



POLYURETHANE COATING FOR THE PROTECTION OF STEEL IN ATMOSPHERE

1 SCOPE

This specification applies to two-pack solvent borne polyurethane coatings for application to steel structures on which optimum surface preparation can be achieved.

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 provides for two-pack solvent borne polyurethane coatings for application to steel structures on which optimum surface preparation can be achieved.
- The systems are intended to provide a service life in excess of 10 years under Category C3 (Medium) atmospheric corrosivity conditions (refer to AS/NZS 2312.1) or in situations where frequent maintenance is impractical.
- Products conforming to APAS specification AP-S2911 are intended for the long-term protection of steel where a high level of decorative finish is required.
- Where the decorative properties of these coatings are considered important, it is crucial that the appearance of the coating be maintained essentially throughout the life of the coating. Purchasers should obtain the manufacturer's written assurance that the selected colour will have acceptable colour stability for the intended purpose.
- The manufacturer's product / technical data sheet should confirm that the exposure conditions to which the coating system is to be exposed is within the capabilities of that system.
- Where surface preparation is likely to be marginal and surface tolerant coatings are required, reference should be made to APAS specification AP-S0156.

3.2 Sub-Classes

- This specification incorporates the following subclasses:
 - 2911/1:** Standard isocyanate-cured polyurethanes (two-pack)
 - 2911/2:** High durability, organically modified polyurethanes

3.3 Basis of this Specification

- Paints complying to sub-class AP-S2911/1 of this specification are based on AS/NZS 3750.6 with the following modifications:
 - All gloss finishes allowed
 - Minimum volume solids set
 - Increase in exterior durability requirements
- There are no known equivalent or near-equivalent specifications or standards for sub-class AP-S2911/2 product types.
- Products approved under this specification comply with Paint Reference Number (PRN) C26 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 3750.6** – Paints for steel structures – Full gloss polyurethane (two-pack)
 - ASTM G154-16** – Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Non-metallic Materials

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/>

POLYURETHANE COATING FOR THE PROTECTION OF STEEL IN ATMOSPHERE

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

5 COMPOSITIONAL REQUIREMENTS

5.1 Binder

- For sub-class AP-S2911/1 coatings, the binder shall typically be comprised of a polyester, polyacrylate or other type of polyol base cured with an aliphatic isocyanate hardener.
- For sub-class AP-S2911/2 coatings, the binder shall also incorporate an organic modifier such as fluoropolymer(s) intended to provide the high durability properties required.

5.2 Volatiles

- The volatile portion shall typically be comprised of oxygenated solvents, such as ketones, esters and glycol ether esters, and chlorinated solvents.
- For VOC content restrictions, refer to APAS document AP-D181.

5.3 Pigmentation

- There is no restriction on the type(s) of pigment(s). The pigmentation shall comply with the requirements of SUSMP, APAS document AP-D123 and be chosen to impart the properties detailed in clause 7, Table 1 below.

5.4 Colour

- Products approved under this specification are normally available in a wide range of colours, known as the Manufacturer's Colour Range (MCR). Refer to the manufacturer's product data sheet or technical data sheet for more information.

6 PRODUCT APPROVAL REQUIREMENTS

6.1 General Requirements

- The product and its application for approval shall comply with the relevant requirements of APAS document AP-D192 during the life of the approval.
- CLASS II (Interim) certification shall be granted for a period of 7 years in the first instance upon demonstrating conformance to the requirements noted in clause 7, Table 1 (with the exceptions of Application Properties of Aged Sample and Resistance to Natural Weathering). Application Properties of Aged Sample testing to the requirements noted in clause 7, Table 1 shall be undertaken and reported to APAS during the CLASS II certification period. Resistance to Natural Weathering testing to the requirements noted in clause 7, Table 1 shall be undertaken during the CLASS II certification period.
- CLASS I (Full, renewable) certification shall be granted to products for a period of 7 years maximum, having demonstrated conformance to Application Properties of Aged Sample and Resistance to Natural

Weathering in addition to ongoing conformance the requirements of clause 7, Table 1.

