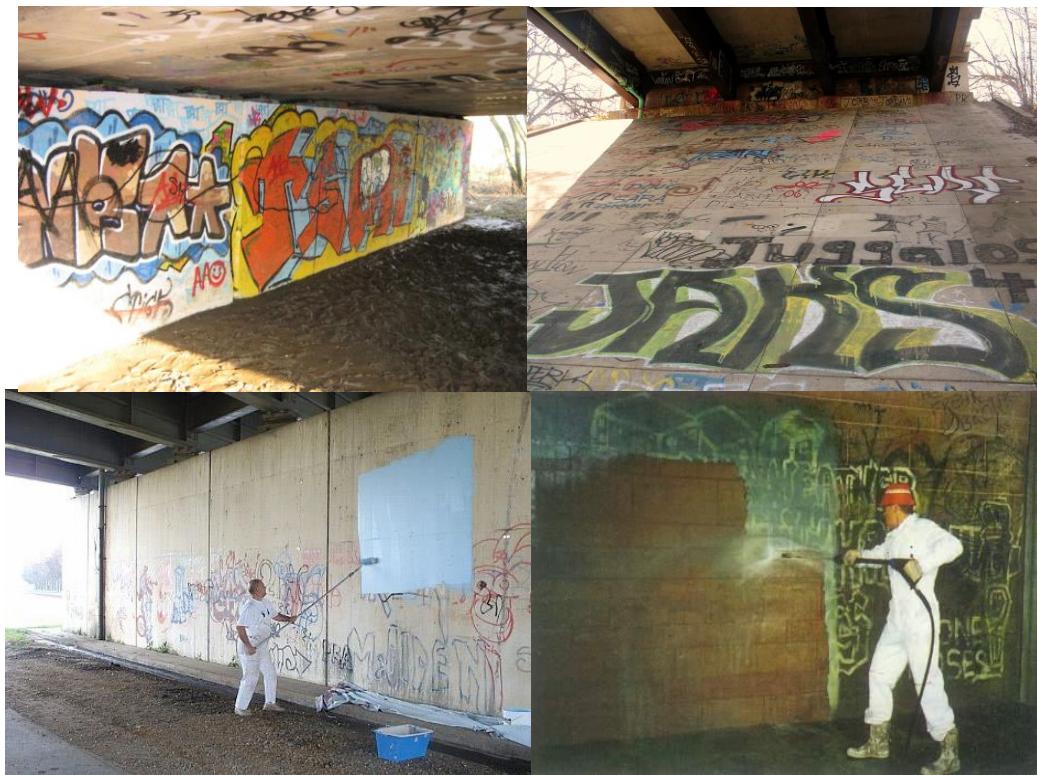




mainroads
WESTERN AUSTRALIA

TESTING METHOD FOR ANTI - GRAFFITI PRODUCTS



Above: Graffiti under various bridges.

Structures Engineering

Document No.: 6706-02-2238

TESTING METHOD FOR ANTI-GRAFFITI PRODUCTS

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AUTHORISATION

As head of Structures Engineering of Main Roads Western Australia, I authorise the issue and use of this document.



.....
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Date: 19/03/2018

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1 BACKGROUND

The contents of this document have been drawn from “Graffiti Product Testing Panel Contract” put together by Contract and Management Services (CAMS) of the Department of Housing and Works.

Main Roads Western Australia has a list of graffiti removal products and anti-graffiti coatings approved for use on government sites (Specification 908: Anti-Graffiti). This document outlines the test methods to be undertaken on new graffiti removal products and anti-graffiti coatings to ensure the list of products represents current best practice in the technology.

2 SCOPE

This standard specifies the test method to be applied in assessing approval of anti-graffiti products by Main Roads Western Australia. The test method is designed to assess the following properties:

- The effectiveness of graffiti removal products by application and removal of graffiti on varied substrates
- The effectiveness of sacrificial anti-graffiti coatings
- The effectiveness of non – sacrificial anti-graffiti coatings
- To evaluate the recommendations of testing results conducted outside Western Australia

3 METHOD FOR ASSESSING THE EFFECTIVENESS OF GRAFFITI REMOVERS BY APPLICATION AND REMOVAL OF GRAFFITI ON VARIED SUBSTRATES

3.1 Scope

The method applies to the removal of spray can paint commonly used in "touch-up" decorative applications, spray can leather dye, black "whiteboard" marker, black crayon and permanent variety felt tipped pens, all used as graffiti on: absorbent bricks, low absorbency clay bricks, limestone, concrete slab, cement fibre sheet, and flat exterior acrylic paint. This method is not applicable to the removal of graffiti from anti-graffiti coatings.

3.2 Principle

This method describes the testing of the effectiveness of a graffiti remover to remove substances commonly used as graffiti on a variety of substrates.

