

COATING SPECIFICATION

EPOXY MASTIC, POLYURETHANE TOP COAT ON CONTROL VALVES

COATING SPECIFICATION: E2

ISSUE: 3

DATE: JULY 2019

1.0 SCOPE

This document summarises the procedure for the application of using 2 pack Epoxy Mastic coating and polyurethane top coat on control valves. This Coating Specification applies to operations required for the surface preparation of Control Valves (Pressure Relief Valves, Radial Valves etc.) of size generally greater than 600 mm

Refer Design Standard, DS95 (Standard for the Selection, Preparation, Application, Inspection and Testing of Protective Coatings on Water Corporation Assets) 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 specification is used on Steel or Cast Iron exposed to atmospheric corrosivity categories C1 to C5 as described in Australian Standard AS 2312.

For potable water applications the coating shall also have AS 4020 (Testing of products for use in contact with drinking water) approval.

Typical application includes Control Valves e.g. Flow Control, Inline Regulating valves etc.

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.

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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.

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 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 recommended by the paint manufacturer and be otherwise compatible with the coating to be applied. If the blast cleaned surface is pitted, then those areas shall be repaired using Belzona® 1111.
- 4.3 Coating shall not be applied to surfaces which have become contaminated or deteriorated after cleaning.

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.

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

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7.0 COATING THICKNESS

7.1 Internal Surfaces (shown in Red colour)

The internal surfaces specified shall be given two or more coats of the accepted 2 pack Epoxy Mastic to achieve minimum 500 microns dry film thickness [Refer Figure 1]. Prior to coating, the pitted areas shall be repaired using Belzona® 1111.

7.2 External Surfaces (shown in Green colour)

The external surfaces specified shall be given two or more coats of the accepted 2 pack Epoxy Mastic to achieve minimum 500 microns nominal dry film thickness followed by a nominal dry film thickness of 50 microns of Polyurethane top coat [Refer Figure 1].

7.3 Flange Faces (shown in Yellow colour)

The flange faces shall be coated with two or more coats of the accepted 2 pack Epoxy Mastic to achieve maximum dry film thickness 250 to 375 microns [Refer Figures 2 & 3].

7.4 Raised and Flat Face Flange Sealing Faces (shown in Blue colour)

The Sealing faces shall be coated with two or more coats of the accepted 2 pack Epoxy Mastic to achieve maximum dry film thickness 50 to 250 microns [Refer Figures 2 & 3].

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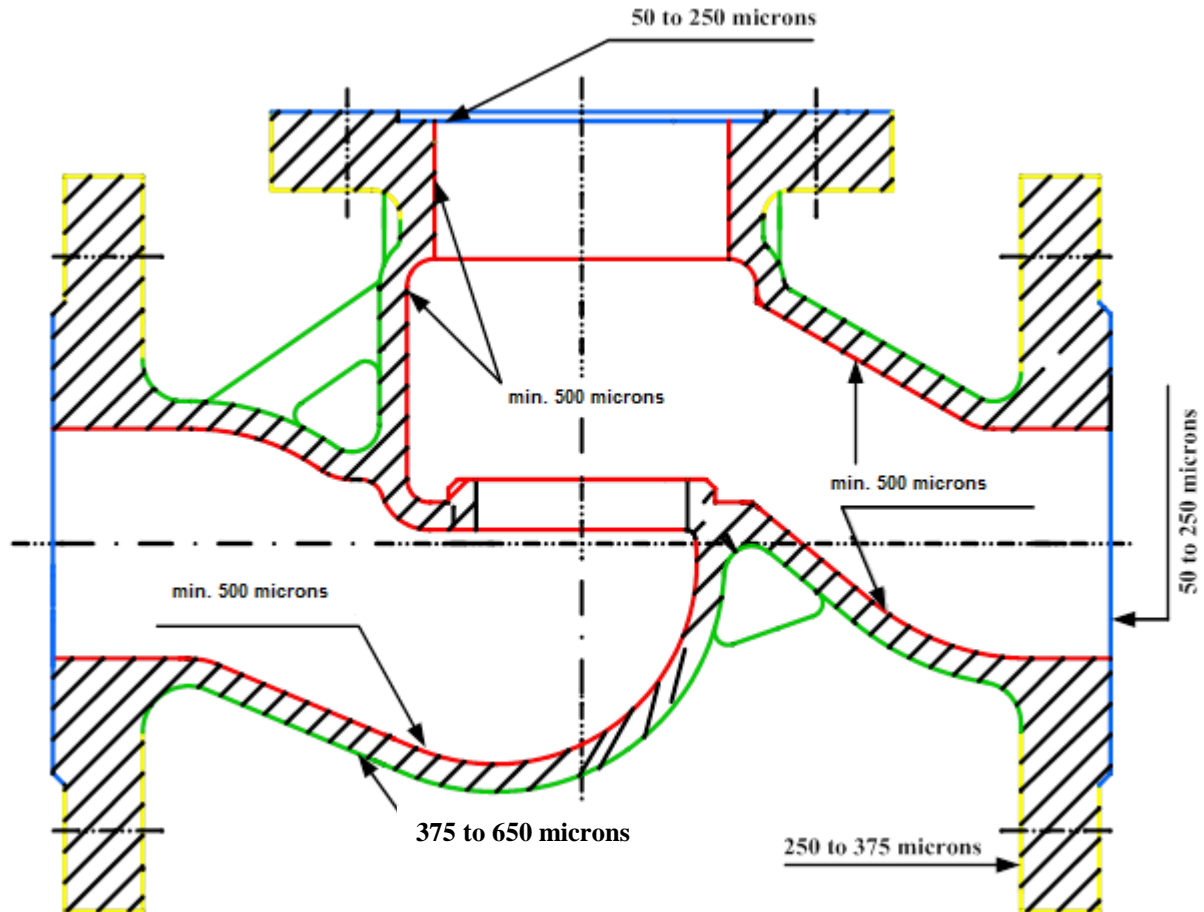


Figure 1 – Required coating thickness on the Internal and External of the Control Valve.

