

Master Specification

Part ST-SS-S2

Protective Treatment of Structural Steelwork

September 2024



Government of South Australia
Department for Infrastructure
and Transport

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ST-SS-S2 Protective Treatment of Structural Steelwork

1 General

- a) This Master Specification Part specifies the requirements for the protective treatment of structural steelwork including new and previously painted, and applies only to steel structures in atmospheric exposure, including:
- i) the documentation requirements, as set out in section 2;
 - ii) the Contractor's personal and prequalification requirements, as set out in section 3;
 - iii) the commencement of Works requirements, as set out in section 4;
 - iv) the hazards, work health and safety and environmental requirements, as set out in section 5;
 - v) the materials requirements, as set out in section 6;
 - vi) the surface preparation requirements, as set out in section 7;
 - vii) the coating system requirements, as set out in section 8;
 - viii) the access, scaffolding and containment requirements, as set out in section 9;
 - ix) the ventilation requirements, as set out in section 10;
 - x) the emissions monitoring requirements, as set out in section 11;
 - xi) the inspection and surveillance requirements, as set out in section 12;
 - xii) the Inspection and Test Plan requirements, as set out in section 13; and
 - xiii) the Hold Point and Witness Point requirements, as set out in section 14.
- a) The protective treatment of structural steelwork must comply with the Reference Documents, including:
- i) AS/NZS 1418.10 Cranes, hoists and winches, Part 10: Mobile elevating work platforms;
 - ii) AS 1418.16 Cranes (including hoists and winches), Part 16: Mast climbing work platforms;
 - iii) AS/NZS 1576.1 Scaffolding, Part 1: General requirements;
 - iv) AS 1576.5 Scaffolding, Part 5: Prefabricated trestle and trestle ladder scaffolds;
 - v) AS/NZS 1580.213.1 Paints and related materials - Methods of test, Method 213.1: Relative dry hiding power;
 - vi) AS 1627.1 Metal finishing - Preparation and pretreatment of surfaces, Part 1: Removal of oil, grease and related contamination;
 - vii) AS 1627.2 Metal finishing - Preparation and pretreatment of surfaces, Part 2: Power tool cleaning;
 - viii) AS 1627.4 Metal finishing - Preparation and pretreatment of surfaces, Part 4: Abrasive blast cleaning of steel;
 - ix) AS 1627.9 Metal finishing - Preparation and pretreatment of surfaces, Part 9: Pictorial surface preparation standards for painting steel surfaces;
 - x) AS/NZS 1680.2.3 Interior and workplace lighting, Part 2.3 Educational and training facilities;
 - xi) AS 1892 Portable ladders;

- xii) AS/NZS 2312 Guide to the protection of steel against atmospheric corrosion by the use of protective coatings;
- xiii) AS 2700 Colour standards for general purposes;
- xiv) AS 3610 Formwork for concrete;
- xv) AS 3894.1 Site testing of protective coatings, Method 1: Non-conductive coatings - Continuity testing - High voltage (brush) method;
- xvi) AS 4312 Atmospheric corrosivity zones in Australia;
- xvii) AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications;
- xviii) NACE VIS 9 / SSPC-VIS 5 Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning;
- xix) the Department Test Procedures (available from: https://www.dit.sa.gov.au/standards/test_procedures), including:
 - A. TP800 The Determination of Surface Profile, Abrasive Blast Cleaned Steel Substrates;
 - B. TP801 The Development of Dry Film Thickness Requirements for Coatings on Structural Steelwork (Abrasive Blast Cleaned);
 - C. TP802 Determination of the Salt Content of Abrasives by Conductivity Measurement;
 - D. TP803 Monitoring of Paint Application Conditions for Heavy Duty Coatings;
 - E. TP913 The Measurement of Dry Film Thickness of Coatings on Structural Steelwork (Abrasive Blast Cleaned); and
 - F. TP916 Measurement of Surface Salt Levels.

2 Documentation

2.1 Hazardous Paint Compliance Plan

- a) The Contractor must establish, implement, and maintain a Hazardous Paint Compliance Plan, which must:
 - i) address the requirements of AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications;
 - ii) reference procedures or documents within the Contractor's Information Management System (IMS);
 - iii) include the hazardous paint risk assessment required by section 5.3;
 - iv) include a personnel management plan, setting out a plan to manage personnel for hazardous coating work, as required by section 5.4; and
 - v) include the emissions monitoring plan, requirements and rating required by section 11.1a).
- b) The Hazardous Paint Compliance Plan required in section 2.1a) must be developed, prepared and submitted, which will constitute a **Hold Point**. Works related to hazardous coating work for the protective treatment of structural steelwork must not commence until this Hold Point has been released.

