TRANSNET
freight rail

A Division of Transnet SOC Limited

TECHNOLOGY MANAGEMENT

SPECIFICATION

PAINTING OF STEEL COMPONENTS OF ELECTRICAL EQUIPMENT

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1.0 SCOPE

This specification covers Transnet Freight Rail requirements for surface preparation, paint systems and painting of steel components of electrical equipment.

2.0 REFERENCES AND GLOSSARY

2.1 The following publications/specifications (latest editions) are referred to herein:

SOUTH AFRICAN NATIONAL STANDARDS (SANS)

SANS 10064: The preparation of steel surfaces for coating.
SANS 1091: National colour standards.
SANS 1274: Coatings applied by powder coating process.

2.2 TRADE NAMES:

OptiDegreaser
OptiPrimeAqua
Noxyde/OptiRustBusta

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 with this specification. This shall take the form of a separate document listing all the specifications clause numbers indicating the individual statement of compliance or non-compliance. This document can be used by tenderers to elaborate on their response to a clause.

3.2 A statement of non-compliance shall be motivated by the tenderer.

3.3 Failure to comply with clauses 3.1 and 3.2 could preclude a tender from consideration.

4.0 SERVICE CONDITIONS

4.1 ENVIRONMENTAL CONDITIONS

The equipment shall be designed and rated for installation and continuous operation under the following conditions:

Altitude:	0 - 1800 m above sea level
Relative humidity:	10% to 90%
Ambient temperature:	-10° C to +55° C
Lightning conditions:	20 ground flashes/km^2 per annum
Pollution:	Heavily salt laden with industrial pollutants including diesel-electric locomotive emissions

5.0 SURFACE PREPARATION

5.1 NON-GALVANISED STEELWORK

5.1.1 NEW STEELWORK

SURFACE PREPARATION (Read: NOTES and SPECIAL INSTRUCTIONS)	PRODUCT REQUIREMENTS AND APPLICATION

	(see variations for specific environmental conditions)
➢ Sandblast to a standard of Sa2 to remove mill scale and/or flash rust ➢ Remove dust with clean compressed air (check air for oil contamination)	➢ Apply a stipe coat to edges, bolts, crevices, nuts and rivets. ➢ Apply 300µm wet coat of Noxyde/OptiRustBusta to the entire structure with contrasting colour. ➢ Apply a final 300µm wet coat of Noxyde/OptiRustBusta at a consumption rate of minimum 400g/m^2

5.1.2 PREVIOUSLY COATED STEELWORK

5.1.2.1 COATING START FAILING TO A LEVEL RE 2

➢ test for adhesion (refer to supplier) ➢ degrease thoroughly with OptiDegreaser ➢ hydro blast complete substrate using a rotating nozzle and minimum 250 bar at the nozzle	➢ Apply a stripe to edges, bolts, nuts, rivets and fill crevices. ➢ Apply one coat of Noxyde/OptiRustBusta to entire substrate in a contrasting colour.

5.1.2.2 COATING FAILURE AND RUSTING TO A LEVEL OF RE 4

➢ Remove all visible traces of rust by mechanical means ST2 (chip/grind/sand) OR shotblasting/spotblasting ➢ degrease thoroughly with OptiDegreaser ➢ hydro blast complete substrate using a rotating nozzle and minimum 250 bar at the nozzle	➢ Apply 300µm wet coat of Noxyde/OptiRustBusta to the de-rusted areas, edges, bolts, nuts and rivets and fill crevices. ➢ Apply one coat of Noxyde/OptiRustBusta at a consumption rate of minimum 400g/m^2 to entire substrate using a contrasting colour.

5.1.2.3 BITUMEN COATED

➢ Remove all visible rust and loosely adhering bitumen coating by means of chipping and scrapping (ST2) ➢ degrease thoroughly with OptiDegreaser ➢ hydro blast complete substrate using a rotating nozzle and minimum 250 bar at the nozzle	➢ Apply 300µm wet coat of Noxyde/OptiRustBusta to the de-rusted areas, edges, bolts, nuts and rivets and fill crevices. ➢ Apply one coat of Noxyde/OptiRustBusta at a consumption rate of minimum 400g/m^2 to entire substrate using a contrasting colour.

5.1.2.4 BADLY RUSTED STEEL WITH PITTING AND CRUST FORMATION TO RE5

➢ Degrease thoroughly with OptiDegreaser ➢ hydro blast complete substrate using a rotating nozzle and minimum 250 bar at the nozzle ➢ shotblast/sandblast complete substrate giving particular attention to bolts nuts rivets and crevices Sa2 ➢ De-dust	➢ Apply a first 300µm wet of Noxyde/OptiRustBusta to entire substrate to the contrasting colour. ➢ Apply a stripe coat to edges, bolts, nuts, rivets and fill crevices using a contrasting colour. ➢ Apply a final coat of Noxyde/OptiRustBusta at a consumption rate of minimum 400g/m^2.

5.2 GALVANISED STEELWORK

5.2.1 NEW AND WEATHERED GALVANISING WITH A SMOOTH GLOSSY FINISH

➢ Degrease thoroughly with OptiDegreaser ➢ rinse down with copious quantities of potable water	➢ Apply one thin coat of OptiPrime/Aqua (100 micron wet/35 micron dry) ➢ Apply a stripe coat of Noxyde/OptiRustBusta to edges, bolts, nuts, rivets and fill crevices. ➢ Apply two coats of Noxyde/OptiRustBusta at a consumption rate of minimum 400g/m^2 per coat to the complete substrate using contrasting colors.

