

TR 15080 P PAGE 1 OF 3			COPYRIGHT AND CONFIDENTIAL used directly or in directly in any was detrimental to the company This Information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or directly in any was detrimental to the interest of the company					REF. COMP. DRG.																																																			
 From no.2038			उत्पाद मानक परिणामित्र शाय 1 अभि. निर्देश				PRODUCT STANDARD TRANSFORMER SHOP/ENGG. INSTRUCTION			TR 15080 P 3 पृष्ठों में 1 PAGE 1 OF 3																																																	
शीर्षक : TITLE :																																																											
10 REMA RKS POLYURETHANE PAINTING (WITH REFERENCE TO SPEC. TR10005 P (SL. NO.20)																																																											
9 PROCESS SPEC. TR10265P																																																											
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> </tr> <tr> <th>SL. NO.</th> <th>PARTS</th> <th>SUR-FACE</th> <th>PAINT</th> <th>NO.OF COATS</th> <th>HOW APPL-IED</th> <th>PAINT SPEC</th> <th>DRY PAINT FILM TK. MICRON</th> <th>PROCESS SPEC.</th> <th>REMA RKS</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TRANSFORMER TANK & COVER, TOP & BOTTOM TANK TURRETS INSPECTION COVERS, CONSERVATOR HEADERS, A-FRAMES PIPE WORKS, ETC...</td> <td>IN SIDE OUT SIDE</td> <td>CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER POLYURETHANE FINISHING PAINT</td> <td>* * * *</td> <td>SPRAY OR BRUSH SPRAY OR BRUSH SPRAY OR BRUSH</td> <td>TRE/ 168 TRE/ 166 TRE/ 165</td> <td>TOTAL DFT. 50 MIN. 50 MIN 50 MIN TOTAL DFT. 100 MIN</td> <td></td> <td></td> </tr> <tr> <td></td> <td>END FRAME, CLAMP PLATE, CROSS BEAMS, T.G. AND TAP CHANGER BRACKETS, OTHER STEEL PARTS GOING INSIDE TRANSFORMER TANK.</td> <td></td> <td>CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT</td> <td>*</td> <td>SPRAY OR BRUSH</td> <td>TRE/ 168</td> <td>TOTAL DFT. 50 MIN</td> <td></td> <td></td> </tr> <tr> <td></td> <td>RADIATOR</td> <td>IN SIDE OUT SIDE</td> <td>FLUSHED WITH VARNISH CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER POLYURETHANE FINISHING PAINT</td> <td>* *</td> <td>SPRAY OR BRUSH</td> <td>TRE/ 0382/03 TRE/ 166 TRE/ 165</td> <td>50 MIN 50 MIN TOTAL DFT. 100 MIN</td> <td></td> <td></td> </tr> </tbody> </table>										1	2	3	4	5	6	7	8	9	10	SL. NO.	PARTS	SUR-FACE	PAINT	NO.OF COATS	HOW APPL-IED	PAINT SPEC	DRY PAINT FILM TK. MICRON	PROCESS SPEC.	REMA RKS	1	TRANSFORMER TANK & COVER, TOP & BOTTOM TANK TURRETS INSPECTION COVERS, CONSERVATOR HEADERS, A-FRAMES PIPE WORKS, ETC...	IN SIDE OUT SIDE	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER POLYURETHANE FINISHING PAINT	* * * *	SPRAY OR BRUSH SPRAY OR BRUSH SPRAY OR BRUSH	TRE/ 168 TRE/ 166 TRE/ 165	TOTAL DFT. 50 MIN. 50 MIN 50 MIN TOTAL DFT. 100 MIN				END FRAME, CLAMP PLATE, CROSS BEAMS, T.G. AND TAP CHANGER BRACKETS, OTHER STEEL PARTS GOING INSIDE TRANSFORMER TANK.		CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	*	SPRAY OR BRUSH	TRE/ 168	TOTAL DFT. 50 MIN				RADIATOR	IN SIDE OUT SIDE	FLUSHED WITH VARNISH CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER POLYURETHANE FINISHING PAINT	* *	SPRAY OR BRUSH	TRE/ 0382/03 TRE/ 166 TRE/ 165	50 MIN 50 MIN TOTAL DFT. 100 MIN		
1	2	3	4	5	6	7	8	9	10																																																		
SL. NO.	PARTS	SUR-FACE	PAINT	NO.OF COATS	HOW APPL-IED	PAINT SPEC	DRY PAINT FILM TK. MICRON	PROCESS SPEC.	REMA RKS																																																		
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 From no.2038		उत्पाद मानक परिणामित्र शाप / अभि. निर्देश			PRODUCT STANDARD TRANSFORMER SHOP/ENGG. INSTRUCTION		TR 15080 P 3 पृष्ठों में 2 PAGE 2 OF 3
