Eskom	Standard	Technology

Title: **Refurbishment of Steel Power Line Structures Standard**

Unique Identifier:	**240-75883230**
Alternative Reference Number:	**DSP_34-1680**
Area of Applicability:	**Engineering**
Documentation Type:	**Standard**
Revision:	**2**
Total Pages:	**58**
Next Review Date:	**March 2021**
Disclosure Classification:	**CONTROLLED DISCLOSURE**

Compiled by

Barry Hill
Chief Engineer Civil

Date: 31-3-2016

Approved by

Bertie Jacobs
Chief Mechanical Engineer

Date: 31-3-2016

Authorised by

Riaz Vajeth
Senior Manager Lines Engineering Services

Date: 31-3-2016

Approved by
SCOT Chairperson

Riaz Vajeth
SCOT Chairperson

Date: 31-3-2016

PCM Reference : **Perform Line Engineering**
SCOT Study Committee Number/Name : **<number or name>**

CONTENTS

EXECUTIVE SUMMARY

Not applicable

1. INTRODUCTION

1.1 KEYWORDS

Corrosion, paint, structures, refurbishment

2. SUPPORTING CLAUSES

2.1 SCOPE

This standard sets out the different corrosion protection standards to be used for the refurbishment of overhead steel power line structures.

The standards detailed herein shall not be modified in any way without the written approval of the *Project Manager*.

2.1.1 Purpose

None

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 NORMATIVE/INFORMATIVE REFERENCES

The following standards contain provisions that, through reference in the text, constitute requirements of this specification. All standards are subject to review and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent revisions of the standards listed below. Information on currently valid national and international standards may be obtained from the Information Centre at Megawatt Park.

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] ASTM D4414: *Standard practice for measurement of wet film thickness by notch gauges.*

[2] ASTM E376: *Measuring coating thickness by magnetic field or eddy current electro-magnetic test methods.* (Can be used as alternative to SANS ISO 2808).

[3] ISO 2409. *Paints and varnishes – Cross cut test*.

[4] ISO 4628 – *1. Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 1: General introduction and designation system.*

[5] ISO 4628 – 3. *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3: Assessment of degree of rusting.*

[6] ISO 8502-3. *Preparation of steel substrates before application of paint and related products – Test for the assessment of surface cleanliness – Part 3: Assessment of dust on steel surfaces prepared for painting (pressure sensitive tape method).* (Can be used as alternative to SANS 5769).

[7] ISO 8502-6. *Preparation of steel substrates before application of paint and related products – Test for the assessment of surface cleanliness – Part 6: Extraction of soluble contaminants for analysis – The Bresle method.*

[8] ISO 9223: *Corrosion of metal and alloys – Corrosivity of atmospheres – Classification*.

[9] SANS ISO 9002*: Quality systems – Model for quality assurance in production, installation and servicing*.

[10] SANS 1091: *National colour standards for paints*

[11] SANS / ISO 2808: *Paints and Varnishes: Determination of film thicknesses* (Can be used as alternative to ASTM E376).

[12] SANS 5159: *Adhesion of paint and varnish films (cross-cut test)*.

[13] SANS 5769: *Cleanliness of blast-cleaned steel surfaces for painting thicknesses* (Can be used as alternative to ISO 8502-3).

[14] SANS 5770: *Preparation of steel substrates before the application of paints and related products – Test for the assessment of cleanliness of blast-cleaned steel surface – Freedom from certain soluble salts.*

[15] TRMSCAAC1:Rev.2, *Transmission line tower and line construction.*

[16] 240-47172520 (TRMSCAAC5):Rev.3, Design and manufacture of high voltage equipment labels.

2.2.2 Informative

2.3 DEFINITIONS

Definition	Description
Approved	Refers to written approval by the *Project Manager*
Coat/coating/film	Refers to single layer of a product.
Coating System	Coating system is an all embracing term including generic type, the number of coats, the thickness of each and the overall thickness of the system.
Contractor	Means the person(s) named as *Contractor* in the Contract Agreement
Detailed Refurbishment Procedure (DRP)	Plant/Item specific corrosion protection standards as attached in Appendix A.
Generic coating type	Refers to a type of product e.g. alkyd, epoxy etc.
Inspector	Someone with vast experience in the application of coatings and ideally qualified as a NACE International or SAQCC [South African Quality Certification Committee] Coating Inspector.
Manufacturer	Means the company that supplies the paint.
Potable water	Clean drinking water
Product Data Sheet	Technical document issued by the Paint/Material Supplier for their products, detailing the physical, chemical and performance qualities of the material, as well all necessary information related to the safe handling and application of the materials.
Supervisor	Refers to a person having a minimum of two years experience in the field of surface preparation and application of surface coatings.

2.3.1 Classification

- **Controlled Disclosure:** Controlled Disclosure to External Parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
DFT / d.f.t	Dry film thickness
DRP	Detailed Refurbishment Procedure
ISO	International Organisation for Standardisation
MIO	Micaceous ion oxide
SANS	South African National Standards
SAQCC	South African Qualification and Certification Committee for Corrosion
w.f.t	Wet film thickness

2.5 ROLES AND RESPONSIBILITIES

None

2.6 PROCESS FOR MONITORING

None

2.7 RELATED/SUPPORTING DOCUMENTS

None

3. REFURBISHMENT OF OVERHEAD STEEL POWERLINE STRUCTURES

3.1 HEALTH AND SAFETY

It is important to realise that health and safety hazards can occur at different stages of the coating process, i.e. during surfaces preparation, storage of paint, application of paint and the service use of the coated surface, and that regular exposure to toxic elements may cause long-term health problems. Therefore, before any work commences, the *Contractor* shall ensure that he conforms to all statutory and regulatory requirements as reflected in all applicable Acts and regulations governing occupational safety and health.

Emphasis is placed on the following:

Proper safety procedures and risk assessments shall be in place prior to any painting work being carried out.

Special care shall be taken when working with all organic liquid materials. Prior to the use of any of these standards, the Material Safety Data Sheets for each product to be used shall be obtained from the relevant coating supplier/manufacturer.

The use of any flammable products, such as solvents, cleaning agents, etc. in confined spaces shall be closely monitored by a Qualified Safety Representative. Proper ventilation of the internals shall be established and strictly monitored.

The *Contractor* shall ensure that the necessary protective equipment, clothing and safety measures are provided for each of his workers.

3.2 ENVIRONMENTAL

The *Contractor* shall ensure that any solid waste materials or liquids stripped or generated during the surface preparation and coating processes are discarded in accordance with all statutory and regulatory requirements, or as governed by Eskom Distribution's Environmental Management Procedures.

3.3 QUALITY ASSURANCE, CONTROL AND SURVEILLANCE

3.3.1 Paint supervisor and coating inspector requirements

Most coating failures on newly painted surfaces are the result of poor surface preparation. Therefore, all coating work shall be overseen by a full-time, experienced paint supervisor. As a "minimum" this person shall have a recognised SAQCC or NACE coatings inspection qualification and at least two years' experience in the field of surface preparation and application of surface coatings.

3.3.2 Contactor quality requirements and documentation

The *Contractor* and his paint manufacturer shall have in place a quality system detailing application techniques, processes, quality control methods and hold points. SABS ISO 9000 series shall be referred to for guidance.

In all cases, the *Contractor* shall be responsible for meeting the quality requirements and keep records of all inspections and tests. These shall include quality control plans, inspection sheets, batch certificates, daily inspection reports, as well as material and safety data sheets. The use of an independent coating inspector by the *Contractor* is also strongly advised.

3.3.3 Eskom or third party quality surveillance inspections

The *Project Manager* may enforce witness and hold points during surface preparation and application of the coating system. Quality surveillance inspections may also be carried out by a third party inspectorate team. However, any quality surveillance inspections carried out by Eskom staff, the *Project Manager* or by an appointed third party inspector shall not relieve the *Contractor* of his duties or liabilities in terms of quality assurance and control during application of the coating system, and it is expressly understood that the *Contractor* shall not rely on any reports or representations made by such a third party inspector.

3.3.4 Contractor quality documents and inspections

Prior to the commencement of work, the *Contractor* shall confirm with the *Project Manager* in writing, the date of the commencement of work and the *Project Manager's* inspection requirements.

