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परिणामित्र

PRODUCT STANDARD
TRANSFORMER

TR,10211P

Form No. 2038

शाप/अभि. निर्देश

SHOP/ENGG INSTRUCTIONS

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शीर्षक TITLE

PROCESS FOR PAINTING OF TRANSFORMER
TANK AND ACCESSORIES

1.0 GENERAL:

This specification details the process to be followed for painting of Transformer/Reactor Tanks, Conservators, Headers etc. (hereinafter referred as tank) by brushing or spraying.

This specification details the schedule for the application of 2 coats of Oil resistant Paint of Jasmine Yellow shade to AA 56132 or white shade to BP 56183 by brushing for inside tank surface, while 2 coats of primer paint to AA 56101 (by brushing/Spraying) followed by 2 coats of Light/Dark grey finishing paint to AA 56126 (by brushing/Spraying) for out side surface of transformer tank.

2.0 MATERIALS:

- | | | | |
|-----|--|---|----------------------------------|
| 2.1 | Anti-corrosive Priming Paint (Red) | : | AA 56101 |
| 2.2 | Anti-corrosive Priming Paint (Brown) | : | AA 56101 |
| 2.3 | High Quality full Glossy Outdoor Finishing Paint | : | AA 56126 |
| | Light Grey Shade No. 631 of IS - 5 | | |
| | Dark grey shade No. 632 of IS - 5 | | |
| 2.4 | Oil Resistant Air Drying synthetic Enamel (Jasmine Yellow shade no. 397) | : | AA 56132 |
| | or | | |
| | Oil resistant non yellowing full glossy white paint | : | BP 56183 |
| 2.5 | White spirit grade 145/205 | : | AA 56701 |
| 2.6 | Water proof abrasive paper grit 220 | : | |
| 2.7 | Degreasing agent | : | Teepol or Chemokleen liquid 1009 |

3.0 PREPARATION OF THE PAINTS:

3.1 Removal of skin from the paint:

Before application, any skin formed on the paint in the tin shall be carefully removed, any settled pigment broken up and loosened and the paint thoroughly stirred to ensure complete and uniform mixing constituents. Care shall be taken to avoid entraining air into the paint while stirring. The paint shall be strained through a muslin cloth or 60 mesh sieve.

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Afterward before drying, clean the surface with fresh water at about 60°C by means of high pressure water ejection pump.

Finally dry the surface using compressed air.

Safety precautions:

Protect the eyes against splashes, use protective goggles and plastic gloves. Use breathing protection with prefilter fine filter and gas filter.

4.2.2 Out side surface of tank.

4.2.2.1 Tanks smaller than shot Blasting Plant.

After dressing, grinding and degreasing as per Cl. 4.1 & 4.2.1 the tank shall be shot blasted to Swedish Standard SIS 055900 Gr. SA 2.5 and then painted with priming paint or oil proof paint as required.

It is recommended that first coat of paint is applied within 24 hours of completion of shot blasting to control onset of corrosion on the surface. Before application of the paint, condition of the surface shall be visually examined. In case of any deficiency the surface shall be cleaned by suitable means (wire brushing etc.)

4.2.2.2 Tanks Larger than Shot Blasting Plant:

Such tanks shall be shot blasted in parts. To start with a portion of tank shall be blasted to Swedish standard SIS 055900 Gr. SA 2.5 and first coat of primer or oil proof paint applied preferably within 24 hours of completion of shot blasting, to control onset of corrosion on the surface.

Before application of the paint condition of the surface shall be visually examined. In case of any deficiency the surface shall be cleaned by suitable means.

4.2.3 Inside surface of tank:

Inside portion of the tank shall be shot blasted and painted with oil resistant paint (Jasmine Yellow/White shade Cl. 2.4) in the similar manner as detailed in Cl. 4.2.2.

Note: In case shot blasting facility is not available the tanks and accessories shall be sand blasted as per plant standard BP 069 00 98.