शीर्षक : TITLE :							
10	REMARKS	POLYURETHANE PAINTING (WITH REFERENCE TO SPEC. TR10005P (SL. NO.22)					
9	PROCESS SPEC.	TR10257P					
8	DRY PAINT FILM TK. MICRON	7	PAINT SPEC.	6	HOW APPLIED	5	NO. OF COATS
TOTAL DFT. 50 MIN.	TRE/ 168	SPRAY OR BRUSH	*	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	IN SIDE	2	PARTS
50 MIN	TRE/ 166	SPRAY OR BRUSH	*	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	OUT SIDE	1	SL. NO.
75 MIN	TRE/ 167	SPRAY OR BRUSH	*	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	IN SIDE	2	TRANSFORMER TANK & COVER, TOP & BOTTOM TANK TURRETS
50 MIN TOTAL DFT. 175MIN	TRE/ 165	SPRAY OR BRUSH	*	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	OUT SIDE	2	INSPECTION COVERS, CONSERVATOR HEADERS, A-FRAMES PIPE WORKS, ETC...
TOTAL DFT. 50 MIN	TRE/ 168	SPRAY OR BRUSH	*	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	IN SIDE	2	END FRAME, CLAMP PLATE, CROSS BEAMS, T.G. AND TAP CHANGER BRACKETS, OTHER STEEL PARTS GOING INSIDE TRANSFORMER TANK.
50 MIN TOTAL DFT. 100 MIN	TRE/ 165	SPRAY OR BRUSH	*	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT	OUT SIDE	2	RADIATOR
NOTES :- * 1- NO OF COATS SHALL BE GIVEN TO ACHIEVE DFT AS PER COLUMN 8. 2-SHADE OF FINISHING PAINT TO BE COVERED ON MID / DRAWING ALONGWITH SL. NO. 1 OR 2 OF THIS STANDARD 3-RELEVANT PRIMER, MIO (IF APPLICABLE), PU PAINT AND MATCHING SOLVENT SHALL BE OF SAME MAKE. 4-LIST OF SUPPLIERS AS PER SHEET 3. 5-PAINTING TO BE TOUCHED UP WHERE EVER REQUIRED BY TRFR. SHOP BEFORE SHIPMENT.							
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TR 15080 P PAGE 3 OF 3	COPYRIGHT AND CONFIDENTIAL used directly or in directly in any was detrimental to the company This information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or directly in any was detrimental to the interest of the company	REF. COMP. DRG.	 From no.2038	उत्पाद मानक परिणामित्र PRODUCT STANDARD TRANSFORMER शाप / अभि. निर्देश SHOP/ENGG. INSTRUCTION	TR 15080 P 3 पृष्ठों में 3 PAGE 3 OF 3																													
शीर्षक : TITLE :																																		
APPROVED VENDORS FOR TRE SPECIFICATION PAINTS:																																		
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">PAINT MAKE</th> <th>INTERNAL SURFACE</th> <th colspan="3">EXTERNAL SURFACE</th> </tr> <tr> <th>TRE/168</th> <th>TRE/166</th> <th>TRE/167</th> <th>TRE/165</th> </tr> </thead> <tbody> <tr> <td>ASIAN</td> <td>APCDDUR CF699 WHITE</td> <td>APCDDUR RAPID RECOAT ZP PRIMER GREY</td> <td>APCDDUR RAPID RECOAT HB MID</td> <td>APCOTHANE CF678</td> </tr> <tr> <td>AKZO NOBEL</td> <td>INTERLINE 1012 WHITE</td> <td>INTERGUARD 251</td> <td>INTERGUARD 966</td> <td>INTERTHANE 990</td> </tr> <tr> <td>JOTUN</td> <td>PENGAURD HB WHITE</td> <td>PENGUARG HSP ZP</td> <td>PENGUARG MID COAT MID</td> <td>HARD TOP XP</td> </tr> <tr> <td>CHING</td> <td>CHING EP EMC 182 WHITE</td> <td>CHING EP PRIMER EMD 183</td> <td>CHING EP MID EMD 30</td> <td>CHING EP TOP COAT ADD 47</td> </tr> </tbody> </table>						PAINT MAKE	INTERNAL SURFACE	EXTERNAL SURFACE			TRE/168	TRE/166	TRE/167	TRE/165	ASIAN	APCDDUR CF699 WHITE	APCDDUR RAPID RECOAT ZP PRIMER GREY	APCDDUR RAPID RECOAT HB MID	APCOTHANE CF678	AKZO NOBEL	INTERLINE 1012 WHITE	INTERGUARD 251	INTERGUARD 966	INTERTHANE 990	JOTUN	PENGAURD HB WHITE	PENGUARG HSP ZP	PENGUARG MID COAT MID	HARD TOP XP	CHING	CHING EP EMC 182 WHITE	CHING EP PRIMER EMD 183	CHING EP MID EMD 30	CHING EP TOP COAT ADD 47
PAINT MAKE	INTERNAL SURFACE	EXTERNAL SURFACE																																
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TR 10005 P

