COATING SPECIFICATION

HIGH BUILD EPOXY COATING ON BUTTERFLY VALVES

COATING SPECIFICATION: D2   ISSUE: 3   DATE: JULY 2019

1.0 SCOPE

This document summarises the procedure for the application of a 2 pack High Build Epoxy Coating, with ≥ 80% volume solids, on steel or ductile iron butterfly valves.

Refer Design Standard, DS 95 (Standard for the Selection, Preparation, Application, Inspection and Testing of Protective Coatings on Water Corporation Assets) for details for additional information 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 is used on the internal and external surfaces of steel or ductile iron butterfly valves immersed in potable water or wastewater or both buried or above ground applications.

In the event of potable water application, the coating shall be AS/NZS 4020 approved.

3.0 DEFINITIONS

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<tbody>
<tr>
<td>Adhesion Testing:</td>
<td>Testing to determine the bonding strength of the coating to the substrates to which they are applied.</td>
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<tr>
<td>Contractor:</td>
<td>The service provider or its sub-contractor who will undertake the works.</td>
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<tr>
<td>Corporation:</td>
<td>The Water Corporation and the Principal for the purposes of externally contracted asset delivery.</td>
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<tr>
<td>DFT:</td>
<td>Dry Film Thickness.</td>
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<tr>
<td>ITP:</td>
<td>The detailed Inspection and Test Plan(s) for the Works.</td>
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<tr>
<td>NACE:</td>
<td>National Association of Corrosion Engineers.</td>
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<tr>
<td>Spark Testing:</td>
<td>Testing of the continuity of a fully-cured coating film for evidence of defects, pin holes, holidays (misses) or damage.</td>
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<tr>
<td>Superintendent:</td>
<td>The Superintendent for the contract, as defined in the conditions of the contract, who is appointed by the Water Corporation to manage/oversee the work under the contract on behalf of the Water Corporation.</td>
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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 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.

4.2 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.

4.3 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.

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.

5.2 The coating components shall be thoroughly mixed in the specified proportions. Material so prepared shall be used within the “pot-life” period claimed by the manufacturer for the relevant site conditions.

5.3 Coating specifications inclusive of datasheets, coating application, method statements and ITP’s shall be submitted to the Principal for approval at least 10 working days prior to commencement of the work.

5.4 Edges, crevices, seams, joints and corners shall be brush coated before commencement of spray application of the coating.

5.5 Mixing, thinning, application and curing of protective coatings shall be carried out in accordance with the coating manufacturer’s recommended practice for the on-site conditions.

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;
   - If the pot life of the paint has been exceeded.

7.0 COATING THICKNESS

7.1 Seal on Body Butterfly Valves

7.1.1 Flanges
   For below ground applications, prior to backfill valve flanges shall be wrapped with System B (4-Step Petroatum) in accordance with Corporation’s tape wrapping procedure L1]. Gear Boxes no wrapping required.

7.1.2 Internal surfaces
   Coatings shall not be applied to the internal surfaces of Seal on Body butterfly valves.

7.1.3 External Surfaces
   External surfaces including gear boxes shall be given two or more coats of 2 pack High Build Epoxy to achieve a dry film thickness of minimum of 500 microns. [Refer: Figure 1].

7.1.4 Raised Face Flange Faces
   The sealing faces of raised faced flanges shall be coated with 2 pack High Build Epoxy to achieve a dry film thickness of 50 to 250 microns [Refer: Figure 1].

7.1.5 Flat Face Flange
   The sealing faces of flat faced flanges shall be coated with 2 pack High Build Epoxy to achieve a dry film thickness of 50 to 250 microns [Refer: Figure 2].
7.2 Seal on Disc Butterfly Valves

7.2.1 Flanges
For below ground applications, prior to backfill valve flanges shall be wrapped with System B (4-Step Petrolatum) in accordance with Corporation’s tape wrapping procedure L1. Gear Boxes no wrapping required.

7.2.2 Internal surfaces
Internal surfaces, with the exception of stainless steel inserts and discs, shall be given 2 or more coats of two packs High Build Epoxy to achieve a minimum dry film thickness of 500 microns.

7.2.2 External Surfaces
External surfaces including gear boxes shall be given two or more coats of 2 pack High Build Epoxy to achieve a minimum dry film thickness of 500 microns.