3.3 Materials

3.3.1 *Graffiti*

Substances used to graffiti the panels are:

- "Black" spray can enamel non-automotive paint
- "Black" spray can leather dye
- "Black" permanent ink solvent based felt tipped pen
- "Red" permanent ink solvent based felt tipped pen
- "Blue" permanent ink solvent based felt tipped pen
- "Black" wax crayon
- "Black" whiteboard marker
- "Red" automotive lacquer

3.3.2 *Apparatus*

Apparatus used in the preparation and testing of the graffiti were:

- Template (1 cm wide) for application of graffiti to substrates
- Medium pressure water blaster (approximately 100 bar and 400L/hr)

3.3.3 Substrates

- "Soft" absorbent brick (clay)
- "Hard faced" low absorbency clay brick
- Natural limestone (use sawn block face)
- Concrete slab (smooth side)
- Compressed cement fibre sheet (smooth face side)
- Flat exterior acrylic paint

3.3.4 Test site

A test site shall be a minimum of approximately 750 mm² (e.g. 75mm x 10mm).

3.4 Procedure

3.4.1 First removal attempt

Apply all eight forms of graffiti to the six substrates ensuring no overspray and an even coverage in one pass e.g. one marking with the felt tipped pen ensuring no area is gone over twice e.g. take approximately 1 second to spray a 750 mm² area with one pass of the spray can. It is ideal to have individual test pieces. If this is not possible, ensure adjacent areas are adequately masked to prevent any overspray on the substrate. Allow 72 hours for the graffiti to dry. Note the coverage of the automotive lacquer will typically be less than the other spray paints.

Apply the graffiti remover in accordance with the manufacturer's recommendations or:-

- (a) 1-3 mm thick if it is a gel
- (b) One liberal application if using a low viscosity liquid

APPLY THE REMOVER WHILST THE SURFACE IS VERTICAL.

Apply with a bristle brush unless otherwise specified by the manufacturer. Use the contact time recommended by the manufacturer.

Remove the graffiti in accordance with the manufacturer's recommendations or if no recommendations are given spray the test site with a water blaster spray for 10 seconds at a distance of 1 metre.

Allow drying at ambient temperature for 24 hours and assess in accordance with the removal assessment rating given below:

0=no graffiti removed, 1=some graffiti removed but no more than 30%, 2=between 30% and 70% graffiti removed, 3=between 70% and 99% graffiti removed, 4=most graffiti removed only shadowing remained, 5=graffiti completely removed.

3.4.2 *Second removal attempt*

Repeat first removal attempt procedure and assess according to the same removal assessment rating.

3.4.3 *Artificial weathering*

The artificial weathering is conducted by subjecting 1 cm wide strips of graffiti (applied as in 4.1 above) on compressed cement sheets to a Q-panel QUV artificial weathering tester set for 250 hours continuous operation cycling between an 8 hour UV light cycle (using UV-B tubes) at 60°C and a 4 hour condensation cycle at 45°C. Assessment is not carried out as these panels are subject to a single removal attempt detailed in 4.1 above.

3.5 Expression of Results

3.5.1 First removal attempt table

Graffiti⇒ Substrate↓	Black spray can	Black leather dye	Black felt tipped pen	Red felt tipped pen	Blue felt tipped pen	Black crayon	Black white board marker	Red Auto Lacquer
Soft brick								
Hard brick								
Limestone								
Concrete								
Cement sheet								
Paint								

3.5.2 Second removal attempt table (cumulative from the first removal attempt)

Graffiti⇒ Substrate↓	Black spray can	Black leather dye	Black felt tipped pen	Red felt tipped pen	Blue felt tipped pen	Black crayon	Black white -board marker	Red Auto Lacquer
Soft brick								
Hard brick								
Limestone								
Concrete								
Cement sheet								
Paint								

3.5.3 Removal after 250 hours artificial weathering

Graffiti⇒ Substrate↓	Black spray can	Black leather dye	Black felt tipped pen	Red felt tipped pen	Blue felt tipped pen	Black crayon	Black white -board marker	Red Auto Lacquer
Soft brick								
Hard brick								
Limestone								
Concrete								
Cement sheet								
Paint								

3.6 Report

Testing shall be carried out by an independent NATA accredited testing body. The report must contain the following:

- Name and Supplier/Manufacturer of remover
- Names and manufacturers of all materials used as graffiti
- Detailed methods of application and/or removal if different from that specified by the manufacturer
- First removal attempt table
- Second removal attempt table
- Date of test
- Name of testing authority
- Any damage to any substrate caused by the removal attempt
- Photographs showing
 - Painted panels prior to exposure,
 - Graffiti removed after first removal attempt,
 - Graffiti removed after second removal attempt, and
 - Graffiti removed after 250 hours artificial weathering.

4 SPECIFICATIONS FOR GRAFFITI REMOVERS

4.1 Scope

This specification outlines the basic requirements of a graffiti remover for the Western Australian Government.