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PAGE 1 OF 6

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FORM NO. 2038
श्राव / अभि. निर्देश SHOP / ENGG. INSTRUCTIONS

PRODUCT STANDARD
TRANSFORMER
TR 10005 P
6 पृष्ठों में 1 PAGE 1 OF 6

शीर्षक :
TITILE : PAINTING INSTRUCTIONS

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
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 WHITE / SHADE I. CHEMICAL & THERM RESIST EPOXY PRIMER II. CHEM & THERM RESISTANT EPOXY. (FOR SHADE REFER H.D.)	2 2 2	SPRAY OR BRUSH SPRAY OR BRUSH SPRAY OR BRUSH	BP 56179 AA 56105 BP 56179	TOTAL DFT 50 Min 50 Min 50 Min TOTAL DFT 100 Min	TR1020UP	EPOXY PAINTING
2	EFF. CLAMP PLATE, CROSS BRACKET, T.C BRACKET, OTHER STEEL PARTS GOING INSIDE TANK UP TO 400 KV CLASS FOR TRANS & REACTORS		OIL RESISTANT FULL GLOSSY EPOXY WHITE PAINT.	2	SPRAY OR BRUSH	BP 56179	TOTAL DFT 40 Min	TR1021TP	
3	BARE COPPER GOING INSIDE TRANS TANK		ONE 50% OVERLAP WOUND LAYER OF GREP KRAFT PAPER TO AA21117 TYPE B						
4	I. TRANS TANKS UP TO 400 KV CLASS II. REACTOR TANKS UP TO 400 KV CLASS III. SPARE COIL TANK IV. CONSERVATOR RELIEF VENT (RAD) HEADER V. CABLE BOX VI. TURRETS	IN SIDE OUT SIDE	OIL RESISTANT FULL GLOSSY EPOXY WHITE PAINT. ANTI CORROSIVE PRIMER PAINT HIGH QUALITY FULL GLOSSY OUTDOOR FINISHING PAINT. (FOR SHADE REFER H.D.)	2 2 2	SPRAY OR BRUSH SPRAY OR BRUSH SPRAY OR BRUSH	BP 56179 AA 56105 AA 56126	TOTAL DFT 40 Min 40 Min 40 Min TOTAL DFT 50 Min	TR1021TP	

Rev. 18C दिनांक Date 13-2-18 Rev. 18B दिनांक Date 26/11/16	NOTE TO D.O SL. NO. 4 ADDED. Akgj. Jume	वितरण DISTRIBUTION TRX TRMVTM TRX FIG QC/CRQA-PCB BHANSI	मं. स्वीकृत किया : APPROVED : sd.SRR, sd.SNA जारी किया : ISSUED : टी.श्राव / अभि. मानक. TRX STD. तैयार किया : PREPD : SD/-SJ	दिनांक : DATE 23-03-1986
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PAGE 2 OF 6

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18C
दिनांक Date
13/2/18
पुनः Rev.
18B
दिनांक Date
26/11/16



उद्यम मानक
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शाय / अमि. निर्देश SHOP / ENGG. INSTRUCTIONS

PRODUCT STANDARD
TRANSFORMER

TR 10005 P

6 पृष्ठों में 2 PAGE 2 OF 6

1	2	3	4	5	6	7	8	9	10
SR NO	PARTS	SUR- FACE	PAINT	NO OF COATS	HOW APPLIED	PAINT SPEC.	DY PAINT FILM TH. MICRON	PROCESS SPEC.	REMARKS
5	PIPE WORK	IN SIDE	AS IN SL NO 4		FLOODING	BP 56179			
		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	1. SELF ETCH PRIMER 2. ANTI CORROSIVE PRIMER 3. HIGH QUALITY FULL GLOSSY FINISHING PAINT	1	SPRAY OR BRUSH	AA56103	6 Min.	TR10205P	
				2	FLOODING OR SPRAY OR BRUSH	AA 56126	40 Min. TOTAL DFT. 85 Min.		
8	ALL BLANKING DURING SHIPPING	IN SIDE OUT SIDE	AS IN SL NO 4	2	SPRAY OR BRUSH	BP 56179	40 Min. TOTAL DFT. 40 Min.	TR10211P	
			POST OFFICE RED FINISHING PAINT	2	SPRAY OR BRUSH	AA 56126	40 Min. TOTAL DFT. 40 Min.		
9	INSTRUMENT TRANSFORMER CIVIL TANK	INSIDE EXCEPT SECONDARY TERMINAL BOX	AS IN SL NO 4	2	SPRAY OR BRUSH	BP 56179	TOTAL DFT. 40 Min.	TR10211P	
		INSIDE SECONDARY TERMINAL BOX	1. ANTI CORROSIVE PRIMER PAINT 2. ANTI YELLOWING FULL GLOSSY WHITE PAINT	2	SPRAY OR BRUSH	AA56101 AA56127	40 Min. 40 Min. TOTAL DFT. 80 Min.		
		OUT SIDE	AS IN SL NO 4	2	SPRAY OR BRUSH	AA56101 AA56126	40 Min. 40 Min. TOTAL DFT. 80 Min.		