2.2 Construction Documentation

In addition to the requirements of PC-CN3 “Construction Management”, the Construction Documentation must include the following documents, procedures and instructions for the protective treatment of structural steelwork:

- a) the approved Hazardous Paint Compliance Plan;
- b) details of all paint which makes up the coating system, including whether the paints are APAS approved, in accordance with section 6.4a);
- c) the instructions for use and manufacturer’s safety data sheets, in accordance with section 6.4g);
- d) a list of personnel and their roles on site, which includes training and competencies relevant to the protective treatment Works;
- e) an access, scaffolding, and containment concept design, including the details of the Contractor’s plan for access, scaffolding and containment plan, in accordance with section 9c);
- f) details of mechanical dust extraction and filtering plant, demonstrating compliance with relevant clauses of this Master Specification Part;
- g) details of the approved scope and methodology for surface preparation and paint application, in accordance with section 7.2;
- h) details of the manufacturer and products which comprise the coating system, in accordance with section 8.1e);
- i) the relevant authorisation and details of any deviation from the manufacturer’s data sheet, in accordance with section 8.4.3c);
- j) details of the bunding and volumes of materials to be stored, in accordance with section 8.4.5b);
- k) evidence that the appropriate size dust collector will be employed, in accordance with section 10c);
- l) a completed project start-up checklist, in accordance with AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications; and
- m) in addition to the requirements of P-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable) the Inspection and Test in accordance with section 13, including a table of all inspection and test equipment to be employed to satisfy the requirements of all referenced inspection and test procedures, including details of the current calibration status of such equipment.

2.3 Quality Management Records

In addition to the requirements of PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable), the Quality Management Records must include:

- a) paint sampling and testing records, in accordance with section 6.1b);
- b) tests results showing compliance of abrasive, in accordance with section 6.2d);
- c) evidence that the conductivity of all water used for blast cleaning or rinsing is less than 100 $\mu\text{S}/\text{cm}$, in accordance with section 6.5b);
- d) evidence that the profile height requirement has been achieved, in accordance with section 7.6c); and
- e) evidence that the stripe coating requirement has been met as required by section 8.2b).

3 Contractor's personnel and prequalification

3.1 General

- a) Where the Works involve the protective treatment of structural steelwork, the Contractor must engage:
 - i) a suitably qualified and experienced Painting Quality Management Representative (PQMR) who must:
 - A. personally carry out all testing as described in the Contractor's approved Inspection and Test Plan and maintain associated diary records; and
 - B. be qualified to AMPP coating inspector program (CIP) level 2;
 - ii) a supervisor with at least 3 years' experience on projects of a similar size and scope to the Works, who must be on site at all times whilst protective treatment of structural steelwork Works is in progress. The supervisor must not be the same person as the PQMR;
 - iii) abrasive blast cleaning operators who are competent in the consistent delivery of the blast cleaning class as specified; and
 - iv) paint applicators who can demonstrate control of dry film thickness at all times. Consistency must be assessed against the requirements set out in section 8.3.
- b) Unless stated otherwise in this section 3.1, suitably qualified personnel may undertake more than one of the listed roles.
- c) Where the PQMR does not comply with the requirements of section 3.1a)i)B, a PMQR qualified to level 1 AMPP coating inspector program (CIP) may be engaged if evidence of at least 10 years experience is provided to the Principal for approval, which will constitute a **Hold Point**. A PMQR qualified to level 1 AMPP coating inspector program (CIP) must not be engaged until this Hold Point has been released.

3.2 Responsibilities of the PQMR

The PQMR's responsibilities must include the following:

- a) observe and record relevant day to day information including (where relevant to the protective treatment of structural steelwork Works):
 - i) abrasive blast quality;
 - ii) information on an ongoing basis through the day, concerning the operational needs of the works, to appropriate standard as required by the Contract Documents (including atmospheric conditions, paint details, equipment function and suitability); and
 - iii) individual dry film thickness readings for each coat;
- b) coordinate all rework for the tasks listed in 3.2a) as required;
- c) manage the Contractor's obligations in relation to all Hold Points and Witness Point relevant to the protective treatment works;
- d) audit, calibrate, and check all measuring equipment where required;
- e) report any Non-Conformance;
- f) provide advice and notification of any problems experienced with the coating system; and
- g) be present at all relevant site meetings.

3.3 Prequalification

The Contractor must ensure that the protective treatment of structural steelwork Works are undertaken by an entity which is Painting Contractors Certification Program (PCCP) accredited to the following classes:

- a) Class 3 - Site application of coatings for atmospheric service;
- b) Class 4 - Site application of coatings for immersion service;
- c) Class 5 - Management of hazardous coatings, heavy metal containing (lead); and
- d) Class 6 - Management of hazardous coatings, respirable airborne dusts.

4 Commencement of Works

4.1 Program

For projects where the scope of protective treatment Works is limited to protective coatings over previous coatings, the Contract Program must comply with the following:

- a) the Contract Program must include all activities required for cleaning and application of protective treatment;
- b) where the protective treatment includes painting, the Contract Program must show the paint manufacturer's estimated time to full cure; and
- c) where the Contract Program no longer reflects the Contractor's actual or planned progress, the Contractor must update and re-submit the Contract Program in accordance with PC-PM2 "Contract Program".