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3.2 Consistencies of the paint AA 56101, AA 56126 and AA 56132 & BP 56183

The paints shall be used at the consistencies as given in the table

Paint Specification	Flow time of the paint in cup No. B-4 to IS:3944	
	Spraying	Brushing
AA 56101	35 ± 3	70 ± 10 secs
AA 56126	35 ± 3	70 ± 10 secs
AA 56132	--	70 ± 10 secs
BP 56183	--	70 ± 10 secs

The above consistencies shall be adjusted using white spirit and the flow times shall be maintained independent of shop temperature within normal variation.

4. SURFACE PREPARATION:

4.1 Dressing and Grinding

After welding all welds and flame cut edges shall be dressed and any major surface imperfections removed by grinding.

NOTE: After dressing and grinding the tank shall be subjected to air/oil pressure tests, vacuum test as per drawing.

4.2 Descaling and Cleaning

It is necessary that surface to be painted is free from loose dust, mill scale, rust, grease, oil, old paint, soap solution, tightness testing powder etc. For surface cleaning and preparation refer BHEL standard (AA 0674101)

Prior to shot/sand blasting degreasing operation as detailed below shall be done,

4.2.1 Degreasing :

The surface shall be degreased by using degreasing agent (Cl. 2.7) mixed with water in 15% approx concentration i.e. one litre of water with 150 to 160 ml of degreasing agent. This shall be warmed to 60 to 70°C and shall be applied at a low pressure. After degreasing, the operator shall carry out a visual inspection of the result. Surface that are difficult to wash shall be inspected carefully. If impurities still remain on the objects, these shall be degreased again.

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5. APPLICATION OF PAINTS:

The paints shall be applied by spraying/brushing and then stoved in painting booth.

Setting temperature and indicating temperature shall be $90 \pm 10^\circ\text{C}$. Stoving time shall be adjusted as per following given time.

Transformer tanks - 1 hour

Accessories/pipe work - 1 hour

Smaller items less than 100 kg = 1 hour

Above time shall be maintained after attaining the temp. of $90 \pm 10^\circ\text{C}$.

5.1 Painting of Inside of Transformer Tank.

5.1.1. Application of first coat of Jasmine Yellow (AA 56132)/White shade BP 56183 Paint

First coat of Jasmine yellow/white shade paint as prepared in clause 3.2 above shall be applied by brushing/spraying.

Job shall be allowed to dry for 20 minutes at room temperature after paint application. Afterward painted surface shall be dried by baking in an oven as indicated in clause 5.0.

5.1.2 Application of second coat of Jasmine yellow (AA 56132/White shade (BP 56183) paint).

Second coat of paint shall be applied in accordance with the Cl. 5.1.1

In case of damage to paint surface it will be retouched with the Jasmine yellow/white shade paint

NOTE: The tank shall not be handled during drying period specified above.

5.2 Painting of outside of transformer tank

5.2.1 Application of first coat of primer (Red or Brown) AA 56101 : First coat of primer as prepared in clause 3.2 above shall be applied by brushing/spraying. Before application of primer coat, surface should be cleaned by compressed air to remove dust etc if any. Job shall be allowed to dry for 20 minutes at room temperature after paint application. Afterward painted surface shall be dried by baking in an oven as indicated in clause 5.0.

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5.2.2 Application of second coat of primer (Brown/Red) AA 56101 : Surface shall be cleaned where necessary. The second coat of primer shall be applied as is clause 5.2.1 above.

5.2.3 Application of First coat of finishing paint - AA56126 - (Light Grey or Dark Grey)

Same as clause 5.1.1 except that paint shall be in light grey/dark grey shade (as required) finishing paint.

5.2.4 Application of second coat of finishing paint - AA 56126 (Light Grey or Dark Grey) :

Same as clause 5.1.1 except paint shall be in light grey/dark grey (as required) finishing paint.

In case of damage to painted surface, it will be re-touched with the light grey/dark grey shade paint (as required).

Note :

1. Time gap between any two successive coats shall not be more than 7 days.

2. In case baking facility is not available, surface shall be allowed to air dry for 16 hrs (min).

6. INSPECTION FOR PROCESS CONTROL:

6.1 Thickness:

6.1.1 Outside Paint film thickness:

The average total dried paint film thickness shall be within 80 to 110 microns. However at certain local points, dry paint film thickness upto 200 microns shall be acceptable.

6.1.2 Inside paint film thickness: The average total dried film thickness shall be within 25 to 60 microns. However at certain local points, dry paint film thickness upto 100 microns shall be acceptable.

