

**SPOORNET**

A division of Transnet limited

**TECHNICAL  
RAILWAY ENGINEERING  
SPECIFICATION**

**PAINTING OF STEEL COMPONENTS OF  
ELECTRICAL EQUIPMENT**

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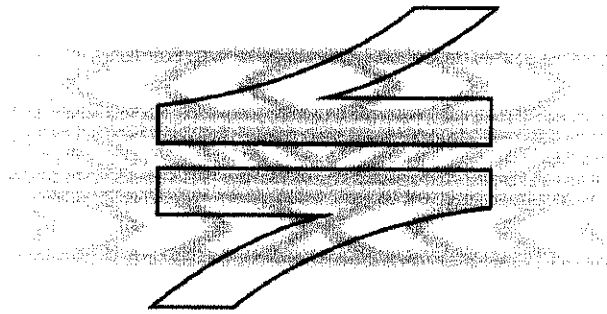
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## 1.0 SCOPE

This specification covers the surface preparation, paint systems and painting of steel components of electrical equipment.

## 2.0 REFERENCES AND GLOSSARY

The following standards and specifications are referred to herein:

### 2.1 South African Bureau of Standards: -

SABS 064 : Code of Practice for the Preparation of Steel Surfaces for Coating.

SABS 1091 : National Colour Standards for Paint.

### 2.2 Trade names :

OptiDegreaser

OptiPrime<sup>Aqua</sup>

Noxyde

### 2.3 Classification of level of surface degradation:

RE1 – 0.05% of surface rusted

RE2 – 0.5% of surface rusted

RE3 – 1.0% of surface rusted

RE4 – 3.0% of surface rusted

RE5 – 8.0% of surface rusted

## 3.0 METHOD OF TENDERING

3.1 Tenderers shall indicate clause by clause compliance or non-compliance with the specification. This shall take the form of a separate document listing all the specification clause numbers indicating the individual statement of compliance or non-compliance. Tenderers to elaborate on their response to a clause can use this document.

## 4.0 SURFACE PREPARATION

### 4.1 NON-GALVANISED STEELWORK

#### 4.1.1 New Steelwork

SURFACE PREPARATION (Read: NOTES and SPECIAL INSTRUCTIONS)	PRODUCT REQUIREMENTS & APPLICATION (See Variations for Specific Environmental Conditions)
<ul style="list-style-type: none"> <li>➤ Sandblast to a standard of Sa2 to remove mill scale and/or flash rust</li> <li>➤ Remove dust with <u>clean</u> compressed air (Check air for oil contamination)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Apply a stripe coat to edges, bolts, crevices, nuts and rivets.</li> <li>➤ Apply one thick coat of Noxyde to the entire structure with contrasting color.</li> <li>➤ Apply a final thick coat of Noxyde at a consumption rate of minimum 400g/m<sup>2</sup></li> </ul>

## 4.1.2 Previously Coated Steelwork

### 4.1.2.1 COATING START FAILING TO A LEVEL OF RE 2

<ul style="list-style-type: none"> <li>➤ Test for adhesion (refer to supplier)</li> <li>➤ Degrease thoroughly with OptiDegreaser</li> <li>➤ Hydro Blast complete substrate using a rotating nozzle and minimum 250 bar at the nozzle</li> </ul>	<ul style="list-style-type: none"> <li>➤ Apply a stripe coat to edges, bolts, nuts and rivets and fill crevices.</li> <li>➤ Apply one coat of Noxyde to entire substrate in a contrasting color</li> </ul>
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### 4.1.2.2 COATING FAILURE AND RUSTING TO A LEVEL OF RE 4

<ul style="list-style-type: none"> <li>➤ Remove all visible traces of rust by mechanical means ST2 (chip/grind/sand) OR shotblasting /spotblasting)</li> <li>➤ Degrease thoroughly with OptiDegreaser</li> <li>➤ Hydro Blast complete substrate using a rotating nozzle and minimum 250 bar at the nozzle.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Apply a thick coat of Noxyde to the de-rusted areas, edges, bolts, nuts and rivets and fill crevices</li> <li>➤ Apply one coat of Noxyde at a consumption rate of minimum 400g/m<sup>2</sup> to the entire substrate using a contrasting color.</li> </ul>
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### 4.1.2.3 BITUMEN COATED

<ul style="list-style-type: none"> <li>➤ Remove all visible rust and loosely adhering bitumen coating by means of chipping and scraping (ST2)</li> <li>➤ Degrease thoroughly with OptiDegreaser</li> <li>➤ Hydro Blast complete substrate using a rotating nozzle and minimum 250 bar at the nozzle.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Apply a thick coat of Noxyde to the de-rusted areas, edges, bolts, nuts and rivets and fill crevices</li> <li>➤ Apply two coats of Noxyde at a consumption rate of minimum 400g/m<sup>2</sup> per coat to the complete substrate using contrasting colors</li> </ul>
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### 4.1.2.4 BADLY RUSTED STEEL WITH PITTING & CRUST FORMATION TO RE 5

