

**TECHNICAL STANDARD****SURFACE PREPARATION AND PROTECTION  
OF STEELWORK USING INORGANIC ZINC  
SILICATE AND ACRYLIC LATEX COATING  
SYSTEM**

Issued by:                      Manager Engineering

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## APPROVAL TO DEVIATE FROM THIS STANDARD

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Approval may be granted by the Asset Owner to deviate from the requirements as stipulated in this Standard if the functional requirements (e.g. Asset Life) for the asset differs from those stated in the Standard, but is assessed as still being acceptable by the Asset Owner's nominated representative.

Any approval to deviate from the stated requirements of this Standard will not be seen as creating a precedent for future like project. Any request to deviate from this Standard must be carried out on a project by project basis where each alternate proposal will be individually assessed on its own merit.

## NO CHANGES REQUIRED IN THE JANUARY 2007 EDITION

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The following lists the major changes to the November 2000 edition and published in the October 2004 edition of TS 82:

1. Reformatted from DS to TS (Departmental Standard to Technical Standard), and updated referenced Australian Standards.
2. Conversion to a technical standard by removal of contractual conditions (to be included in the contract that references this standard).
3. August 2004-Complete review of document resulted in a number of minor changes. No significant change was made to the overall content.

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## REFERENCED DOCUMENTS

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|                     |   |
|---------------------|---|
| <b>AS 1627:</b>     | Metal finishing - Preparation and pretreatment of surfaces        |
| <b>AS 3894:</b>     | Site testing of protective coatings                               |
| <b>AS/NZS 4680:</b> | Hot-dip galvanized (zinc) coatings on fabricated ferrous articles |

**APAS Document D - 184:** Guidelines to Specification, Supply and Quality Assurance  
([www.apas.gov.au](http://www.apas.gov.au))  
APAS 280/1  
APAS 2908  
APAS 2971

## SECTION 1: SCOPE

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This Technical Standard (TS) details the surface preparation, application and repair of inorganic zinc silicate primer coat, epoxy tie coat and acrylic latex gloss coating system used for medium term protection of steelwork and hot dip galvanised steelwork exposed to mild atmospheric environments.

This Technical Standard shall be read in conjunction with the manufacturer's technical data sheets and specifications and the products shall be applied in accordance with the manufacturer's written instructions where details are not included in this standard.

## SECTION 2: COATING CONTRACTOR AND QUALITY ASSURANCE

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The Contractor shall be certified under the 'Painting Contractor Certification Program' for the appropriate class of work or an approved equivalent. The Contractor shall submit, to SA Water's Representative, documentation in accordance with their Quality Assurance Plan. However the minimum requirement for Quality Assurance shall be completion of AS 3894.10, AS 3894.11 and AS 3894.12, 'Site testing of protective coatings' equipment and inspection reports. All quality control records shall be available for inspection by SA Water's Representative at any time.

### 2.1 SA Water's Representative

SA Water's Representative in this Technical Standard will be nominated by SA Water.

## SECTION 3: INSTRUCTIONS ON SUPPLY OF MATERIALS

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An Australian Paint Approvals Scheme (APAS) 'Record of Supply' shall be obtained when the products are purchased. The purchaser shall request an 'APAS Record of Supply' from the manufacturer at the time paint is ordered.

A 'Certificate of Test' can then be obtained if problems in the application of the coating subsequently occur. Information and procedures concerning Records of Supply and Certificate of Test are detailed in APAS Document D-184 'Guidelines to Specification, Supply and Quality Assurance' ([www.apas.gov.au](http://www.apas.gov.au)).

Returns as required by APAS Document D 184 instructions shall be completed by the manufacturer and submitted to SA Water's Representative by the Contractor for forwarding to the Material Sciences Unit.

## SECTION 4: SAFETY AND ENVIRONMENT

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The Contractor shall conduct the operations (including blast cleaning and coating applications) in accordance with the standards of safety laid down in the *South Australian Occupational Health, Safety & Welfare Act* and all regulations there under.

All operations shall be conducted in accordance with the *Environmental Protection Act*.

All operations conducted outside the state of South Australia shall meet all local safety and environmental requirements. Contractors are responsible for obtaining all necessary approvals and disposal of all waste.

## SECTION 5: SURFACE PREPARATION

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### 5.1 Steel Surfaces (not galvanised)

#### 5.1.1 General

The fabricator shall ensure that all joints are fully welded and sealed, sharp edges and corners are ground off to a radius not less than 2 mm and all weld spatter and irregularities are removed.