The *Contractor* shall provide a detailed quality control plan of how the work will be done. This shall be verified by the *Project Manager* or a coating specialist i.e. for technical correctness and whether all the factors have been considered.

Prior to the application of any coating material, the selected manufacturer's product and safety data sheets for the products to be used, shall be obtained by the *Contractor*. Copies of these data sheets shall be signed by the coating supplier. This is to ensure that the latest product data sheet has been provided to the *Contractor*, that the material manufacturer is aware of this standard, the conditions under which their product/s will be applied/used and to allow for technical back-up where required.

In addition to obtaining updated product data sheets, the *Contractor* shall establish the impact of any deviations from the standard recommended application procedures and exposure conditions of the coating, as well as limitations of use, i.e. compared to the information provided in the most current product data sheet, prior to the use of the material.

The *Contractor* shall be responsible for preparing and inspection of the metal surfaces to be protected, the coating application/inspection of the work during and after coating, as well as testing for electrical insulation defects, if required.

In order to comply with this standard, as well as to monitor and record the following parameters throughout the coating process, the *Contractor* shall have suitable calibrated equipment on-site at all times.

Parameters to be monitored:

- Storage conditions of coating materials (here the ambient temperature and humidity shall be recorded).
- Expiry dates of paint materials.
- Calibration dates of all quality control test equipment.
- Degree of surface cleanliness – as per reference standard.
- Soluble salts – By means of the Weber Riley, Chlor*Test or Bresle Method (ISO 8502-6) or other approved standard methods.
- Ambient and substrate temperatures – by means of calibrated temperature probes.
- Relative humidity – with a calibrated humidity meter.
- Dew point – by means of a dew point calculator.
- Other environmental conditions, e.g. incidence of industrial fall-out, mist, rain, etc.
- Mixing times of paint and quantities used.
- Wet film thickness (w.f.t) per each coat - in accordance with ASTM D4414.
- Dry film thickness (d.f.t) per each coat – in accordance with ASTM E376 / SANS ISO 2808.
- Overcoating times – as per product data sheet.

3.4 MATERIAL SELECTION AND MANUFACTURE

3.4.1 Alternative manufacturer's or materials

3.4.1.1 In the case of most detailed refurbishment procedures (DRPs), specific products and suppliers are specified of which the details and performance criteria are provided in Technical Bulletin No. 10TB-011 Rev. 0. Where alternative materials or manufacturers are favoured, prior approval shall be obtained from the *Project Manager*.

3.4.1.2 Where alternative corrosion protection systems or improved methods are known to the *Contractor*, prior to the granting of any concessions for change, information of these systems or methods shall be supported by detailed, technical reports and applicable case studies to show that the proposed alternatives will meet or exceed Eskom Distribution's performance requirements. Prior approval shall be obtained from the *Project Manager* before any alternative coating systems or protection methods can be used.

3.4.1.3 In the case of equipment manufacturer proprietary finishes, these proprietary systems shall only be used if prior approval has been obtained.

3.4.2 Material supply, storage, testing, composition and application methods

3.4.2.1 Material supply

a. All materials, i.e. paint, solvents and cleaning agents for a specific paint system shall be supplied by the same manufacturer.
b. All coatings, solvents and cleaning materials shall be supplied in sealed, sturdy containers which have been labelled with all the information necessary to ensure proper storage, mixing, application and traceability. The coating containers shall be of a size large enough to allow mixing in the containers themselves.

3.4.2.2 Material storage

a. All containers (i.e. coatings, solvents and cleaning materials) shall be kept in a storage area that is completely dry, enclosed, well ventilated, covered and maintained at a temperature compatible with good preservation of the materials.
b. Should any of the coating containers show traces of leakage prior to use, the contents of that container shall not be used.

3.4.2.3 Material testing

a. All materials (coatings) shall be regularly tested at the manufacturers' factories. The Contractor shall make sure that regular quality control tests are carried out to ensure that good quality of the materials is maintained.
b. The following properties shall be closely monitored:

- Quality of raw materials
- Analytical formulation of finished products
- Percentage solids by volume
- Specific gravity
- Colour and gloss
- Drying time
- Viscosity

c. Record of the batch numbers, expiry dates, dates of manufacturing of each type of system used, shall be retained by the *Contractor*. These records shall be presented to the *Project Manager* or his appointed third-party inspector, prior to commencement of work. The *Contractor* shall also ensure that the coating/material manufacturer retains a sample of each batch for at least the guarantee period (see Section 3.7).

3.4.2.4 Material composition and application methods

a. All coatings shall be consistent and formulated for the proposed application method. If the *Contractor* regards the proposed application method as unsuitable for the materials specified, he shall notify the *Project Manager* in writing. His proposed alternative application method shall only be used after approval has been obtained from the *Project Manager*.
b. All coats of a coating system shall come from the same manufacturer.
c. During application, solvents shall only be used for thinning of the coating:
- When they are specified by the manufacturer as being compatible with the coating material, and
- When the percentage added does not exceed the limits given by the paint manufacturer's product data sheet.

d. Under no circumstances shall solvents be used that are not supplied by the relevant coating manufacturer.
e. In the case of 2-part materials, the splitting of kits as supplied from the factory will not be permitted. The *Contractor* either has to make use of smaller kits or needs to plan the coating work in such a way that any unnecessary wastage of paint is avoided.

3.5 SURFACE PREPARATION

3.5.1 General

3.5.1.1 No leniency shall be tolerated in terms of the quality of surface preparation prior to application of the coatings. It is extremely important that the Contractor endeavour to achieve the best surface preparation possible, by means of using the latest technologies when it comes to surface preparation apparatus and materials. The minimum degree of surface preparation shall be as stipulated in the Detailed Refurbishment Procedure (DRP).

3.5.1.2 In general the following aspects shall always be considered:

- Before application of the protective system, the substrate shall be prepared, in accordance with each Detailed Refurbishment Procedure (DRP)'s requirements and where applicable, as described in detail below.
- All harmful contaminants such as scale, grease, oil, soil, salt residues, corrosion product and any foreign matter or residues that may affect the performance of the coating system shall be removed, prior to application of the protective system. In general the following aspects shall always be considered:

3.5.2 Degreasing

3.5.2.1 All detrimental deposits of oil or grease spots and all other contaminants shall be removed prior to the application of the coating system.

3.5.2.2 Depending on the degree and nature of contamination, degreasing shall be carried out using a water-soluble alkaline cleaner, alkaline detergent or cold organic solvents.

3.5.2.3 Following the degreasing operation, all surfaces shall be thoroughly rinsed with clean potable water to remove all traces of the cleaning agent residues. The surfaces shall thereafter be allowed to dry completely prior to coating or before continuing with the rest of the surface preparation process.

3.5.2.4 It is important that clean potable water is used for cleaning, or the surfaces will be left contaminated after washing.

3.5.3 High pressure water jetting

High to ultra-high pressure water jetting may be required prior to power and hand-tool cleaning of surfaces to remove excessive salts, paint, scale and other loose contaminants.

All surfaces shall be tested for salt contamination prior to coating. In general the maximum permissible limit is 100 mg/m^2. However, where lower values are preferred or considered critical by the paint supplier, their maximum value shall apply.

In the case where water jetting is specified as the only form of surface preparation, the visual assessment of surface cleanliness shall be as stipulated in the Detailed Refurbishment Procedure (DRP).

3.5.4 Power and hand-tool cleaning

3.5.4.1 Cleaning by means of hand or power-tools, i.e. wire brushes, chipping hammers, scrapers, grinders, sanders, needle descalers etc. may only be used where specified in the Detailed Refurbishment Procedure (DRP) and the condition of the substrate metal is such that efficient cleaning can be achieved and where the protective system is designed for application to brushed or ground surfaces, e.g. in the case of surface tolerant coatings.

3.5.4.2 Prior to power or hand-tool cleaning, all welds shall be free of slag, slag inclusions and pinholes. Adjacent areas shall be free of weld spatter, which shall be removed by grinding or scraping.

3.5.4.3 Oil and grease deposits shall be removed prior to cleaning as detailed above. In this regard, special attention shall be paid to drillings, bolt holes, etc.

3.5.4.4 Following the degreasing as described above, all surfaces of steelwork and plant under this category shall be prepared to remove all loose mill-scale, rust, paint and other deleterious matter.