The finished component shall be visually inspected for various paint film defects such as gloss uniformity of shade, wrinkles, orange peel effect, blistering etc.

6.3 Adhesion by tape test:

This test is carried out by applying & removing pressure sensitive adhesion tape over cuts made in the paint film to ensure that adhesion of paint film to metallic substrate is adequate.

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The test shall be carried out generally in line with ASTM D 3359 except that pressure sensitive Adhesive tape of 25 mm width, shall confirm to IS: 2880

Method A of ASIM D 3359 shall be followed in case thickness of film is greater than 125 microns & acceptance criterion shall be "4A" and Method B of ASTM D 3359 shall be followed when thickness of paid film is between 50 to 125 microns and acceptance criterion shall be "4B".

7. REPAIR OF DAMAGED PAINT WORK:
 - 7.1 Remove the damaged paint by using chisel /Grinder or other convenient tool.
 - 7.2 Roughen the surface by using a rough emery/wire brush.
 - 7.3 Remove oil or grease from the surface by swabbing with white spirit soaked cotton cloth. Allow the residual white spirit to evaporate from the surface.
 - 7.4 Apply Primer/Finishing paint as per relevant clauses above.

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TITLE :

PAINTING INSTRUCTIONS

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SR NO	PARTS	SUR- FACE	PAINT	NO OF COATS	HOW APPL- IED	PAINT SPEC.	DRY PAINT FILM TH. MICRON	PROCESS SPEC.	REMARKS
1	i. TRANSFORMER/ REACTOR TANK & COVER, TOP TANK BOTTOM TANK ii. TURRETS iii. INSPECTION COVERS, CONSERVATOR HEADERS	IN SIDE OUT SIDE	CHEMICAL & THERMAL RESISTANT EPOXY ENAMEL WHITE / CREAM SHADE i. CHEMICAL & THERM. RESIST EPOXY PRIMER. ii. CHEM. & THERM. RESISTANT EPOXY ENAMEL LIGHT GREY SHADE 631 OF IS : 5	2 2 2	SPRAY OR BRUSH SPRAY OR BRUSH SPRAY OR BRUSH	BP 56179 AA 56105 BP 56179	TOTAL DFT 50 Min. 50 Min. TOTAL DFT 100 Min.	TR10206P	EPOXY PAINTING
2	END FRAME, CLAMP PLATE, T.G. & T.C BRACKETS & OTHER STEEL PARTS GOING INSIDE TRANSFORMER TANK		CHEMICAL & THERMAL RESISTANT EPOXY ENAMEL WHITE / CREAM SHADE	2	SPRAY OR BRUSH	BP 56179	TOTAL DFT 50 Min.	TR10206P	
2 (A)	E/F, CLAMP PLATE, CROSS BEAM, T.G. & T.C BRACKET, OTHER STEEL PARTS GOING INSIDE TANK UPTO 400 KV CLASS FOR TRANS & REACTORS		OIL RESISTANT FULL GLOSSY WHITE PAINT	2	SPRAY OR BRUSH	BP 56183	TOTAL DFT 40 Min.	TR10211P	
3	BARE COPPER GOING INSIDE TRANS. TANK		ONE 50% OVERLAP WOUND LAYER OF CREPE KRAFT PAPER TO AA21117 TYPE B						
4	i. TRANSF. TANKS UPTO 400 KV CLASS ii. REACTOR TANKS UPTO 400 KV CLASS iii. SPARE COIL TANK iv. CONSERVATOR, RELIEF VENT, RAD HEADER v. CABLE BOX COMPOUND FILLED vi. TURRETS	IN SIDE OUT SIDE	OIL RESISTANT FULL GLOSSY WHITE PAINT i. ANTI CORROSIVE PRIMER PAINT ii. HIGH QUALITY FULL GLOSSY OUTDOOR FINISHING PAINT LIGHT GREY SHADE 631 OF IS : 5	2 2 2	SPRAY OR BRUSH SPRAY OR BRUSH SPRAY OR BRUSH	BP 56183 AA 56101 AA 56126	TOTAL DFT 40 Min. 40 Min. TOTAL DFT 80 Min.	TR10211P	