6.2 Technical Requirements

- The product shall comply with **all** the requirements of clause 7, Table 1 below, throughout the certification period.

6.3 Health and Safety Requirements

- The manufacturer's Safety Data Sheet (SDS) must be studied closely prior to using the product and complied with during use of the product.
- As products covered by this specification typically contain solvents, the paint is considered flammable and should be stored away from all sources of heat or ignition.
- 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.
- Care should be taken to avoid contact with the skin using protective clothing and barrier cream. All pumping equipment should be adequately earthed. A full-face air fed respirator should be used when spraying.
- In higher concentrations, monomeric isocyanates in these products can cause throat irritation and in severe instances, asthmatic symptoms. Some workers are sensitised at airborne concentrations well below the normal hygiene standards. This precludes persons with a history of respiratory problems from using these products.
- 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.
- 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.
- The product shall comply with all requirements of clause 6.3 and 6.4 of APAS document AP-D192.



SPECIFICATION AP-S2911



POLYURETHANE COATING FOR THE PROTECTION OF STEEL IN ATMOSPHERE

7 TABLE 1: PERFORMANCE PROPERTIES

TEST	AS/NZS 1580 METHOD	REQUIREMENTS										
General Requirements	AS/NZS 3750.6 602.2	Shall comply with all the requirements of clause 2 Material Requirements , <u>except</u> clause 2.5.4 (Gloss). All results shall be reported. Gloss: To be reported.										
Non-Volatile Content by Volume	301.2	Minimum 35%. Note: Theoretical calculations using raw material data is permissible.										
Thinning or Mixing Properties	208.1	Using 10% of manufacturers recommended thinner, there shall be no signs of incompatibility.										
Application of Aged Sample	205.1 205.3 205.2 or 205.4 AS/NZS 3750.6 2.4.5 & 2.5.3	A sample of the product which has been stored at routine conditions for 12 months, shall exhibit satisfactory application properties when applied by brushing, rolling and spraying. The product shall also comply with the requirements of: The cured film shall be free from defects. The cured film shall withstand a load of > 1.5 Kg.										
Colour – Visual Comparison	601.1	Approximate match.										
Resistance to Weathering	457.1 (Cat 1) 481.1.7 481.1.8 481.1.9 481.1.10 481.3	After 72 months exposure at all three exterior 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											
Accelerated Weathering Testing (ASTM G154)	AS/NZS 3750.6 2.5.13 481.1.2 481.1.5 481.1.7 481.1.8 481.1.9 481.1.10 481.3	For sub-class AP-S2911/2 only. After 4000 hours, the ratings shall be: Discolouration: Rating 0 or 1 Percentage Change in Gloss: ≤ 20% of initial gloss measurement. Measurements are to be taken using a 60° head. <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											
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 .										



SPECIFICATION AP-S2911



POLYURETHANE COATING FOR THE PROTECTION OF STEEL IN ATMOSPHERE

8 APPENDIX A

Document History

Status: Current
Version: 11
Date Published: 14-09-2021

Document Version No.:	Date Published:	Summary of Changes:
11	14-09-2021	<ul style="list-style-type: none">• General format changes• Updated background information in clause 2• Updated SUSMP information• Updated APAS website information
10	14-12-2020	<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
9	06-09-2017	<ul style="list-style-type: none">• Updated format• Updated current reference to the Poisons Schedule• Modified sub-class 2911/1 to allow for all gloss finishes• Added Colour test requirement to Table 1
8	05-05-2005	<ul style="list-style-type: none">• Expanded the range of coatings to include high durability (modified PU) versions
7	27-11-2003	<ul style="list-style-type: none">• Deleted reference to GPC numbering and incorporated a general format update
6	11-04-2001	<ul style="list-style-type: none">• Initiated the second stage of the move to new specification numbering with prominence given to the new number (previously GPC-C-29/11)