7.2.4 Raised Face Flange Faces
The sealing faces of raised faced flanges shall be coated with an anti-corrosive coating for transportation / storage purposes, the applied coating shall be such that it is readily removable [Refer: Figure 3].

7.2.5 Flat Flange Faces
The sealing faces of flat faced flanges shall be coated with an anti-corrosive coating for transportation / storage purposes, the applied coating shall be such that it is readily removable.
Figure 1 - Coating thickness on the external and raised face flange surfaces of a seal on body butterfly valve.

Figure 2 - Coating thickness on the flat face flange surface of a Seal on Body Butterfly Valve.
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Figure 3 - Coating thickness on the raised face flange surface of a Seal on Disc Butterfly Valve.

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<tr>
<th>Colour Legends for Figures 1 - 3</th>
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<tr>
<td><strong>Flange Face Coating:</strong> Spray apply High Build Epoxy with a thickness of 375 to 600 microns.</td>
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<tr>
<td><strong>Internal Coating:</strong> Spray apply High Build Epoxy with a thickness of 550 microns minimum.</td>
</tr>
<tr>
<td><strong>Raised Face Coating:</strong> Spray apply High Build Epoxy with a thickness of 50 to 250 microns.</td>
</tr>
<tr>
<td><strong>Sealing Face Coating:</strong> A thin layer of anti-corrosive coating to be applied for transport/storage purposes.</td>
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Note: Colours in the above diagrams are indicative only, standard valve coating colours to be used.

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 holidays, laps, sags, blistering, checking, wrinkling, overspray, patchiness and any other defects that may impair the performance and/or appearance of the coating.
8.2 Protective coating colours shall comply with AS/NZS 2700 - Colour Standards for General Purposes. If a suitable approved colour is not available, then the proposed colour shall be referred to the Water Corporation for acceptance prior to use. Reference shall be made to Water Corporation Colour Code Drawing No. EG71-1-1, Rev. E for details of colours to be used for different applications. Where valves are being supplied by a European manufacturer reference shall be made to DS 95 Table 7 for equivalent European standard colours (RAL), unless agreed otherwise by the Superintendent.

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 Applicator’s Coating Supervisor shall possess as a minimum one of the following certifications:

- ACA - Coating Inspector; or
- NACE - CIP Level I Coating Inspector.

9.4 The coating contractor shall nominate a Coating Inspector as their Quality Control Officer to carry out inspections, submit the ITP, undertake the required testing and maintain appropriate records for all work performed.

The Applicator’s Coating Inspector shall possess as a minimum one of the following certifications:

- ACA - Coating Inspector; or
- NACE - CIP Level I Coating Inspector.

10.0 INSPECTION AND TESTING OF COATING

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

10.2 **Spark Testing** - The finished, fully cured coating subjected to buried or immersed conditions shall be holiday tested in accordance with AS/NZS 3894.1.

10.3 **Adhesion Testing** - Testing shall be carried out to confirm the integrity of the internal coating of seal on disc valves. Testing shall be in accordance with AS/NZS 1580.
Method 408.5 and AS 3894.9 Method C. The minimum acceptable adhesion value for High Build Epoxy coatings on Steel or Cast Iron shall be 5MPa.

10.3.1 For each purchase order 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.

10.3.2 In the event of test failure, additional adhesion tests shall be carried out on other valves under construction.

10.3.3 The results of all adhesion tests shall be submitted to the Superintendent as part of the overall quality control documentation.

11.0 REPAIR OF A DEFECTIVE COATING AND RETESTING

11.1 Coatings with defective areas equal to 20% or more of the total coated surface will be rejected outright.

11.2 Defects such as pinholes, cracks, blisters, voids, foreign inclusions and irregular profile peaks shall be marked for repair and retested upon full cure of the repaired coating.

12.0 RECORDING AND REPORTING

12.1 Following testing a report shall be submitted by the Contractor. The Contractor shall keep detailed records and reports including the following:

- Environmental conditions (relative humidity, dew point etc.);
- Surface preparation;
- Surface profile;
- Coating application;
- Coating testing; and
- General failure.

12.2 To supplement these records, prior to any works commencing, an Inspection Test Plans (ITP) shall be forwarded to the Water Corporation for review a minimum of ten working days prior to the commencement of work.

13.0 CONTRACTOR'S RESPONSIBILITY

13.1 The Contractor shall supply all necessary plant, equipment, materials and labour, prepare the surface and apply 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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