

**TNZ C23 NOTES: 2000**

**NOTES FOR REPAIR OF CORROSION PROTECTION SYSTEMS**

**1. SCOPE**

These notes set out the technical requirements for the quality repair of corrosion protection systems and may be used as a basis for particular specifications. These include paints, galvanizing and metal spraying used to prevent corrosion of metal structures, devices and components installed on or as part of the State Highway system. The notes cover the following:

- (a) Supply of materials
- (b) Surface preparation
- (c) Application of coatings
- (d) Quality control

**2. RELATED DOCUMENTS**

- (e) AS 1627 (11 parts) - Metal finishing, preparation and pretreatment of surfaces.
- (f) AS/NZS 4680 – Hot-dip galvanized (zinc) coatings on fabricated ferrous articles.
- (g) AS/NZS 3570.9 - Organic zinc rich primer.
- (h) AS 3894.3 - Determination of dry film thickness.
- (i) AS/NZS 3894.5 – Determination of surface profile.
- (j) AS/NZS 3894.6 – Determination of residual contaminants.
- (k) BS 812 Pt 117 - Method for determination of water soluble chloride salts.
- (l) BS EN 22063 – Metallic and other inorganic coatings. Thermal spraying.
- (m) SIS 05 5900 - Pictorial surface preparation standards for painting steel surfaces.
- (n) AS 3894 Parts 10 and 12 – Inspection report forms.

### 3. SUPPLY OF MATERIALS

#### 3.1 Abrasives

All sand or grit supplied for abrasive blast clearing shall be free of dirt, dust, chemical contaminants, grease and oils, and organic matter.

The abrasive shape and size shall be capable of producing the surface profile specified for the particular coating. Soluble chlorides shall be not more than 0.01% when tested in accordance with BS 812: Part 117: 1988.

#### 3.2 Compressed Air

Air for abrasive blasting or painting shall be free from oil or water as determined by Method B of AS/NZS 3894.6.

#### 3.3 Washing Water

Wash water used for water blasting or wash cleaning shall be potable and free of any contaminants which may be detrimental to coating adhesion.

#### 3.4 Paint

All paints used for the repair of coatings shall be compatible with existing coatings and supplied by a single manufacturer who shall be approved under the NZ Paint Approvals Scheme (PASS) or Australian Paint Approvals Scheme (APAS).

Paints shall be delivered in sealed containers bearing the manufacturer's name, batch number and carry a label clearly indicating the paint type.

### 4. SURFACE PREPARATION

#### 4.1 General

Preparation and pretreatment of all repair surfaces shall be carried out in accordance with the requirements of the relevant parts of Australian Standard 1627 (11 parts). Unless otherwise specified, preparation shall be by abrasive blasting to Class 2 ½ of AS 1627.4 or Sa 2 ½ of SIS 05 5900.

#### 4.2 Chemical Contamination

Particular attention shall be paid to the removal by washing of chemical contaminants from the surface to be coated. Most mechanical methods of surface cleaning do not adequately remove contaminants such as soluble salts.

Unless otherwise specified, the Contractor shall test the prepared surface for the presence of chlorides or sulphates immediately prior to application of the coatings. A suitable test procedure is included as Method A of AS/NZS 3894.6.

Where chlorides are in excess of 50mg/sqm the surface shall be washed and repaired at the Contractor's expense.

### 4.3 Surface Profile

Surface profiles shall be measured using AS/NZS 3894.5.

### 4.4 Treatment of Edges

No sharp edges shall be permitted. All such edges shall be rounded to a minimum radius of 1.5 mm before further preparation is carried out.

### 4.5 Treatment of Welded Areas

All welding flux contaminants, pinholes, slag and loose or damaged coating shall be removed prior to the application of coatings.

### 4.6 Pictorial Surface Preparation Standard

SIS 05 5900 may be used as a reference standard in lieu of AS 1627.9 where for example, Class 2 ½ is equivalent to Sa 2 ½ in the Swedish standard.

## 5. APPLICATION OF COATINGS

### 5.1 Application of Paint Coatings

#### 5.1.1 General

Coatings shall be applied strictly in accordance with the manufacturers written recommendations. Copies of the manufacturer's data sheets shall be available for inspection on site.

#### 5.1.2 Application of Coating

The appropriate protective coating shall be applied not later than the same day on which the cleaning is undertaken, and shall be applied as soon as possible after cleaning has taken place before visible deterioration or contamination of the surface occurs.

#### 5.1.3 Dry Film Thickness

The dry film thickness (DFT) specified for individual coats shall be as defined in particular contract documents. Otherwise DFT shall be achieved within the specified tolerances recommended by the manufacturer.

#### 5.1.4 Intervals Between Application of Coatings

The maximum and minimum time intervals between application of each coat as recommended by the manufacturer and/or specified in particular contracts shall be adhered to.

## 5.2 Galvanized Coating Repairs

### 5.2.1 Hot Dip Galvanizing

Where so specified, items shall be re-galvanized in accordance with the requirements of AS/NZS 4680.

