

COATING SPECIFICATION

HIGH BUILD EPOXY COATING ON BUTTERFLY VALVES

COATING SPECIFICATION: D2

ISSUE: 4

DATE: FEBRUARY 2023

1.0 SCOPE

This document summarises the procedure for the application of a 2 pack High Build Epoxy Coating, with $\geq 80\%$ 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, additional information or clarification.

This Specification shall be read in conjunction with Water Corporation Specification **A1 - Surface Preparation for the application of Protective Coatings on Steel or Cast Iron.**

2.0 PURPOSE

This coating system is intended to be applied on the internal and external surfaces of steel or ductile iron butterfly valves, which are immersed in potable water or wastewater or both, in either buried or above ground applications. In the event of potable water application, the coating shall be compliant to AS/NZS 4020.

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 the contract, who is appointed by the Water Corporation to manage/oversee the work under the contract on behalf of the Water Corporation (Principal).

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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 and Water Corporation Specification A1.
- 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 Principal. This approval is required before coating commences.
- 5.2 The coating components shall be thoroughly mixed in the specified proportions as per coating manufacturer's recommendations.
- 5.3 Coating specifications inclusive of datasheets, coating application, method statements and ITPs shall be submitted to the Principal for approval at least 10 working days prior to commencement of work.
- 5.4 Edges, crevices, seams, joints and corners shall be stripe coated before commencement of spray application of the coating.

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;

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- The substrate temperature is above 55°C;
- The surface to be coated is wet or damp;
- Where specified cleanliness of the surface deteriorates;
- If the weather is deteriorating or is unfavorable for application or curing;

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 Water Corporation Tape Wrapping System B (4-Step Petrolatum) in accordance with Corporation's Specification L1 Tape Wrapping Requirements. Gear boxes do not require wrapping.

7.1.2 Internal surfaces

Coating shall not be applied to the internal surfaces of seal on body butterfly valves.

7.1.3 External Surfaces - Valve Body

Shall be given two or more coats of 2 pack High Build Epoxy to achieve a minimum dry film thickness of 500 microns. [Refer: Figure 1 and Figure 2 for details].

7.1.4. Gear Boxes

Shall be given two or more coats of 2 pack High Build Epoxy to achieve a minimum dry film thickness of 500 µm, unless otherwise previously agreed by the Principal.

7.1.5 Flange Face

To reduce the propensity of stress cracking during bolt torquing, coating thickness applied to the back of the flange face shall be coated with 2 pack High Build Epoxy to archive dry film thickness of 200 to 400 microns. [Refer: Figure 1 and Figure 2].

7.1.6 Raised Face and Flat Face Flanges

The sealing faces shall be coated with 2 pack High Build Epoxy to achieve a dry film thickness of 50 to 250 microns [Refer: Figure 1 and 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 Water Corporation Tape Wrapping System B (4-Step Petrolatum) in accordance with Corporation's Specification L1 Tape Wrapping Requirements. Gear boxes do not require wrapping.

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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.

7.2.3 External Surfaces - Valve Body

Shall be given two or more coats of 2 pack High Build Epoxy to achieve a minimum dry film thickness of 500 microns. [Refer: Figure 3].

7.2.4. 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, unless otherwise previously agreed by the Principal.

7.2.5 Flange Face

To reduce the propensity of stress cracking during bolt torquing, coating thickness applied to the back of the flange face shall be coated with 2 pack High Build Epoxy to achieve a minimum dry film thickness of 200 to 400 microns. [Refer: Figure 3].

7.2.6 Raised Face and Flat Face Flanges

The sealing faces shall be coated with 2 pack High Build Epoxy to achieve a minimum dry film thickness of 50 to 250 microns.

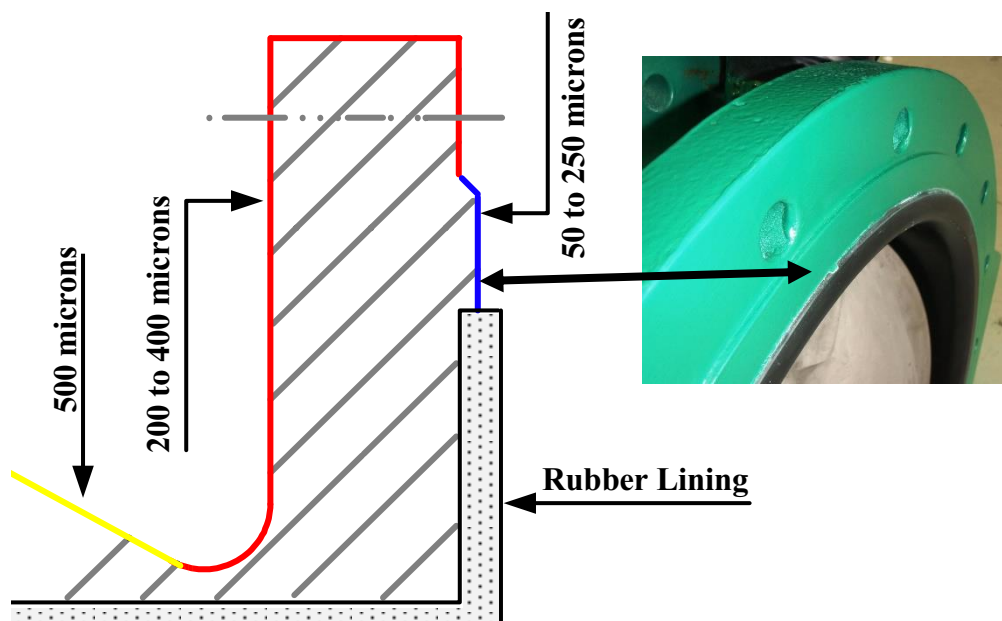


Figure 1 - Coating thickness on the external and raised face flange surfaces of a seal on body butterfly valve.