<ul style="list-style-type: none"> <li>➤ 1.Degrease thoroughly with OptiDegreaser</li> <li>➤ 2.Hydro Blast complete substrate using a spinner tip and minimum 250 bar at the nozzle</li> <li>➤ Shotblast/sandblast complete substrate giving particular attention to bolts nuts rivets and crevices. Sa2</li> <li>➤ 4.Dedust</li> </ul>	<ul style="list-style-type: none"> <li>➤ Apply a first thick coat of Noxyde to the entire substrate</li> <li>➤ Apply a stripe coat to edges, bolts, nuts and rivets and fill crevices using a contrasting color</li> <li>➤ Apply a final coat of Noxyde at a consumption rate of minimum 400g/m<sup>2</sup></li> </ul>
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## 4.2 GALVANISED STEELWORK

### 4.2.1 NEW AND WEATHERED GALVANISING WITH A SMOOTH GLOSSY FINISH

<ul style="list-style-type: none"> <li>➤ Degrease thoroughly with OptiDegreaser</li> <li>➤ Rinse down with copious quantities of potable water</li> </ul>	<ul style="list-style-type: none"> <li>➤ Apply one thin coat of OptiPrime<sup>Aqua</sup> (100 micron wet/35 micron dry)</li> <li>➤ Apply a stripe coat of Noxyde to edges, bolts, nuts and rivets and fill crevices</li> <li>➤ Apply two coats of Noxyde at a consumption rate of minimum 400g/m<sup>2</sup> per coat to the complete substrate using contrasting colors</li> </ul>
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## 4.2.2 WEATHERED GALVANISING

### 4.2.2.1 White rust (zinc oxide)

<ul style="list-style-type: none"> <li>➤ Degrease thoroughly using OptiDegreaser – ensure that all traces of "white rust" are removed</li> <li>➤ Rinse down with copious quantities of potable water</li> </ul>	<ul style="list-style-type: none"> <li>➤ Apply one thin coat Noxyde</li> <li>➤ Apply a stripe coat of Noxyde to edges, bolts, nuts and rivets and fill crevices</li> <li>➤ Apply a final coat of Noxyde at a consumption rate of minimum 400g/m<sup>2</sup> per coat to the complete substrate using a contrasting color</li> </ul>
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### 4.2.2.2 Combination of red rust (iron oxide) and white rust (zinc oxide)

<ul style="list-style-type: none"> <li>➤ Remove all traces of red rust</li> <li>➤ Degrease thoroughly using OptiDegreaser – ensure that all traces of "white rust" are removed</li> <li>➤ Rinse down with copious quantities of potable water</li> </ul>	<ul style="list-style-type: none"> <li>➤ Apply a thick coat of Noxyde to the de-rusted areas, edges, bolts, nuts and rivets and fill crevices</li> <li>➤ Apply a final coat of Noxyde at a consumption rate of minimum 400g/m<sup>2</sup> per coat to the complete substrate using a contrasting color</li> </ul>
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NOTES and SPECIAL INSTRUCTIONS:		
<p>1 Sand or Grit-blasting</p> <ul style="list-style-type: none"> <li>a) Always use clean, non-recycled grit</li> <li>b) Always use fine or extra fine grit</li> <li>c) Always use oil free air</li> <li>d) Always use a moisture trap</li> <li>e) Dedust</li> </ul>	<p>2 Degreasing:</p> <ul style="list-style-type: none"> <li>a) Use only OptiDegreaser</li> <li>b) Dilute according to instructions – see data sheet</li> <li>c) Always follow up with hydro-blasting to remove all chemical residues</li> </ul>	<p>3 Hydro-blasting:</p> <ul style="list-style-type: none"> <li>a) Always use clean potable water</li> <li>b) Use a rotating nozzle and ensure a pressure of minimum 250 bar at the nozzle</li> <li>c) Remove ALL traces of dirt and any form of salt contamination and residues of the degreasing agent</li> <li>d) Concentrate in crevices and other similar "collection" areas</li> </ul>

## 5. PRODUCT APPLICATION

### 5.1 METHOD OF APPLICATION

OptiPrime <sup>Aqua</sup>	Noxyde
Temperature-Min 5 °C Relative humidity-Max 80% R.H. <ul style="list-style-type: none"> <li>➤ Apply by brush, lacquer roller or airless spray using a no. 11 nozzle</li> <li>➤ Apply one thin coat only - 100 micron wet = 35 micron dry (DFT)</li> <li>➤ Small parts can be dipped - dilute with 10% water for dipping</li> </ul>	Temperature-Min. 8 °C, Max. 55 °C Relative Humidity-Max 80% R.H. <ul style="list-style-type: none"> <li>➤ Apply by brush, roller or airless spray</li> <li>➤ For airless spray applications refer to "Tips for airless spraying of Noxyde"</li> </ul>