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SR NO	PARTS	SUR- FACE	PAINT	NO.OF COATS	HOW APPLIED	PAINT SPEC.	DRY PAINT FILM TH. MICRON	PROCESS SPEC.	REMARKS
5	PIPE WORK	IN SIDE	AS IN SL NO.4		FLOODING	BP 56183			
		OUT SIDE	AS IN SL NO.4	2	SPRAY OR BRUSH	AA 56101	40 Min.	TR10210P	
				2	SPRAY OR BRUSH	AA 56126	40 Min. TOTAL DFT. 80 Min.		
6	ROLLER ASSY, A-FRAMES, BREATHERS, STEEL PARTS OUTSIDE TRANSFORMER TANK	OUT SIDE	AS IN SL NO.4	2	SPRAY OR BRUSH	AA 56101	40 Min.	TR10211P	
				2	SPRAY OR BRUSH	AA 56126	40 Min. TOTAL DFT. 80 Min.		
7	RADIATORS	OUT SIDE	i. SELF ETCH PRIMER ii. ANTI CORROSIVE PRIMER iii. HIGH QUALITY FULL GLOSSY FINISHING PAINT	1 2	SPRAY OR BRUSH FLOODING OR SPRAY OR BRUSH	AA56103 AA56101 AA56126	5 Min. 40 Min. 40 Min. TOTAL DFT. 85 Min.	TR10205P	
8	ALL BLANKING DURING SHIPPING	IN SIDE OUT SIDE	AS IN SL NO.4 POST OFFICE RED FINISHING PAINT	2 2	SPRAY OR BRUSH SPRAY OR BRUSH	BP56183 AA56126	TOTAL DFT. 40 Min. TOTAL DFT. 40 Min.	TR10211P	
9	INSTRUMENT TRANSFORMER CT/CVT TANK	INSIDE EXCEPT SECONDARY TERMINAL BOX INSIDE SECONDARY TERMINAL BOX OUT SIDE	AS IN SL NO.4 i. ANTI CORROSIVE PRIMER PAINT. ii. NON YELLOWING FULL GLOSSY WHITE PAINT AS IN SL NO.4	2 2 2	SPRAY OR BRUSH SPRAY OR BRUSH SPRAY OR BRUSH	BP 56183 AA56101 AA56127 AA56101 AA56126	TOTAL DFT. 40 Min. TOTAL DFT. 40 Min. TOTAL DFT. 80 Min. 40 Min. 40 Min. TOTAL DFT. 80 Min.	TR10211P	

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SR NO	PARTS	SUR- FACE	PAINT	NO.OF COATS	HOW APPLIED	PAINT SPEC.	DRY PAINT FILM TH. MICRON	PROCESS SPEC.	REMARKS
10	MARSHALLING BOX/ KIOSK	IN SIDE	i. ANTICORROSIVE PRIMER PAINT. ii. NON YELLOWING FULL GLOSSY WHITE PAINT	2 2	SPRAY OR BRUSH	AA56101 AA56127	40 Min. 40 Min. TOTAL DFT. 80 Min.	TR10211P	
11	MARSHALLING BOX / KIOSK AIR FILLED CABLE BOX	OUT SIDE	— SAME AS IN SL. NO. 4 —	2 2	SPRAY OR BRUSH	AA56101 AA56126	40 Min. 40 Min. TOTAL DFT. 80 Min.	TR10211P	
12	PANELS MOUNTED INSIDE M.BOX/KIOSK	IN SIDE	i. ANTICORROSIVE PRIMER PAINT. ii. WHITE ANTI CONDENSATION PAINT	2 2	SPRAY OR BRUSH	AA56101 HE1006 BP56194	40 Min. 40 Min. TOTAL DFT. 80 Min.	TR10211P	
13	MARSHALLING BOX/ KIOSK PARTS INCLUDING PANELS EXPOSED TO CHLORINE CONTAMINATED ATMOSPHERE	OUT SIDE	— SAME AS IN SL. NO. 4 —	2 2	SPRAY OR BRUSH	AA56101 AA56126	40 Min. 40 Min. TOTAL DFT. 80 Min.	TR10211P	
14	NON FERROUS PARTS EXPOSED TO CHLORINE CONTAMINATED ATMOSPHERE	OUT SIDE	i. CHEMICAL & THERMAL RESISTANT EPOXY PRIMER PAINT. ii. CHEMICAL & THERMAL RESISTANT EPOXY ENAMEL WHITE SHADE i. CHEMICAL & THERMAL RESISTANT PRIMER PAINT. ii. CHEMICAL & THERMAL RESISTANT EPOXY ENAMEL PAINT LIGHT GREY SHADE 6310F IS:5 i. SELF ETCH PRIMER ii. CHEMICAL & THERMAL RESISTANT EPOXIDE PRIMING PAINT. iii. CHEMICAL & THERMAL RESISTANT EPOXY ENAMEL PAINT LIGHT GREY SHADE 6310F IS:5	2 2	SPRAY OR BRUSH SPRAY OR BRUSH	AA56105 BP56179 AA56105 BP56179	50 Min. 50 Min. TOTAL DFT. 100 Min. 50 Min. 50 Min. TOTAL DFT. 100 Min.	TR10206P	
15	RADIATORS (EPOXY PAINTING	OUT SIDE	— SAME AS IN SL. NO. 1 —	2 2	SPRAY OR BRUSH	AA56105 BP56179	50 Min. 50 Min. TOTAL DFT. 100 Min.	TR10208P	