Before commencing coating application, the coating Contractor shall inspect the surfaces to be coated. If the coating Contractor considers that there are any imperfections that may render the coating unsatisfactory, the Contractor shall notify SA Water's Representative. Commencement of work on the coating shall indicate unconditional acceptance of the surface to be coated.

All surfaces shall be free from mill scale, rust, weld spatter, oil, grease, soil, moisture and any other matter likely to impair the adhesion of the coating.

#### 5.1.2 Removal of Oil and Grease

Oil and grease shall be removed from all steelwork using an alkali degreasing process or solvent washing as approved by SA Water's Representative and in accordance with AS 1627 Part 1 "Cleaning using liquid solvent and alkaline solutions".

#### 5.1.3 Abrasive Blast Cleaning

All surfaces to be coated shall be wet or dry abrasive blast cleaned to class Sa 3 finish in accordance with AS 1627.4 "Part 4: Abrasive blast cleaning". The surface profile shall be a fine profile grade with maximum profile height of 44 microns and shall be determined in accordance with AS 3894.5 "Method 5: Determination of surface profiles" and shall be determined in accordance with this standard. Abrasive materials used shall be in accordance with AS 1627 Part 4, be free from contamination, contain less than 100 milligrams per

kilogram sodium chloride and contain less than 30 milligrams per kilogram copper.

Water used during the cleaning process shall be potable and shall not contain more than 500 milligrams per litre of total dissolved salts. All surfaces may be initially wet blasted or ultra high-pressure water blasted followed with final dry blasting after all moisture has dissipated. If wet abrasive blast cleaning is used, soluble polyphosphate corrosion inhibitor approved by the coating manufacturer shall be added to the water in the minimum concentration specified on the manufacturer's written instructions, to prevent rusting. The inhibitor shall be added accurately. Toxic inhibitors such as chromate, nitrate and nitrite shall not be used.

All work shall be coated on the same day that it is cleaned and while the surface remains class Sa 3 finish. Coatings shall not be applied if the steel temperature is less than 3°C above dew point.

The Contractor shall not apply the coating until the surface preparation has been inspected and approved by SA Water's Representative. If rust producing salts, chlorides or any other surface contamination judged to be detrimental to coating performance are detected, surfaces shall be further prepared to remove all such contamination to the satisfaction of SA Water's Representative. Testing for such contamination shall be performed in accordance with AS/NZS 3894.6 "Determination of residual contaminants". The maximum permissible level of chloride shall be 50 milligrams per square metre. This equates to 8.3 micrograms per square centimetre of sodium chloride. (Refer to Clause 7.2.)

## **5.2 Hot Dip Galvanized Steel Surfaces**

### 5.2.1 General

Steelwork shall be hot dip galvanised in accordance with AS/NZS 4680. The coating contractor shall inspect the surface to be coated and if he/she considers there are any imperfections that may render the coating unsatisfactory, the coating contractor shall notify SA Water's Representative before starting the coating work. Commencement of the coating work shall indicate unconditional acceptance of the surface to be coated.

All surfaces shall be free from oil, grease, soil, moisture and any other material likely to impair the adhesion of the coating. Excessive localised lumps or pools of zinc and all dross shall be removed.

### 5.2.2 Removal of Oil and Grease

Oil and grease shall be removed from all steelwork using an alkali degreasing process or solvent washing as approved by SA Water Representative's and in accordance with AS 1627.1 "Part 1: Cleaning using liquid solvent and alkaline solutions".

### 5.2.3 Abrasive Blast Cleaning

This procedure is intended to remove oxide film and surface contamination and lightly profile the surface with minimal reduction in galvanised coating thickness. (no more than 10 microns) The surfaces shall be lightly 'whip' or 'brush' blasted

to provide a fine surface profile. Surfaces shall be dry abrasive blast cleaned generally in accordance with AS 1627.4 "Part 4: Abrasive blast cleaning".

The cleaning procedure shall be in accordance with the following requirements and Appendix I of AS/NZS4680 'Hot dip galvanised (zinc) coatings on fabricated ferrous articles'. Abrasive shall be garnet or other approved silica free mineral. Abrasive materials used shall be in accordance with AS 1627.4, be free from contamination, contain less than 100 milligrams per kilogram sodium chloride and contain no metallic copper.

All work shall be coated on the same day that it is prepared and before any visible oxidation occurs. Coatings shall not be applied if the steel temperature is less than 3°C above dew point.

The Contractor shall not apply the coating until the surface preparation has been inspected and approved by SA Water's Representative. If salts, chlorides or any other surface contamination judged to be detrimental to coating performance are detected, surfaces shall be further prepared to remove all such contamination to the satisfaction of SA Water's Representative.