4.2 Notification

The Contractor must provide at least 48 hours' notice prior to the commencement of any cleaning process which will constitute a **Witness Point**. The cleaning process must not commence until the Contractor has proceeded past the Witness Point.

5 Hazards, work health and safety and environment

5.1 Existing paint and hazardous coating work

- a) The threshold concentration criteria for hazardous paint projects are as shown in Table ST-SS-S2 5-1, which must not be exceeded.
- b) Other potentially hazardous materials not identified in AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications, may be present on structures. Where such other potentially hazardous materials are present, they must be identified and included in the risk assessment required by section 5.3 and the Hazardous Paint Compliance Plan. Previously identified hazardous materials which may be present are listed in Table ST-SS-S2 5-2.
- c) Where available, the Principal may provide documentation or test sample data on existing paint treatments, for reference only.
- d) The Contractor must assess the Works in accordance with the AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications, threshold concentration criteria and manage the Works as either hazardous or non-hazardous coating work as appropriate.

Table ST-SS-S2 5-1 Threshold concentration of hazardous metals

Metal	Total mass of paint (kg)		
	>250	50-250	<50
Lead	0.1	0.25	1
Chromium	0.05	0.1	0.25
Arsenic	0.05	0.1	0.25
Cadmium	0.05	0.1	0.25

Table ST-SS-S2 5-2 Other hazardous materials

Material	Hazard		
	Short term health effect	Long term health effect	Exposure level
Polycyclic aromatic hydrocarbon (PAH) - coal tar epoxy	a) Eye irritation; b) nausea and vomiting; and c) diarrhoea.	a) Skin damage; b) photosensitivity; and c) carcinogenic.	No safe level of exposure

5.2 Work health and safety requirements

In addition to requirements of the Contract Documents, the Contractor must comply with all relevant Laws including all requirements of the *Work Health and Safety Act 2012* (SA), and its associated regulations, including:

- a) in relation to lead, Chapter 7, Part 7.2, Regulations 319 to 418; and
- b) in relation to chromium, cadmium, and arsenic, Chapter 7, Part 1 Hazardous Chemicals Regulations 328 to 388.

5.3 Hazardous paint risk assessment

A hazardous paint risk assessment specific to the Works must be carried out in accordance with AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications, and included as part of the Hazardous Paint Compliance Plan.

5.4 Worker protection

The Contractor must submit a plan to manage personnel as part of the Hazardous Paint Compliance Plan for hazardous coating work.

5.5 Waste and environmental management

Waste and environmental management must be in accordance with the Contract Documents.

6 Materials

6.1 Paint sampling and testing

- a) Audit samples, including samples from the painter's pot, may be collected at any time by the Principal.
- b) At least 7 days prior to the commencement of Works, as part of the Quality Management Records, the Contractor must submit:
 - i) an APAS record of supply for each batch of APAS approved material to be used for protective treatment; and
 - ii) where non-APAS approved products are approved for use by the Principal pursuant to section 6.4b), evidence that each batch of paint supplied has been manufactured to the same formula as the approved sample.

6.2 Abrasive

- a) Where required for the Works, the abrasive to be used for dry abrasive blast cleaning must be garnet. Abrasive must be clean, dry, and free from extraneous material such as dirt, gravel, and organic matter, and must contain no free silica.
- b) Samples representative of all batches of abrasive to be used in conjunction with the Works must be tested before use in accordance with TP802 Determination of the Salt Content of Abrasives by Conductivity Measurement. The conductivity must not be greater than 125 $\mu\text{S}/\text{cm}$. The abrasive to be used for wet abrasive blast cleaning must be garnet. Blast media must not be recycled.
- c) The initial sampling rate must be the cube root of the number of bulk bags in a batch, and all samples taken must be tested. Should any batch tested fail to comply with the specified requirements, all remaining bulk bags must be tested. Any abrasive which fails to comply with the specified requirements must not be used in the Works.
- d) The grade of abrasive used must be such that the surface profile produced complies with all relevant requirements of this Master Specification Part. The Contractor must provide documented results of tests showing compliance of abrasive to the Principal, as part of the Quality Management Records.

6.3 Packaging and transportation of abrasive

Where used, blast media must be delivered to Site in the manufacturer's containers, unopened and with the label intact. The following information must be legibly and durably marked on each container:

- a) material type;
- b) batch number;
- c) date of manufacture;
- d) grading of material; and
- e) manufacturer's name.

