		

Conditioning: Dried for minimum 48 hours @ 65 deg C

Test Number	Specimen Identification	Initial Mass (g)	Mass Loss (g)	Loss after 15 Cycles (%)	Mode of Decay
X2618	Q565/1	377.51	24.00	6.36%	SV SP; MD CE
X2619	Q565/2	380.24	29.39	7.73%	SV SP; SV CE
X2620	Q565/3	375.10	20.00	5.33%	SV SP; MD CE
X2621	Q565/4	421.48	31.48	7.47%	SV SP; SV CE

MEAN MASS LOSS **6.72% ± 0.03** (U_{95})

Standard Deviation: **1.1**

Key to Mode of Decay

Degree	Type
VSL= Very Slight	SP= Surface pitting
SL= Slight	CE= Crumbling of edges
MD= Moderate	CR= Cracking
SV= Severe	DL= Delamination
	EX= Exfoliation

NOTE: The expanded measurement uncertainty values (u95) quoted in this report are at a confidence level of 95 % with a nominal coverage factor of 2. These values do not include any estimate of the effects associated with sampling.

COMMENTS/VARIATIONS Modified specimen size

TESTED BY: Graham Baggs

APPROVED SIGNATORY:

NAME: Graham J Baggs

ISSUE DATE: 21-Jul-15

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ASTM INTERNATIONAL MEMBER

RESISTANCE TO SALT ATTACK - SODIUM SULPHATE

Test Certificate

TEST METHOD		AS/NZS 4456.10-2003 Method A	
TEST DATE		27-Jun-15 to 20-Jul-15	
CLIENT		Prestige Surfaces Australia Pty Ltd	
OUR REFERENCE		PSA0615-1	
SAMPLE		Sandstone sealed with #JUSTSEALIT Plus	
SURFACE FINISH		Sawn & sealed	
SAMPLE ORIGIN		Not Known	
SAMPLING DATE	Not Known	**SAMPLE LOCATION**	Not Known
SHAPE and NOMINAL SIZE		Prism: 50mm x 100mm	
WORK SIZE		N/A - Raw material evaluation	
SOLUTION USED		6.2% Sodium Sulphate	

Conditioning: Dried for minimum 48 hours @ 65 deg C

Test Number	Specimen Identification	Initial Mass (g)	Mass Loss (g)	Loss after 15 Cycles (%)	Mode of Decay
X2627	Q567/1	379.85	0.52	0.14%	SL SP
X2628	Q567/2	362.99	0.03	0.01%	SL SP
X2629	Q567/3	407.48	0.11	0.03%	SL SP
X2630	Q567/4	396.59	0.75	0.19%	MD SP
X2631	Q567/5	381.96	0.73	0.19%	MD SP

MEAN MASS LOSS **0.11% ± 0.03** (u_{95})

Standard Deviation: **0.1**

Key to Mode of Decay

Degree	Type
VSL= Very Slight	SP= Surface pitting
SL= Slight	CE= Crumbling of edges
MD= Moderate	CR= Cracking
SV= Severe	DL= Delamination
	EX= Exfoliation

NOTE: The expanded measurement uncertainty values (u95) quoted in this report are at a confidence level of 95 % with a nominal coverage factor of 2. These values do not include any estimate of the effects associated with sampling.

COMMENTS/VARIATIONS Modified specimen size

TESTED BY: Graham Baggs

APPROVED SIGNATORY:

NAME: Graham J Baggs



ISSUE DATE: 27-Jul-15

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