



ENAMEL EPOXY POLYESTER (SHIPS)

1 SCOPE

A two-pack epoxy polyester paint for use on the interior surfaces of submarines. Colour generally white or light grey, but other colours may be specified.

2 BACKGROUND

- a) To obtain a broad overview of the Australian Paint Approval Scheme (APAS), refer to APAS document AP-D001.
- b) To obtain an overview of restricted ingredients in APAS certified products, refer to APAS document AP-D123.
- c) To obtain the current list of APAS participating manufacturers (and suppliers) and resellers, refer to APAS document AP-D152.
- d) To obtain an overview of how to participate in the APAS, refer to APAS document AP-D177.
- e) 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

- a) A two-pack epoxy polyester paint for use on the interior surfaces of submarines. Colour generally white or light grey, but other colours may be specified.
- b) Apply by roller or spray (or brush for small areas) to the steel and timber bulkheads of living and machinery spaces of submarines. It may if necessary be applied over a holding primer.

3.2 Sub-Classes

- a) This specification does not incorporate any sub-class.

3.3 Basis of this Specification

- a) This specification is not based on an AS/NZS standard.

4 REFERENCED DOCUMENTS

- a) The following standard is referenced in this document
 - i. **AS/NZS 1580** – Paints and related materials: Methods of test

This document may be purchased through the Reference Standards Australia website:
<https://www.standards.org.au/>

- ii. **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 website at:
<https://www.legislation.gov.au/Details/F2021L00650>

- b) The following APAS documents are referenced in this document:
 - i. AP-D001 Rules Governing How APAS® Operates
 - ii. AP-D123 Restrictions on Ingredients in Product Formulations
 - iii. AP-D152 APAS® Participating Manufacturers and Resellers
 - iv. AP-D177 Rules Governing How Product Manufacturers participate in APAS®
 - v. AP-D181 Volatile Organic Compounds (VOC) Limits
 - vi. AP-D192 Rules Governing APAS® Product Certification Scheme

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

5 COMPOSITIONAL REQUIREMENTS

5.1 Binder

- a) The binder shall typically consist of epoxy and polyester resins.

5.2 Volatiles

- a) The volatiles shall typically consist of hydrocarbons.
- b) For VOC content restrictions, refer to APAS document AP-D181.

5.3 Pigmentation

- a) Products shall typically consist of appropriate colouring pigments.

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 mixing ratio of the finishing paints shall be 1:1 by volume.
- b) In all panel performance tests, the dry film thickness of each coat shall be 65 - 75 µm.
- c) Tin plate panels shall be prepared in accordance with AS/NZS 1580.105.2.
- d) Tin plate panels shall be as specified in AS/NZS 1580.104.1.
- e) In all panel tests where 7 days curing is required before testing, the curing conditions shall be as specified in AS/NZS 1580.101.5.
- f) The product shall comply with all the requirements of clause 7, Table 1 below.
- g) The manufacturers own quality control schedule of tests and limits shall be allowed subject to the approval of the Executive Officer (EO), APAS.



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- h) On request, the EO may request the results of the tests for a batch and compare these with previous batches.
- i) Density and non-volatile content by weight (NVCW) figures for each production batch of the approved product shall be within $\pm 3\%$ of the actual (not theoretical) figures quoted in the original product approval submission (APAS document AP-D139).
- j) Subject to compliance with all the requirements of this specification, the level of Approval appropriate to the application shall be given to the system.

6.3 Health and Safety Requirements

- a) Shall not be a Schedule 1, Schedule 2 or Schedule 3 paint (SUSMP).
- b) The manufacturer's Safety Data Sheet (SDS) must be studied closely prior to using the product and complied with during use of the product.
- c) Since the paint contains a hydrocarbon solvent, the wet paint is flammable and should be stored away from all sources of heat or ignition. Care should be taken to avoid contact with the skin by the use of protective clothing and barrier cream.
- d) Component 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. Painting should not be carried out whilst enclosed spaces are occupied, and exterior doors should be propped open as the vapours are heavier than air.
- 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
Individual Component Testing – To be carried out on <u>both</u> Part A and Part B components		
Preliminary Examination	103.1	To be readily reincorporated. Shall be free of coarse particles, gel and foreign matter.
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 .
Mixed Product Testing		
Fineness of Grind	204.1	Maximum 25 µm.
Viscosity	214.X	Method and result to be recorded.
Pot Life		A full 500 mL tin shall retain satisfactory application properties after being stored for 8 hours at 25 ± 2°C and shall show no signs of separation, gelation or inhomogeneity.
Thinning / Mixing Properties	208.1	10% by volume of the recommended solvent shall be readily miscible with the paint 30 minutes after initial mixing.
Clean-up		Mixed paint to be readily miscible with recommended cleaning solvent at the end of the product's specified pot life.
Application Properties		
- Brushing	205.1	Shall show satisfactory application properties without excessive drag, the dry film shall be free of defects and not exhibit excessive brush marks.
- Rolling	205.3	Shall show satisfactory application properties (no undue pull on roller) and the dry film shall be free of defects.
- Spraying	205.2	
Surface Dry Condition	401.1	Maximum 6 hours.
Hard Dry Condition (Mechanical Thumb Test)	401.6	Maximum 24 hours.
Recoating properties – over enamel (APAS Specification 0024/1)	401.1	When applied over enamel (to APAS specification 0024/1), there shall be no lifting, cracking, wrinkling or other defects. After 7 days curing, the coating shall withstand a scratch load of 2000g and there shall be no delamination when bent around a 12 mm mandrel.
Dry Hiding Power - Contrast Ratio	213.2	Minimum 95 % at manufacturer's recommended spreading rate.
Scratch Resistance	403.1	Minimum 2000g.



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TEST	AS/NZS 1580 METHOD	REQUIREMENTS
Mixed Product Testing (cont.,)		
Colour - Visual Comparison	601.1	Close match.
Specular Gloss	602.2	Minimum 90 units at 60°.
Finish	603.1	Shall be free of coarse particles, wrinkling or orange peel and have a uniform colour and appearance.
Reincorporation after Storage	211.2	To comply with all the preceding requirements after 18 months storage at ambient temperature.
Degree of Settling	211.1	Settling shall not fall below 6.
Non-Yellowing Properties		Place a prepared test panel in a desiccator together with a 100 mL beaker half filled with concentrated ammonia solution. With the lid in place and the desiccator in a fume cupboard, expose the panel for 24 hours. Remove the panel and examine. Colour change not to exceed 1.0 NBS units.



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8 APPENDIX A

Document History

Status: Current
Version: 9
Date Published: 27-08-2021

Document Version No.:	Date Published:	Summary of Changes:
9	27-08-2021	<ul style="list-style-type: none">• General format change to clause 1• Updated background information in clause 2• Updated SUSMP information• Updated APAS website information
8	11-11-2020	<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• Removed references to APAS specification 0330• Addition of "People + Product = Protection" to Footer
7	22-04-2003	<ul style="list-style-type: none">• Deleted reference to GPC numbering and incorporated a general format update
6	16-01-2001	<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-E-82)