

Reference : CC-ENGG-9587-001-104-PVM-H-002

Date : 20/05/2024

From : RAMESH CHANDRA SHIAL
ENGINEER

To : BHARAT HEAVY ELECTRICALS LTD
NEW DELHI
110049
IN

Cc : singhjp@bhel.in

Subject : EPC Package

Please find enclosed following drawings/ documents for necessary action at your end.

Vendor Drg. No. : PS:LARA:EPC:R8/1555

Orgn. Drg. No. : 9587-001-104-PVM-H-002

Revision No. : 02

Drg. Title : PAINTING SCHEME FOR SG AREA FANS, ESP, GATES & DAMPERS
AND APH

App. Category : CAT-I

Release Date : 20/05/2024



Scan to verify

Comments : No Comment

	Bharat Heavy Electricals Limited Boiler Auxiliaries Plant Ranipet – 632 406		
	BHEL DOC NO.	PS:LARA:EPC:R8/1555	
	REVISION NO.	02	
DATE		18-05-2024	

NTPC LARA STPP STAGE – II (2 X 800 MW) - EPC PACKAGE**PAINTING SCHEDULE FOR FANS, APH, ESP AND G&D****NTPC CONTRACT NO: CS-9587-001R-2-FC-NOA-7332 dated 29.08.2023****NTPC DRAWING NO: 9587-001-104-PVM-H-002; REV:00****BHEL RANIPET Customer No(s): R8/1555, R8/1556**

Prepared & Reviewed By	Approved By
	
Renjith K / Manager (QA)	Aravindhan D / DGM (Quality)

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

RECORD OF REVISION

DETAILS OF REVISION MADE								
00	11-04-2024	Original issue – first submission						
01	03-05-2024	Customer comment: For all the equipment’s Shade: Grey white RAL9002 for all the equipment’s with finish enamel paint to be maintained BHEL reply: Incorporated. Customer comment: In other NTPC projects surface exposed to higher temperature Aluminum Gr-I has been considered. BHEL to adopt the same philosophy BHEL reply: Heat resistant aluminium paint grade identified as per tender clause no. 1.06.05 (PS9*) based on temperature and the same is technically acceptable. Request to review and accept the proposed Heat resistant aluminium paint as per tender requirement. Customer comment: Fans sl. No. 2 and sl. No. 10 finish paint to be clarified as Two pack aliphatic isocyanate cured acrylic finish paint. BHEL reply: Updated.						
02	18-05-2024	Customer comment: Please mark the revision number in the drawing. BHEL reply: Rev. 01 changes marked with "  " symbol. Customer comment: BHEL to furnish list of Gates & Damper > 95°C and up to 200°C category identified in Product 3) Gates & Damper, Sl. No. 02. BHEL reply: 57430 (Flue Gas APH Outlet Gate), 57460 (ESP Inlet Gate), 57470 (ESP Outlet Gate), 57480 (ID Fan Inlet Gate), 57490 (ID Fan Outlet Gate), 57CX0 (CO2 to methanol system tap-off Gate). Sl. No. 01 & 02 Temperature details also included in surface location column for better clarity. Rev. 02 changes marked with "  " symbol.						

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1. AIR PRE HEATER (APH)

01	Steam coil APH Temp > 95°C	50510	Power Tool cleaning to St3 (SSPC-SP3)	Heat Resistant Aluminum Paint Gr II to IS 13183 (Two Coats)	40	--	--	40
02	Module assembly – Temp > 95°C	52010	Power Tool cleaning to St3 (SSPC-SP3)	Two Coats Red Oxide Zinc phosphate prime to IS:12744	60	--	--	60
03	Heating Element with Baskets	52010	Power Tool cleaning to St3 (SSPC-SP3)	Temporary Rust Preventive Oil application (Wet) as per PRQA 522 Note: Heating elements are assembled in module assy after dipping in the rust preventive fluid				
04	Rotor post assembly – Temp > 95°C	52011	Power Tool cleaning to St3 (SSPC-SP3)	Two Coats Red Oxide Zinc phosphate prime to IS:12744	60	--	--	60
05	Pin rack assembly	52012	---	Temp rust preventive as per PRQA 523	20	--	--	20
06	Radial Seals –Temp > 95°C	52013	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	--	--	60
07	Rotor Housing Assembly – Temp > 95°C	52030	Insulated Side	Temporary rust preventive Oil as per PRQA 523	20	--	--	20
			Flue gas Swept Surface	Heat Resistant Aluminum Paint Gr II to IS 13183 (Two Coats)	40	--	--	40
08	Hot and Cold End Connecting Plate Assembly – Temp > 95°C	52041 52042	Insulated Side	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	--	--	60
			Flue gas Swept Surface	Heat Resistant Aluminum Paint Gr II to IS 13183 (Two Coats)	40	--	--	40
09	Axial seals	52054	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	--	--	60
				Temp. Rust Preventive Oil as per PRQA 523	20	--	--	20