5.2.2 WEATHERED GALVANISING

5.2.2.1 White rust (Zinc oxide)

➢ Degrease thoroughly with OptiDegreaser – ensure that all traces of “white rust” are removed ➢ rinse down with copious quantities of potable water	➢ Apply one 300µm wet coat of Noxyde/OptiRustBusta ➢ Apply a stripe coat of Noxyde/OptiRustBusta to edges, bolts, nuts, rivets and fill crevices. ➢ Apply a final coat of Noxyde/OptiRustBusta at a consumption rate of minimum 400g/m^2 per coat to the complete substrate using contrasting color.

5.2.2.2 Combination of red rust (Iron oxide) and white rust (Zinc oxide)

➢ Remove all traces of red rust ➢ Degrease thoroughly with OptiDegreaser – ensure that all traces of “white rust” are removed ➢ rinse down with copious quantities of potable water	➢ Apply 300µm wet coat of Noxyde/OptiRustBusta to the de-rusted areas, edges, bolts, nuts and rivets and fill crevices. ➢ Apply a final coat of Noxyde/OptiRustBusta at a consumption rate of minimum 400g/m^2 per coat to the complete substrate using contrasting color.

NOTES AND SPECIAL INSTRUCTIONS:

1 Sand or Grit-blasting: a) Always use clean, non-recycled grit b) Always use fine or extra fine grit c) Always use oil free air d) Always use a moisture trap e) Dedust	2 Degreasing: a) Use only OptiDegreaser b) Dilute according to instructions – see data sheet c) Always follow up with hydro-blasting to remove all chemical residues	3 Hydro-blasting: a) Always use clean portable water b) Use a rotating nozzle and ensure a pressure of minimum 250 bar at the nozzle c) Remove ALL traces of dirt and any form of salt contamination and residues of the degreasing agent d) Concentrate in crevices and other similar “collection” areas

6.0 PRODUCT APPLICATION

6.1 METHOD OF APPLICATION

OptiPrimeAqua	Noxyde/OptiRustBusta
Temperature-Min 5 ^{o}C Relative humidity-Max 80% R.H. ➢ Apply by brush, lacquer roller or airless spray using a no.11 nozzle ➢ Apply one thin coat only – 100 micron wet=35 micron dry (DFT) ➢ Small parts can be dipped – dilute with 10% water for dipping	Temperature-Min 5 ^{o}C Relative humidity-Max 80% R.H. ➢ Apply by brush, roller or airless spray ➢ For airless spray applications refer to “data sheet of Noxyde/OptiRustBusta”

6.2 DRYING TIME AND OVERCOAT PERIODS

➢ Do not overcoat within 12 hours ➢ Wash down with clean portable water (100 bar) before over coating to remove dust or any other form of intermediate contamination	➢ Drying time is dependent on ambient conditions and can vary from a few minutes (in dry windy conditions) to a few hours (in humid shaded conditions) ➢ Over coat as soon as possible to avoid contamination of previous coat ➢ Wash down with clean portable water (100-150 bar) before over coating if danger of contamination exists or it left more than 4 hours before over coating

6.3 CURING TIME

n/a	➢ 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

6.4 DRY FILM THICKNESS (DFT) READINGS

35 micron	➢ Severe coastal & marine environment (in the spray zone) – TWO stripe coats & overall minimum DFT of 400 micron ➢ Normal coastal environment (15 km from coastal line) - a single stripe of coat & overall minimum DFT of 400 micron ➢ Non-coastal high rainfall areas, in the immediate vaccinate of rivers, dams, lakes, etc., and in industrial areas with high levels of chemical pollution – a single stripe of coat & overall minimum DFT of 400 micron ➢ Dry non aggressive environments - a single stripe of coat & overall minimum DFT of 250 micron NOTE:DFT readings can only be taken after 72 hours

6.5 Notwithstanding the above requirements, all surfaces shall be cleaned according to the appropriate method described in SANS 10064 for the particular surface to be cleaned, the contamination to be removed and the primer to be applied.

6.6 Blast cleaning of components shall be in accordance with clause 4.5 of SANS 10064 to a degree of cleanliness of at least Sa2 for inland exposure components and Sa21/2 for coastal exposure components. See table 1 of SANS 10064 for the appropriate profile.

6.7 Sheet metal components that cannot be blast cleaned shall be cleaned by pickling according to clause 4 of SANS 10064.

6.8 Components that will be powder coated shall be cleaned and prepared by the surface conversion process according to clause 5 of SANS 10064 to a medium weight classification of table 2 of that specification.

6.9 Oil and accumulated dirt on steel components where no rusting is present shall be removed according to clause 3 of SANS 10064.

7.0 PAINT SYSTEM

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

7.1 Water based paint system

1st coat: OptiPrimeAqua

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

2nd coat: Noxyde/OptiRustBusta

Dry film thickness: 165 micrometers @ 400g/m^2.

3rd coat: Noxyde/OptiRustBusta

Dry film thickness: 165 micrometers @ 400g/m^2.

7.1.1 Paint application

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

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

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

7.1.1.4 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.

7.2 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.

8.0 COATINGS AND WORKMANSHIP

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

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

8.3 When examined visually, the finished product 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.

9.0 SUBSTITUTION

9.1 This specification replaces specification CEE.045 of 2002/1.

9.2 All clauses have been revised to suit latest requirements.

END