

## COATING SPECIFICATION

### HIGH BUILD EPOXY COATING ON STEEL OR CAST IRON

COATING SPECIFICATION: D1

ISSUE: 4

DATE: July 2021

#### 1.0 SCOPE

This document summarises the procedure for the application of a 2 pack High Build Epoxy Coating, with  $\geq 85\%$  volume solids, on steel or cast iron and 100% volume solids for potable water applications.

Refer Design Standard, DS95 (Standard for the Selection, Preparation, Application, Inspection and Testing of Protective Coatings on Water Corporation Assets) for additional information and/or clarification.

It shall be read in conjunction with Water Corporation surface preparation specification **A1 - Surface Preparation for the Application of Protective Coatings on Steel or Cast Iron.**

#### 2.0 PURPOSE

This coating system is suitable for use on Steel or Cast-Iron surfaces which are immersed in potable or wastewater. For potable water applications the coating shall also have AS/NZS 4020 (Testing of products for use in contact with drinking water) approval and a 100% volume solid High Build Epoxy shall be used.

#### 3.0 DEFINITIONS

**ACA:** Australasian Corrosion Association.

**Adhesion Testing:** Testing to determine the bonding strength of the coating to the substrates to which they are applied.

**Contractor:** The service provider or its sub-contractor who will undertake the works.

**Corporation:** The Water Corporation and the Principal for the purposes of externally contracted asset delivery.

**DFT:** Dry Film Thickness.

**ITP:** The detailed Inspection and Test Plan(s) for the Works.

**NACE:** National Association of Corrosion Engineers.

**Spark Testing:** Testing of the continuity of a fully-cured coating film for evidence of defects, pin holes, holidays (misses) or damage.

**Superintendent:** The Superintendent for the contract, as defined in the conditions of contract, who is appointed by the Water Corporation to manage/oversee the work under the contract on behalf of the Water Corporation.

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**TDFT:** Total Dry Film Thickness.

**Works:** The surface preparation, coating application and inspection to be undertaken by the contractor to which this coating specification applies.

#### 4.0 SURFACE PREPARATION

- 4.1 Preparation of substrate to be in accordance with preparation specification **A1 - Surface Preparation for the application of Protective Coatings on Steel or Cast Iron**.
- 4.2 All visible mill scale, rust, oxides, paint and other foreign matter shall be removed from the surfaces to be coated by blast cleaning to a **Class 3** (white metal) finish as specified in AS/NZS 1627 Part 4.
- 4.3 The blast cleaned surfaces shall have a uniform metallic appearance, a surface profile which provides satisfactory anchorage for the coating, as per paint manufacturer's recommendation and be otherwise compatible with the coating to be applied.
- 4.4 Particulate contamination to be conducted on blasted surface for surfaces to be used in an immersed environment as per DS95 - clause 4.21. The dust quantity level shall not exceed rating 2 and class 2 for dust particle size.
- 4.5 Coating shall not be applied to any prepared surface(s) exhibiting "flash corrosion" or that has been abrasive blasted more than 4 hours prior to commencement of coating.
- 4.6 Assessment of the surface profile height or anchor pattern of the abrasive blasted surface shall be carried out using the Replica Tape method (TESTEX PRESS-O-FILM) as described in AS/NZS 3894.5. Profile range between 75-100µm on carbon steel or as per manufacturers recommendations.

#### 5.0 COATING MATERIALS

- 5.1 Coating materials used for attaining the specified standard shall be selected in accordance with Appendix 3 of DS-95- commonly used coatings in potable water and wastewater infrastructures unless approved otherwise by the Team Leader – Asset Durability. This approval is required before coating commences and referenced in the ITP.
- 5.2 The coating components shall be thoroughly mixed in the specified proportions. Material so prepared shall be used within the "pot-life" period defined by the manufacturer for the relevant site conditions.

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- 5.3 Coating specifications inclusive of datasheets, coating application method statements and ITPs shall be submitted to the Principal for approval.
- 5.4 Surfaces to be coated which will become inaccessible after assembly or erection shall be cleaned and painted before they become inaccessible.
- 5.5 Welding slag, weld spatter, sharp edges and any other surface irregularities which may impair the appearance or performance of the protective coating shall be removed. Sharp edges shall be radiused to a minimum of 2mm.
- 5.6 Welds, edges, crevices, seams, joints and corners shall be brush (stripe) coated on each coat of a multi coat system before the commencement of spray application of the coating.
- 5.7 Mixing, thinning, application of protective coatings shall be carried out in accordance with manufacturers recommendations.
- 5.8 Recommended recoat interval times between coats shall not be exceeded.

#### 6.0 ATMOSPHERIC CONDITIONS

- 6.1 Prior to and during coating application, the contractor shall record details pertaining to environmental conditions including ambient and surface temperature, relative humidity and dew point.
- 6.2 Coating application shall not commence if any one of the following conditions exists:
- The relative humidity is above 85%;
  - The substrate temperature is less than dew point plus 3°C;
  - The substrate temperature is below 10°C;
  - The substrate temperature is above 55°C;
  - The surface to be coated is wet or damp;
  - Where the full prime coat application cannot be carried out before the specified cleanliness of the surface deteriorates.
  - If the weather is deteriorating or is unfavorable for application or curing.
- 6.3 Ambient Conditions – Relative humidity, dew point, etc. shall be recorded at least 4 times per shift at minimum and more frequently when the ambient conditions become close to being unfavorable to conduct surface treatment or coating application.