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		EPOXY PAINTING				ALUMINIUM PAINTING			
10	9	8	7	6	5	4	3	2	1
REMARKS	PROCESS SPEC.	DRY PAINT FILM TH. MICRON	PAINT SPEC.	HOW APPLIED	NO. OF COATS	PAINT	SUR-FACE	PARTS	SR NO
	TR10206P	50 Min.	BP56179	SPRAY OR BRUSH	2	CHEMICAL & THERMAL RESISTANT EPOXY ENAMEL WHITE SHADE	IN SIDE	i. TRANSFORMER TANK & COVER, TOP TANK, BOT. TANK ii. TURRETS iii. INSPECTIONS COVERS, CONSERVATOR HEADERS	16
	TR10206P	50 Min. 50 Min. TOTAL DFT. 100 Min.	AA56105 BP56179	SPRAY OR BRUSH	2 2	i. CHEMICAL & THERMAL RESISTANT EPOXY PRIMER ii. CHEMICAL & THERMAL RESIST EPOXY ENAMEL LIGHT GREY SHADE 631 OF IS : 5	OUT SIDE	END FRAME, CLAMP PLATE, CROSS BEAM, T.G & T.C. BRACKETS, OTHER STEEL PARTS GOING INSIDE TRANS. TANK	17
	TR10211P	TOTAL DFT. 50 Min.	BP56179	SPRAY OR BRUSH	2	CHEMICAL & THERML RESISTANT EPOXY ENAMEL WHITE SHADE		TRANS. TANK, COVER, TURRETS, INSP. COVER, CONS., RAD. HEADERS, RELIEF VENT, CABLE BOXES, P.W. A-FRAME MARSHALLING BOX ETC.	18
	TR10209P	TOTAL DFT. 40 Min. 40 Min. TOTAL DFT. 80 Min.	BP56183 AA56101 AA56128	SPRAY OR BRUSH	2 2	OIL RESISTANT FULL GLOSSY WHITE PAINT i. ANTI CORROSIVE PRIMING PAINT. ii. ALUMINIUM PAINT	IN SIDE OUT SIDE	RADIATORS (ALUMINIUM PRINTING)	19
	TR10209P	40 Min. 40 Min. TOTAL DFT. 80 Min.	AA56101 AA56128	SPRAY OR BRUSH	2	I. ANTI CORROSIVE PRIMING PAINT. ii. ALUMINIUM PAINT	OUT SIDE		