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PRODUCT STANDARD
TRANSFORMER

TR 10005 P

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6 पृष्ठों में 3

PAGE 3 OF 6

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
10	MARSHALLING BOX / KIOSK	IN SIDE	1. ANTICORROSIVE PRIMER PAINT 2. NON YELLOWING EPOXY PAINT GLOSSY WHITE PAINT	2	SPRAY OR BRUSH	AA56105 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	SPRAY OR BRUSH	AA56101 AA56126	40 Min 40 Min TOTAL DFT 80 Min	TR10211P	
12	PANELS MOUNTED INSIDE M BOX/KIOSK	IN SIDE	1. ANTICORROSIVE PRIMER PAINT 2. WHITE ANTI CONDENSATION PAINT	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 — (INSIDE) —	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	1. CHEMICAL & THERMAL RESISTANT EPOXY PRIMER PAINT 2. CHEMICAL & THERMAL RESISTANT EPOXY WHITE SHADE 1. CHEMICAL & THERMAL RESISTANT PRIMER PAINT 2. CHEMICAL & THERMAL RESISTANT EPOXY PAINT FOR SHADE REFER SL NO	2	SPRAY OR BRUSH	AA56105 BP56179	50 Min 50 Min TOTAL DFT 100 Min	TR10206P	
15	RADIATORS (EPOXY PAINTING)	OUT SIDE	1. SELF ETCH PRIMER 2. CHEMICAL & THERMAL RESISTANT EPOXIDE PRIMING PAINT 3. CHEMICAL & THERMAL RESISTANT EPOXY PAINT FOR SHADE REFER SL NO	2	SPRAY OR BRUSH	AA56105 BP56179	50 Min 50 Min TOTAL DFT 100 Min	TR10206P	

Rev. 18C
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Rev. 18B
Date 26/11/16

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PRODUCT STANDARD
TRANSFORMER

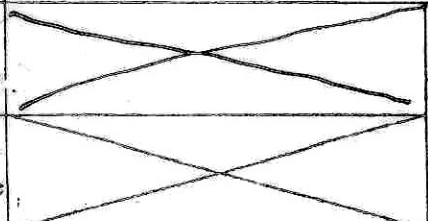
TR 10005 P

6 पृष्ठों में 4

PAGE 4 OF 6

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
16	1. TRANSFORMER TANK COVER, TOP TANK BOT. TANK 2. TURRETS 3. INSPECTIONS COVERS, CONSERVATOR HEADERS	IN SIDE	CHEMICAL & THERMAL RESISTANT EPOXY WHITE SHADE	2	SPRAY OR BRUSH	BP56179	50 Min		
		OUT SIDE	1. CHEMICAL & THERMAL RESISTANT EPOXY PRIMER 2. CHEMICAL & THERMAL RESIST EPOXY <i>(FOR SHADE REFER NO. 1)</i>	2 2	SPRAY OR BRUSH	AA58105 BP56179	50 Min 50 Min TOTAL DFT 100 Min	TR10206P	
17	END FRAME, CLAMP PLATE, CROSS BEAM, T.G & T.C. BRACKETS, OTHER STEEL PARTS GOING INSIDE TRANS. TANK		CHEMICAL & THERMAL RESISTANT EPOXY WHITE SHADE	2	SPRAY OR BRUSH	BP56179	TOTAL DFT 50 Min	TR10206P	
18	TRANS. TANK COVER, TURRETS, INSP. COVER, CONS., RAD. HEADERS, RELIEF VENT, CABLE BOXES, P.W. A-FRAME MARSHALLING BOX ETC	IN SIDE	OIL RESISTANT FULL GLOSSY EPOXY WHITE PAINT.	2	SPRAY OR BRUSH	BP 56179	TOTAL DFT 40 Min	TR10211P	
		OUT SIDE	1. ANTI CORROSIVE PRIMING PAINT. 2. ALUMINIUM PAINT	2 2	SPRAY OR BRUSH	AA55101 AA55128	40 Min. 40 Min. TOTAL DFT 80 Min	TR10206P	
19	RADIATORS (ALUMINIUM PAINTING)	OUT SIDE	1. ANTI CORROSIVE PRIMING PAINT. 2. ALUMINIUM PAINT	2	FLOODING SPRAY OR BRUSH	AA58101 AA55128	40 Min. 40 Min. TOTAL DFT 80 Min	TR10206P	