4.2 General

The remover shall be able to fulfil the claims of the manufacturer with respect to removal properties.

A “shelf life” guarantee is to be given by the manufacturer or distributor and is to be not less than 1 year under normal paint storage conditions.

4.3 Graffiti removal

4.3.1 Removal assessment rating

0=no graffiti removed, **1**=some graffiti removed but no more than 30%, **2**=between 30% and 70% graffiti removed, **3**=between 70% and 99% graffiti removed, **4**=most graffiti removed only shadowing remained, **5**=graffiti completely removed.

4.3.2 Results

Results of testing in accordance with “Method for Assessing the Effectiveness of Graffiti Removers by Application and Removal of Graffiti on Varied Substrates” shall be carried out and expressed in tabular form for the following:

- First removal attempt (Rating of 0-5 for all graffiti types on all substrates)
- Second removal attempt (Cumulative from the first removal attempt) (Rating of 0-5 for all graffiti types on all substrates)

The remover shall not leave any noticeable remover residue (e.g. thickening agents) on each substrate after two removal attempts in accordance with the above method.

The minimum WA Government requirement for selected applications is a rating of 4 (most graffiti removed only shadowing remained).

4.4 Data

The following information is to be available at the time of testing (prior to supply):

- Current MSDS in accordance with Worksafe Standard
- Current Technical Data sheet including application methods, application rates, application thickness, number of applications required, recommended removal method and clean up requirements

4.5 Suitability for particular substrate

The manufacturer must state to which substrate(s) the remover is suitable to be applied.

5 METHOD FOR ASSESSING THE EFFECTIVENESS OF NON-SACRIFICIAL ANTI-GRAFFITI COATINGS

5.1 Principle

The coating shall be applied to suitable size panels of compressed cement sheet able to be accommodated by the test instruments detailed elsewhere. The panels are then subject to the various tests listed below and assessed individually.

Manufacturers directions on product use are to be strictly followed.

Any deviations from the manufacturer's directions are to be documented and explained in detail.

The testing results are presented as data that can be interpreted for specific applications and in accordance with the associated Specification (Specifications for Non-sacrificial Anti Graffiti Coatings – refer to Section 6)

5.2 Scope

This method only applies to non-sacrificial anti-graffiti coatings intended to be resistant to graffiti removers and assist with graffiti removal.

This test does not apply to limestone substrates or similar highly porous substrates where a layer of anti-graffiti coating cannot be achieved at the surface of the substrate.

5.3 Materials

5.3.1 *Graffiti*

Substances used to graffiti the panels are:

- "Black" spray can enamel non-automotive paint (eg Dulux Spray Pak Gloss Black)
- "Black" spray can leather dye (eg Tana Leather Colour Black)
- "Black" permanent ink solvent based felt tipped pen (eg Artline 70)
- "Red" permanent ink solvent based felt tipped pen (eg Artline 70)
- "Blue" permanent ink solvent based felt tipped pen (eg Artline 70)
- "Black" wax crayon (eg Crayola Black)
- "Black" whiteboard marker (eg Artline 500 Black)
- "Red" automotive spray lacquer

NOTE: It has been determined by testing, that the Artline 100 (thicker marker pen) is equal in difficulty to the Artline 70 (of the same colour) to remove from surfaces.

5.3.2 Apparatus

Apparatus required to prepare test panels are:

- Template (1cm wide) for application of graffiti to panels
- Scratch testing equipment to meet requirements of AS 1580.403.1 “Scratch resistance”
- Q-panel QUV Artificial Weathering Tester
- Instrument conforming to AS 2331.3.1 “Methods of test of metallic and related coatings - Corrosion and related property tests - Neutral salt spray (NSS) test”
- Apparatus conforming to AS 1580.408.5 “Adhesion - Pull-off test”
- Disposal variety cigarette lighter
- Medium pressure water blaster (approximately 100bar and 400L/hr (eg Karcher 310 using fine nozzle))

5.4 Panel preparation

Use panels of compressed cement sheet.

Groups of these panels are then separately coated with each anti-graffiti coating in accordance with manufacturer's specifications and the coating allowed to cure for a minimum of seven days.

Graffiti is applied to a portion of the panels coated with each anti-graffiti coating. Some coated panels are tested without graffiti application.

Apply all eight forms of graffiti to the panels ensuring no overspray and an even coverage in one pass e.g. one marking with the felt tipped pen ensuring no area is gone over twice e.g. take approximately 1 second to spray a 750 mm² area with one pass of the spray can. It is ideal to have individual test pieces. If this is not possible, ensure adjacent areas are adequately masked to prevent any overspray on the substrate. Note the coverage of the automotive lacquer will typically be less than the other spray paints.

Graffiti is applied in 1cm strips across each panel (using a template) in a predetermined order to allow for easier identification of each type of graffiti should removal percentage be high.

