

PART S35 PROTECTIVE TREATMENT OF STRUCTURAL STEELWORK**CONTENTS**

1. GENERAL
2. QUALITY REQUIREMENTS
3. MATERIALS
4. CONTRACTOR'S PERSONNEL
5. COMMENCEMENT OF WORK
6. SURFACE PREPARATION
7. APPLICATION OF PAINT
8. FILM THICKNESS
9. REPAIR OF PROTECTIVE TREATMENT
10. REPORTING
11. HOLD POINTS
12. VERIFICATION REQUIREMENTS AND RECORDS

1. GENERAL

1. This Part specifies the requirements for the protective treatment of structural steel work. Refer to the Contract Specific Requirements for details of the protective treatment, including paint type, dry film thickness, finish coat colour, extent of treatment and any special requirements.

2. The following documents are referenced in this Part:

Australian Standards

AS 1580	Paints and Related Materials - Methods of Test
AS 1627	Metal Finishing – Preparation and Pre-treatment of Surfaces
AS 1680.2.4	Interior Lighting – Industrial Tasks and Processes
AS 2312.1	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings. Paint Coatings
AS 2700	Colour Standards for General Purposes
AS 3894.1	Site testing of protective coatings. – Non-conductive coatings-Continuity testing-High voltage (brush) method
AS 3894.3	Site Testing of Protective Coatings. Method 3: Determinations of Dry Film Thickness (Reference for Sampling Plans Only).
AS 3894.4	Site testing of protective coatings. – Assessment of Degree of Cure
AS 3894.10	Site Testing of Protective Coatings. Inspection Report - Daily.
AS 3894.11	Site Testing of Protective Coatings. Equipment Report.
AS 3894.12	Site Testing of Protective Coatings. Inspection Report – Coating.
AS 3894.13	Site testing of protective coatings. Inspection report – Daily
AS 3894.14	Site testing of protective coatings. Inspection report – Daily painting
AS 4312	Corrosivity zones in Australia

DPTI

TP 765	Determination of Total Dissolved Salts of Abrasive Blast Medium
TP800	The Determination of Surface Profile, Abrasive Blast Cleaned Steel Substrates
TP801	The Development of Dry Film Thickness Requirements for Coatings on Structural Steelwork (Abrasive Blast Cleaned)
TP 913	The Measurement of Dry Film Thickness of Coatings on Structural Steelwork (Abrasive Blast Cleaned).

The Society for Protective Coatings

SSPC-PA 2	Measurement of Dry Coating Thickness With Magnetic Gages
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The following abbreviations may be used in this Contract:

ACA	Australasian Corrosion Association
APAS	Australian Paint Approval Scheme (refer www.apas.gov.au)
EPA	Environmental Protection Authority
NACE	National Association of Corrosion Engineers
PCCP	Painting Contractors Certification Program (refer www.apas.gov.au/pccp)
SSPC	The Society for Protective Coatings

2. **QUALITY REQUIREMENTS**

1. At a minimum, the Contractor's Quality Plan must include the following documents, procedures and/or instructions:
 - (a) Inspection and Test Plan, vide Clause G20.7 "Inspection and Testing";
 - (b) A list of personnel and their roles on site, which includes training and competencies relevant to this project;
 - (c) Details of lighting to be provided for inspection;
 - (d) Current calibration records of test equipment according to AS 3894.11;
 - (e) Surface preparation procedures, describing the sequence, process and materials to be used;
 - (f) Paint application plan, including proposed locations of profile error readings and DFT readings;
 - (g) Method of handling and transport; and
 - (h) Method of repairing damage to protective treatment.
2. If not provided beforehand, this documentation must be submitted at least 28 days prior to the commencement of any protective treatment work.
3. Provision of the documentation listed in this Clause shall constitute a **HOLD POINT**.

3. **MATERIALS**

Sampling and Testing

1. At least 7 days prior to the commencement of work, the Contractor must submit:
 - (a) an APAS record of supply for each batch of APAS approved material to be used for protective treatment;
 - (b) where non-APAS approved products are used, evidence that each batch of paint supplied has been manufactured to the same formula as the approved sample; and
2. The contractor must supply a test certificate from a 2 kg representative sample of abrasive, which is to be used for initial blast cleaning, prior to commencing blasting, showing the salt content.
3. In addition, test certificates from representative samples of abrasive taken from bulk containers of abrasive to be used on the project showing the salt content must be submitted. The initial sampling rate must be the cube root of the number of bulk bags, and all samples taken must be tested.
4. 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 specification requirements must not be used on this project. Audit samples, including samples from the painter's pot, may be taken at any time.
5. The contractor must provide records of current calibration of test equipment on AS 3894.11 "Site Testing of Protective Coatings. Equipment Report" or an approved equivalent
6. Provision of the information and samples required by this Clause shall constitute a **HOLD POINT**.