Notes:

- Internal Coating:** Spray apply epoxy mastic with a minimum DFT of 500 microns.
- External Coating:** Spray apply epoxy mastic with a minimum DFT of 500 microns followed by 50 microns top coat of polyurethane
- Flange Face Coating:** Spray apply epoxy mastic with a DFT of 250 to 375 microns. followed by 50 microns top coat of polyurethane
- Sealing Face Coating:** Spray apply epoxy mastic with a DFT of 50 to 250 microns.

Note: Colours in the above diagram is indicative only, standard valve coating colours to be used.

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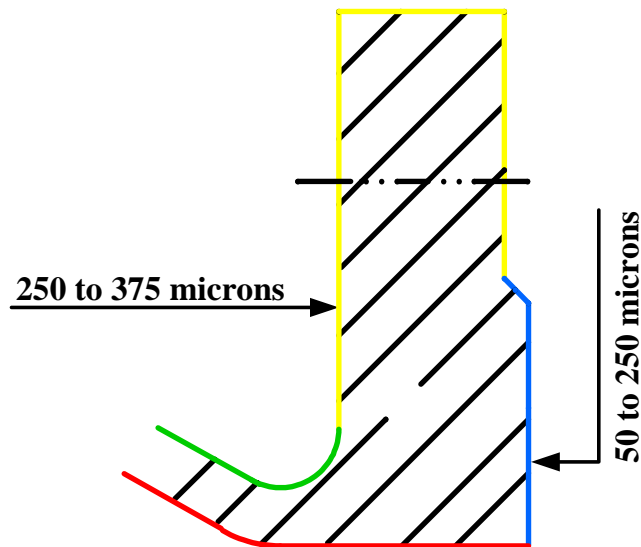


Figure 2 – Coating thickness on the Raised Face flange surface.

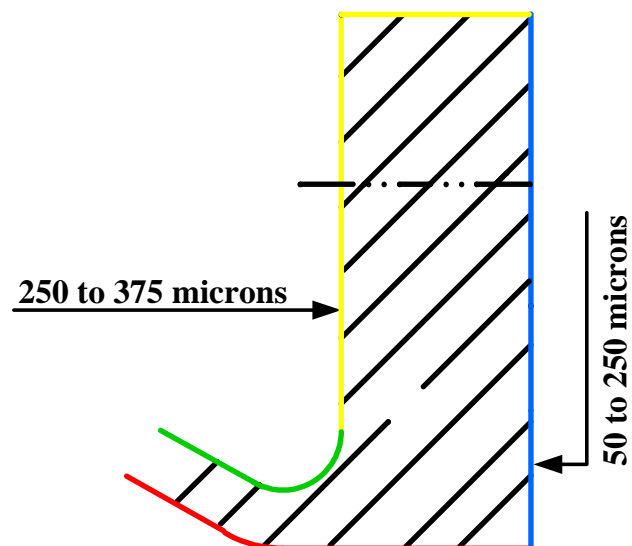


Figure 3 - Coating thickness on the Flat Face flange surface.

Notes:

- **Internal Coating:** Spray apply epoxy mastic with a minimum DFT of 500 microns.
- **External Coating:** Spray apply epoxy mastic with a minimum DFT of 500 microns followed by 50 microns top coat of polyurethane
- **Flange Face Coating:** Spray apply epoxy mastic with a DFT of 250 to 375 microns. followed by 50 microns top coat of polyurethane
- **Sealing Face Coating:** Spray apply epoxy mastic with a DFT of 50 to 250 microns.

Note: Colours in the above diagrams are indicative only, standard valve coating colours to be used.

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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 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.
- 8.2.1 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 DS95 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 competent personnel.
- 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.

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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 3894.1.
- 10.3 **Adhesion Testing** - Testing shall be carried out in accordance with AS 1580 Method 408.5 and AS 3894.9 Method C on a test panel..
- 10.3.1 A test panel/coupon (of similar substrate material) shall be prepared and coated in conjunction with the valve coating and a pull off test consisting of a minimum 3 dollies, 100mm apart, shall be carried out to confirm the adhesion of the coating. Acceptable pull off force shall be greater than or equal to 5MPa.
- 10.3.2 The frequency of the test to be performed on a particular order prior to dispatch shall be identified and agreed upon by both the Contractor and the Superintendent.
- 10.3.3 In the event of test failure, additional adhesion tests shall be carried out on other valves under construction.
- 10.3.4 The results of all adhesion tests shall be submitted to the Superintendent as part of the overall quality control documentation.
- 10.4 Finished coating thickness shall be determined using suitable instruments standardised (zeroed) on a smooth uncoated metal plate in accordance with AS 3894.3.

11.0 REPAIR OF A DEFECTIVE COATING AND RETESTING

- 11.1 Coatings with defective area is 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;

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- 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 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 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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