3.5.4.5 Hand-tool cleaning may be utilised provided the required standard of finish is achieved. The finish shall be to the stipulated standard Grade in the Detailed Refurbishment Procedure (DRP) and in accordance with ISO 8501-1 or SIS 055900. Where necessary, power-tool cleaning shall be used. Burnishing of the surface shall not be permitted.

3.5.4.6 In all cases, after wire brushing or grinding, all traces of loose material shall be removed from the surface.

3.5.4.7 Cleaned surfaces shall not be contaminated with oil, grease, rust or other deposits before coating/lining.

3.6 COATING APPLICATION GENERAL PROCEDURES

General requirements that shall be followed to ensure that the coating is given optimal opportunity to perform to acceptable standards are:

3.6.1 Painting is a skilled process and shall only be carried out by capable and experienced personnel, as well as with equipment suitably designed for application of the coating.

3.6.2 All surfaces shall be inspected prior to coating, to ensure that the standard of cleaning complies with the criteria as stipulated in the Detailed Refurbishment Procedure (DRP).

3.6.3 Immediately before coating, the blast-cleaned steel shall not exhibit more dust and debris than what has been agreed in the case of the reference tower. (See Section 3.9)

3.6.4 Coating application and cleaning shall not take place when site conditions are likely to negatively affect these operations. The Contractor shall ensure that the necessary protective equipment is used to prevent contamination of the coatings and to minimise delays due to such site conditions.

3.6.5 Surrounding areas shall be protected from paint contamination.

3.6.6 Equipment name plates and identification plates shall be protected from coating. No coatings shall be applied over any surfaces where these will adversely affect the performance of the item or component.

3.6.7 The different coats shall all be evenly applied to form smooth, continuous, unbroken layers free from sags, runs and other defects. Each coat shall provide complete coverage and the film thicknesses for the different coats shall be as specified in the Detailed Refurbishment Procedure (DRP).

3.6.8 With respect to the methods of application, overcoating requirements, pot life, mixing, induction time, straining, thinning, drying times, etc. the manufacturer's recommendations (as per the product data sheet) shall be strictly adhered to.

3.6.9 Mixing of the paint shall be carried out in accordance with the product data sheet. Here proper industrial type mixing tools shall be used and the paint shall be supplied in containers large enough for mixing of the paint.

3.6.10 During application, the relative humidity shall not exceed 85% and ambient temperatures shall be between 10°C and 30°C. However, in the case of special coatings, these conditions may be waived providing the requirements as stipulated in the product data sheet are met.

3.6.11 Using the above data, the dew point shall be determined by means of a suitable dew point calculator. During coating application, the substrate temperature shall be at least 3°C above the dew point.

3.6.12 The maximum/minimum substrate temperature at the time of coating application shall be in accordance with the product data sheet.

3.6.13 Care shall be taken to ensure adequate coating of all nuts, bolts, welds, fasteners, edges and other areas normally prone to corrosion attack. These areas shall always be stripe coated by brush prior to application of the rest of the coating system. Under no circumstances shall stripe coating be carried out by roller application.

3.6.14 Where more than one coat is applied, the colour of each coat shall be clearly different from the colour of the previous coat. However, two finishing coats of the same colour may be applied to achieve complete colour uniformity. All finishing colours shall be to the Project Manager's approval. In the case where aesthetic requirements are secondary, repairs after final testing shall be carried out using a different colour. All primers shall be of a contrasting colour to the newly prepared substrate.

3.6.15 The coating shall be evenly applied to form a smooth, continuous, unbroken layer/s free from sags, runs and other defects.

3.6.16 Each coat shall provide complete coverage and the film thickness per coat shall be as specified in the product data sheet, providing any necessary deviations and the impacts thereof can be supported by technically correct research data.

3.6.17 The coating thicknesses shall comply with the relevant Detailed Refurbishment Procedure (DRP). All coating thicknesses on metal substrates shall be measured in accordance with ASTM E376 or ISO 2808. These measurements shall be made on surfaces free of contaminants. Calibrated electronic instruments and shims shall be used for determination of film thicknesses.

3.6.18 Thicknesses of both magnetic and non-magnetic substrates shall also be checked by verification of the quantity of coating consumed and by means of wet film thickness measurements.

3.6.19 The average thickness of each coat shall be within the range as defined in the Detailed Refurbishment Procedure (DRP). 90% of random readings shall be equal to or greater than the lower specified thickness. No individual reading shall be less than 80% of the lower specified thickness. No individual reading shall be greater than 120% of the upper specified thickness. In the areas where stripe coating is carried out, the maximum total specified dry film thickness range shall allow for the additional coat.

3.6.20 All deficient film thicknesses shall be rectified prior to hand-over.

3.6.21 Where excessive film thicknesses can be detrimental to the integrity of the coating, the manufacturer's recommended maximum (as indicated in the Product Data Sheet) shall apply.

3.6.22 Damaged paint, due to handling and erection of components, shall be cleaned and repaired. Rust spots and any other deleterious matter shall be removed. Spot repairs shall be carried out such that the patch painting extends at least 25 mm beyond the damaged areas. Spot repairs shall reinstate each of the previous coats and shall commence directly after surface preparation.

3.6.23 Due to the difficulty in repairing some coatings, if the defect cannot be rectified by patch repairing or by application of an additional coat of the material, then the component shall be repainted.

3.6.24 In the case where dust and other light contaminants have settled on newly painted surfaces, or in the case of pre-coated steel, prior to the application of additional coats of paint or overcoating on site, the contaminants shall be removed by washing of the surfaces with clean potable water, followed by drying. Removal of more persistent contaminants shall be dealt with on a case by case basis.

3.6.25 Prior to commencement of any coating process, the following shall be verified:

- That the *Contractor* has the correct paint on site as specified.
- The materials are all from the same supplier and where relevant, of different colours.
- The containers are sealed/ unopened.
- The paint is fresh and within expiry date.
- The *Contractor* has the proper mixing equipment.
- The *Contractor* and employees have proper safety equipment on site.

3.6.26 The adhesion of the coating may be verified by means of cross cut or pull-off adhesion tests. The method to be used shall be approved by all parties concerned and the damaged areas repaired by the *Contractor* at no additional expense to Eskom Distribution.

3.7 GUARANTEES

3.7.1 Signing of product data sheets and contract order acceptance

It is important to note that all the Detailed Refurbishment Procedures (DRPs) have been compiled based on long-term laboratory and natural exposure testing of numerous materials, as well as written recommendations provided by the various paint suppliers. Since the Contractor is obliged to submit signed product data sheets to the Project Manager at the time of the Contract Order Acceptance, in doing so, and by supplying materials to the Contractor, both the Contractor and his paint supplier bind themselves to a minimum guarantee period of 36 months in terms of the performance of the corrosion protection system.

3.7.2 Performance guarantee

As a minimum, the guarantee regarding the performance of the corrosion protection system is stipulated as follows:

The coating will be considered defective should rusting of the coated surfaces develop within 36 months where it is rated more than Ri 1 or 0.05% (in accordance with ISO 4628-3)

and/or

Blistering, flaking, delamination, cracking, alligatoring, or any other defects not specifically listed, are present that in the opinion of the *Project Manager* or his coating specialist, reduces the aesthetic appearance or compromises the integrity of the coating system.

It is important to note that this guarantee period is based on the natural exposure testing of coatings over a period of more than 20 years, where is has been shown that most defective or unsuitable coatings fail within the first two to three years of service. Research has also shown that when the rating for the degree of rusting of coated surfaces exceeds Ri 1 (>0.05%), that the coating is no longer providing adequate protection of the underlying substrate.