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Form no. 2038

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PRODUCT STANDARD
TRANSFORMER

SHOP / ENGG. INSTRUCTIONS

TR 10005 P

6 पृष्ठों में 5

PAGE 5 OF 6

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
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	TR1026SP	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, PW ETC.			.		TRE/165	50 Min TOTAL DFT 100 Min		
	END FRAME, CLAMP PLATE, CROSS BEAM, J.G & J.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/262/203		TR10211P	
		OUT SIDE	I. CHEMICAL & THERMAL RESISTANT EPOXY ZINC PHOSPHATE PRIMER II. POLYURETHANE FINISHING PAINT.	.	SPRAY OR BRUSH	TRE/166 OR AA56105	50 Min		
				.		TRE/165 OR AA56142	50 Min TOTAL DFT 100 Min		
				2	SPRAY OR BRUSH	BP56123	40 Min		
21	TRANSFORMER TANK COVER TOP TANK, BOT. TANK, TURRETS, INSPECTIONS COVERS, CONSERVATOR HEADERS, A-FRAMES, PW ETC.	IN SIDE	OIL RESISTANT FULL GLOSSY WHITE PAINT	2	SPRAY OR BRUSH	BP56123	40 Min	TR10228P	
		OUT SIDE	I. CHEMICAL RESISTANT HIGH BUILD EPOXIED PRIMING PAINT. OR II. CHEMICAL & THERMAL RESISTANT EPOXY PRIMER III. POLYURETHANE FINISHING PAINT (RECOMMENDED)	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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PAGE 6 OF 6



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TR 10005 P

पृष्ठ नं 6 PAGE 6 OF 6

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
2	1. TRANSFORMER TANK & COVER, TOP & BOT TANK 2. TURRETS 3. INSPECTIONS COVERS, CONSERVATOR HEADERS, PW ETC 4. END FRAME, CLAMP PLATE, CROSS BEAM, T G & T.C. BRACKETS, OTHER STEEL PARTS GOING INSIDE TRANS TANK 5. RADIATOR	IN SIDE	CHEMICAL & THERMAL RESISTANT EPOXY WHITE PAINT		SPRAY OR BRUSH	TRE/168	TOTAL DFT 50 Min	TR 102579	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		
		IN SIDE	FLUSHED WITH VARNISH			TRE/32203			
		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		

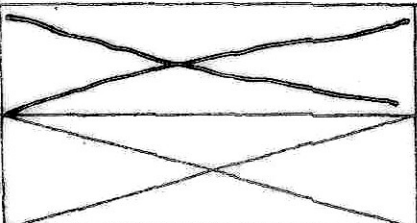
NOTE TO DO:

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.
4. POLYURETHANE PAINT AS PER S4 NO. 22 TO BE FOLLOWED FOR EXPORT JOBS.

NOTE TO SHOP -

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

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PRODUCT STANDARD
TRANSFORMER
SHOP/ENGG INSTRUCTIONS

TR 10257P

9 पृष्ठों में 1

Page 1 of 9

TITLE: - Painting System of Transformer Tank & Accessories, Radiators, Cooler Control Cabinets / RTCC Panels etc.

This instruction applies to the painting application procedure for Transformer Tanks, Conservators and other fittings, Radiators, Marshalling Box, and Cooler Control Cabinet etc. This instruction also includes surface preparation and pretreatment for painting of the fabricated parts.

1.0 MATERIALS:

1.1. For Painting on Transformer Tank & Accessories.

- | | |
|---|------------|
| 1.1.1. Epoxy Base Zinc Primer. | AA 56105 |
| 1.1.2. Epoxy HB MIO. | TRE/382/02 |
| 1.1.3. Aliphatic Polyurethane Finishing Paint shade 697 of IS 5 | AA 56142 |
| 1.1.4. Thinners for above as recommended. | |
| 1.1.5. Emery paper no 220, Wire Brush, Clean Cloth etc. | |
| 1.1.6. Nitro- Cellulose/Synthetic resin (epoxy) putty. | |
| 1.1.7. White Epoxy Enamel Paint. | BP 56179 |

1.2. For Painting on Marshalling Box and Control cabinets

- | | |
|---|------------|
| 1.2.1. Epoxy Base Zinc Primer. | AA 56105 |
| 1.2.2. Epoxy HB MIO. | TRE/382/02 |
| 1.2.3. Aliphatic Polyurethane Finishing Paint shade 697 of IS 5 | AA 56142 |
| 1.2.4. Thinners for above as recommended. | |
| 1.2.5. Emery paper, Wire Brush, Clean Cloth etc. | |
| 1.2.6. White Epoxy Enamel Paint. | BP 56179 |