5.5 Procedure

Tests carried out are a combination of in-house developed methods and Australian Standard methods to assess the durability and suitability of the paints as anti-graffiti systems when used in such diverse applications as interiors of public toilets and interiors and exteriors of coastally located changerooms.

The tests conducted on the coatings are:

- Graffiti removal 24 hours after graffiti application
- Graffiti removal 72 hours after graffiti application
- Graffiti removal after artificial weathering
- Graffiti removal after artificial salt spray exposure
- Attack on the coating by alternate removal agents
- Adhesion of the coating to selected substrates
- Scratch resistance of the coating
- Burn resistance of the coating
- Weathering resistance of the coating

5.5.1 *Graffiti removal*

Four graffiti removal tests are carried out

- Removal after 24 hours
- Removal after 72 hours
- Removal after artificial weathering
- Removal after salt spray exposure

5.5.1.1 *Removal after 24 and 72 hours*

The following graffiti removal procedure is to be carried out 24 hours and 72 hours after graffiti application. The removal is also carried out after 500 hours artificial weathering in accordance with 5.5.1.2 below, and 500 hours salt spray exposure in accordance with 5.5.1.3 below.

The removal after 24 hours, removal after 72 hours, removal of artificially weathered graffiti and removal of graffiti after exposure to salt spray are carried out on 4 different sets of panels.

Apply the recommended graffiti remover in accordance with the manufacturer's recommendations or:

- (a) 1-3 mm thick if it is a gel
- (b) One liberal application if using a low viscosity liquid

APPLY THE REMOVER WHILST THE SURFACE IS VERTICAL.

Apply with a bristle brush unless otherwise specified by the manufacturer. Use the contact time recommended by the manufacturer. Remove the graffiti in accordance with the manufacturer's recommendations or if no recommendations are given spray the test site with a water blaster for 10 seconds at a distance of 1 metre.

Allow drying at ambient temperature for 24 hours and assessing in accordance with the removal assessment rating given below:

0=no graffiti removed, 1=some graffiti removed but no more than 30%, 2=between 30% and 70% graffiti removed, 3=between 70% and 99% graffiti removed, 4=most graffiti removed only shadowing remained, 5=graffiti completely removed.

Tabulate individual graffiti type removal results for each of the 4 removal tests.

5.5.1.2 Artificial weathering

The artificial weathering is conducted by subjecting the coated panels to a Q-panel QUV artificial weathering tester set for 500 hours (for panels with graffiti) and 1000 hours (for panels without graffiti) continuous operation cycling between an 8 hour UV light cycle (using UV-B tubes) at 60°C and a 4 hour condensation cycle at 45°C. Assessment is carried out in accordance with AS 1580.481.1.2 "Discolouration", AS 1580.481.1.11 "Degree of chalking" and AS 1580.481.1.12 "Degree of colour change" as appropriate.

5.5.1.3 Salt spray exposure

The salt spray exposure is conducted by subjecting the coated panels to a continuous spray of salt fog in accordance with AS 2331.3.1 "Methods of test of metallic and related coatings - Corrosion and related property tests - Neutral salt spray (NSS) test" at a temperature of 35°C for 500 hours.

5.5.2 Attack on the coating by alternative removal agents

On separate coated panels (no graffiti) apply mineral turps, acetone and methylene chloride. Allow standing for 1 minute and removing with a water blaster. Assess the increasing damage to the coating in terms of no, minimal, moderate or severe attack.

APPLY THE REMOVER WHILST THE SURFACE IS HORIZONTAL FOR THIS TEST ONLY.

Tabulate individual results for this test as per the associated specification and Standards under Section 6.

5.5.3 Adhesion of coating to selected substrates

The testing was carried out in accordance with AS 1580.408.5 "Adhesion - Pull-off test" and the assessment results are an indication of the force required to remove the coating. The higher the number, the more adherent the coating.

Tabulate individual results for this test as per the associated specification and Standards under Section 6.

5.5.4 Scratch testing

Scratch resistance test is to be carried out using a scratch tester conforming to AS 1580.403.1 "Scratch resistance" where a "weighted" point is dragged across a panel and the mass required to cause a scratch is recorded. The higher the mass required to cause a scratch the more scratch resistant the coating. The instrument has masses ranging in 100g increments from 0 to 2100g.

Tabulate individual results for this test as per the associated specification and Standards under Section 6.

5.5.5 *Burn resistance of the coating*

A cigarette lighter is held (by unprotected hand) under a horizontally mounted anti-graffiti coating coated panel for 20 seconds and the damage recorded. It has been found that at about 20 seconds the cigarette lighter became too hot to hold. An assessment of the coated panel against the results for testing a painted panel (premium quality exterior water based acrylic paint - 2 coats) is recorded as having less burn resistance, equal burn resistance or more burn resistance with respect to spread of flame, smoke evolved and ignitability.

Tabulate individual results for this test as per the associated specification and Standards under Section 6.