3.8 CLASSIFICATION AND SELECTION OF CORROSION PROTECTION SYSTEMS

The Detailed Refurbishment Procedure (DRP) to be used for the corrosion protection of the various items of plant shall be as defined in Table 2 of this document. Each procedure has been provided with an arbitrary reference number (e.g. DRP -100) which should not be linked to other standards or previous versions of this document. The procedures distinguish between different atmospheric environments of which the corrosivity is classified in terms of ISO 9223 as follows:

Table 1: Categories of Corrosivity of Atmospheres

Corrosivity category	General description	Corrosivity	Corrosion rate for mild steel
C1	Desert to rural	Very low	≤1.3 µm/yr
C2	Rural to light industrial	Low	≤25 µm/yr
C3	Moderate industrial or marine	Medium	≤50 µm/yr
C4	High industrial or marine	High	≤80 µm/yr
C5	Severe / heavy industrial or marine	Very high	≤200 µm/yr

Table 2: Corrosion Protection Selection Table

ITEM/S OF PLANT	CONDITION OF THE EXISTING CORROSION PROTECTION SYSTEM	DETAILED REFURBISHMENT PROCEDURE	ADDITIONAL REQUIREMENTS
REFURBISHMENT OF PREVIOUSLY PAINTED STEELWORK	Previously painted and showing signs of corrosion and coating failure		
Hollow pole structures			
Desert to Light-Industrial Areas (C1 to C2)		DRP-100	The conditions of Options 1 and 2 apply
Medium to Heavy-industrial Areas (C3 to C5-I)		DRP-200	
Moderate to Severe Marine Areas (C3 to C5-M)		DRP-300	
Lattice structures			
Desert to Light-Industrial Areas (C1 to C2)		DRP-400	The conditions of Options 1 and 2 apply
Medium to Heavy-industrial Areas (C3 to C5-I)		DRP-500	
Moderate to Severe Marine Areas (C3 to C5-M)		DRP-600	

ITEM/S OF PLANT	CONDITION OF THE EXISTING CORROSION PROTECTION SYSTEM	DETAILED REFURBISHMENT PROCEDURE	ADDITIONAL REQUIREMENTS
REFURBISHMENT OF PREVIOUSLY GALVANISED STEELWORK	Previously galvanised and showing signs of corrosion and depletion of the zinc coating		
Hollow pole structures			
Desert to Light-Industrial Areas (C1 to C2)		DRP-700	The conditions of Options 1 and 2 apply
Medium to Heavy-industrial Areas (C3 to C5-I)		DRP-800	
Moderate to Severe Marine Areas (C3 to C5-M)		DRP-900	
Lattice structures			
Desert to Light-Industrial Areas (C1 to C2)		DS-1000	The conditions of Options 1 and 2 apply
Medium to Heavy-industrial Areas (C3 to C5-I)		DRP-1100	
Moderate to Severe Marine Areas (C3 to C5-M)		DRP-1200	
SEALING OF CONCRETE/STEEL INTERFACE AREAS		DRP-1300	
ADDITIONAL PROTECTION OF NUTS AND BOLTS		DRP-1400	
MAINTENANCE PAINTING OF STAY RODS		DRP-1500	
ADDITIONAL PROTECTION OF TOWER FOOTINGS		DRP-1600	
PROTECTION OF EARTH STRAPS		DRP-1700	

ITEM/S OF PLANT	CONDITION OF THE EXISTING CORROSION PROTECTION SYSTEM	DETAILED REFURBISHMENT PROCEDURE	ADDITIONAL REQUIREMENTS
MARKING / LABELLING OF TOWERS		DRP-1800	
PATCH REPAIR OF COATINGS		DRP-1900	

SPECIAL NOTES

3.8.1 During the application of the coating system, care shall be taken to ensure that no paint is allowed to drip and spill onto the electrical insulators. The use of protective covers is advised.

3.8.2 All insulators that show any indications of paint contamination shall be cleaned or replaced at the contractor's expense.

3.8.3 Labels, signs etc. or where otherwise specified shall be removed from the structure before application of the coating system and replaced after the coating system has cured, unless other instructions are given by Site Instruction. All structures shall be provided with temporary labels during the painting process.

3.8.4 Where excavation of the tower footings has been carried out to facilitate foundation refurbishment, on completion of the work, backfilling shall be carried out in accordance with TRMSCAAC1. Care shall be taken to ensure that the equipment used for compacting is wrapped with a thick layer of rubber to minimise damage to the newly painted structure.

3.8.5 With respect to items/topics not covered by the detailed standards (e.g. overcoating and curing times, mixing ratios, pot life, thinning, safety precautions etc.), the manufacturer's recommendations shall be strictly adhered to (refer to product datasheets).

3.8.6 The colour of each coat shall be different to the previous coat and the final coat shall be light grey or as otherwise specified.

3.8.7 Warning: Where dark coloured base coats are used, additional coats may be required to ensure complete uniformity of the topcoat.

3.8.8 In the case C1 and C2 environments), two options are provided, of which Option 1 can be seen as a move towards using more environmentally friendly materials. Option 1 applies to very low corrosive (i.e. Desert to Rural areas), whereas Option 2 applies to Urban to Light-industrial environments.

3.8.9 It is important to realise that not all site conditions can be simulated under laboratory conditions. Therefore, the practical applications of the specified corrosion protection systems will depend on the specific product requirements and actual site conditions. These must be considered by the Contractor prior to Contract Signature.

3.8.10 Various material options are provided in the Technical Bulletin No 10TB-011. This is to provide the *Contractor* with the opportunity to select a material that he is most familiar with and to accommodate *Contractor* specific constraints. The *Contractor* needs to familiarise himself with the constraints related to the site application of each material.

3.9 REFERENCE STRUCTURE

3.9.1 At the beginning of the refurbishment of each line, a structure selected shall be a reference point for the entire project. This tower shall be prepared under the supervision of all parties concerned (i.e. the Eskom Project Co-ordinator, the Eskom Clerk of Works/Paint Inspector and the *Contractor*) and the degree of surface preparation that is reasonable and economically viable for that specific line be assessed and mutually agreed upon. A Sellotape test (SANS 5769 / ISO 8502-3) that will act as standard reference for all other towers of that line with respect to the allowable percentage dust and debris shall be carried out.

3.9.2 After proper cleaning of the tower the full coating system shall be applied in accordance with the appropriate detailed standard. This tower shall be the standard with respect to the quality of workmanship that is expected from the contractor throughout the project. Should any premature failure of the coating system occur, this tower shall form an integral part of the investigation.

3.10 SUMMARY OF REVISIONS

3.10.1 SCSCAAR8 revision 1 (DSP_34-1680, 240-75883230):

The standard has been revised to allow for the following:

- Changes to national and international standards reference in the text
- Replacement of obsolete product or supplier information
- To address environmental, safety and health issues surrounding the use of protective coating systems
- Corrosion protection quality requirements – Incorporate ESKCAAB8 revision 2 requirements
- To address the sealing of concrete/steel interfaces
- To address the maintenance painting of stay rods
- To address the protection of nuts and bolts
- To address the protection of earth straps
- To address the additional protection of towers footings
- To provide a repair procedures for coatings.

3.11 TESTS

Not applicable

3.12 MARKING, LABELLING AND PACKAGING

Not applicable

3.13 SPARES

Not applicable

4. AUTHORISATION

This document has been seen and accepted by:

Name	Designation
Barry Hill	Chief Engineer Electrical
Bharat Haridass	Senior Consultant Engineering
Riaz Vajeth	Senior Manager Lines Engineering Services

5. REVISIONS

Date	Rev.	Compiler	Remarks
March 2016	2	Barry Hill	Document re-numbered and in the new format approved through the TDAC process
February 2014	1	Barry Hill	Document formatted; no change to content. This document, 240-75883230, supersedes document DSP_34-1680. 'Compiled by' changed from BP Hill and DTJ Van Rensburg to Barry Hill. 'Approved by' changed from B Brandfield to Bharat Haridass. 'Authorised by' changed from MN Bailey to Riaz Vajeth. 'Authorisation' table updated to reflect title page.
August 2010	0	DT Janse van Rensburg	See clause 13 This revision (DSP_34-1680) cancels and replaces revision no 0 of document no. SCSSCAAR8.

This specification shall apply throughout Eskom Holdings Limited, its divisions, subsidiaries and entities wherein Eskom has a controlling interest.