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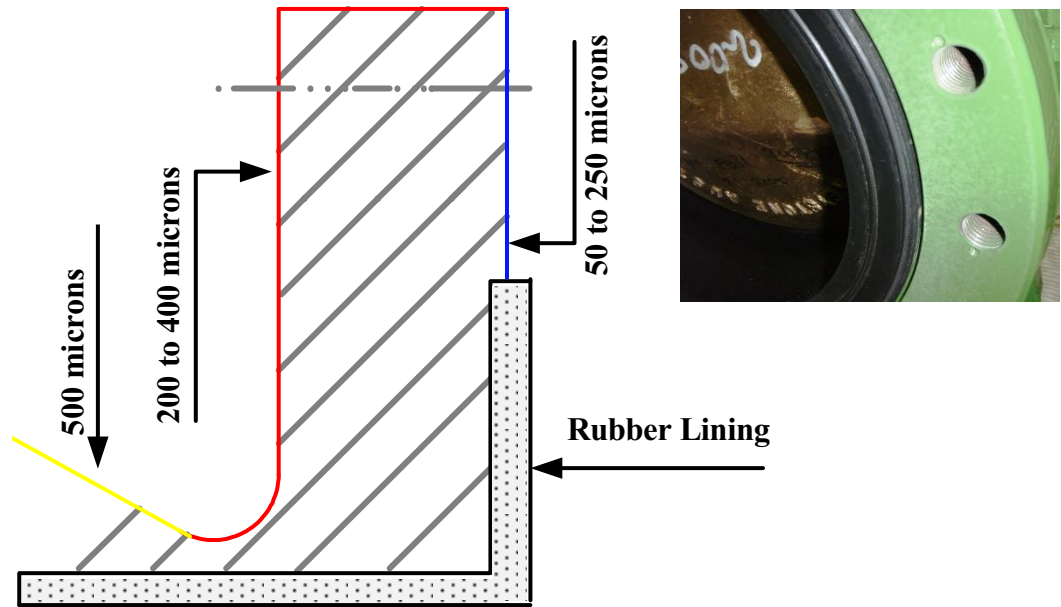


Figure 2 - Coating thickness on the flat face flange surface of a seal on body butterfly valve.

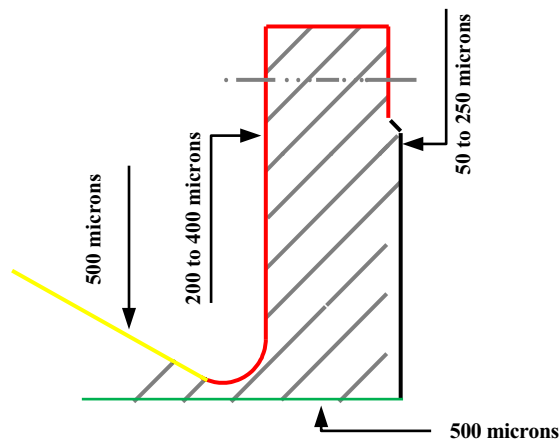


Figure 3 - Coating thickness on the raised face flange surface of a seal on disc butterfly valve.

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Colour Legends for Figures 1 - 3

- **Flange Face Coating:** Spray apply High Build Epoxy with a thickness of 200 to 400 microns DFT
- **Internal Coating:** Spray apply High Build Epoxy with a minimum thickness of 500 microns DFT
- **Flat and Raised Face Coating:** Spray apply High Build Epoxy with a thickness of 50 to 250 microns DFT
- **Main body of valve:** Spray apply HBE with thickness of 500 microns DFT
- **Sealing Face Coating:** A thin layer of anti-corrosive coating to be applied for transport/storage purposes.

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.

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 Protective Coating and Concrete Repair Services Panel member unless approved otherwise by the Principal.
- 9.3 The Contractor shall nominate a certified coating inspector to perform inspections and maintain appropriate records for the work performed. The 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.

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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 or as per of manufacture recommendation.
- 10.3 **Adhesion Testing** - Testing is a method of confirming integrity of the internal coating of 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. Water Corporation reserve the right to request that adhesion testing be completed in the event of a catastrophic coating failure. Additional adhesion tests shall be carried out on other valves within the same batch.

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.

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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.

Document Revision History					
Sect	Issue	Date	Revision Description	RVWD	APROV
7	4	01/02/2023	Amend coating thickness	AO	SS
9	4	01/02/2023	Amend coating applicator/personnel qualification	AO	SS
10	4	01/02/2023	Inspection and testing of coating	AO	SS

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