5.5.6 *Weathering resistance of the coating*

The artificial weathering is conducted by subjecting the coated panels to a Q-panel QUV artificial weathering tester set for 1000 hours (for panels without graffiti) continuous operation cycling between an 8 hour UV light cycle (using UV-B tubes) at 60°C and a 4 hour condensation cycle at 45°C. Assessment is carried out in accordance with AS 1580.481.1.2 "Discolouration", AS 1580.481.1.11 "Degree of chalking" and AS 1580.481.1.12 "Degree of colour change" as appropriate.

Rating

0 = no defects or changes, **1** = some just insignificant defects or changes, **2** = small significant defects or changes, **3** = moderate defects or changes, **4** = considerable defects or changes, **5** = dense pattern of defects or changes.

Tabulate individual results for this test as per the associated specification and Standards under Section 6.

5.6 Report

Testing shall be carried out by an independent NATA accredited testing body. The report must contain the following:

- Name and Supplier/Manufacturer of coating
- Name of remover used
- Names and manufacturers of all materials used as graffiti
- Names of tests carried out and any deviations from standard methods
- Table of ratings of graffiti removal 24 hours after graffiti application
- Table of ratings of graffiti removal 72 hours after graffiti application
- Table of ratings of graffiti removal after artificial weathering
- Table of ratings of graffiti removal after artificial salt spray exposure
- Table of ratings of attack on the coating by alternate removal agents
- Adhesion strength results of the coating to selected substrates
- Scratch resistance results of the coating
- Assessment result of burn resistance of the coating
- Assessment result of weathering resistance of the coating
- Confirmation that a current MSDS in Worksafe Standard format is available
- Confirmation that the current Technical Data Sheets (or equivalent) contains at least application methods, application rates, application thickness, number of coats required, whether a primer is required, clean up requirements, recoatability, drying time, recoat window
- A concise statement as to the recoatability of the coating including timing, conditions and special requirements, for the purpose of recoating at any time during or beyond the coating warranty
- Date of test
- Name of testing authority
- Photographs showing:
 - Painted panels prior to exposure,
 - Graffiti removed after 24 hours exposure ambient cure,
 - Graffiti removed after 72 hours exposure ambient cure,
 - Graffiti removed after artificial weathering, and
 - Graffiti removed after artificial salt spray exposure.

6 SPECIFICATION FOR NON-SACRIFICIAL ANTI-GRAFFITI COATINGS

6.1 Scope

This specification outlines the basic requirements of a non-sacrificial anti-graffiti coating for the Government of Western Australia.

6.2 General

The coating shall be able to fulfil the claims of the manufacturer with respect to application properties. The following Standards apply.

AS 1580.205.1	Australian Standard Methods of Test for Paints and Related Materials - Application Properties - Brushing
AS 1580.205.2	Australian Standard Methods of Test for Paints and Related Materials - Application Properties - Conventional Air Spraying
AS 1580.205.3	Australian Standard Methods of Test for Paints and Related Materials - Application Properties - Roller Coating
AS 1580.205.4	Australian Standard Methods of Test for Paints and Related Materials - Application Properties - Airless Spraying

A “shelf life” guarantee is to be given by the manufacturer or distributor and is to be not less than 1 year under normal paint storage conditions.

6.3 Graffiti removal

6.3.1 Removal assessment rating

0=no graffiti removed, **1**=some graffiti removed but no more than 30%, **2**=between 30% and 70% graffiti removed, **3**=between 70% and 99% graffiti removed, **4**=most graffiti removed only shadowing remained, **5**=graffiti completely removed.

6.3.2 Results

Results of testing in accordance with “Method for Assessing the Effectiveness of Non-Sacrificial Anti-Graffiti Coatings” shall be carried out and expressed in tabular form for the following:

- Removal of graffiti 24 hours after graffiti application (Rating of 0-5 for all graffiti types)
- Removal of graffiti 72 hours after graffiti application (Rating of 0-5 for all graffiti types)
- Removal of graffiti after artificial weathering (500 hours) (Rating of 0-5 for all graffiti types)
- Removal of graffiti after artificial salt spray exposure (500 hours) (Rating of 0-5 for all graffiti types)

For attack on the coating by alternative removal agents, the following criteria are to be met:

Alternative removal agent	Result
Mineral turpentine	No attack
Acetone	Removes less than 10% of the coating
Methylene chloride	Removes less than 10% of the coating

- Adhesion to selected substrates

Substrate	Minimum result by AS 1580.408.5
Concrete slab	2.0 MPa
Compressed cement sheet	Greater than the cohesive strength of the sheet

- Scratch resistance of coating after 7 days

Substrate	Minimum result by AS 1580.403.1
Applied to compressed cement sheet	400 grams

- Burn resistance of coating to cigarette lighter flame

Substrate	Minimum result
Applied to compressed cement sheet	Equal or greater burn resistance when compared to cured exterior acrylic paint

- Weathering resistance of coating (without graffiti applied)

Aspect	Exposure to 1000 hours QUV
Discolouration	≤ 1 (AS 1580.481.1.2)
Degree of chalking	≤ 1 (AS 1580.481.1.11)
Degree of colour change	≤ 1 (AS 1580.481.1.12)

6.4 Data

The following information is to be available at the time of testing (prior to supply):

- Current MSDS in accordance with Worksafe Standard
- Current Technical Data sheet including application methods, application rates, application thickness, number of coats required, whether a primer is required, clean up requirements, recoatability, drying time, recoat window

6.5 Suitability for particular substrate

The manufacturer must state to which substrate(s) the coating is suitable to be applied.