6. DEVELOPMENT TEAM

The following people were involved in the development of this document:

- DT Janse van Rensburg

- B Branfield
- B Hill

7. ACKNOWLEDGEMENTS

None

APPENDIX A: DETAILED REFURBISHMENT PROCEDURES STANDARD RFP – 100

(Desert to Light-industrial, i.e. C1 to C2 environments)

Initial preparation:	Detail
	Where hollow poles are to be refurbished in-situ, excavate to a depth of approximately 500 mm below ground level. The following standard shall apply from 500 mm below ground level to the top of the structure.
Surface preparation:	
	Remove **all loose rust**, paint or other contaminants which may be present on the surface of the pole using wire brushes, machine brushes, scrapers, grinders and chipping hammers. All surfaces requiring overcoating shall be abraded with sandpaper and then washed using bristle brushes, **clean sponges and copious amounts of clean potable water**. All harmful deposits detrimental to the adhesion of the coating shall be removed using a detergent wash. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
Coating application:	
First coat: Second coat: *Option 1: Desert to rural areas* *Option 2: Urban to light-industrial areas*	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85 % volume solids content), Aluminium Pigmented or Aluminium Free Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (Excluding previous layers of paint). Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Water-based Acrylic Topcoat to the entire structure. Dry film thickness 40 µm to 60 µm. Alternatively, allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Specification RFP – 200

Applicability and conditions of use

The following procedure applies to the refurbishment of previously painted hollow pole structures

(Medium to Heavy-industrial, i.e. C3 to C5-I environments)

Initial preparation:	Detail
	Where hollow poles are to be refurbished in-situ, excavate to a depth of approximately 500 mm below ground level. The following specification shall apply from 500 mm below ground level to the top of the structure.
Surface preparation:	
	Remove **all loose rust**, paint or other contaminants which may be present on the surface of the pole using wire brushes, machine brushes, scrapers, grinders and chipping hammers. All surfaces requiring overcoating shall be abraded with sandpaper and then washed using bristle brushes, **clean sponges and copious amounts of clean potable water**. All harmful deposits detrimental to the adhesion of the coating shall be removed using a detergent wash. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (See Section 3.9).
Coating application:	
First coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented or Aluminium free Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint).
Second coat:	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a coat of Twin Pack, High Build (≥ 50% volume solids content), Micaceous Iron Oxide Pigmented Epoxy. (**No Aluminium filled coatings shall be allowed with the second coat**.) Dry film thickness 100 µm to 150 µm.
Third coat:	Allowing sufficient time for the second coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.

APPENDIX A
(Continued)

Specification RFP – 200

Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A (continued)
Standard RFP – 300

Applicability and conditions of use

The following procedure applies to the refurbishment of previously painted hollow pole structures

(Moderate to Severe Marine, i.e. C3 to C5-M environments)

Initial preparation:	Detail:
	Where hollow poles are to be refurbished in-situ, excavate to a depth of approximately 500 mm below ground level. The following standard shall apply from 500 mm below ground level to the top of the structure.
Surface preparation:	
	Remove **all loose rust**, paint or other contaminants which may be present on the surface of the pole using wire brushes, machine brushes, scrapers, grinders and chipping hammers. All surfaces requiring overcoating shall be abraded with sandpaper and then washed using bristle brushes, **clean sponges and copious amounts of clean potable water**. All harmful deposits detrimental to the adhesion of the coating shall be removed using a detergent wash. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
Coating application:	
First coat: Second coat: Third coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint). Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a second coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy as above. Dry film thickness 100 µm to 150 µm. Allowing sufficient time for the second coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 400

Applicability and conditions of use

The following procedure applies to the refurbishment of previously painted lattice structures

(Desert to Light-industrial, i.e. C1 to C2 environments)

Gusset plates:	Detail:
	Gusset plates shall only be loosened and treated if contractually required. This work is not considered part of the routine maintenance painting work.
	Only one gusset plate per structure shall be loosened, removed, treated, replaced and tightened at a time.
	Where deformation of the plate has occurred this shall be mechanically corrected, i.e. straightened.
	Any gusset plate which displays more than 25% loss of metal in the contact areas, shall be replaced. (The contact areas are those areas where the gusset plates come into contact with the tower leg and bracing members).
	Remove all loosely adherent paint, scale and rust, using wire brushes, scrapers and grinders.
	All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion products, shall be removed using clean sponges and fresh potable water. Allow to dry.
	Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
	Apply by brush one coat Solvent Free Epoxy Coating to all surfaces of the gusset plate.
	Dry film thickness 150 µm to 200 µm.
	Allow 1 h to 2 hours to cure, to touch dry, (curing times are dependent on ambient temperatures).
	Liberally apply a layer of petroleum-based mastic to the inside or contact surface of the gusset plate, ensuring that the entire surface is covered. There shall be no voids or misses.
	Replace and tighten.

APPENDIX A
(Continued)

Specification RFP – 400

(continued)

Tower:	
	Remove **all** loose rust, paint or other contaminants which may be present on the surface of the structure using wire brushes, machine brushes, scrapers, grinders and chipping hammers. All surfaces requiring overcoating shall be abraded with sandpaper and then washed using bristle brushes, **clean sponges and copious amounts of clean potable water**. All harmful deposits detrimental to the adhesion of the coating shall be removed using a detergent wash. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
Coating application:	
First coat: Second coat: *Option 1: Desert to rural areas* *Option 2: Urban to light-industrial areas.*	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85 % volume solids content), Aluminium Pigmented or Aluminium Free Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint). Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Water-based Acrylic Topcoat to the entire structure. Dry film thickness 40 µm to 60 µm. Alternatively, allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev 0

APPENDIX A
(Continued)

Standard RFP – 500

Applicability and conditions of use

The following procedure applies to the refurbishment of previously painted lattice structures

(Medium to Heavy-industrial, i.e. C3 to C5-I environments)

Gusset plates:	
	Gusset plates shall only be loosened and treated if contractually required. This work is not considered part of the routine maintenance painting work.
	Only one gusset plate per structure shall be loosened, removed, treated, replaced and tightened at a time.
	Where deformation of the plate has occurred this shall be mechanically corrected, i.e. straightened.
	Any gusset plate which displays more than 25% loss of metal in the contact areas, shall be replaced. (The contact areas are those areas where the gusset plates come into contact with the tower leg and bracing members).
	Remove all loosely adherent paint, scale and rust, using wire brushes, scrapers and grinders.
	All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion products, shall be removed using clean sponges and fresh potable water. Allow to dry.
	Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
	Apply by brush one coat Solvent Free Epoxy Coating to all surfaces of the gusset plate.
	Dry film thickness 150 µm to 200 µm.
	Allow 1 h to 2 hours to cure, to touch dry, (curing times are dependent on ambient temperatures).
	Liberally apply a layer of petroleum-based mastic to the inside or contact surface of the gusset plate, ensuring that the entire surface is covered. There shall be no voids or misses.
	Replace and tighten.

APPENDIX A
(Continued)

Specification RFP – 500

(continued)

Tower:	
	Remove **all** loose rust, paint or other contaminants which may be present on the surface of the structure using wire brushes, machine brushes, scrapers, grinders and chipping hammers. All surfaces requiring overcoating shall be abraded with sandpaper and then washed using bristle brushes, **clean sponges and copious amounts of clean potable water**. All harmful deposits detrimental to the adhesion of the coating shall be removed using a detergent wash. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
Coating application:	
First coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented or Aluminium free Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint).
Second coat:	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a coat of Twin Pack, High Build (≥ 50% volume solids content), Micaceous Iron Oxide Pigmented Epoxy. **(No Aluminium filled coatings shall be allowed with the second coat).** Dry film thickness 100 µm to 150 µm.
Third coat:	Allowing sufficient time for the second coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 600

Applicability and conditions of use

The following procedure applies to the refurbishment of previously painted lattice structures

(Moderate to Severe Marine, i.e. C3 to C5-M environments)

Gusset plates:	Detail:
	Gusset plates shall only be loosened and treated if contractually required. This work is not considered part of the routine maintenance painting work. Only one gusset plate per structure shall be loosened, removed, treated, replaced and tightened at a time. Where deformation of the plate has occurred this shall be mechanically corrected, i.e. straightened. Any gusset plate which displays more than 25 % loss of metal in the contact areas, shall be replaced. (The contact areas are those areas where the gusset plates come into contact with the tower leg and bracing members). Remove all loosely adherent paint, scale and rust, using wire brushes, scrapers and grinders. All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion products, shall be removed using clean sponges and fresh potable water. Allow to dry. Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9). Apply by brush one coat Solvent Free Epoxy Coating to all surfaces of the gusset plate. Dry film thickness 150 µm to 200 µm. Allow 1 to 2 hours to cure, to touch dry, (curing times are dependent on ambient temperatures). Liberally apply a layer of petroleum-based mastic to the inside or contact surface of the gusset plate, ensuring that the entire surface is covered. There shall be no voids or misses. Replace and tighten.

