TESTING OF BATHROOM WERX COATING

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Prepared for:	Bathroom Werx 3 Harrow Street, Preston, VIC, AUSTRALIA, 3072
Agreement:	2014030839
Report No:	XC3257
Issue date:	17 March 2014

REPORT XC3257R1

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1.0 INTRODUCTION

At the request of Mr. John Yammouni, National Operations Manager, Bathroom Werx, CSIRO was requested to test panels coated with Bathroom Werx Enamel coating. This coating is manufactured by Bathroom Werx and is used to resurface bathtubs, basins, shower bases and wall tiles.

CSIRO undertook the following tests on the panels coated with the Bathroom Werx Enamel coating:

- Adhesion (cross cut) using AS/NZS 1580 Method 408.4
- Adhesion (pull off) using AS/NZS 1580.408.5:1994
- Impact resistance using AS 1580 Method 406.1
- Chemical Resistance using ASTM D1308-02 'Effect of Household Chemicals on Clear and Pigmented Organic Finishes'.
- Alkali Resistance using ASTM D1308-02 'Effect of Household Chemicals on Clear and Pigmented Organic Finishes'. 10% Sodium Hydroxide 24 hours contact.
- Acid Resistance using ASTM D1308-02 'Effect of Household Chemicals on Clear and Pigmented Organic Finishes'. 10% Hydrochloric acid 24 hours contact.
- Hot Water Resistance using AS1580 method 456.1 'Resistance to boiling water'.
- Abrasion Resistance using AS1580 Method 403.2 'Abrasion resistance – Taber abrader 1,000 gm load and 1,000 cycles with CS17 wheels.

2.0 TEST METHODS

2.1 ADHESION

The adhesion of the coating was determined in accordance with AS/NZS 1580 Method 408.4 'Adhesion-Cross cut'. The method requires that the coated panel is cut with a sharp knife to give 6 cuts at 1 mm gap of 20mm length with another 6 cuts at right angles to these cuts. An adhesive tape is then placed over the cuts and then removed. The crosscuts are then observed at 10x magnification.

The adhesion is rated as:
0 = no detachment of the paint through to
5 = greater than 65% of the paint is removed.

2.2 ABRASION RESISTANCE

The abrasion resistance was determined in accordance with AS 1580 Method 403.2 'Abrasion resistance – Taber abrader'. The instrument was set with 1000 g load per arm, CS17 wheels and operated for 1000 cycles. The mass loss was measured after the 1000 cycles to indicate the abrasion resistance.

2.3 PULL-OFF ADHESION

AS/NZS 1580.408.5:1994 'Adhesion – Pull-off test was used to determine the adhesion of the coating. The Elcometer 106-1 (SN 1001) with a range of 0.5 to 3.5 MPa was used. A two-part epoxy adhesive was used to stick the dollies in place and allowed to cure for 24 hours. The pressure at which the dolly was pulled from the surface was then noted.

2.4 IMPACT RESISTANCE – TEST METHOD

The impact resistance was determined in accordance with AS 1580 Method 406.1. A Gardiner-type impact tester was used to determine the maximum height and weight of a hemispherical indenter that could be dropped without cracking or breaking the enamel coating.

2.5 CHEMICAL RESISTANCE

The chemical resistance of the coating was determined in accordance with ASTM D1308-02 'Effect of Household Chemicals on Clear and Pigmented Organic Finishes'

10% Hydrochloric acid and 10% NaOH were applied to the surface of the coating, covered and allowed to be in contact with the surface for 24 hours. The surface was then washed with distilled water, allowed to dry and then inspected.

2.6 HOT WATER RESISTANCE

The resistance to hot water was determined in accordance with AS1580 Method 456.1. The sample was immersed for 5 minutes in boiling water. The sample was washed with distilled water and checked for colour change or coating removal. After 2 hours the coating was then checked for blistering wrinkling or change in gloss. The scratch resistance before and after immersion was then determined.

2.7 TEST CONDITIONS:

Testing was carried out during the period 30 May to 4 June 2013.

Ambient conditions at the time of the test/s were 23 ± 3°C and 45 ± 15% RH thereby complying with AS/NZS 1580.101.5

3.0 RESULTS

The results of the testing are detailed in the attached table and are expressed in SI units as required by the test method. SI is from the French: Le Système international d'unités and is the modern form of the metric system and is the world's most widely used system of measurement, used in both everyday commerce and science. MPa (Megapascal) is a measure of pressure, mg (milligrams) a measure of weight and Joule a measure of energy.

Property	Test method	Result
Adhesion (cross cut)	AS/NZS 1580 Method 408.4 'Adhesion-Cross cut'	*Surface* *Result* Steel plate: 0, 0, 0 av. = 0 Cast Iron: 0, 0, 0 av. = 0 Fibreglass: 0, 0, 0 av. = 0 Ceramic tile: 0, 0, 0 av. = 0
Adhesion (pull off)	AS/NZS 1580.408.5:1994 'Adhesion – Pull-off	*Surface* *Result* Cast Iron : 3.5 MPa Fibreglass: 1.1 MPa Ceramic Tile: 2.8 Mpa
Impact Resistance	AS 1580 Method 406.1	4.5 Joule on Steel Substrate
Alkali Resistance*	ASTM D1308-02 'Effect of Household Chemicals on Clear and Pigmented Organic Finishes'. 10% Sodium Hydroxide 24 hours contact	Resistant
Acid Resistance*	ASTM D1308-02 'Effect of Household Chemicals on Clear and Pigmented Organic Finishes'. 10% Hydrochloric acid 24 hours contact	Resistant
Hot Water Resistance*	AS1580 Method 456.1. 'Resistance to Boiling Water'	No change in gloss, scratch resistance or colour. No loss of coating or blistering.
Abrasion Resistance*	AS 1580 Method 403.2 'Abrasion resistance – Taber abrader 1000 gm load and 1000 cycles with CS17 wheels	80.4 mg

Note: The results pertain to the sample as supplied by the client.

* The test results relate to the coating and are unaffected by the substrate the coating is applied to. Therefore results for a range of substrates are not required.