7 METHOD FOR ASSESSING THE EFFECTIVENESS OF SACRIFICIAL ANTI-GRAFFITI COATINGS

7.1 Principle

The coating is applied to suitable size panels of compressed cement sheet able to be accommodated by the test instruments. The panels are then subject to the various tests listed below and assessed individually.

Manufacturer's directions on product use are to be strictly followed.

Any deviations from the manufacturer's directions are to be documented and explained in detail.

The testing results are presented as data that can be interpreted for specific applications and in accordance with the associated Specification

(Specifications For Sacrificial Anti Graffiti Coatings – refer to Section 8)

7.2 Scope

The method only applies to sacrificial anti-graffiti coatings. This method applies to limestone substrates or similar highly porous substrates as well as lower porosity substrates.

7.3 Materials

7.3.1 Apparatus

Apparatus required to prepare test panels are:

- Template (1 cm wide) for application of graffiti to panels
- Scratch testing equipment to meet requirements of AS 1580.403.1 “Scratch resistance”
- Q-panel QUV Artificial Weathering Tester
- Instrument conforming to AS 2331.3.1 “Methods of test of metallic and related coatings - Corrosion and related property tests - Neutral salt spray (NSS) test”
- Apparatus conforming to AS 1580.408.5 “Adhesion - Pull-off test”
- Disposal variety cigarette lighter
- Medium pressure water blaster (approximately 100bar and 400L/hr)

Substances used to graffiti the panels are:

- "Black" spray can enamel non-automotive paint (eg Dulux Spray Pak Gloss Black)
- "Black" spray can leather dye (eg Tana Leather Colour Black)
- "Black" permanent ink solvent based felt tipped pen (eg Artline 70)
- "Red" permanent ink solvent based felt tipped pen (eg Artline 70)
- "Blue" permanent ink solvent based felt tipped pen (eg Artline 70)
- "Black" wax crayon (eg Crayola Black)
- "Black" whiteboard marker (eg Artline 500 Black)
- "Red" automotive spray lacquer

NOTE: It has been determined by testing, that the Artline 100 (thicker marker pen) is equal in difficulty to the Artline 70 (of the same colour) to remove from surfaces.

7.4 PANEL PREPARATION

Use panels of compressed cement sheet.

Groups of these panels are then separately coated with each anti-graffiti coating in accordance with manufacturer's specifications and the coating allowed to cure for a minimum of seven days.

Graffiti is applied to a portion of the panels coated with each anti-graffiti coating. Some coated panels are tested without graffiti application.

Apply all eight forms of graffiti to the panels ensuring no overspray and an even coverage in one pass e.g. one marking with the felt tipped pen ensuring no area is gone over twice e.g. take approximately 1 second to spray a 750 mm² area with one pass of the spray can. It is ideal to have individual test pieces. If this is not possible, ensure adjacent areas are adequately masked to prevent any overspray on the substrate. Note the coverage of the automotive lacquer will typically be less than the other spray paints.

Graffiti is applied in 1 cm strips across each panel (using a template) in a predetermined order to allow for easier identification of each type of graffiti should removal percentage be high.

7.5 Procedure

Tests carried out are a combination of in-house developed methods and Australian Standard methods to assess the durability and suitability of the paints as anti-graffiti systems when used in such diverse applications as interiors of public toilets and interiors and exteriors of coastally located changerooms.

The tests conducted on the coatings are:

- Graffiti removal 24 hours after graffiti application
- Graffiti removal 72 hours after graffiti application
- Graffiti removal after artificial weathering
- Graffiti removal after artificial salt spray exposure
- Attack on the coating by alternate removal agents
- Adhesion of the coating to selected substrates
- Scratch resistance of the coating
- Burn resistance of the coating
- Weathering resistance of the coating
- Vapour permeability

7.5.1 *Graffiti removal*

Four graffiti removal tests are carried out

- Removal after 24 hours
- Removal after 72 hours
- Removal after artificial weathering
- Removal after salt spray exposure

7.5.1.1 *Removal after 24 and 72 hours*

The following graffiti removal procedure is to be carried out 24 hours and 72 hours after graffiti application. The removal is also carried out after 500 hours artificial weathering in accordance with 7.5.1.2 below, and 500 hours salt spray exposure in accordance with 7.5.1.3 below.

