SPECIFICATION AP-S0214

COATINGS FOR CONCRETE USED IN SEWAGE WORKS

1 SCOPE

This specification applies to products designed for use on concrete that is to be subjected to full or partial immersion in raw sewage conditions.

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) This specification covers coating products designed for application to concrete structures in full or partial immersion situations in sewage treatment plants on which optimum surface preparation can be achieved.
b) Due to the nature of the substrate and immersion conditions, a full coating system comprised of one or more of the following elements may be required to achieve all the properties of clause 7, Table 1: primer, intermediate coat and/or topcoat.
c) The systems are intended to provide a service life in excess of 10 years under corrosive or aggressive environmental conditions or in situations where frequent maintenance is impractical.

NOTE:

Careful selection of product type is required depending on the expected exposure conditions e.g., full immersion in raw sewage is a less aggressive environment than partial immersion where high levels of hydrogen sulphide gas in the head space are likely to be encountered. The test methodology in this specification calls for compliance to the more aggressive environment of partial immersion unless case history evidence is supplied.

Compliance with the requirements of this specification does not automatically guarantee that the approved product will supply the level of protection desired. Coatings on concrete must have a continuous film, free of all imperfections such as blow holes, pin holes, holidays etc before they will provide proper protection for the concrete. This is a function of the applicator and coatings inspector. The onus is on the asset owner to ensure project painting specification and associated QA documentation adequately covers such inspections.

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 any know specification or standard.
b) Products approved under this specification do not comply with any Paint Reference Number (PRN) of AS/NZS 2311 and AS/NZS 2312.

4 REFERENCED DOCUMENTS

a) The following standards are referenced in this document:

i. **AS 1379** – Specification and supply of concrete
ii. **AS/NZS 1580** – Paints and related materials: Methods of test
iii. **AS/NZS 2311** – Guide to the painting of buildings
iv. **AS/NZS 2312** – Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings

These documents may be purchased through the Reference Standards Australia website: https://www.standards.org.au/

v. **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

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) Although the type of binder is not restricted by this specification, binder types with a history of satisfactory performance include epoxies (high build, ultra-high build

or solventless), glass flake filled vinyl esters, glass flake filled polyester coatings, polyurea and elastomeric polyurethanes. Of primary importance is the compliance with the properties in clause 7, Table 1 below.

b) Other binder types may be considered depending on their compliance with the requirements established below.

5.2 Volatiles

a) There is no restriction placed on the type of volatiles used. Of primary importance is the compliance with the technical requirements detailed in clause 7, Table 1 below.
b) For VOC content restrictions, refer to APAS document AP-D181.

5.3 Pigmentation

a) Pigmentation shall be non-toxic and anti-corrosive and comply with the requirements of the SUSMP.
b) Of primary importance is that the choice of pigmentation shall result in compliance with the technical requirements detailed in clause 7, Table 1 below.

5.4 Colour

a) As colour is not an important consideration for this product class, products approved under this specification are normally available in a limited range of colours. Refer the manufacturer's product or technical data sheet.

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.
b) In addition to these tests, each coating system submitted for approval shall be required to perform satisfactorily in field durability testing – refer to clause 7, Table 1 below.
c) Initial enquiries and requests for quotation, as well as duplicate field test panels complying with Figure 1 below, shall be forwarded to:

Mr Kingsley Brown
Principal Engineer Materials Science
SA Water
250 Victoria Square / Tarntanyangga
Adelaide SA 5000
M +61 (0)487 888 200
E Kingsley.Brown@sawater.com.au

d) When forwarding test panels to SA Water, applicants are requested to cc the test request letter (or email) to the Executive Officer, APAS.
e) The SA Water report demonstrating compliance to requirements shall be attached to the APAS certification application at the completion of the test sequence.
f) 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) 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) 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.
c) The product shall comply with all requirements of clause 6.3 and 6.4 of APAS document AP-D192.

COATINGS FOR CONCRETE USED IN SEWAGE WORKS

7 TABLE 1: PERFORMANCE PROPERTIES

TEST	AS/NZS 1580 METHOD	REQUIREMENTS
For each COMPONENT of the System		
Preliminary Examination	103.1	To be readily reincorporated. Shall be free of coarse particles, gel and foreign matter.
Viscosity	214.x	To be recorded.
Application Properties - Brushing - Rolling - Spraying	 205.1 205.3 205.2 or 205.4	Shall show satisfactory application properties and the dry film shall be free of defects.
Surface Dry Condition	401.1	To be recorded.
Hard Dry Condition (Mechanical Thumb Test)	401.6	To be recorded.
Reincorporation after Storage	211.2	To comply with all the preceding requirements after 12 months storage at ambient temperature.
Degree of Setting	211.1	After 12 months standing at ambient conditions, settling shall not fall below 6.
Aged Spray Application	205.2 or 205.4	After 12 months, the use of spray application shall produce a uniform finish typical of the product type.
Colour - Visual Comparison	601.1	Approximate match.
Specular Gloss (60°)	602.2	To be recorded.
Finish	603.1	Shall be free of coarse particles, wrinkling or orange peel and have a uniform colour and appearance.
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.
For the COMPLETE System – Field Testing		
Accelerated Sewage Resistance Testing		Concrete (min. 25 MPa) panel 300 x 300 x 75 mm prepared[1] and coated by the coating manufacturer[2] shall be despatched to SA Water (refer to clause 6.2 c) above) for partial immersion in raw sewage at the SA Water (Bolivar) test site for a period of 24 months[3]. **CLASS II Approval (Interim)**: no blistering, cracking or integrity loss[4] after **18 months** immersion. **CLASS I Approval (Full)**: no blistering, cracking or integrity loss[4] after **2 years** immersion.

