



SLOW DRYING / HIGH VOLUME SOLIDS TWO-PACK EPOXY MASTIC COATING FOR THE LONG-TERM PROTECTION OF STEEL

1 SCOPE

This specification applies to solvent-containing, slow curing, high volume solids, two-pack epoxy mastic coating systems intended for high build (minimum of 400 μm applied in two coats) application to steel structures.

2 BACKGROUND

- To obtain a broad overview of the Australian Paint Approval Scheme (APAS), refer to APAS document AP-D001.
- To obtain an overview of restricted ingredients in APAS certified products, refer to APAS document AP-D123.
- To obtain the current list of APAS participating manufacturers (and suppliers) and resellers, refer to APAS document AP-D152.
- To obtain an overview of how to participate in the APAS, refer to APAS document AP-D177.
- APAS approval to this specification may be gained by compliance with the requirements detailed in this specification and those in APAS document AP-D192.

3 DESCRIPTION AND GUIDE FOR USERS

3.1 General Requirements

- This specification applies to solvent-containing, slow curing, high volume solids, two-pack epoxy mastic coating systems intended for high build (minimum of 400 μm applied in two coats) application to steel structures.
- These are very versatile products with a wide range of colours (including aluminium, glass flake, mica or MIO pigmentation), wide range of chemical resistance (pH 3-14) and suitable for potable water, immersion or buried structures.
- These products are also suitable for application to surfaces with less than ideal preparation. The systems are intended to provide a service life in excess of 10 years under Category C3 (Medium) atmospheric corrosivity conditions (refer to AS 2312.1) or in situations where frequent maintenance is impractical.
- Systems approved under this specification, while generally approved for atmospheric exposure, may also have the following approvals: fresh water, sea water and hydrocarbon fuels.
- APAS specification AP-S2977 differs from AP-S0156 (surface tolerant high build epoxy mastics) in that the former is slow drying to assist penetration.

3.2 Sub-Classes

- This specification incorporates the following sub-classes:
 - 2977:** For atmospheric exposure
 - 2977F:** For fresh water immersion
 - 2977S:** For salt water immersion
 - 2977T:** For hydrocarbon fuels

3.3 Basis of this Specification

- This specification is based on AS/NZS 3750.1, with the following modification:
 - Minimum volume solids set at 80%.
 - Increase in exterior durability requirements from 24 to 72 months.
- Paints approved under this specification are referenced as Paint Reference Number (PRN) C32 of AS 2312.1.

4 REFERENCED DOCUMENTS

- The following standards are referenced in this document:
 - AS/NZS 1580** – Paints and related materials: Methods of test
 - AS 2312.1** – Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings – Part 1: Paint Coatings
 - AS/NZS 3750.1** – Paints for steel structures – Part 1: Epoxy mastic (two-pack) – For rusted steel
 - AS 3750.18** – Paints for steel structures – Part 18: Moisture cure urethane (single-pack) systems

These documents may be purchased through the Reference Standards Australia website:

<https://www.standards.org.au/>

- The Poisons Standard June 2021:** Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) No. 33, Part 2: Control on Medicines and Poisons, Section Seven / Appendix I Paint or Tinters

This document is available from the Australian Government Federal Register of Legislation web site at: <https://www.legislation.gov.au/Details/F2021L00650>

- The following APAS documents are referenced in this document:
 - AP-D001 Rules Governing How APAS® Operates
 - AP-D123 Restrictions on Ingredients in Product Formulations
 - AP-D152 APAS® Participating Manufacturers and Resellers
 - AP-D177 Rules Governing How Product Manufacturers participate in APAS®
 - AP-D181 Volatile Organic Compounds (VOC) Limits
 - AP-D192 Rules Governing APAS® Product Certification Scheme
 - AP-S0156 Epoxy Mastic High Build Two-Pack Coating for Rusted Steel

All APAS documents are available for download from the APAS website: <https://vs.csiro.au/apas/documents/>

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5 COMPOSITIONAL REQUIREMENTS

5.1 Binder

- a) Typically, the binder will be a catalysed epoxy binder with polyamide, amine adduct or other hardeners.

5.2 Volatiles

- a) The volatile portion shall be typically comprised of hydrocarbons.
- b) For VOC content restrictions, refer to APAS document AP-D181.

5.3 Pigmentation

- a) The pigmentation shall be chosen to impart the properties detailed in clause 7, Table 1 below.

5.4 Colour

- a) Epoxy mastics come in a wide range of colours (including aluminium, glass flake, mica or MIO pigmentation), however approved products will usually be either black/brown or aluminium pigmented in colour. Refer to the manufacturers technical / product data sheet for more details of the Manufacturers Colour Range (MCR).
- b) The early chalking and loss of gloss characteristic of epoxies on exterior exposure may detract from the decorative properties but not from the protective properties of the product.