The removal after 24 hours, removal after 72 hours, removal of artificially weathered graffiti and removal of graffiti after exposure to salt spray are carried out on 4 different sets of panels.

Apply the recommended graffiti remover in accordance with the manufacturer's recommendations or:

- (a) 1-3 mm thick if it is a gel
- (b) One liberal application if using a low viscosity liquid

APPLY THE REMOVER WHILST THE SURFACE IS VERTICAL.

Apply with a bristle brush unless otherwise specified by the manufacturer. Use the contact time recommended by the manufacturer.

Remove the graffiti in accordance with the manufacturer's recommendations or if no recommendations are given spray the test site with a water blaster for 10 seconds at a distance of 1 metre.

Allow drying at ambient temperature for 24 hours and assess in accordance with the removal assessment rating given below:

0=no graffiti removed, 1=some graffiti removed but no more than 30%, 2=between 30% and 70% graffiti removed, 3=between 70% and 99% graffiti removed, 4=most graffiti removed only shadowing remained, 5=graffiti completely removed.

Tabulate individual graffiti type removal results for each of the 4 removal tests.

7.5.1.2 Artificial weathering

The artificial weathering is conducted by subjecting the coated panels to a Q-panel QUV artificial weathering tester set for 500 hours (for panels with graffiti) and 1000 hours (for panels without graffiti) continuous operation cycling between an 8 hour UV light cycle (using UV-B tubes) at 60°C and a 4 hour condensation cycle at 45°C. Assessment is carried out in accordance with AS 1580.481.1.2 "Discolouration", AS 1580.481.1.11 "Degree of chalking" and AS 1580.481.1.12 "Degree of colour change" as appropriate.

7.5.1.3 Salt spray exposure

The salt spray exposure is conducted by subjecting the coated panels to a continuous spray of salt fog in accordance with AS 2331.3.1 "Methods of test of metallic and related coatings - Corrosion and related property tests - Neutral salt spray (NSS) test" at a temperature of 35°C for 500 hours.

7.5.2 Attack on the coating by alternative removal agents

On separate coated panels (no graffiti) apply mineral turpentine, acetone and methylene chloride. Allow standing for 1 minute and removing with a water blaster. Assess the increasing damage to the coating in terms of no, minimal, moderate or severe attack.

APPLY THE REMOVER WHILST THE SURFACE IS HORIZONTAL FOR THIS TEST ONLY.

Tabulate individual results for this test as per the Specification and Standards under Section 8.

7.5.3 Adhesion of coating to selected substrates

The testing was carried out in accordance with AS 1580.408.5 "Adhesion - Pull-off test" and the assessment results are an indication of the force required to remove the coating. The higher the number, the more adherent the coating.

Tabulate individual results for this test as per the Specification and Standards under Section 8.

7.5.4 Scratch testing

Scratch resistance test is to be carried out using a scratch tester conforming to AS 1580.403.1 "Scratch resistance" where a "weighted" point is dragged across a panel and the mass required to cause a scratch is recorded. The higher the mass required to cause a scratch the more scratch resistant the coating. The instrument has masses ranging in 100g increments from 0 to 2100g.

Tabulate individual results for this test as per the Specification and Standards under Section 8.

7.5.5 *Burn resistance of the coating*

A cigarette lighter is held (by unprotected hand) under a horizontally mounted anti-graffiti coating coated panel for 20 seconds and the damage recorded. It has been found that at about 20 seconds the cigarette lighter became too hot to hold. An assessment of the coated panel against the results for testing a painted panel (premium quality exterior water based acrylic paint - 2 coats) is recorded as having less burn resistance, equal burn resistance or more burn resistance with respect to spread of flame, smoke evolved and ignitability.

Tabulate individual results for this test as per the Specification and Standards under Section 8.

7.5.6 *Weathering resistance of the coating*

The artificial weathering is conducted by subjecting the coated panels to a Q-panel QUV artificial weathering tester set for 1000 hours (for panels without graffiti) continuous operation cycling between an 8 hour UV light cycle (using UV-B tubes) at 60°C and a 4 hour condensation cycle at 45°C. Assessment is carried out in accordance with AS 1580.481.1.2 "Discolouration", AS 1580.481.1.11 "Degree of chalking" and AS 1580.481.1.12 "Degree of colour change" as appropriate.

Rating

0 = no defects or changes, **1** = some just insignificant defects or changes, **2** = small significant defects or changes, **3** = moderate defects or changes, **4** = considerable defects or changes, **5** = dense pattern of defects or changes.

Tabulate individual results for this test as per the Specification and Standards under Section 8.

7.5.7 *Liquid permeability of the coating*

The coating is applied to limestone substrate in accordance with the manufacturer's recommendations. The coating system must penetrate into the substrate.

Tabulate individual results for this test as per the Specification and Standards under Section 8.