Tower:	
	Remove **all** loose rust, paint or other contaminants which may be present on the surface of the structure using wire brushes, machine brushes, scrapers, grinders and chipping hammers. All surfaces requiring overcoating shall be abraded with sandpaper and then washed using bristle brushes, **clean sponges and copious amounts of clean potable water**. All harmful deposits detrimental to the adhesion of the coating shall be removed using a detergent wash. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
Coating application:	
First coat: Second coat: Third coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint). Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a second coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy as above. Dry film thickness 100 µm to 150 µm. Allowing sufficient time for the second coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 700

Applicability and conditions of use

The following procedure applies to the refurbishment of previously galvanised hollow pole structures

(Desert to Light-industrial, i.e. C1 to C2 environments)

Initial preparation:	Detail:
	Where hollow poles are to be refurbished in-situ, excavate to a depth of approximately 500 mm below ground level. The following standard shall apply from 500 mm below ground level to the top of the structure. Prior to overcoating previously galvanised structures, the thickness of the existing zinc coating (galvanising) shall be determined. An approved, calibrated electronic dry film thickness meter shall be employed. Readings shall be taken at 5 m intervals, from the bottom of the steelwork to the top of the structure. Should the average zinc thickness be found to be less than 35 μm, the structure shall be repainted.
Surface preparation of galvanised steel:	
	Slightly abrade using sandpaper. Where the zinc is totally depleted and rusting of the steel substrate has occurred, remove all rust and other contaminants using wire brushes, machine brushes, scrapers, grinders and sandpaper. All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion product shall be removed using clean sponges and copious quantities of fresh potable water. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).

APPENDIX A
(Continued)

Standard RFP – 700

(continued)

Coating application:	
First coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented or Aluminium Free Surface Tolerant Epoxy. **Work coating into all irregularities.**
Second coat:	Dry film thickness 100 to 150 µm (Excluding previous layers of paint).
Option 1: Desert to rural areas	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Water-based Acrylic Topcoat to the entire structure.
Option 2: Urban to light-industrial areas	Dry film thickness 40 µm to 60 µm. Alternatively, allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 800

Applicability and conditions of use

The following procedure applies to the refurbishment of previously galvanised hollow pole structures **(Medium to Heavy-industrial, i.e. C3 to C5-I environments)**

Initial preparation:	Detail:
	Where hollow poles are to be refurbished in-situ, excavate to a depth of approximately 500 mm below ground level. The following standard shall apply from 500 mm below ground level to the top of the structure. Prior to overcoating previously galvanised structures, the thickness of the existing zinc coating (galvanising) shall be determined. An approved, calibrated electronic dry film thickness meter shall be employed. Readings shall be taken at 5 m intervals, from the bottom of the steelwork to the top of the structure. Should the average zinc thickness be found to be less than 35 µm, the structure shall be repainted.
Surface preparation of galvanised steel:	
	Slightly abrade using sandpaper. Where the zinc is totally depleted and rusting of the steel substrate has occurred, remove all rust and other contaminants using wire brushes, machine brushes, scrapers, grinders and sandpaper. All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion product shall be removed using clean sponges and copious quantities of fresh potable water. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).

APPENDIX A
(Continued)

Standard RFP – 800

(continued)

Coating application:	
First coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented or Aluminium free Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint).
Second coat:	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a coat of Twin Pack, High Build (≥ 50% volume solids content), Micaceous Iron Oxide Pigmented Epoxy. **(No Aluminium filled coatings shall be allowed with the second coat).** Dry film thickness 100 µm to 150 µm.
Third coat:	Allowing sufficient time for the second coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 900

Applicability and conditions of use

The following procedure applies to the refurbishment of previously galvanised hollow pole structures

(Moderate to Severe Marine, i.e. C3 to C5-M environments)

Initial preparation:	Detail:
	Where hollow poles are to be refurbished in-situ, excavate to a depth of approximately 500 mm below ground level. The following standard shall apply from 500 mm below ground level to the top of the structure. Prior to overcoating previously galvanised structures, the thickness of the existing zinc coating (galvanising) shall be determined. An approved, calibrated electronic dry film thickness meter shall be employed. Readings shall be taken at 5 m intervals, from the bottom of the steelwork to the top of the structure. Should the average zinc thickness be found to be less than 35 µm, the structure shall be repainted.
Surface preparation of galvanised steel:	
	Slightly abrade using sandpaper. Where the zinc is totally depleted and rusting of the steel substrate has occurred, remove all rust and other contaminants using wire brushes, machine brushes, scrapers, grinders and sandpaper. All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion product shall be removed using clean sponges and copious quantities of fresh potable water. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).

APPENDIX A
(Continued)

Standard RFP – 900

(continued)

Coating application:	
First coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint).
Second coat:	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a second coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy as above. Dry film thickness 100 µm to 150 µm.
Third coat:	Allowing sufficient time for the second coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 1000

Applicability and conditions of use

The following procedure applies to the refurbishment of previously galvanised lattice pole structures

(Desert to Light-industrial, i.e. C1 to C2 environments)

Initial Preparation	Detail:
	Prior to overcoating previously galvanised structures, the thickness of the existing zinc coating (galvanising) shall be determined. An approved, calibrated electronic dry film thickness meter shall be employed. Readings shall be taken at 5 m intervals, from the bottom of the steelwork to the top of the structure, on at least four sides (including cross members and bracings). Should the average zinc thickness be found to be less than 35 μm, the structure shall be repainted.
Surface preparation	
	Slightly abrade using sandpaper. Where the zinc is totally depleted and rusting of the steel substrate has occurred, remove all rust and other contaminants using wire brushes, machine brushes, scrapers, grinders and sandpaper. All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion product shall be removed using clean sponges and copious quantities of fresh potable water. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).

APPENDIX A
(Continued)

Standard RFP – 1000

(continued)

Coating application:	
First coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented or Aluminium Free Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint).
Second coat:	
Option 1: Desert to rural areas	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Water-based Acrylic Topcoat to the entire structure. Dry film thickness 40 µm to 60 µm.
Option 2: Urban to light-industrial areas	Alternatively, allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)
Standard RFP – 1100
Applicability and conditions of use

The following procedure applies to the refurbishment of previously galvanised lattice pole structures **(Medium to Heavy-industrial, i.e. C3 to C5-I environments)**

Initial preparation:	Detail:
	Prior to overcoating previously galvanised structures, the thickness of the existing zinc coating (galvanising) shall be determined. An approved, calibrated electronic dry film thickness meter shall be employed. Readings shall be taken at 5 m intervals, from the bottom of the steelwork to the top of the structure, on at least four sides (including cross members and bracings). Should the average zinc thickness be found to be less than 35 µm, the structure shall be repainted.
Surface preparation for galvanised steel:	
	Slightly abrade using sandpaper. Where the zinc is totally depleted and rusting of the steel substrate has occurred, remove all rust and other contaminants using wire brushes, machine brushes, scrapers, grinders and sandpaper. All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion product shall be removed using clean sponges and copious quantities of fresh potable water. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
Coating application:	
First coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented or Aluminium free Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint).
Second coat:	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a coat of Twin Pack, High Build (≥ 50% volume solids content), Micaceous Iron Oxide Pigmented Epoxy. **(No Aluminium filled coatings shall be allowed with the second coat).** Dry film thickness 100 µm to 150 µm.
Third coat:	Allowing sufficient time for the second coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.

APPENDIX A
(Continued)

Standard RFP – 1100

(continued)

Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 1200
Applicability and conditions of use

The following procedure applies to the refurbishment of previously galvanised lattice pole structures **(Moderate to Severe Marine, i.e. C3 to C5-M environments)**

Initial preparation:	Detail:
	Prior to overcoating previously galvanised structures, the thickness of the existing zinc coating (galvanising) shall be determined. An approved, calibrated electronic dry film thickness meter shall be employed. Readings shall be taken at 5 m intervals, from the bottom of the steelwork to the top of the structure, on at least four sides (including cross members and bracings). Should the average zinc thickness be found to be less than 35 µm, the structure shall be repainted.
Surface preparation for galvanised steel:	
	Slightly abrade using sandpaper. Where the zinc is totally depleted and rusting of the steel substrate has occurred, remove all rust and other contaminants using wire brushes, machine brushes, scrapers, grinders and sandpaper. All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion product shall be removed using clean sponges and copious quantities of fresh potable water. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
Coating application:	
First coat:	Apply by brush, roller or spray, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint).
Second coat:	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a second coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy as above. Dry film thickness 100 µm to 150 µm.
Third coat:	Allowing sufficient time for the second coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.