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10	Bypass seals	52055	Power Tool cleaning to St3 (SSPC-SP3)	Temp. Rust Preventive Oil as per PRQA 523	20	--	--	20
11	Rotor Drive assembly With bracket, Air Motor, Gear Box– Temp <95°C	52100	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
12	Air seal piping Temp < 95° C	52211	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
13	Access door – Temp. > 95 ° C	52220	Power Tool cleaning to St3 (SSPC-SP3)	Heat Resistant Aluminium Paint Gr II to IS 13183 (Two Coats)	40	--	--	40
14	Observation port with light	52220	No painting, as the same is made of Glass					
	Other than glass part– Temp > 95°C	52220	Power Tool cleaning to St3 (SSPC-SP3)	Heat Resistant Aluminium Paint Gr II to IS 13183 (Two Coats)	40	--	--	40
15	Rotor Stoppage alarm	52220	Made of Aluminium (No painting is required)					
	Other than aluminium -- Temp > 95°C		Power Tool cleaning to St3 (SSPC-SP3)	Heat Resistant Aluminium Paint Gr II to IS 13183 (Two Coats)	40	--	--	40
16	Air receiver– Temp < 95°C	52101	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
17	Lifting beams, special Tools & tackles – Temp < 95°C	52220 52000	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
18	T C pipe Assy. (Stainless Steel part)	52220	No Painting					
	T C pipe Assy. (Non Stainless Steel part)– Temp < 95°C	52220	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100

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19	Guide Bearing Assembly– Temp < 95°C	52261	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
20	Supporting Bearing Assembly– Temp < 95°C	52262	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
21	Oil piping Hot end– Temp < 95°C	52271	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
22	Oil piping cold end– Temp < 95°C	52272	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
23	Oil circulating units – Temp < 95°C	52274	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
24	Washing manifold & deluge assy items– Temp < 95°C	52301 52302	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
25	Cleaning Device assemblies Tube with Nozzle, HP pump – Temp < 95°C	52338 52339 52341	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
26	Cleaning device drive– Temp < 95°C	52339	Power Tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
27	Commissioning spares and Mandatory spares	52988	As per respective items as above					

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2. FANS

01	Foundation Material of FD, ID & PA Fans	55011 55021 55031	Temp. Rust Preventive Fluid as per PRQA 523		20	NIL	NIL	20
02	Foundation Matl of FD, ID & PA Fans – Packer Plates	55011 55021 55031	Primer Coat: One coat of Inorganic Ethyl Zinc Silicate Primer to IS 14946, (Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat		70	Two coats of two pack Aliphatic Isocyanate cured Acrylic Finish Paint to IS 13213 (solid by volume- 55% (min) DFT = 35 µm per coat, Shade: Light blue RAL 5012	70	240
	Seal Air Fan Motor Base Frame / Plate	56670	Intermediate Coat: One coat of polyamide cured Epoxy based MIO pigmented Intermediate coat (solid by volume- 80% (min) DFT = 100 µm per coat		100			
	Base Frame for Actuators of FD, ID & PA Fans	55516 55628 55635						
03	FD FAN <95° C Surface Temperature Static Parts - Insulated Surface (Outside) & Ambient Air swept surface (Inside) setting & indication shaft assy, expansion joint parts	55516 55716 55816 55410 55510	Power tool cleaning to St3(SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
	Rotating Parts (Inside the Insulated static parts – protection up to erection)	55216	Power tool cleaning to St3 (SSPC-SP3)	Epoxy based Zinc Phosphate Primer (Two Pack system) as per IS:13238 (Two coats) per coat= 30µm & Total DFT = 60 µm min.	60	NIL	NIL	60
04	ID FAN >95° C Surface Temperature Static Parts - Insulated Surface (Outside), expansion joint parts	55628 55728 55828 55420 55520	Power tool cleaning to St3(SSPC-SP3)	One coat of HR Aluminium Paint to IS:13183 Gr. II	20	One coat of HR Aluminium Paint to IS:13183 Gr. II	20	40
	Static Parts – Flue gas swept surface (Inside), setting & indication shaft assy		Power tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	NIL	60
	Rotating Parts - (Inside the insulated Static Parts – protection up to erection)	55328	Power tool cleaning to St3(SSPC-SP3)	Epoxy based Zinc Phosphate Primer (Two Pack system) as per IS:13238 (Two coats) per coat= 30µm & Total DFT = 60 µm min.	60	NIL	NIL	60

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				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
05	PA FAN <95° C surface Temperature Static parts – Insulated Surface (Outside) & Ambient Air swept surface (Inside) setting & indication shaft assembly, expansion joint parts	55635 55735 55835 55430 55530	Power tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
	Rotating Parts (Inside the insulated static parts- protection up to erection)	55335	Power tool cleaning to St3 (SSPC-SP3)	Epoxy based Zinc Phosphate Primer (Two Pack system) as per IS:13238 (Two coats) per coat= 30µm & Total DFT = 60 µm min.	60	NIL	NIL	60
06	Coupling and coupling Guard – for FD, ID & PA FAN & Seal Air FAN, SA Fan motor canopy, FD, ID, PA Fan motor canopy, FD, ID, PA Fan LOS canopy, Fan Tools and fixture – temp < 95°C	55000 55015 55025 55035 56075 56079 55810 55820 55830 56870 55019 55029 55039 55210 55220 55330	Power tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
	Lub oil System – For FD, ID & PA FAN	55910 55920 55930	Power tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
08	Silencer for FD & PA FAN <95° C Surface Temperature Insulated Surface	55911 55931	Power tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100