1.3. For Painting on Radiators.

- | | |
|--|------------|
| 1.3.1. Epoxy Base Zinc Primer | AA 56105 |
| 1.3.2. Aliphatic Polyurethane Paints shade 697 of IS 5 | AA 56142 |
| 1.3.3. Etch Primer. | AA 56103 |
| 1.3.4. White Spirit. | AA 56701 |
| 1.3.5. Emery paper, Wire Brush, Clean Cloth etc. | |
| 1.3.6. Transformer Oil. | |
| 1.3.7. Oil resistant low viscosity varnish | TRE/382/03 |

2.0 MEASURING APPARATUS:

- 2.1 Alco meter for checking the Dry Film Thickness.
2.2 Ford Cup No 4 for measuring the Viscosity of the paint.
2.3 Cutter and Cello-tape for adhesion test.

Rev.
01
23.
08.04

Painting system on M. Box & control cabinets changed to epoxy. Painting system for RTCC added. Specification for MIO paint and Varnish updated.

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PAGE 1 OF 9

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		9 पृष्ठों में 2		Page 2 of 9	
3.0 PROCEDURE FOR PAINTING 3.1 GENERAL 3.1.1 Paint used for primer, under coat and top or finish coat should be from the same manufacturer and compatible to each other. 3.1.2 Store the paints and thinners in original sealed containers with clear identification marks indicating manufacturer's name, shade, designation and instruction for mixing & application. 3.1.3 Do not use paints after the shelf life has expired. 3.1.4 Open the containers just before application. 3.1.5 Thoroughly examine steel surface to be coated prior to commencement of work. Correct any condition that will adversely affect cleaning and coating application. 3.1.6 Inspect and test at each step of the painting operation before proceeding with the next step. 3.1.7 Verify that all painted surfaces are free from defects. If any defective area is found, repair and re-inspect before next operation. 3.2 SURFACE PREPARATION FOR INTERNAL AND EXTERNAL SURFACES: 3.2.1 For Transformer Tank, Turrets, Conservator, Header, & Frame, Pipe Work above 20 NB, External surface of pipe work up to 30 NB etc. Remove all the lamination, weld spatters, slag by scraping. Chamfer all the edges and remove sharp corners that cannot be properly painted. Remove oil, grease, dirt, dust etc. by using suitable degreasing agent and fresh water cleaning. Allow it to dry. After cleaning, check for any traces on substrate visually and re-clean if any traces are found. Sand, Shot or Grit blast the surface to Sa 2.5 in accordance with ISO 8501 Part 1 or Swedish standard SIS 055900. The fast angles, concealed areas shall be blast cleaned prior to fabrication & paint with one coat of primer prior to fabrication. After adequate blast cleaning of each large surface where blasting time is more than 3 hours, an overall blast cleaning is to be done on the entire surface once more so that entire surface areas is exposed as fresh for 1st coat of primer paint.					
Rev. 01 23. 08.04	Painting system on M. Box & control cabinets changed to epoxy. Painting system for RTCC added. Specification for MIO paint and Varnish updated. <i>A.K.G 15/9/04</i>	वितरण DISTRIBUTION TRE/TRM/FTM TRX/ITG/ QC-TCB/QA-TCB/ JHANSI	मं. CHECKED & APPROVED नैयार किया PREPD. Amulya Deota Sd-	S.G.Bokade Sd- जारी किया ISSUED टीआरडी/मानक TKE/STD.	दिनांक DATE 31.05.03

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PAGE 2 OF 9



Form No. 2038

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PRODUCT STANDARD

TRANSFORMER

SHOP/ENGG INSTRUCTIONS

TR 10257P

9 पृष्ठों में 3

Page 3 of 9

Compressed air used for the purpose must be dry and free from oil. Remove dust abrasive carefully by clean brush, by hosing with dry air. The first coat of primer or paint should be applied not later than 3-4 hours after surface preparation to avoid oxidation. Machined areas, Threaded components studs etc should be suitably protected during blast cleaning.

Note : Internal surface of pipe work upto 80 NB shall be cleaned by pickling process.

3.2.2 For Radiators

3.2.2.1 Radiator Element

3.2.2.1.1 Dressing & Grinding :

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

3.2.2.1.2 Degreasing and cleaning :

Single radiator element after air pressure testing under water shall be wiped with clean dry cloth piece to remove water and shall be degreased and cleaned to make the surface free from visible oil, grease & dirt, mill scale, rust, paint and other foreign matter using suitable chemicals.

3.2.2.2 Other parts of Radiator Assembly

All support and bracing details including header and header cover etc. shall be sand, shot or grit blasted in accordance with ISO 8501 part 1 or Swedish standard SIS 055900 Sa 2.5 to make the surface free from visible oil, grease & dirt, mill scale, rust, paint and other foreign matter. Compressed air used for blasting should be dry and free from oil.