7.6 Report

Testing shall be carried out by an independent NATA accredited testing body. The report must contain the following:

- Name and Supplier/Manufacturer of coating
- Name of remover used
- Names and manufacturers of all materials used as graffiti
- Names of tests carried out and any deviations from standard methods
- Table of ratings of graffiti removal 24 hours after graffiti application
- Table of ratings of graffiti removal 72 hours after graffiti application
- Table of ratings of graffiti removal after artificial weathering
- Table of ratings of graffiti removal after artificial salt spray exposure
- Table of ratings of attack on the coating by alternate removal agents
- Adhesion strength results of the coating to selected substrates
- Scratch resistance results of the coating
- Assessment result of burn resistance of the coating
- Assessment result of weathering resistance of the coating
- Confirmation that a current MSDS in Worksafe Standard format is available.
- Confirmation that the current Technical Data Sheets (or equivalent) contains at least application methods, application rates, application thickness, number of coats required, whether a primer is required, clean up requirements, recoatability, drying time, recoat window
- A concise statement as to the recoatability of the coating including timing, conditions and special requirements, for the purpose of recoating at any time during or beyond the coating warranty
- Extent of penetration of the coating into limestone
- Date of test
- Name of testing authority
- Photographs detailing:
 - Graffiti removal 24 hours after graffiti application
 - Graffiti removal 72 hours after graffiti application
 - Graffiti removal after artificial weathering
 - Graffiti removal after artificial salt spray exposure

8 SPECIFICATION FOR SACRIFICIAL ANTI-GRAFFITI COATINGS

8.1 Scope

This specification outlines the basic requirements of a sacrificial anti-graffiti coating for the Government of Western Australia.

8.2 General

The coating shall be able to fulfil the claims of the manufacturer with respect to application properties. The following Standards apply.

AS 1580.205.1	Australian Standard Methods of Test for Paints and Related Materials - Application Properties - Brushing
AS 1580.205.2	Australian Standard Methods of Test for Paints and Related Materials - Application Properties - Conventional Spraying
AS 1580.205.3	Australian Standard Methods of Test for Paints and Related Materials - Application Properties - Roller Coating
AS 1580.205.4	Australian Standard Methods of Test for Paints and Related Materials - Application Properties - Airless Spraying

A “shelf life” guarantee is to be given by the manufacturer or distributor and is to be not less than 1 year under normal paint storage conditions.

8.3 Graffiti removal

8.3.1 Removal assessment rating

0=no graffiti removed, **1**=some graffiti removed but no more than 30%, **2**=between 30% and 70% graffiti removed, **3**=between 70% and 99% graffiti removed, **4**=most graffiti removed only shadowing remained, **5**=graffiti completely removed.

8.3.2 Results

Results of testing in accordance with “Method for Assessing the Effectiveness of Sacrificial Anti-Graffiti Coatings” shall be expressed in tabular form for the following:

- Removal of graffiti 24 hours after graffiti application (Rating of 0-5 for all graffiti types)
- Removal of graffiti 72 hours after graffiti application (Rating of 0-5 for all graffiti types)
- Removal of graffiti after artificial weathering (500 hours) (Rating of 0-5 for all graffiti types)
- Removal of graffiti after artificial salt spray exposure (500 hours) (Rating of 0-5 for all graffiti types)

For attack on the coating by alternative removal agents, the following criteria are to be met:

Alternative removal agent	Result
Mineral turpentine	Removes less than 10% of the coating

- Adhesion to selected substrates

Substrate	Minimum result by AS 1580.408.5
Concrete slab	>0.25 MPa

- Scratch resistance of coating after 7 days

Substrate	Minimum result by AS 1580.403.1
Applied to compressed cement sheet	Not greater than 600 grams

- Burn resistance of coating to cigarette lighter flame

Substrate	Minimum result
Applied to compressed cement sheet	Equal or greater burn resistance when compared to cured exterior acrylic paint

- Weathering resistance of coating (without graffiti applied)

Aspect	Exposure to 1000 hours QUV
Discolouration	≤ 2 (AS 1580.481.1.2)
Degree of chalking	≤ 2 (AS 1580.481.1.11)
Degree of colour change	≤ 2 (AS 1580.481.1.12)

Rating

0 = no defects or changes, **1** = some just insignificant defects or changes, **2** = small significant defects or changes, **3** = moderate defects or changes, **4** = considerable defects or changes, **5** = dense pattern of defects or changes.

- Liquid permeability of the coating

Substrate	Result
Limestone	Coating fully penetrated

8.4 Data

The following information is to be available at the time of testing (prior to supply):

- Current MSDS in accordance with Worksafe standard
- Current Technical Data sheet including application methods, application rates, application thickness, number of coats required, whether a primer is required, clean up requirements, recoatability, drying time, recoat window

8.5 Suitability for particular substrate

The manufacturer must state to which substrate(s) the coating is suitable to be applied.