Abrasive

7. Abrasive must consist of metallic grit or garnet and must be clean, dry and free from extraneous material such as dirt, gravel and organic matter. Abrasive used for dry blasting must contain no free silica.
8. The maximum permissible level of dissolved salt content in abrasive blast medium (including recycled media) must be 0.01% when determined in accordance with TP 765.

9. The grade of abrasive used must be such that the surface profile produced complies with the requirements of Clause 6 "Surface Preparation".

Packaging and Transportation of Abrasive

10. Blast media must be delivered to the applicator's premises in the manufacturer's containers, unopened and with the label intact. The following information must be legibly and durably marked on each container:
 - (a) Abrasive type, e.g. steel grit;
 - (b) Batch Number;
 - (c) Date of Manufacture;
 - (d) Grading of Material; and
 - (e) Manufacturer's name.

Paint

11. Subject to Clause 3.13, paint products must be APAS approved.
12. The colour of the external finish coat must be specified in accordance with AS 2700. The decorative final coat must provide complete coverage to a hiding power chart as described in AS 1580.213.1.
13. Paints must be delivered to the applicator's premises in the manufacturer's containers, unopened and with the label intact. The following information must be legibly and durably marked on each container:
 - (a) The name or registered mark of the manufacturer
 - (b) The paint type;
 - (c) Colour to AS 2700 (if applicable);
 - (d) The contents by volume, in litres;
 - (e) Product identification together with appropriate description of each component, e.g. base, hardener, etc.;
 - (f) Production or batch numbers on packs of 4 Litre capacity and above;
 - (g) Date of manufacture;
 - (h) Information required by statutory regulations;
 - (i) Instructions for use, including the mixing ratio of the component parts, the pot life, and an instruction that the manufacturer's technical data sheet must be studied; and
 - (j) The Manufacturer's Safety Data Sheets.
14. All the above information must be kept on the applicator's premises at all times, and available for inspection.
15. If the Contractor proposes to use a non-APAS approved product, it must provide evidence of satisfactory previous known performance and obtain prior approval before using the product.
16. Provision of this information shall constitute a **HOLD POINT**.

4. CONTRACTOR'S PERSONNEL

General

1. The Contractor's personnel must include:
 - (a) A suitably qualified and experienced Painting Quality Management Representative (PQMR) who must personally carry out all testing as described in the Contractor's approved Inspection and Test Plan and maintain associated diary records. The PQMR must be qualified to NACE CIP 1 or ACA Coating Inspector at a minimum.
 - (b) A supervisor with at least 3 years experience on projects of a similar size and scope to this work, who must be on site at all times whilst work is in progress. The supervisor must not be the PQMR.
 - (c) Abrasive blast cleaning operators who are competent in the consistent delivery of the blast cleaning class as specified.
 - (d) Paint applicators that can demonstrate control of dry film thickness at all times. Consistency must be assessed against the requirements of Clause 13 "Dry Film Thickness".
2. Unless stated otherwise, suitably qualified personnel may undertake more than one of the above roles.

Painting Quality Management Representative

3. At a minimum, the PQMR's responsibilities must include the following:
 - (a) To observe and record relevant day to day information including.
 - i) Abrasive blast quality.
 - ii) Information on an ongoing basis through the day concerning the operational needs of the works to appropriate Australian Standards. This includes atmospheric conditions, paint details, equipment function and suitability etc.
 - iii) Individual dry film thickness readings for each coat.
 - iv) Co-ordinate all rework for the above as required.
 - v) Address all hold points relevant to these operations.
 - vi) Audit, calibrate and check all measuring equipment where required.
 - (b) To report any Non-conformance with the Specification or Australian and Industry Standards.
 - (c) To provide advice and notification of any problems experienced with the coating system.
 - (d) Be present at all site meetings.

5. COMMENCEMENT OF WORK**Program**

1. At least one week prior to the commencement of any work associated with protective treatment, the Contractor must submit a complete detailed program of work showing all activities required for cleaning and application of protective treatment. The Contractor must also provide advice of any alteration to the program.
2. The program must show the paint manufacturers estimated time to full cure.
3. Where the program no longer reflects the Contractor's actual or planned progress, the Contractor must provide the Principal with an amended program as soon as practicable.
4. Provision of the program and any amended program shall constitute a **HOLD POINT**.

Notification

5. The Contractor must provide at least 48 hours notice prior to the commencement of any cleaning process.
6. Provision of the notice shall constitute a **HOLD POINT**.

Inspection and Lighting

7. Where inspection and/or surveillance requires the use of scaffolding, the Contractor must provide the scaffolding in accordance with appropriate regulations. 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 1680.2.0 Table 2 "For the Purpose of Inspection".