3.2.2.3 Application of Etch Primer

One coat of Etch Primer shall be applied within 3-4 hours after shot blasting/chemical cleaning. Before application of Etch Primer coat, compressed dry air should be passed through the opening of radiator element as well as outside surface to remove dust etc. if any

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PAGE 3 OF 9

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			9 पृष्ठों में 4		Page 4 of 9	
3.2.3 For Marshalling Box, Control Cabinets etc. All weld, flame cut edges, sharp corners etc. shall be dressed. Surface preparation and phosphating shall be carried out by 7 tank process. 3.3 PAINT APPLICATION 3.3.1 General Perform mixing of paints as per manufacturers published instructions. Maintain the ratio of two components critically. Follow these instructions. 1. Painting to be carried out in closed and dust free area. 2. Paint used for primer, under coat and top or finish coat should be from the same paint manufacturer and compatible to each other. 3. Stir each component separately and then mix the hardener into resin and stir till uniform consistency is obtained. After mixing, the paint shall be allowed to mature for 30 minutes before use. 4. Consistency of the primer and finishing paint shall be maintained as per manufacturer's recommendations. Suitable thinner shall be used to achieve required consistency. 5. Set air pressure and volume of painting gun to achieve proper atomisation. 6. Apply a wet coat in parallel passes; overlap 50% to avoid bare areas and pinholes. 7. The time gap between any two successive coats shall not be more than 7 days. 8. When oven drying facility for coatings is available painted surface after each coat shall be allowed to air dry for 20 min at room temp there after forced dried in an oven at 90 ± 10 deg C for one hour. 9. In case oven drying facility is not available, painted surface shall be allowed to air dry for 16 hrs after each coat. 10. The number of coats shall be such that the minimum dry film thickness (DFT) specified is achieved. 11. The painted surface shall be allowed to air dry at shop temperature for 4 days before shipping.						
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				9 पृष्ठों में 5 Page 5 of 9
3.3.2 Painting of external surface of Transformer Tank, Turrets Conservator, Headers, A-Frames, Pipe Work, and Supporting Structures etc. [A] Application of Epoxy base zinc Primer: - Primer paint as prepared shall be applied by spraying / brushing over the sand, shot or grit blasted surface. DFT of the coat shall be 30-40 microns. [B] Application of Intermediate under coat : - Blow Dry compressed air on the entire primer painted surface and clean loose paint, dust etc. Intermediate Paint of Epoxy HB MIO paint shall be applied. DFT of the coat shall be 75 microns (min). [C] Finishing Coat: - Air hose the entire surface to remove loose paint, dust etc. Polyurethane finishing paint shall be applied by spraying / brushing. DFT of finishing coat shall be 50 microns (min). Total DFT of all the three coats shall be 155 microns (min). 3.3.3 Painting on internal surface of Transformer Tank, Turrets, Conservator, Headers, Pipe Work above 80 NB, Core Clamping Parts & all internal parts Internal surface of tanks and other items shall be painted not later than 3-4 hours after preparation of the surface. White Epoxy Enamel Paint to be applied by spraying / brushing. DFT of the coat shall be 30 microns (min). 3.3.4 Painting on External Surface of Marshalling Box, Cooler Control Cabinet [A] Application of Epoxy base zinc Primer: - Primer paint as prepared shall be applied by spraying / brushing. DFT of the coat shall be 30-40 microns. [B] Application of Intermediate under coat : - Blow Dry compressed air on the entire primer painted surface and clean loose paint, dust etc. Intermediate Paint of Epoxy HB MIO paint shall be applied. DFT of the coat shall be 75 microns (min).				
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Form No. 2038

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TRANSFORMER
SHOP/ENGG INSTRUCTIONS

TR 10257P

9 पृष्ठों में 6

Page 6 of 9

REF
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PAGE 6 OF 9

[C] **Finishing Coat:** - Air hose the entire surface to remove loose paint, dust etc. Polyurethane finishing paint shall be applied by spraying / brushing. DFT of finishing coat shall be 50 microns (min).

Total DFT for Marshalling Box & Control Cabinet shall be 155 microns (min).

3.3.5.1 Painting on internal surface of Marshalling Box and Control Cabinets

Internal surface shall be painted by Two Coats of Epoxy primer followed by White Epoxy Enamel Paint. by spraying / brushing. DFT of total coats shall be 50 microns (min).

3.3.5.2 Painting on RTCC Panels

RTCC panels shall be powder coated as per Std. AA0674124.

3.3.6 Painting on Internal Surface of Radiators and pipe work upto 80 NB

Internal surface of the radiators and pipes upto 80 NB shall be flushed with oil proof low viscosity varnish. Allow the surface to dry for 8 hours Varnish coated surface shall be flushed with transformer oil.