#### 7.0 COATING THICKNESS

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- 7.1 The surfaces specified shall be given two or more coats of the 2 pack epoxy coating to produce a minimum of 500 microns dry film thickness. Maximum dry film thickness should not exceed 750 microns. Recommended recoat interval between coats shall not be exceeded.
- 7.2 Finished coating thickness shall be determined using suitable instruments standardised (zeroed) on a smooth uncoated metal plate in accordance with AS/NZS 3894.3. and in accordance with SSPC - PA2.

#### 8.0 COATING FINISH

- 8.1 The finished coating shall be of uniform thickness, colour, appearance and gloss. It shall be fully cured, insoluble, adherent, coherent and free from mud cracking, holidays, laps, sags, blistering, checking, wrinkling, overspray, patchiness and any other defects that may impair the performance and/or appearance of the coating.

#### 9.0 COATING APPLICATOR/PERSONNEL QUALIFICATION

- 9.1 Work shall only be carried out by a competent person.
- 9.2 The work shall be undertaken by an approved Water Corporation Corrosion Control Panel Services member, unless approved otherwise by the Team Leader – Asset Durability.
- 9.3 The contractor shall nominate a certified coating inspector to perform inspections and maintain appropriate records for the work performed. Coating Inspector engaged in testing, monitoring and verification of surface preparation and coating application shall hold relevant inspection qualifications and current certifications (e.g. NACE or ACA) or approved by the Principal. The coating inspector shall conduct the following:
- Prepare Quality Assurance documentation to meet the specified standards given herein and the required acceptance criteria.
  - Perform inspections and maintain appropriate records for work performed.
  - Testing, monitoring and verification of surface preparation and coating application.

#### 10.0 INSPECTION AND TESTING OF COATING

- 10.1 **Visual Inspection** - Coatings shall be visually examined for surface defects and any defects arising after curing shall be recorded and repaired.

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- 10.2 **Spark Testing** - The entire finished, fully cured coating subjected to immersion or otherwise specified shall be holiday tested in accordance with AS 3894.1. Spark Testing is to be performed once unless specified otherwise by the Principal. Secondary holiday testing is only to be performed at any repair locations.
- 10.3 **Adhesion Testing** - Adhesion testing is only required on the following assets: Tanks and Pressure Vessels. Testing shall be carried out in accordance with AS/NZS 1580 Method 408.5 and AS/NZS 3894.9 Method C, Clause 4.2. In the case of Pressure Vessels, a test panel/coupon (of similar substrate material) shall be prepared and a pull off test consisting of a minimum 3 dollies, 100mm apart, shall be carried out to confirm the adhesion of the coating. The minimum acceptable adhesion value for High Build Epoxy coatings on Steel or Cast Iron shall be 5MPa.
- 10.3.1* The location of any destructive testing locations shall be identified and agreed upon by both the Contractor and the Superintendent prior to the start of attaching the dollies to the coating. This may include completing the adhesion tests on coupons as per DS95. Destructive testing on a completed tank lining other than on test panels to qualify a coating system would only be required in the event of a catastrophic coatings failure.
- 10.3.2* In the event of test failure, additional adhesion tests shall be carried out on the asset under construction/remediation.
- 10.3.3* The results of all adhesion tests shall be submitted to the Superintendent as part of the overall quality control documentation.
- 10.4 Soluble salt testing to be conducted on the prepared blasted surface for C4 or C5 site/plant/yard conditions before coating application as per clause 4.1 DS 95 unless specified otherwise.
- Immersion service - 3µg/cm<sup>2</sup>
  - Ambient service - 5µg/cm<sup>2</sup>

## 11.0 REPAIR OF DEFECTIVE COATINGS AND RETESTING

- 11.1 Defects such as pinholes, cracks, blisters, voids, foreign inclusions and irregular profile peaks (e.g. runs) and / or deviations from the specified coating thickness shall be marked for repair and retested upon full cure of the repaired coating.
- 11.2 Coatings with defective areas equal to 20% or more of the total coated surface will be rejected outright requiring the affected area to be blasted and re-coated, unless agreed otherwise by the Superintendent or delegate.

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#### 12.0 RECORDING AND REPORTING

- 12.1 Prior to any works commencing, an Inspection Test Plans (ITP) shall be forwarded to the Superintendent for review a minimum of **ten working days** prior to the commencement of work.
- 12.3 On completion of the works a report shall be submitted by the Contractor to the Superintendent. This report shall include all coating test results, details of any failures and subsequent repairs if required.

#### 13.0 CONTRACTOR'S RESPONSIBILITY

- 13.1 The Contractor shall supply all necessary plant, equipment, materials and labour, prepare the surface and apply, inspect and maintain the protective coating in accordance with this specification.
- 13.2 A list of all items to be inspected and the relevant drawing reference shall be forwarded to the Water Corporation Coating Inspector prior to the inspection being undertaken.
- 13.3 The preceding inspection clauses shall not relieve the Contractor of their responsibility to supply materials and perform work in accordance with the requirements of any overriding contract documentation.

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