6. SURFACE PREPARATION**Preliminary Cleaning**

1. Weld spatter, surface irregularities and sharp edges must be removed by mechanical means. All steel must be checked for sharp edges and where found must be ground to a minimum 2 mm radius. Large deposits of bird droppings and other deleterious material must be removed manually for disposal as per statutory regulations. Deposits of oil and grease must be removed by solvent cleaning in accordance with AS 1627.1.
2. The Contractor must prepare test areas on representative surfaces to confirm that the abrasive blasting process and materials can produce the specified profile height.
3. Provision of the results from the test area shall constitute a **HOLD POINT**.

Final Cleaning

4. All surfaces must be dry abrasive blast cleaned back to the metal, removing all rust, mill scale, weld slag, paint, or any extraneous material, in accordance with AS 1627.4, "Metal finishing - Preparation and pre-treatment of surfaces Part 4: Abrasive blast cleaning of steel", to a Class Sa 3 finish as described in

AS 1627.9, "Metal finishing Part 9: Preparation and pre-treatment of surfaces – Pictorial surface preparation standards for painting steel surfaces".

5. After-blast cleaning must be carried out in accordance with AS 1627.4 Clause 5.4.
6. All blast cleaned surfaces must be overcoated within 4 hours of completion of blast cleaning, or before discolouration occurs, whichever is the sooner.
7. All surface profile readings must be within the range of 50 to 100µm, when measured in accordance with TP800 Method 2. A minimum of 5 tests must be carried out to establish the profile height range delivered by the abrasive blasting process. This process must be repeated for each abrasive blast cleaning operator.
8. After completion of cleaning but prior to the application of any protective treatment a **HOLD POINT** shall apply.

7. APPLICATION OF PAINT

Deviations from Manufacturer's Data Sheets

1. Any deviations from the manufacturer's data sheet must be authorised in writing by the paint manufacturer. Copies of such authorisation must be provided at least 48 hours prior to the application of paint.
2. Provision of the authorisation shall constitute a **HOLD POINT**.

Safety Precautions

3. 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).

Mixing and Thinning

4. All paints must be thoroughly mixed before use to ensure that it is homogeneous and if required must be agitated during application to keep the paint homogeneous in accordance with the manufacturer's written recommendations
5. Liquid wastes must be disposed of in accordance with the requirements of the EPA.

Tinting

6. Where successive coats of the same colour are to be used or have been specified, alternate coats must be tinted off-shade sufficiently to produce enough contrast to indicate separate coats and complete coverage of the surface.

Application and Climatic Conditions

7. Paints shall be applied in accordance with AS2312.1.
8. All painting must be carried out under cover. Structural steelwork must remain undercover until paint has hardened sufficiently to prevent damage during handling or due to environmental conditions.
9. All paints must be applied in accordance with the manufacturer's written recommendations. The finish must be uniform and free from runs, sags, pinholes, blisters or other defects. All atmospheric measurements must be taken in the paint application area.
10. Notwithstanding the above, under no circumstances should paint be applied under any of the following conditions:
 - (a) the ambient temperature is below 10°C;
 - (b) in rain, fog, mist, strong winds or dusty conditions;
 - (c) when moisture is present on the steel surface;
 - (d) when the temperature of the steel is less than 3°C above the dew point at the time of coating, when measured using a calibrated and corrected sling psychrometer or dew point meter;
 - (e) when the steel surface temperature exceeds 35°C;
 - (f) When the relative humidity exceeds 80%.
11. Prior to each application of each coat, a **HOLD POINT** shall apply.

Stripe Coating

12. Unless specified otherwise, stripe coating to AS 2312.1 is required wherever AS 2312.1 states that it is advisable or recommended.
13. A stiff, stripe coating brush must be used to apply stripe coats to welds, crevices, mouse holes, bolt holes and rivets.

Handling and Transport

14. The finished system must be allowed to cure for at least 7 days before either:
 - (a) transporting to site if painting is being done off site, or
 - (b) being erected.

8. FILM THICKNESS**Measurement of Dry Film Thickness**

1. The dry film thickness must be measured in accordance with TP 913 and the dry film thickness range must be determined in accordance with TP801. Minimum and maximum specified values must include the estimated uncertainty of measurement. Results must be recorded on AS 3894.12: "Site Testing of Protective Coatings. Inspection report—Coating or an approved equivalent.
2. Measurement of the profile induced error must be carried out on the first day of surface preparation and reported prior to application of the first coat of paint. The profile error induced in the dry film thickness gauge must be added to the minimum and maximum values provided.
3. The measurement and acceptance of surface profile induced error shall constitute a **HOLD POINT**.
4. All single point readings (as defined in SSPC-PA 2) of dry film thickness must be within the range specified. If the thickness is not within the specified range, a **HOLD POINT** shall apply. The Contractor's disposition must be in accordance with the manufacturer's recommendations and must take into account any difficulties with over-coating a product with itself.
5. On completion of successive paint coats and prior to transportation a **HOLD POINT** shall apply.