6.4 Paint

- a) All paint which makes up the coating system must be included in the Construction Documentation for the Principal's approval. All paints making up the coating system must be APAS approved.
- b) If the Contractor proposes to use a non-APAS approved product, the Contractor must seek the Principal's prior approval pursuant to PC-CN3 "Construction Management", including submission of evidence of satisfactory previous performance of the proposed product.
- c) Paint must be thoroughly mechanically mixed prior to use to ensure that it is homogeneous, and must be maintained to this condition during use.
- d) Paint must be delivered to the Site in the manufacturer's containers, unopened and with the label intact. The following information must be legibly and durably marked on each container:
 - i) the name or registered mark of the manufacturer;
 - ii) the paint type;
 - iii) the colour to AS 2700 Colour standards for general purposes (if applicable);
 - iv) the contents by volume in litres, or by mass in kilograms;
 - v) the product identification;
 - vi) the production or batch numbers on packs of 5 kg capacity, or greater;
 - vii) the date of manufacture; and

- viii) the information required by statutory regulations.
- e) The colour of the external finish must be in accordance with that specified in the Contract Documents (determined in accordance with AS 2700 Colour standards for general purposes).
- f) The decorative final coat must provide complete coverage to a hiding power chart as described in AS/NZS 1580.213.1 Paints and related materials - Methods of test, Method 213.1: Relative dry hiding power.
- g) Instructions for use and manufacturer's safety data sheets must be provided as part of the Construction Documentation.
- h) The information required by this section 6.4 must be made available at all times in accordance with the Contract Documents.

6.5 Water

- a) The conductivity of all water used for blast cleaning or rinsing must be less than 100 $\mu\text{S}/\text{cm}$.
- b) The Contractor must provide evidence the requirements in section 6.5a) have been met, as part of the Quality Management Records.

7 Surface preparation requirements

7.1 Purpose of surface preparation

- a) The Contractor must assess the Contract Documents to determine the purpose of the surface preparation activity and to propose which of the activities required by this section 7 apply.
- b) The purpose of the surface preparation will be one or more of the following:
 - i) spot repair of corroded areas and other identified Defects only;
 - ii) spot repair of corroded areas and other identified Defects, followed by total over-coating; and
 - iii) total surface preparation, for painting of all surfaces and removal of any existing coatings.

7.2 Approval of surface

- a) The Contractor must propose the scope of Works to be carried out in accordance with this section 7, which will constitute a **Hold Point**. The Works related to the surface preparation and application of any coating must not occur until this Hold Point has been released.
- b) Following release of the Hold Point, the scope of Works in section 7.2a) must be included as part of the Construction Documentation.

7.3 Preliminary cleaning

7.3.1 General

- a) All areas of surface imperfections must be suitably prepared by filing or grinding before paint application. All sharp edges must be ground to a minimum 2 mm radius. Chamfering of edges is not permitted.
- b) Deposits of oil and grease must be removed by solvent cleaning in accordance with AS 1627.1 Metal finishing - Preparation and pretreatment of surfaces, Part 1: Removal of oil, grease and related contamination.
- c) Large deposits of bird droppings and other deleterious material must be removed manually for disposal as per statutory regulations.

7.3.2 Sweep dry blasting - for “spot repair and overcoat”

All surfaces, including corroded areas and sound paint, must be sweep blasted using:

- a) fine garnet abrasive, nominally 150 to 200 µm;
- b) a 10 to 13 mm venturi nozzle;
- c) a blast pressure at the nozzle of 275 kPa (40 psi) maximum; and
- d) a distance of 350 to 400 mm from the painted surface, directed at an angle of no greater than 45° to the surface.

7.3.3 Sweep wet blasting - for “spot repair and overcoat”

All surfaces must be sweep wet blasted using equipment, materials, and techniques which minimise the reduction in film thickness of the existing paint, whilst providing a surface texture suitable for over-coating.

7.4 Final cleaning

7.4.1 Hand or power tool cleaning - for “spot repair” or “spot repair and overcoat”

- a) All loose and flaking paint must be removed by hand or power tool.
- b) All corroding steel surfaces must be cleaned back to the metal, removing all rust, mill scale, weld slag, or any extraneous material, in accordance with AS 1627.2 Metal finishing - Preparation and pretreatment of surfaces, Part 2: Power tool cleaning, to a Class P St 2½ finish.
- c) Edges of sound paint must be feathered back by sanding to produce a smooth transition to prepared steel.

7.4.2 Abrasive blast cleaning - for “total surface preparation”

- a) All steel surfaces must be cleaned back to the metal, removing all rust, mill scale, weld slag, or any extraneous material, in accordance with AS 1627.4 Metal finishing - Preparation and pretreatment of surfaces, Part 4: Abrasive blast cleaning, to a Class Sa 2½ finish.
- b) Difficult to access areas, such as between pairs of plates, at nodes, or obstructed by other structural elements, must receive particular attention to achieve the required class of blast.

7.4.3 Final cleaning

- a) After-blast cleaning must be carried out in accordance with AS1627.4 Metal finishing - Preparation and pretreatment of surfaces, Part 4: Abrasive blast cleaning of steel.
- b) All surfaces must be primed within 4 hours of completion of a single blast cleaning session, or before discolouration of the surface occurs, whichever is sooner. Any change to this process must be subject to prior authorisation by the Principal, which will constitute a **Hold Point**. The Contractor must not implement the change to this process until the Hold Point has been released.
- c) All surfaces must be cleaned to remove any loose contaminants prior to application of the first coat.