APPENDIX A
(Continued)

Standard RFP – 1200

(continued)

Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 1300

Applicability and conditions of use

The following procedure applies to the sealing of concrete/steel interfaces

Surface preparation of concrete/steel interfaces:	Detail:
	Remove all traces of previously applied sealants or coatings. Wire brush and remove any harmful deposits detrimental to the adhesion of the sealant/coating, including all loose dust, corrosion product etc. Wash surfaces using clean sponges and copious quantities of fresh potable water. Allow to dry completely. Once the concrete and steel surfaces have dried, the following sealant/coating shall be applied:
Sealant:	
Option 1: (Bolted interfaces)	This material should only be applied where no risk of veld fires exists. Apply by hand or special applicator, liberal amounts of Petrolatum Fibre-filled Mastic into the concrete/steel joint. Ensure that the sealant is applied in such a way that it overlaps the concrete and steel surfaces by at least 20 mm on both sides of the joint.
Option 2: (Coating of steel imbedded in concrete)	The steel/concrete interface areas can be protected by either using the same surface tolerant epoxy that is used for the coating of the tower or alternatively, should the requirement exist for only the interface area to be protected, can be sealed with a Water-based, Modified Vinyl Acrylic Water-Proofing System. In the case of the latter, two-coats need to be applied to the concrete steel interface area. Ensure that the coating is applied to the entire concrete cap and at least 10cm above the interface area.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0. Various brands of Mastic are available having different thermal properties. Care shall be taken to choose a product suitable for the temperature range likely to be encountered under normal operating conditions.

APPENDIX A
(Continued)

Standard RFP – 1400

Applicability and conditions of use

The following procedure applies to the additional corrosion protection of nuts and bolts

Inspection:	Detail:
	A detailed visual inspection shall be carried out to identify all nuts and bolts where corrosion is evident. All nuts and bolts displaying exfoliation and metal loss shall be replaced.
Special Note:	
	If the tower is to be fully re-painted with an epoxy system, no additional protection of the nuts and bolts is required. However, where only additional protection of new or weathered/corroded fasteners is required, the following procedure can be followed:
New galvanised nuts and bolts:	
	Remove all traces of oil and other contaminants by means of a solvent wipe. Allow drying..
Lightly corroded nuts and bolts:	
	Where the coating has failed and/or where corrosion has been identified, thoroughly wire brush to remove all loose paint, corrosion product, dust etc. Rinse with clean potable water and allow drying.
Coatings and Mastics:	
Option 1:	Apply by brush one coat Water-based Modified Vinyl Acrylic Coating in sufficient quantities to totally enclose all exposed parts of the bolts, nuts and washers. After allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a second coat Water-based Modified Vinyl Acrylic as above.
Option 2:	Apply by brush one coat Twin Pack, High Build (≥ 85 % volume solids content), Aluminium Pigmented or Aluminium free Surface Tolerant Epoxy in sufficient quantities to totally enclose all exposed parts of the bolts, nuts and washers. After allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a second coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented or Aluminium free Surface Tolerant Epoxy as above.
Option 3:	Apply Petrolatum Fibre-filled Mastic in sufficient quantities to totally enclose all exposed parts of the bolts, nuts and washers. Temperature during application shall not exceed 45°C. The manufacturer's recommendations regarding method of application shall be strictly adhered to.

APPENDIX A
(Continued)

Standard RFP – 1400

(continued)

Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 1500

Applicability and conditions of use

The following procedure applies to the maintenance painting of stay rods

Initial preparation:	Detail:
	Where stay rods are to be painted, excavate to a depth of approximately 500 mm below ground level. The following standard shall apply from 500 mm below ground level to the top of the stay rod.
Surface preparation of galvanised steel:	
	Remove all loose rust and other contaminants using wire brushes, scrapers, and sandpaper. Wash with clean sponges and copious quantities of fresh potable water. Allow drying completely.
Coating application:	
Option 1:	
First coat:	Apply by brush, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint).
Second coat:	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a second coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy as above. Dry film thickness 100 µm to 150 µm.
Option 2:	Apply by brush, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint). Once the epoxy coating has cured, wrapping of the stay rod shall extend at least 500 mm above and 500 mm below ground level. Prior to the application of the wrapping system, the stay rod shall be wiped clean with a, slightly moist, cotton cloth. Allow drying. Lightly coat with Petrolatum fibre-filled paste. All surfaces shall be wrapped with a layer of Petrolatum impregnated tape. Tape width utilised for specific structures shall be as per Suppliers recommendation. The tape shall be applied in a helical manner with a tape overlap of 50% to produce a double layer in one wrapping operation. The application shall be free of wrinkles, creases and air voids. Special care shall be taken to ensure that correct tension is used while applying the tape and all overlaps shall be suitably smoothed by hand to produce a smooth and continuous wrapping.

APPENDIX A
(Continued)

Standard RFP – 1500

(continued)

Following the complete inspection and acceptance of the tape wrapping, the stay rod shall receive an outer wrap of PVC non-adhesive wrapping. The tape width used shall be as per supplier's recommendations.

The PVC tape shall be applied in a helical manner with a tape overlap of 50% to produce a double layer in one wrapping operation. The application shall be free of wrinkles, creases and air voids. Special care shall be taken to ensure that correct tension is used while applying this tape.

As this PVC tape is non-adhesive, the start and end of each roll of tape is to be firmly secured to the earth strap using lengths of adhesive PVC tape of 100 mm width. This is imperative to ensure that the non-adhesive PVC will not uncoil at the new roll joints.

Safety note:

The manufacturer’s recommendations regarding the safe handling and use of these materials shall be adhered to.

Approved products:

See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 1600

Applicability and conditions of use

The following procedure applies to the additional protection of new and weathered tower footings

Surface preparation of galvanised steel:	Detail:
	Slightly abrade using sandpaper. Where the zinc is totally depleted and rusting of the steel substrate has occurred, remove all rust and other contaminants using wire brushes, machine brushes, scrapers, grinders and sandpaper. All harmful deposits detrimental to the adhesion of the coating, including all loose dust and corrosion product shall be removed using clean sponges and copious quantities of fresh potable water. Allow to dry completely. All traces of previously applied bitumen coatings shall be removed by scraping or grinding, followed by washing with a water-soluble solvent/detergent mixture (e.g. Brush Cleaner) and finally rinsed with copious quantities of clean potable water. **No more than 4 hours shall elapse between cleaning and the application of the coating system. Steelwork shall be re-washed if left overnight.** Immediately before coating the cleaned steel surfaces shall not exhibit more dust and debris than the Standard Reference Tape (see Section 3.9).
Coating application:	
First coat: Second coat:	Apply by brush or roller one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented or Aluminium free Surface Tolerant Epoxy. **Work coating into all irregularities.** Dry film thickness 100 to 150 µm (excluding previous layers of paint). Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply one coat Twin Pack Aliphatic Acrylic Polyurethane Enamel. Dry film thickness 40 µm to 60 µm.
Safety note:	
	The manufacturer's recommendations regarding the safe handling and use of these materials shall be adhered to.
Approved products:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 1700
Applicability and conditions of use

The following procedure applies to the protection of earth straps

Initial preparation:	Detail:
	Where earth straps are to be painted, excavate to a depth of approximately 500 mm below ground level. The following standard shall apply from 500 mm below ground level to the top of the earth strap.
Surface preparation of galvanised steel:	
	Remove all loose rust and other contaminants using wire brushes, scrapers, and sandpaper. Wash with clean sponges and copious quantities of fresh potable water. Allow drying completely.
Coating application:	
Option 1: First coat:	Apply by brush, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy. Work coating into all irregularities. Dry film thickness 100 to 150 μm (excluding previous layers of paint).
Second coat:	Allowing sufficient time for the first coat to cure, the manufacturer's recommendations shall be adhered to in this regard, apply a second coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy as above. Dry film thickness 100 μm to 150 μm.
Option 2:	Apply by brush, one coat Twin Pack, High Build (≥ 85% volume solids content), Aluminium Pigmented Surface Tolerant Epoxy. Work coating into all irregularities. Dry film thickness 100 to 150 μm (excluding previous layers of paint). Once the epoxy coating has cured, wrapping of the earth strap shall extend at least 500 mm above and 500 mm below ground level. Prior to the application of the wrapping system, the earth strap shall be wiped clean with a, slightly moist, cotton cloth. Allow drying. Lightly coat with Petrolatum fibre-filled paste. All surfaces shall be wrapped with a layer of Petrolatum impregnated tape. Tape width utilised for specific structures shall be as per Suppliers recommendation. The tape shall be applied in a helical manner with a tape overlap of 50% to produce a double layer in one wrapping operation. The application shall be free of wrinkles, creases and air voids. Special care shall be taken to ensure that correct tension is used while applying the tape and all overlaps shall be suitably smoothed by hand to produce a smooth and continuous wrapping.