## **SECTION 6: APPLICATION OF COATING SYSTEM**

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### **6.1 General**

All products shall be approved by the Australian Paint Approvals Scheme. (APAS) All products in the system shall be from the same manufacturer. Coating materials shall be mixed and applied in accordance with the manufacturers written instructions. Proportioning and mixing of part cans is not permitted without the approval of SA Water Representative's. Strict attention shall be paid to the shelf life and onsite storage conditions, which must meet the manufacturer's recommendations.

The finish shall be generally smooth and free from protuberances.

The surface temperature of the steel to be painted shall be at least 3°C above dew point. Coating shall not be applied to any surface, which will have a temperature less than 10°C or more than 55°C during the cure period.

Coating shall be applied as soon as SA Water's Representative has approved the surface preparation.

### **6.2 Primer Coat (for bare steel)**

The primer coat shall be a two part (liquid and zinc dust) inorganic zinc silicate coating for the protection of steel approved to APAS 2908. It shall be applied with a minimum dry film thickness of 75 microns and a maximum of 100 microns. Application shall be by conventional spray as recommended in the manufacturer's data sheet and shall be continuously mechanically stirred while spraying. Minimum overcoating times as detailed in the manufacturer's data sheet shall be observed. Acceptable products include International 215 Inorganic zinc silicate grey, Interzinc 225, Watty Galvit ES510, Galvit ES600 and PPG D9 SB Zinc silicate grey.

**Note this primer coat shall be omitted on galvanised steel.**

### **6.3 Seal Coat**

The seal coat shall be a two part epoxy primer suitable for application to inorganic zinc silicate approved to APAS 2971. The minimum dry film thickness shall be 40 microns. The manufacturer may recommend thinning of the primer due to the porosity of the inorganic zinc silicate. Application shall be by spray. Under special circumstances SA Water's Representative may approve brush application for small areas. Acceptable products include International Interzinc 52 MCR, Wattyl Epinamel PR 250 and PPG Amercoat 182 ZPK grey.

### **6.4 Top Coat**

The top coat shall be exterior gloss acrylic approved to APAS 0280/1 and approved by SA Water's Representative. The colour used shall be as specified or as directed by SA Water's Representative. The coating shall be applied by spray, roller or brush in two coats to give a minimum dry film thickness of 50 microns. Acceptable products include International Intercryl 853 white, Wattyl Solagard gloss and PPG Taubmans Sunproof MAX acrylic gloss.

### **6.5 Dry Film Thickness**

The dry film thickness shall be measured in accordance with AS 3894.3 "Method 3: Determination of dry film thickness" or as approved by SA Water's Representative. Calibration of instruments shall take account of surface profile height and shall be adjusted in accordance with this test method.

## **SECTION 7: INSPECTION**

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### **7.1 General**

The work shall be monitored and inspected by an Australasian Corrosion Association (ACA) or National Association of Corrosion Engineers (NACE) Accredited Coating Inspector who will be engaged by SA Water. For surface preparation and coating SA Water's Representative would usually be the coating inspector. To allow for inspection, 48 hours notice shall be given to SA Water's Representative prior to commencement of any surface preparation or application of coating. Subsequently SA Water's Representative shall be kept informed with at least 48 hours notice of future work schedules for surface preparation and painting.

Inspectors will not be available outside normal accepted industry working hours, unless specifically agreed to by the inspector.

### **7.2 Before Coating**

The Contractor shall not apply any coating until the surface preparation has been inspected and approved by SA Water's Representative. SA Water's Representative may, at his/her discretion, perform any tests relating to surface

preparation or contamination. If testing is required, the test areas shall be prepared again in accordance with Section 5 after testing is complete.

### **7.3 After Completion of Coating**

The coating will be inspected by SA Water's Representative as soon as practicable after completion to ensure compliance with the specification.

Areas that have been inadequately or unsatisfactorily coated shall be treated in accordance with Section 5 and 6 or Section 8 as directed by, and to the satisfaction of SA Water's Representative.

### **7.4 Re-Inspection**

Should surface preparation or applied coating prove to be unsatisfactory in the view of SA Water's Representative and require rework and subsequent inspection, the cost of such inspection will be charged to the contractor and such costs will be deducted from any moneys due and payable.

## **SECTION 8: REINSTATEMENT OF CURED COATING**

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Damaged and defective areas including mud cracking shall be abraded by dry abrasive blast cleaning or power disk sanding till bright steel is exposed or as approved by SA Water's Representative. Edges of the coating shall be feathered back by the same means for approximately 20 millimetres. Coating shall be re-applied in accordance with Section 6. Small areas of reinstatement coating may be applied by brush with the approval of SA Water's Representative. Topcoat colour matching shall be to the satisfaction of SA Water's Representative.