7.5 Surface salt contamination

- a) Structures which may be subject to salt contamination must have surface chloride ion levels less than 10 µg/cm². Provision of evidence of this requirement will constitute a **Hold Point**. Coating works must not commence until this Hold Point has been released.
- b) All wash water must comply with the relevant clauses of this Master Specification Part.

7.6 Surface profile height

- a) When cleaned bare metal areas are measured, all surface profile readings must be within the approved coating manufacturer's specified range. A minimum of 5 tests must be carried out to establish the profile height range delivered by the abrasive blasting process.
- b) This process must be repeated for each abrasive blast cleaning operator, and before adoption of any change to materials or equipment.
- c) Evidence that the profile height requirement in section 7.6a) has been achieved must be provided as part of the Quality Management Records. Provision of this evidence will constitute a **Witness Point**. The Contractor must not commence coating works until the Contractor has progressed past the Witness Point.

8 Coating system

8.1 General

- a) All paints used in a coating system must be from the one manufacturer.
- b) A list of generic coating systems, using the system designations from AS/NZS 2312 Guide to the protection of steel against atmospheric corrosion by the use of protective coatings, is provided in Table ST-SS-S2 8-1. The Contractor acknowledges that the coating thicknesses listed are for guidance only, and specific coating thicknesses above and beyond those listed in Table ST-SS-S2 8-1 may be required.
- c) A list of coating systems not covered by AS/NZS 2312 Guide to the protection of steel against atmospheric corrosion by the use of protective coatings, is provided in Table ST-SS-S2 8-2.
- d) A list of product descriptions and equivalent APAS specifications is shown in Table ST-SS-S2 8-3.
- e) The Contractor must submit to the Principal, details of the manufacturer and products which comprise the coating system, as part of the Construction Documentation.

Table ST-SS-S2 8-1 List of generic coating systems

AS/NZS 2312	Primer / 1 st coat		Intermediate / 2 nd coat		Finish / 3 rd coat	
	Product	Nominal DFT, µm	Product	Nominal DFT, µm	Product	Nominal DFT, µm
IZS1	IZS solvent-borne	75				
IZS2	IZS water-borne	75				
IZS3	IZS water-borne	125				
IZS4	IZS Solvent-borne	125				
EHB5	Epoxy primer	75	HB Epoxy MIO	125	HB Epoxy MIO	125
EHB6	Epoxy zinc	75	HB Epoxy MIO	125	HB Epoxy MIO	125
EVB2	VHB Epoxy	400				
EVB3	Epoxy primer	75	VHB Epoxy	400		
EPM3	Epoxy mastic	200	Epoxy mastic	200		
PSL2	Epoxy zinc	75	HB Epoxy MIO	175	Polysiloxane	75
PSL3	Epoxy primer	75	HB Epoxy MIO	175	Polysiloxane	75
PUR5	Epoxy zinc	75	HB Epoxy MIO	200	Polyurethane	50

Table ST-SS-S2 8-2 List of alternative coating systems

Department designation	Primer / 1 st coat		Intermediate / 2 nd coat		Finish / 3 rd coat	
	Product	Nominal DFT, μm	Product	Nominal DFT, μm	Product	Nominal DFT, μm
Z1	Zinga	60				
Z2	Zinga	60	Zinga	60		
Z2	Zinga	90	Zinga	90		
MCU1	MCU Zinc	75	MCU MIO	75	MCU Finish	75
MCU2	MCU Zinc	75	MCU Tar	100	MCU Tar	100
TAPE1	Anti-corrosive tape primer	60	Anti-corrosive Tape	NA		

Table ST-SS-S2 8-3 APAS specifications for listed coating systems

Product type	APAS specification
EPM (Epoxy mastic)	2976, 2977
Epoxy primer	2971
Epoxy zinc	2916/1
EHB Epoxy MIO	2972, 2973, 2940
IZS (Inorganic Zinc Silicate)	2908
MCU (Moisture Cure Urethane)	2930
PSL (Polysiloxane)	2920
PUR (Polyurethane)	2911
EVH (Very High Build) Epoxy	2975
Z (Zinga)	2916/2

8.2 Application

- a) All edges must be stripe coated before application of full coats. Where a gap, crevice, or severe pitting is present, the approved paint system must be brushed into these areas and allowed to cure before over-coating. Particular attention must be paid to any gaps under bolt or rivet heads, all welds, and all difficult to access areas.
- b) The Contractor must provide evidence to the Principal as part of the Quality Management Records that the stripe coating requirement has been met in accordance with this Master Specification Part.