APPENDIX A
(Continued)

Standard RFP – 1700

(continued)

Following the complete inspection and acceptance of the tape wrapping, the earth strap shall receive an outer wrap of PVC non-adhesive wrapping. The tape width used shall be as per supplier's recommendations.

The PVC tape shall be applied in a helical manner with a tape overlap of 50% to produce a double layer in one wrapping operation. The application shall be free of wrinkles, creases and air voids. Special care shall be taken to ensure that correct tension is used while applying this tape.

As this PVC tape is non-adhesive, the start and end of each roll of tape is to be firmly secured to the earth strap using lengths of adhesive PVC tape of 100 mm width. This is imperative to ensure that the non-adhesive PVC will not uncoil at the new roll joints.

Safety note:

The manufacturer’s recommendations regarding the safe handling and use of these materials shall be adhered to.

Approved products:

See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 1800

Applicability and conditions of use

The following procedure applies to the marking of towers

Surface preparation:	Detail:
	Ensuring that the previous coatings are fully cured: Lightly abrade the area to be marked using fine sandpaper to provide a key for adhesion. After sanding, the affected area, it shall be washed with clean potable water to remove all dust, abrasive products etc. and finally allowed to dry. It is imperative that all surface dirt and contaminants are completely removed before over-coating or the adhesion between the existing and new coats will be impaired. No more than 4 hours shall elapse between cleaning and the application of the first coat to avoid recontamination of the surface.
Coating application:	
Base coat:	Using a rectangular stencil of a size to be specified by Eskom, apply one coat Alkyd High Gloss Enamel in accordance with SANS 630 Type I by brush. The colour shall be to SANS 1091-C61 (Canary yellow).
Lettering:	Using stencils for the alphanumeric tower numbering system, apply by brush one coat Alkyd High Gloss Enamel in accordance with SANS 630 Type I by brush. The colour shall be SANS black. The lettering shall comply with the requirements specified in 240-47172520 (TRMSCAAC5).
Approved suppliers:	
	See Technical Bulletin No. 10TB-011 Rev. 0.

APPENDIX A
(Continued)

Standard RFP – 1900

Applicability and conditions of use

The following procedure applies to the patch repair of previously painted surfaces

Inspection:	Detail:
	A detailed visual inspection shall be carried out to identify all areas where localized rusting or mechanical damage to the existing coating is evident.
Surface preparation:	
	The damaged area shall be thoroughly mechanically and/or hand wire brushed to remove all paint, corrosion product and any other deleterious matter. Following wire brushing, the affected area shall be cleaned down to a smooth surface and feathered back to a hard edge, using abrasive paper. This cleaning shall be extended to a minimum distance of 25 mm beyond the periphery of the affected area. It is vitally important that the sound, existing coating be abraded in order to provide a good "key" for the repair coating. After sanding, the affected area shall be washed with clean potable water to remove all dust, abrasive products etc. and finally allowed to dry. It is imperative that all surface dirt and contaminants are completely removed before over-coating or the adhesion between the existing and new coats will be impaired. No more than 4 hours shall elapse between cleaning and the application of the primer coat to avoid recontamination of the surface. The repair coating shall then be applied by brush or roller in accordance with the relevant standard.
Coating system:	
	Patch repair those areas where the metal substrate are exposed with the full coating system as per original standard. Where only the intermediate or final coats have been damaged, these should be re-instated as per original standard.

APPENDIX B: SAMPLE HEADING FOR APPENDIX

(Normative)

Impact assessment form to be completed for all documents.

1 Guidelines

- All comments must be completed.
- Motivate why items are N/A (not applicable)
- Indicate actions to be taken, persons or organisations responsible for actions and deadline for action.
- Change control committees to discuss the impact assessment, and if necessary give feedback to the compiler of any omissions or errors.

2 Critical points

2.1 Importance of this document. E.g. is implementation required due to safety deficiencies, statutory requirements, technology changes, document revisions, improved service quality, improved service performance, optimised costs.

Comment: N/A

2.2 If the document to be released impacts on statutory or legal compliance - this need to be very clearly stated and so highlighted.

N/A

2.3 Impact on stock holding and depletion of existing stock prior to switch over.

N/A, it is all done on contract presently

2.4 When will new stock be available?

Immediately

2.5 Has the interchangeability of the product or item been verified - i.e. when it fails is a straight swop possible with a competitor's product?

Yes

2.6 Identify and provide details of other critical (items required for the successful implementation of this document) points to be considered in the implementation of this document.

Buy in from the approved manufacturers

2.7 Provide details of any comments made by the Regions regarding the implementation of this document.

None

APPENDIX B: IMPACT ASSESSMENT
(continued)

3 Implementation timeframe

3.1 Time period for implementation of requirements.

Immediate

3.2 Deadline for changeover to new item and personnel to be informed of DX wide change-over.

Immediate

4 Buyers Guide and Power Office

4.1 Does the Buyers Guide or Buyers List need updating?

The list of products needs to be loaded on the CAP list

4.2 What Buyer's Guides or items have been created?

None

4.3 List all assembly drawing changes that have been revised in conjunction with this document.

N/A

4.4 If the implementation of this document requires assessment by CAP, provide details under 5

4.5 Which Power Office packages have been created, modified or removed?

None

5 CAP / LAP Pre-Qualification Process related impacts

5.1 Is an ad-hoc re-evaluation of all currently accepted suppliers required because of implementation of this document?

When this document is approved the products will be loaded on LAP.

5.2 If NO, provide motivation for issuing this specification before Acceptance Cycle Expiry date.

Comment:

5.3 Are ALL suppliers (currently accepted per LAP), aware of the nature of changes contained in this document?

APPENDIX B: IMPACT ASSESSMENT
(continued)

5.4 Is implementation of the provisions of this document required during the current supplier qualification period?

No

5.5 If Yes to 5.4, what date has been set for all currently accepted suppliers to comply fully?

Comment:

5.6 If Yes to 5.4, have all currently accepted suppliers been sent a prior formal notification informing them of Eskom's expectations, including the implementation date deadline?

Comment:

5.7 Can the changes made, potentially impact upon the purchase price of the material/equipment?

No

5.8 Material group(s) affected by specification: (Refer to Pre-Qualification invitation schedule for list of material groups)

Coatings

6 Training or communication

6.1 Is training required?

No

Comment: (If NO then 6.2 – 6.6 will be N/A)

6.2 State the level of training required to implement this document. (E.g. awareness training, practical / on job, module, etc.)

Comment:

6.3 State designations of personnel that will require training.

Comment:

6.4 Is the training material available? Identify person responsible for the development of training material.

Comment:

6.5 If applicable, provide details of training that will take place. (E.G. sponsor, costs, trainer, schedule of training, course material availability, training in erection / use of new equipment, maintenance training, etc).

Comment:

APPENDIX B: IMPACT ASSESSMENT
(continued)

6.6 Was Technical Training Section consulted w.r.t module development process?

Comment:

6.7 State communications channels to be used to inform target audience.

This Spec has and will go thru the TESCOD process of communication

7 Special tools, equipment, software

7.1 What special tools, equipment, software, etc will need to be purchased by the Region to effectively implement?

Comment:

7.2 Are there stock numbers available for the new equipment?

N/A

7.3 What will be the costs of these special tools, equipment, software?

8 Finances

8.1 What total costs would the Regions be required to incur in implementing this document? Identify all cost activities associated with implementation, e.g. labour, training, tooling, stock, obsolescence

Comment:

This is an update of previous used coatings.

……

……

……

Impact assessment completed by:

Name: BP Hill

Designation: Chief Enginerer