6 PRODUCT APPROVAL REQUIREMENTS

6.1 General Requirements

- a) The product and its application for approval shall comply with the relevant requirements of APAS document AP-D192 during the life of the approval.

6.2 Technical Requirements

- a) The product shall comply with **all** the requirements of clause 7, Table 1 below.

6.3 Health and Safety Requirements

- a) The manufacturer's Safety Data Sheet (SDS) must be studied closely prior to using the product and complied with during use of the product.
- b) As products covered by this specification principally contain solvents, the paint is considered flammable and should be stored away from all sources of heat or ignition.
- c) Containers should be resealed immediately after use and good ventilation provided during use to minimise the risk of fire or explosion and the long-term toxic effects of absorption of the vapour into the lungs.
- d) Care should be taken to avoid contact with the skin using protective clothing and barrier cream. All pumping equipment should be adequately earthed. It is anticipated that most of these products would be

- applied by operators in well ventilated spray booths or in the field by operators with adequate safety equipment.
- e) Products intended for sale in Australia shall comply with all the requirements of the SUSMP. Products intended for sale in other countries shall comply with all local WHS and environmental requirements.
 - f) The product shall comply with all requirements of clause 6.3 and 6.4 of APAS document AP-D192.



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7 TABLE 1: PERFORMANCE PROPERTIES

TEST	AS/NZS 1580 METHOD	REQUIREMENTS										
General Requirements	AS/NZS 3750.1	Shall comply with all the requirements of clause 2 Materials Requirements , with the exception of clause 2.3.2 (Volume Solids), 2.5.1 (Curing and Hard Dry Time) and 2.5.9 (Durability) as amended below. All results shall be reported. NOTE: Other tests listed below are in addition to these requirements.										
Non-volatile Content by Volume	Theoretical Calculation	Minimum 80%.										
Thinning or Mixing Properties	208.1	Using 10% of manufacturers recommended thinner, there shall be no signs of incompatibility.										
Viscosity	214.x	State method and record results.										
Application of Aged Sample	AS/NZS 3750.1 2.5.1 403.1	A sample of the product which has been stored at routine conditions for 12 months shall produce a uniform finish typical of the product type when applied by spray. The sprayed film shall still comply with the requirements of: Curing Properties: > 1.5 kg										
Surface Dry Condition (Mechanical Thumb Test)	401.6	Not less than 6 hours at 400µm dry film build at routine conditions.										
VOC Content	APAS AP-D181	Refer to APAS document AP-D181 for method and limits. If the APAS specification is not listed on AP-D181, a declaration of VOC content is still required .										
Resistance to Natural Weathering	AS/NZS 3750.1 clause 2.5.9 457.1 481.1.7 481.1.8 481.1.9 481.1.10 481.3	A mild steel panel, tested as per clause 2.5.9 of AS/NZS 3750.1, shall, after 72 months exposure at all 3 atmospheric exposure sites (listed in APAS document AP-D192, clause 12), the coating shall show no integrity failure i.e., at the end of 6 years, the ratings shall be: <table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">Checking</td> <td style="text-align: right;">0</td> </tr> <tr> <td>Cracking</td> <td style="text-align: right;">0</td> </tr> <tr> <td>Blistering</td> <td style="text-align: right;">0</td> </tr> <tr> <td>Flaking and Peeling</td> <td style="text-align: right;">0</td> </tr> <tr> <td>Corrosion</td> <td style="text-align: right;">0</td> </tr> </table>	Checking	0	Cracking	0	Blistering	0	Flaking and Peeling	0	Corrosion	0
Checking	0											
Cracking	0											
Blistering	0											
Flaking and Peeling	0											
Corrosion	0											
Water immersion <u>2977F and 2977S only</u>		After 60 months at the appropriate immersion exposure test site(s) (listed in APAS document AP-D192, clause 12), the product shall comply with the ratings in AS 3750.18 Table 2 (48 months).										
Resistance to Immersion - Hydrocarbon Fuels <u>2977T only</u>		When immersed for 2 hours at ambient temperature in a solution of 75% n-heptane and 25% toluene, the coating shall show no sign of softening, lifting, crazing or blistering.										



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8 APPENDIX A

Document History

Status: Current
Version: 3
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Document Version No.:	Date Published:	Summary of Changes:
3	02-09-2021	<ul style="list-style-type: none">• General format changes• Updated background information in clause 2• Updated SUSMP information• Updated APAS website information
2	24-12-2020	<ul style="list-style-type: none">• Addition of Appendix A Document History and removal of the Editorial Note previously used in specification versions• Updated document to the current format• Updated internal and external document references• Inclusion of VOC Content requirement to Table 1 Performance Properties• Addition of "People + Product = Protection" to Footer
1	10-12-2003	<ul style="list-style-type: none">• Removed reference to GPC and incorporated a general format update
0	07-12-2001	<ul style="list-style-type: none">• New specification