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PRODUCT STANDARD
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1	2	3	4	5	6	7	8	9	10
SR NO	PARTS	SUR- FACE	PAINT	NO.OF COATS	HOW APPLIED	PAINT SPEC.	DRY PAINT FILM THK MICRON	PROCESS SPEC.	REMARKS
20	i. TRANSFORMER TANK & COVER, TOP & BOT. TANK	IN SIDE	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	*	SPRAY OR BRUSH	TRE/168	TOTAL DFT 50 Min	TR10265P	POLYURETHANE PAINTING
	ii. TURRETS	OUT SIDE	i. CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER ii. POLYURETHANE FINISHING PAINT.	*	SPRAY OR BRUSH	TRE/166	50 Min.		
	iii. INSPECTIONS COVERS, CONSERVATOR HEADERS, A-FRAMES, P/W ETC.			*		TRE/165	50 Min. TOTAL DFT 100 Min.		
	END FRAME, CLAMP PLATE, CROSS BEAM T.G & T.C. BRACKETS, OTHER STEEL PARTS GOING INSIDE TRANS. TANK		CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	*	SPRAY OR BRUSH	TRE/168	TOTAL DFT 50 Min.		
21	RADIATOR	IN SIDE	FLUSHED WITH VARNISH			TRE/382/03		TR10211P	
		OUT SIDE	i. CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER ii. POLYURETHANE FINISHING PAINT.	*	SPRAY OR BRUSH	TRE/166 OR AA56105 TRE/165 OR AA56142	50 Min. 50 Min. TOTAL DFT 100 Min.		
		IN SIDE	OIL RESISTANT FULL GLOSSY WHITE PAINT	2	SPRAY OR BRUSH	BP56183	40 Min.		
		OUT SIDE	i. CHEMICAL RESISTANT HIGH BUILD EPOXIED PRIMING PAINT OR CHEMICAL & THERMAL RESISTANT EPOXY PRIMER ii. POLYURETHANE FINISHING PAINT SHADE 631 OF IS:5	1 2 1 OR 2	SPRAY OR BRUSH	AA56109 AA56105 AA56142	50 Min. 50 Min. 50 Min. TOTAL DFT 100 Min.		

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PRODUCT STANDARD
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1	2	3	4	5	6	7	8	9	10
SR NO	PARTS	SUR- FACE	PAINT	NO.OF COATS	HOW APPLIED	PAINT SPEC.	DRY PAINT FILM TH. MICRON	PROCESS SPEC.	REMARKS
22	I. TRANSFORMER TANK & COVER, TOP & BOT. TANK ii. TURRETS iii. INSPECTIONS COVERS, CONSERVATOR HEADERS, A-FRAMES, PW ETC.	IN SIDE	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	*	SPRAY OR BRUSH	TRE/168	TOTAL DFT 50 Min	TR10257P	POLYURETHANE PAINTING
		OUT SIDE	i. CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER ii. EPOXY HB MIO iii. POLYURETHANE FINISHING PAINT.	*	SPRAY OR BRUSH	TRE/166 TRE/167 TRE/165	50 Min. 75 Min. 50 Min. TOTAL DFT. 155 Min.		
			CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT		SPRAY OR BRUSH	TRE/168	TOTAL DFT 50 Min.		
	END FRAME, CLAMP PLATE, CROSS BEAM, T.G & T.C. BRACKETS, OTHER STEEL PARTS GOING INSIDE TRANS. TANK	IN SIDE	FLUSHED WITH VARNISH			TRE/382/03			
		OUT SIDE	i. CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER ii. POLYURETHANE FINISHING PAINT.	*	SPRAY OR BRUSH	TRE/166 TRE/165	50 Min. 50 Min. TOTAL DFT. 100 Min.		
	RADIATOR								

NOTE TO DO:

1. EPOXY PAINTING TO BE CALLED WHEN SPECIFICALLY ASKED FOR BY THE CUSTOMERS.
2. EPOXY PAINTING HOWEVER TO BE CALLED WHEN EQUIPMENTS ARE TO BE INSTALLED IN CHEMICAL ATMOSPHERE OR NEAR SEA SHORES.
3. SHADE OF FINISHING PAINT IS TO BE COVERED ON MID/ DRAWINGS ALONG WITH RESPECTIVE S.NO. OF THIS STD.

(*) NUMBER OF COATS SHALL BE GIVEN TO ACHIEVE DFT AS PER COLUMN 08 .

NOTE TO SHOP:

1. PAINTING TO BE TOUCHED UP WHERE EVER REQUIRED BY TRANSFORMER SHOP BEFORE SHIPMENT.

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