Test Frequency

6. The frequency of single point measurements must be the greater of 3 readings per square metre; and
7. For main bridge girders, 1 reading for each lineal metre of girder (taken on each facet of the girders);
8. For cross bracing members, 1 set of readings for each 500 millimetres of girder length Single point measurements must be (taken on each facet).
9. For plates as specified in SSPC -PA 2

9. CONTINUITY TESTING

1. If specified in the **Contract Specific Requirements**, the Contractor must undertake Continuity Testing.
2. Continuity Testing must be performed in accordance with AS 3894.1.
3. At the completion of Continuity Testing and when full cure is complete (as determined by AS 3894.4), a **HOLD POINT** shall apply.

10. REPAIR OF PROTECTIVE TREATMENT

1. The Contractor must repair any defective or damaged areas, which includes any acts of vandalism.
2. The Quality Plan must include a proposal for the repair of damaged areas. This proposal must include repair methods for minor damage (i.e. where the substrate is not visible) and for major damage (i.e. the damage penetrates the substrate).
3. Provision of the proposal for the repair of damaged areas shall constitute a **HOLD POINT**.

11. REPORTING

1. The Contractor must record all relevant details of the painting process each day, including the information specified in:

AS 3894.10	"Site Testing of Protective Coatings. Inspection Report – Daily Surface and Ambient Conditions"
AS 3894.11	"Site Testing of Protective Coatings. Equipment Report"
AS 3894.12	"Site Testing of Protective Coatings. Inspection Report – Coating"
AS 3894.13	"Site Testing of Protective Coatings. Inspection Report – Daily"
AS 3894.14	"Site Testing of Protective Coatings. Inspection Report – Daily Painting"

- The Contractor may use the above forms or an approved equivalent.

12. **HOLD POINTS**

- The following is a summary of Hold Points referenced in this Part:

CLAUSE REF.	HOLD POINT	RESPONSE TIME
2	Submission of Quality Plan documentation	7 days
3.6	Provision of the abrasive data and APAS paint records	24 hours
3.16	Provision of evidence of satisfactory previous known performance if non-APAS product proposed	7 days
5.4	Provision of program of work	48 hours
6.3	Results demonstrating specified profile height can be achieved.	2 hours
6.4	Prior to commencement of any cleaning process	48 hours
6.8	Following the completion of cleaning treatment and prior to the application of primer.	2 hours
7.2	Prior to using any products not in accordance with Manufacturer's instructions	48 hours
7.11	Prior to application of each coat of paint.	24 hours
8.3	Measurement and acceptance of surface profile induced error	2 hours
8.4	Disposition regarding the under- or over-application of paint	24 hours
8.5	Prior to transportation.	24 hours
9.3	Continuity Testing (if specified) once coating is fully cured	24 hours
10.3	Provision of the proposal for the repair of damaged areas	24 hours

13. **VERIFICATION REQUIREMENTS AND RECORDS**

Test Records

- The Contractor must undertake the testing specified in this Clause and must supply written evidence of compliance with the lot package.
- All records must then be certified correct by the Contractor and provided within 18 hours of the completion of a day's work.

CLAUSE REF.	SUBJECT	PROPERTY	TEST PROCEDURE	TEST FREQUENCY	ACCEPTANCE LIMITS
3.6	Abrasive	level of dissolved salt content	TP 765	Representative samples for each source of supply	< 0.01%
5.7	Lighting	illuminance	AS 1680.2.0 Table 2	Once for each work area prior to commencement of work	> 300 lux
6.7	Surface Profile	Surface Profile Height	TP800 Method 2.	5 tests for each blast cleaning operator	50 to 100µm
8.1	Paint Application	Dry film thickness	TP 913	Refer Clause 8.1	Refer Contract Specific Requirements
8.1	Paint Application	Dry film thickness range	TP 801	Refer Clause 8.1	Refer Contract Specific Requirements
9.2	Continuity Test (If specified in the Contract Specific Requirements)	Defects per unit area tested	AS 3894.1	After final coat unless specified otherwise in Contract Specific Requirements	Nil

Other Records

3. The Contractor must supply the following records (in addition to records provided with Hold Points):

CLAUSE REF.	SUBJECT	RECORD TO BE PROVIDED
2.	Calibration of Equipment	AS 3894.11: Equipment report
3.1 (a)	APAS approved material	APAS record of supply
3.1 (b)	Non- APAS approved material	Evidence of conformance
11.	Climatic conditions, ambient / surface conditions, surface preparation details, painting details, dry film thickness	AS 3894 Parts 10, 12, 13, 14 and / or equivalent