8.3 Paint film thickness

- a) A dry film thickness range specific to the Works must be developed in accordance with Department Test Procedure TP801 The Development of Dry Film Thickness Requirements for Coatings on Structural Steelwork (Abrasive Blast Cleaned). Paint film thickness must be measured in accordance with Department Test Procedure TP913 The Measurement of Dry Film Thickness of Coatings on Structural Steelwork (Abrasive Blast Cleaned).
- b) Where existing paint remains after surface preparation, paint consumption, calculated from used and part used containers may be used as the acceptance criteria instead of Department Test Procedure TP913 The Measurement of Dry Film Thickness of Coatings on Structural Steelwork (Abrasive Blast Cleaned).
- c) Greater than 95% of all single point readings must be within the specified range. The Contractor must apply additional paint, or remove excess paint, to any areas which amount to a Non-Conformance and the associated Hold Point set out in PC-QA1 "Quality Management Requirements" or PC-QA2 "Quality Management Requirements for Major Projects" (as applicable) will apply.
- d) Where relevant, either the dry film thickness and paint consumption data must comply with specified requirements, or the Work Lot represented by the data will amount to a Non-Conformance and the associated Hold Point set out in PC-QA1 "Quality Management

Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable) will apply.

8.4 Application of paint

8.4.1 General

Paint must be mixed, used, and applied in accordance with the manufacturer’s written instructions.

8.4.2 Storing and sampling of paint

- a) Paint must be supplied in a ready mixed condition. 2 pack paint must be supplied and mixed in strict accordance with manufacturer’s recommendations.
- b) Both paint and thinners must be delivered to Site, in the manufacturer’s original containers, with labels and seals unbroken.
- c) The exterior of the containers must not show any signs of exposure to heat or weather, which would indicate that they had been stored incorrectly in the past.
- d) Drums in which paint is stored must be kept in a cool place.
- e) Paints should be used in order of date of manufacture or delivery.
- f) Paint which is older than the manufacturer’s specified shelf life must not be used in the Works and must be immediately removed from the Site.

8.4.3 Deviations from manufacturer’s data sheets

- a) Any deviations from the manufacturer’s data sheet must be authorised in writing by the paint manufacturer.
- b) Any proposal to deviate from the manufacturer’s data sheet will constitute a **Hold Point**. The Contractor must not deviate from the manufacturer’s data sheet or submit the information required by 8.4.3c) until the Hold Point has been released.
- c) Following the release of the Hold Point in section 8.4.3b), the relevant authorisation and details of the deviation from the manufacturer’s data sheet must be provided as part of the Construction Documentation.

8.4.4 Safety precautions

The Contractor must abide by all recommendations provided on the paint manufacturer’s safety data sheets and must ensure that work and work-site procedures are carried out in strict accordance with the *Work Health and Safety Act 2012* (SA) and the WHS Regulations.

8.4.5 Bundling

- a) All hazardous substances must be stored within separate bunded areas. The capacity of each bunded area must be equal to the volume of hazardous substances stored, plus 20%. The volume of stored material must not exceed this calculated volume.
- b) The Contractor must submit details of the bunding and volumes of materials to be stored as part of the Construction Documentation.

8.4.6 Mixing and thinning

All paint must be thoroughly mixed before use. Mixing must be carried out within a bunded area.

8.4.7 Climatic conditions

- a) All paints must be applied in accordance with the paint manufacturer’s written instructions.
- b) Paint application conditions must be monitored in accordance with Department Test Procedure TP803 Monitoring of Paint Application Conditions for Heavy Duty Coatings.

- c) Paint must not be applied under the following conditions, or where these conditions might reasonably be expected, during the application and initial curing period:
 - i) when the ambient temperature is below 5°C;
 - ii) when moisture is present on the steel surface;
 - iii) when the steel surface temperature exceeds 40°C (the surface temperature gauge must be calibrated and any corrections required must be applied); or
 - iv) when the relative humidity exceeds 85% (only calibrated and corrected sling psychrometers must be used for the determination of relative humidity).
- d) All atmospheric measurements must be taken in the paint application area.

8.5 Repair of damaged areas

- a) Damaged areas (which include any access shadow areas and any acts of vandalism occurring prior to Handover) will be treated as a Non-Conformance and the associated Hold Point set out in PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable) will apply, and must be repaired as follows:
 - i) for minor damage, where the substrate is not visible: remove loose or flaking paint by sanding, then apply 1 intermediate and 1 finish coat, overlapping existing sound paint by at least 50 mm; and
 - ii) for major damage where the steel substrate is visible: remove loose or flaking paint by sanding, prepare surface as per the initial treatment, then apply the full coating system, overlapping existing sound paint by at least 50 mm.
- b) The cost of the repairs to any damaged areas must be borne by the Contractor.