COATINGS FOR CONCRETE USED IN SEWAGE WORKS

NOTE:

[1] Panels shall be cast from ordinary Portland cement class 25 MPa concrete complying with AS 1379 and moist cured at 25 ± 3°C, ensuring surfaces of specimen are kept wet (full immersion is acceptable) for a minimum period of 28 days. No curing agents shall be used. One 300 x 75 mm side of the cast concrete test panel shall be provided with a corrosion-resistant cast-in handle centrally located for safe handling. A 20 mm length of a 100 mm PVC pressure pipe [i.e., a short section of a large pipe shall be half immersed in the side of the test panel(s)] or a 10 mm minimum diameter Grade 316 bent stainless-steel bar may be used. Refer Figure 1 below. Concrete surfaces shall be brush blasted to remove laitance unless the manufacturer specifically recommends an alternative method of surface preparation. Blow holes shall be filled before application of the coating either using filler recommended by the coating manufacturer as compatible with the topcoat or using a system base coat.

[2] Special care shall be taken with coating where the handle emerges from the concrete to ensure there are no voids or holidays or other coating defects that will allow the ingress of headspace gas.

[3] Each test specimen will be examined at approximately 6 monthly intervals.

[4] Integrity Loss: When examined in accordance with the relevant sections of AS/NZS 1580.481.1, there shall be no checking, cracking, flaking or blistering. Cracking, flaking and blistering includes any such defect in either the total coating or one or more coats.

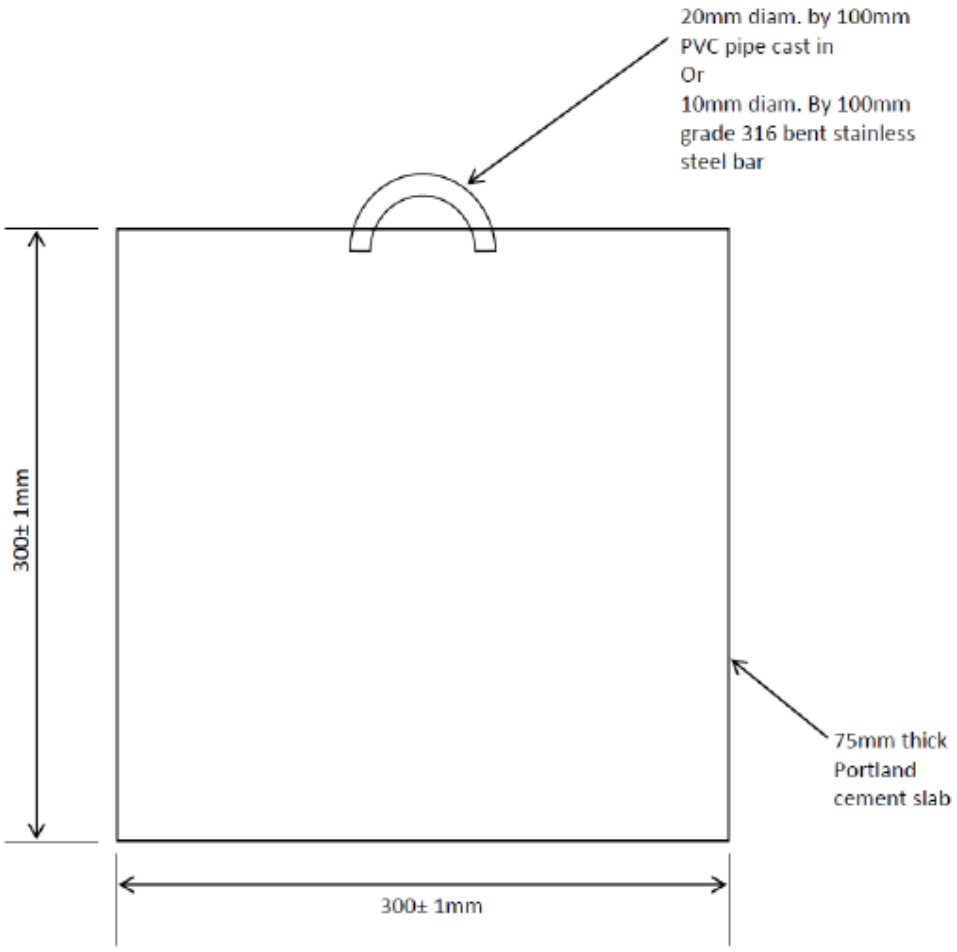

Figure 1: Test Panel Details

8 APPENDIX A

Document History

Status: Current
Version: 7
Date Published: 10-09-2021

Document Version No.:	Date Published:	Summary of Changes:
7	10-09-2021	• General format changes • Updated background information in clause 2 • Updated SUSMP information • Updated APAS website information
6	03-12-2020	• 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 • Updated SA Water contact details • Inclusion of VOC Content requirement to Table 1 Performance Properties • Addition of “People + Product = Protection” to Footer
5	25-11-2016	• Updated logos and corrected field-testing delivery details in 7.2
4	07-04-2011	• Document new format and only editorial changes made
3	26-11-2008	• Corrected Note cross-references on page 4
2	04-06-2008	• Clarified concrete test panel requirements (see Note 3) and size (min 75mm thick)
1	23-10-2003	• Deleted reference to GPC numbering and incorporated a general format update
0	04-07-2001	• Original document