3.3.7 Painting on External Surface of Radiators.

3.3.7.1 Brush / Spray painting of support and bracing detail for radiator elements and radiator header and outside of header cover

Epoxy Primer shall be applied by brush at the surface between the flutes before welding elements with header. Drying time for the coat shall be 16 hours.

3.3.7.2 Assembly of Radiators

The radiator shall be assembled after application of Etch Primer and Epoxy Primer Paints between flutes on radiator elements. Degreasing and rust removal shall be done of all support & bracing details for radiator elements as well as radiator header & outside of header.

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TRANSFORMER
SHOP/ENGG INSTRUCTIONS

TR 10257P

9 पृष्ठों में 7

Page 7 of 9

3.3.7.3 Painting of Assembled Radiators

[A] First coat of Epoxy base zinc primer

First coat of Epoxy base zinc primer shall be applied by brushing / spraying. Thickness of the coat shall be 30-40 microns. The painted surface shall be allowed to air dry for 16 hours.

[B] Second coat of Epoxy base zinc primer

The second coat of epoxy base zinc primer shall be applied by brushing / spraying. The painted surface shall be allowed to air dry for 16 hours before the first coat of finishing paint is applied. Thickness of the coat shall be 30-40 microns.

[C] Final Coat of Aliphatic Polyurethane Paints

Aliphatic Polyurethane Finishing Paint (shade 697 of IS 5) shall be applied at the appropriate viscosity by brushing / spraying. The painted surface shall be allowed to air dry for 16 hours. Thickness of the coat shall be 50 microns (min).

Total DFT of primer and finish coats shall be 110 microns (min).

4.0

Testing

1. Painted surfaces shall be visually checked for defects like rundown, bubbles, blisters wrinkles etc. and for any area not covered by the coat.
2. Dry film thickness (DFT) shall be checked after every coat as per ASTM D1186.
3. Adhesion test shall be carried out as per ASTM D 3359-83.

4.1

Maintenance & touch up paint (External Surface)

In case any area of paint is damaged during handling / transport or is rectified by welding / heating after painting, following procedure shall be carried out on damaged areas.

4.1.1 Clean the surface thoroughly by convenient tools. No trace of oil / carbon should be left on the surface. If rusting has taken place, it should be removed by emery paper.

4.1.2 Apply Surface Tolerant Epoxy Priming Paint to give a DFT of 50 microns.

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PAGE 7 OF 9

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PRODUCT STANDARD

TRANSFORMER

SHOP/ENGG INSTRUCTIONS

TR 10257P

9 पृष्ठों में 8

Page 8 of 9

4.1.3 Apply finish coat of Aliphatic Polyurethane paint to get total paint thickness of 155 microns minimum.

5.0 GENERAL INSTRUCTION

5.1 Painting after dye penetrant test:

When jacking and lifting tests are to be performed on the transformers, load bearing welds, these areas are not painted immediately after sand / shot / grit blasting of the tank. Following procedure is to be adopted for painting in this area.

5.1.1 Whenever any area is to be left unpainted for DP test, apply adhesive tape on that area after blasting & before painting.

5.1.2 After completing the dye penetration test, remove tape and apply cleaner over the entire area and remove the dye and developer from that area.

5.1.3 Clean the area with general purpose thinner.

5.1.4 Clean the entire surface with a wire brush and do the painting as per given system procedure.

5.2 It is very essential to remove all the abrasives and dust generated by abrasive blasting. It may otherwise lead to premature failure of paint.

5.3 If minimum specified thickness is not achieved with one coat additional coat to be given after drying to achieve desired thickness.

5.4 Mix only sufficient quantity of paint required for immediate use. Do not use the paint once the pot life indicated is over, even after thinning.

5.5 Acceptance criteria for Dry film thickness measurement (90-10 rule)

For each area

- less than 10% of the reading may be below the specified total dry film thickness.

- No reading must be below 90% of the DFT specified.

5.6 All the earthing pads and bosses (if not protected during painting) should be cleaned free of paint before dispatch.

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PAGE 8 OF 9

Rev.
01
23.
08.04

Painting system on M. Box & control cabinets changed to epoxy. Painting system for RTCC added. Specification for MIO paint and Varnish updated.

AKG 15/9/04

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Page 9 of 9

6.0 PRECAUTIONS :-

- 6.1 Mix only a sufficient quantity of paint required for immediate use for 2 hours.
- 6.2 Do not use leftover paint, which progressively hardens, and become unusable by adding thinner.
- 6.3 For wiping or cleaning the dust or loose particles from painted surface, use cotton rags only. Do not use cotton waste as it will leave loose fibers on the surface.
- 6.4 Painted surface if damaged, should be retouched up with similar procedure depending upon the extent of film exposed.

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PAGE 9 OF 9

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