9 Access, scaffolding, and containment

- a) All scaffolding must comply with:
 - i) the requirements of AS/NZS 1576.1 Scaffolding, Part 1: General requirements; or
 - ii) where not covered in AS/NZS 1576.1 Scaffolding, Part 1: General requirements, the following Reference Documents:
 - A. elevating work platforms must comply with AS/NZS 1418.10 Cranes, hoists and winches, Part 10: Mobile elevating work platforms;
 - B. mast climbing working platforms must comply with AS 1418.16 Cranes (including hoists and winches), Part 16: Mast climbing work platforms;
 - C. portable ladders must comply with AS 1892 Portable ladders;
 - D. formwork constructed primarily to support concrete must comply with AS 3610 Formwork for concrete;
 - E. trestle ladders must comply with AS 1892 Portable ladders, and
 - F. trestle ladders must comply with AS 1576.5 Scaffolding, Part 5: Prefabricated trestle and trestle ladder scaffolds.
- b) The access system must also support the containment. The Contractor must determine the containment requirements based on a risk assessment for the Works and Temporary Works and the likely level of emissions, which will be a consequence of the final cleaning methodology employed by the Contractor. AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications, must be employed in the design of containment.
- c) Details of the Contractor’s plan for access, scaffolding and containment that complies with this section 9 must be submitted as part of the Construction Documentation.

10 Ventilation

- a) Dust collectors must be sized to ensure that the airflow within the containment complies with the requirements of AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications:
 - i) 30 m/min cross-draft; and
 - ii) 18 m/min down-draft or up-draft.
- b) The Contractor must carry out the calculation to ensure that the airspeed complies with the above requirements. The calculation must be undertaken as shown in Table ST-SS-S2 10-1.
- c) Evidence that the appropriate size dust collector will be employed must be provided to the Principal, as part of the Construction Documentation, prior to undertaking works requiring ventilation.
- d) Negative pressure, as evidenced by concave containment fabric, must be maintained at all times where mechanical ventilation is employed.
- e) The Contractor must ensure that:
 - i) dust collectors are fitted with a means of detecting dust emissions from the filter exhaust, providing either an audible alarm or shutting down the system in accordance with AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications; or
 - ii) where the requirements of section 10e)i) are not satisfied, an observer must be assigned the task of continuously monitoring the exhaust outlet and must be authorised to shut down the system in the event of emissions.

Table ST-SS-S2 10-1 Calculation of dust

Containment dimensions, m				Volume, m ³	Specified air speed, m/min	Air flow time, min	Minimum dust collector capacity, m ³ /min
Furthest point from duct	Length	Width	Depth				
$A^{(1)}$	L	W	D	$V = L \times W \times D$	S	$T = \frac{A}{S}$	$DC = T \times V^{(2)}$

Table notes:

- (1) A = airflow volume requirements.
- (2) C = collector.

11 Emissions monitoring

11.1 Type, frequency and duration

- a) An emissions monitoring plan must be designed and implemented such that emissions are quantified in accordance with the risk assessment required in section 5.3, and subsequent rating documented in the Hazardous Paint Compliance Plan.
- b) The type, frequency and duration of monitoring must be in accordance with AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications.

11.2 Ambient air monitoring

Ambient air monitoring must be carried out using high volume air samplers in accordance with AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications.

11.3 Surface dust sampling

Surface dust sampling must be carried out in accordance with AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications.

11.4 Mist fall-out monitoring

Mist fall-out monitoring must be carried out in accordance with AS/NZS 4361.1 Guide to hazardous paint management, Part 1: Lead and other hazardous metallic pigments in industrial applications.

12 Inspection and surveillance

12.1 Inspection

- a) The Contractor must develop and implement an Inspection and Test Plan which ensures compliance with all aspects of this Master Specification Part, and must carry out all quality assurance testing required to confirm that the requirements of this Master Specification Part have been met.
- b) The Contractor's Environmental Management Representative must manage all environmental aspects associated with the protective treatment Works and Temporary Works, including management of all environmental sampling and testing associated with the protective treatment activities.

12.2 Surveillance

- a) The Principal may provide a surveillance officer to check any or all work carried out.
- b) The Contractor must provide all required access to the Site and any information required for the surveillance officer to check any or all work carried out, in accordance with the requirements of the Contract Documents.

12.3 Inspection and lighting

Sufficient artificial lighting must be provided within the contained area, as a supplement to any natural lighting present. The minimum average illuminance over the area of inspection must be 300 lux and must comply with requirements of AS/NZS 1680.2.3 Interior and workplace lighting, Part 2.3 Educational and training facilities.

12.4 Documentation

- a) Records must be maintained of all inspection and testing, including those relating to WHS and environmental management, and must be made available to the Principal at all times in accordance with the Contract Documents.
- b) All records must be certified correct by the Construction Quality Representative or the Contractor's Environmental Management Representative as appropriate.
- c) Records must be maintained on a daily basis.

13 Inspection and Test Plan

An Inspection and Test Plan must be provided as part of the Construction Documentation and at a minimum address the items listed in Table ST-SS-S2 13-1.