### 5.2.2 Repair by Painting

Preparation shall be by abrasive blasting to Clause 2 ½, to AS 1627.4 or disc grinding to bright metal. Zinc-rich paint conforming to AS/NZS 3750.9 shall then be applied to a dry surface to give a minimum DFT of 100 microns. The paint shall be thoroughly mixed prior to and during application.

### 5.2.3 Repair by Zinc Spray

Preparation and coating application shall conform to BS EN 22063. In addition, an average surface profile of between 50 and 100 microns shall be obtained with a surface cleanliness to Class 3 of AS 1627.4. Minimum zinc thickness shall be 100 microns or 20% thicker than adjacent galvanizing whichever is the greater.

## 6. 6. QUALITY CONTROL

### 6.1 Temperature

No coatings shall be applied when the surface temperature is less 3°C above the dew point, or more than 50°C, or when the ambient temperature is above 35°C, unless otherwise approved by the coating manufacturer.

### 6.2 Humidity

No abrasive blasting shall be carried out or paint coatings applied where the relative humidity is above 85%.

### 6.3 Illumination

No blasting or painting shall occur in conditions of poor visibility (minimum of 200 lux is required).

### 6.4 Documentation

The Contractor shall record and supply to the Engineer the following information:

- (a) The brand name and batch numbers of all materials used.
- (b) Air temperature, steel surface temperature, and relative humidity at the start of painting and at 4 hourly intervals while painting continues.
- (c) For each item coated, the average and minimum DFT achieved for each coat applied. Measurements shall be made in accordance with AS 3894.3.

Quality control records shall be made using AS 3894.10 and AS 3894.12 or similar approved forms.

**ADDENDUM TO NOTES FOR THE REPAIR OF  
CORROSION PROTECTION COATINGS**

**1. SURFACE PREPARATION**

Surface preparation can be achieved by a number of different methods depending on the tolerance of the particular coating and the standard of service life expected from the repair. AS 1627 is the general standard accepted in NZ for the preparation of metal surfaces. The standard is compiled in 11 parts which deals with the various methods used in surface preparation and pretreatment of metal surfaces.

AS 1627.9 has only recently become available, and SIS 05 5900 which was used as its base document, is more readily available and so may be used as an alternative pictorial standard.

Contract specifications should specify the relevant part of AS 1627 as the standard specification which should be observed where abrasive blasting is not appropriate.

**2. MATERIAL SUPPLY**

In general, it is customary for the contract documents to specify paints by generic type rather than specific brands. In isolated cases, this standard practice may not be observed because of a proven performance record of a proprietary system, but specifying a particular brand of paint can lead to contractual difficulties where service performance of the coating is unsatisfactory.

The reason for requiring supply of all paints, within a particular contract, from a single manufacturer is to ensure compatibility of the various coats, and avoidance of contractual problems where incompatibility occurs.

**3. SURFACE PREPARATION**

**3.1 General**

Surface preparation by abrasive blasting may be too high a standard for some minor routine maintenance repairs. AS 1627 covers a considerable range of preparation methods and SIS 05 5900 a wide range of pictorial surface preparation standards. Contract specifiers can choose the standard of surface preparation required from SIS 05 5900 and leave the method of achieving that standard to the Contractor.

**3.2 Chemical Contamination**

The Contractor is required by this clause to ensure that the surface is free of chemical contaminants, the Engineer may carry out additional random checks to ensure compliance.

### 3.3 Treatment of Edges

Where sharp edges have not been removed application of paint will rarely provide sufficient DFT and paint coatings will breakdown much more rapidly than the rest of the painted surface. The standard edge treatment during surface preparation will be dependent on the service life expected from the coating. A minimum radius of 1.5 mm has been specified as this is about the minimum radius that can be assessed visually.

## 4. APPLICATION OF COATINGS

- (a) The contract specification should quote the method of application for the various paint coatings e.g. the primer coat may be required to be applied by brush to ensure good adhesion to the substrate.

Dry film thickness (DFT) is generally quoted with a minimum thickness for each coat and a minimum thickness for the aggregate of all coatings.

- (b) Hot dip galvanizing requirements are covered in AS/NZS 4680. The particular contract specification will generally quote a minimum thickness of galvanizing.
- (c) When preparing a contract specification for repair to corrosion protection coatings of iron and steel, writers should use AS/NZS 2312 (Guide to the Protection of Iron and Steel Against Exterior Atmospheric Corrosion) as reference document to ensure all the important criteria are addressed. This document is currently being revised and is expected to be republished in 2000.

## 5. ENVIRONMENTAL CONDITIONS

Where on-site repairs such as spot painting are being done, the ambient temperature and relative humidity on site will heavily influence the timing for completion of the repairs. These specification notes have placed general limits on both the repair surface temperature and relative humidity but the Contract specification may also need address site specific environmental conditions such as wind borne salt spray and other air borne chemical contaminants peculiar to particular locations (e.g. whether washing between coats is necessary, whether additional illumination is required, whether screens to reduce wind and overspray problems are required, etc). Some new technology coatings, eg moisture-cured urethane, can be applied when relative humidity is greater than 85%.