### 5.2 DRYING TIME AND OVERCOAT PERIODS

<ul style="list-style-type: none"> <li>➤ Do not overcoat within 12 hours</li> <li>➤ Wash down with clean potable water (100 bar) before over coating to remove dust or any other form of intermediate contamination</li> </ul>	<ul style="list-style-type: none"> <li>➤ Drying time is dependant on ambient conditions and can vary from a few minutes (in dry windy conditions) to a few hours (in humid shaded conditions)</li> <li>➤ Overcoat as soon as possible to avoid contamination of previous coat</li> <li>➤ Wash down with clean potable water (100 - 150 bar) before over coating if danger of contamination exists or if left more than 4 hours before over coating</li> </ul>
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### 5.3 CURING TIME

n/a	<ul style="list-style-type: none"> <li>➤ 7 - 14 days to "full cure". During this period the product is prone to mechanical damage - the longer time it is allowed to cure, the tougher it becomes</li> </ul>
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### 5.4 DRY FILM THICKNESS (DFT) READINGS

35 micron	<ul style="list-style-type: none"> <li>➤ Severe coastal &amp; marine environments (in the spray zone) - TWO stripe coats &amp; overall minimum DFT of 400 micron</li> <li>➤ Normal coastal environment (1 5 km from the coast line) - a single stripe coat &amp; overall minimum DFT of 400 micron</li> <li>➤ Non coastal high rainfall areas, in the immediate vicinate of rivers, dams, lakes, etc., and in industrial areas with high levels of chemical pollution - a single stripe coat &amp; overall minimum DFT of 400 micron</li> <li>➤ Dry non aggressive environments - a single stripe coat &amp; overall minimum DFT of 250 micron</li> </ul> <p>NOTE: DFT readings can only be taken after 72 hours</p>
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5.5 Notwithstanding the above requirements, all surfaces shall be cleaned according to the appropriate method described in SABS 064 for the particular surface to be cleaned, the contamination to be removed and the primer to be applied.

5.6 Blast cleaning of components shall be in accordance with clause 4.3 of SABS 064 to a degree of cleanliness of at least Sa 2 for inland exposure components and Sa 2 ½ for coastal exposure components. See Table 1 of SABS 064 for the appropriate profile.

5.7 Sheet metal that cannot be blast cleaned shall be cleaned by pickling according to clause 4.6 of SABS 064.

5.8 Components that will be powder coated shall be cleaned and prepared by the surface conversion process according to clause 5 of SABS 064 to a medium weight classification of table 2 of that specification.

5.9 Oil and accumulated dirt on steel components where no rusting is present shall be removed according to clause 3 of SABS 064.

### 6.0 PAINT SYSTEM

A choice of two systems is available to suit the contractors equipment.

#### 6.1 Noxyde paint system

1<sup>st</sup> coat: OptiPrime<sup>Aqua</sup>

Wet film thickness: 100 micrometers. Dry film thickness: 35 micrometers.

2<sup>nd</sup> coat: Noxyde Topcoat

Dry film thickness: 165 micrometers @ 400g/m<sup>2</sup>.

6.1.1 Paint application:

6.1.1.1 The primer and paint is normally applied by brush at supply viscosity (no reducer required).

6.1.1.2 The practical spreading rate of the primer and paint is a function of the ambient temperature, wind velocity and the application technique, but will generally fall in the range of 400g/m<sup>2</sup> in low to mild corrosive areas, and 500g/m<sup>2</sup> in severely corrosive areas.

6.1.1.3 Once the applied coat of primer/paint is touch dry, the next coat of paint may be applied.

6.1.1.4 If painted steelwork is to be bolted onto structures, it is imperative that the paint has been allowed to hard dry before the steelwork is bolted onto structures. This is to prevent the soft paint being damaged when tightening the bolts securing the steelwork to the structures.

6.2 Powder Coating System.

The powder-coating process shall be in accordance with SABS 1274 type 4: Corrosion-resistant coatings for interior use and using the thermosetting type high gloss coatings.

**7.0 COATINGS AND WORKMANSHIP**

7.1 All specified coatings shall be applied according to the relevant specification and the manufacturer's instructions shall be followed.

7.2 Coatings shall not be applied under conditions that may be detrimental to the effectiveness of the coating or the appearance of the painted surface.

7.3 When examined visually, the finished products shall have a uniform appearance and shall show no sign of damage. Damaged areas shall be repaired coat for coat to obtain the desired finish.

TENDERER'S SIGNATURE.....

DATE.....