Table ST-SS-S2 13-1 Inspection and Test Plan summary

Item	Procedure	Frequency	Requirement
Sampling and testing - abrasive	TP802 Determination of the Salt Content of Abrasives by Conductivity Measurement	All batches before use	Dry abrasive must be <math><125 \mu\text{S}/\text{cm}</math>
	TP800 The Determination of Surface Profile, Abrasive Blast Cleaned Steel Substrates		Must deliver profile height, see section 6.2d)
Water	Method 1 as set out in TP916 Measurement of Surface Salt Levels	Before use	Conductivity $\leq 100 \mu\text{S}/\text{cm}$
Preliminary cleaning - Defects	AS 1627.1 Metal finishing - Preparation and pretreatment of surfaces, Part 1: Removal of oil, grease and related contamination	All surfaces	No surface Defects
Preliminary cleaning - oil and grease	AS 1627.1 Metal finishing - Preparation and pretreatment of surfaces, Part 1: Removal of oil, grease and related contamination	All surfaces	No oil or grease
Preliminary cleaning - bird droppings	Not applicable	All surfaces	No loose contaminants
Preliminary cleaning - sweep dry blasting	As per section 7.3.2	All surfaces	Clean profiled surface
Preliminary cleaning - sweep wet blasting	As per section 7.3.3	All surfaces	Clean profiled surface
Final cleaning - hand or power tool	a) AS1627.2 Metal finishing - Preparation and pretreatment of surfaces, Part 2: Power tool cleaning; and	Existing paint	Remove loose and flaking paint
	b) AS 1627.9 Metal finishing - Preparation and pretreatment of surfaces, Part 9: Pictorial surface preparation standards for painting steel surfaces.	Corroded areas	Class St2½
Final cleaning - dry abrasive blast	a) AS1627.4 Metal finishing - Preparation and pretreatment of surfaces, Part 4: Abrasive blast cleaning of steel; and	Corroded areas	Class Sa2½
	b) AS 1627.9 Metal finishing - Preparation and pretreatment of surfaces, Part 9: Pictorial surface preparation standards for painting steel surfaces.		
Final cleaning - dry abrasive blast	a) AS1627.4 Metal finishing - Preparation and pretreatment of surfaces, Part 4: Abrasive blast cleaning of steel; and b) AS 1627.9 Metal finishing - Preparation and pretreatment of surfaces, Part 9: Pictorial surface preparation standards for painting steel surfaces.	All surfaces	Class Sa2½

Item	Procedure	Frequency	Requirement
Final cleaning - wet abrasive blast	NACE VIS 9 / SSPC-VIS 5 Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning	Corroded areas	WAB-10
Final cleaning - wet abrasive blast	NACE VIS 9 / SSPC-VIS 5 Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning	All surfaces	WAB-10
Surface salt contamination	Methods 1 or 2 as set out in TP916 Measurement of Surface Salt Levels	As per TP916 Measurement of Surface Salt Levels	Maximum 10 µg/cm ² of Cl- Levels
Surface profile height	TP800 The Determination of Surface Profile, Abrasive Blast Cleaned Steel Substrates	5 locations minimum	Paint manufacturer's specified range
Paint film thickness	TP913 The Measurement of Dry Film Thickness of Coatings on Structural Steelwork (Abrasive Blast Cleaned) / TP801 The Development of Dry Film Thickness Requirements for Coatings on Structural Steelwork (Abrasive Blast Cleaned)	All surfaces	Thickness range as per TP801 The Development of Dry Film Thickness Requirements for Coatings on Structural Steelwork (Abrasive Blast Cleaned)
Paint application conditions	TP803 Monitoring of Paint Application Conditions for Heavy Duty Coatings	Prior to and during application	As per section 8
Coating continuity	AS 3894.1 Site testing of protective coatings, Method 1: Non-conductive coatings - Continuity testing - High voltage (brush) method	After final application and cure	Coating must continue until it is finished without any days in the program where the coating works are interrupted or not progressed

14 Hold Points and Witness Points

- a) Table ST-SS-S2 14-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.
- b) Table ST-SS-S2 14-2 details the review period or notification period, and type (documentation or construction quality) for each Witness Point referred to in this Master Specification Part.

Table ST-SS-S2 14-1 Hold Points

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
2.1b)	Submission and approval of the Hazardous Paint Compliance Plan	Documentation	5 Business Days review
3.1c)	Approval to engage a PMQR qualified to level 1 AMPP coating inspector program (CIP)	Documentation	5 Business Days review
7.2a)	Approval of any repair work, the surface finish or other pre-coating work	Documentation	5 Business Days review
7.4.3b)	Approval of change to final cleaning process	Documentation	5 Business Days review
7.5a)	Provision of evidence of chloride ion levels less than 10 $\mu\text{g}/\text{cm}^2$	Documentation	5 Business Days review
8.4.3b)	Authorisation of deviations from manufacturer's data sheet	Documentation	5 Business Days review

Table ST-SS-S2 14-2 Witness Points

Section reference	Witness Point	Documentation or construction quality	Review period or notification period
4.2	Notice prior to the commencement of any cleaning process	Construction quality	48 hours notification
7.6c)	Provision of evidence that the profile height requirement has been achieved	Documentation	24 hours review