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09	Radial pent house ventilation fan /ID sealing /cooling fans/ Radial Seal Air Fan, Radial seal air fan stator <95° C Surface Temperature	55024 56161 56173 56373 56473	Power tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats) 	40	100
10	FD, ID, PA & SA Fan Stair & Handrail - Galvanizing items (as per BHEL Engineering document)	55012 55022 55032 56072	Gratings- Blast cleaning to Sa 2½ Other Items- Power tool cleaning to St3 (SSPC-SP3) and acid cleaning	Hot Dip Galvanizing to 610 gm sq. Meter (minimum) and to a coating thickness of 85 µm (minimum)				
	FD, ID, PA & SA Fan Stair & Handrail – Other than galvanized structural items		Blast Cleaning to SA 2 ½ (Near white metal) with surface profile 40 – 60 µm	Primer Coat: One coat of Inorganic Ethyl Zinc Silicate Primer to IS 14946, (Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat Intermediate Coat: One coat of polyamide cured Epoxy based MIO pigmented Intermediate coat (solid by volume- 80% (min) DFT = 100 µm per coat	70 100	Two coats of two pack Aliphatic Isocyanate cured Acrylic finish Paint to IS 13213 (solid by volume- 55% (min) DFT = 35 µm per coat, Shade: Light blue RAL 5012 	70	240

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3. GATES & DAMPER

01	Gates & Dampers (200 ° C to 400 ° C) Insulated Surfaces 	57203, 57223, 57270, 57273, 57620	Power tool cleaning to St3 (SSPC-SP3)	HR Aluminium Paint to IS: 13183 Gr. II (200 ° C to 400 ° C) – Two Coats	40	--	--	40
02	Gates & Dampers > 95°C up to 200 °C Insulated Surfaces 	57430, 57460, 57470, 57480, 57490, 57CX0	Power tool cleaning to St3 (SSPC-SP3)	HR Aluminium Paint to IS: 13183 Gr. III (up to 200 ° C) – Two Coats	40	--	--	40
03	Gates & Dampers, Seal Air piping < 95 ° C	57010, 57033, 57063, 57083, 57110, 57113, 57141, 57S41, 57143, 57160, 57173	Power tool cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two Coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats) 	40	100
04	Ladder, Cage for Ladder, Toe Guard Plate Floor Grill, Hand Rails, Hand Rail Post,	57466 57666	Gratings- Blast cleaning to Sa 2½ Other Items- Power tool cleaning to St3 (SSPC-SP3) & Acid cleaning	Hot Dip Galvanizing to 610 gm per Sq. Meter (minimum) and to a coating thickness of 85 µm (minimum)				
05	Other Structural Items – other than sl.no. 4 of above. Blower with motor, valves, Mounting bracket	57466, 57666, 57209, 57491, 57S91, 57497, 57S97	Power tool cleaning to St3(SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two Coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats) 	40	100
06	Ducts Commissioning Spares	57988	As per respective items mentioned in this Painting Scheme					

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4. ELECTROSTATIC PRECIPITATOR (ESP OR EP)

1	Insulator Housing Assembly– Temp > 95°C	79906	Power Tool Cleaning to st3 (sspc-sp3)	Heat Resistant Aluminum paint to IS 13183 Gr. II (200 °C to 400 °C) (Two Coats)	40	NIL	--	40
2	Gas Distribution Assembly– Temp > 95°C	79908	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
3	GD Rapping Mechanism– Temp > 95°C	79909	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
4	GD Drive Arrangements– Temp< 95°C	79910	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats))	40	100
5	Gas Screening– Temp > 95°C	79911	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
6	Emitting System suspension– Temp > 95°C	79913	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
7	Emitting Electrode –Hook Part	79915	Rust preventive application on Hook part only (Electrode Wire is Stainless Steel)					
8	Emitting Electrode Rapping Mechanism– Temp > 95°C	79916	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
9	Drive Arrangement for Emitting System– Temp < 95°C	79917	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
10	Suspension Arrangement for Collecting Electrode– Temp > 95°C	79919	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
11	Collecting Electrode	79920	Rust Preventive Fluid as per TEP AQCS RP					

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12	Lifting Beam for Collecting Electrode	79920	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats) 	40	100
13	Frame Of Emitting System- Top– Temp > 95°C	79921	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
14	Frame Of Emitting System - Bottom– Temp > 95°C	79922	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
15	Inspection /Access Door	79923	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats) 	40	100
16	Shock Bars - -- Temp > 95°C	79924	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
17	Collecting Electrode (CE) Rapping Mechanism – Temp > 95°C	79925	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
18	Drive Arrangements for CE Rapping – Temp < 95°C	79926	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats) 	40	100
19	ESP Roof Beams – Temp > 95°C	79928	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
20	Frame of Emitting System – Middle– Temp > 95°C	79932	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
21	Outer Roof –EP - – Temp < 95°C	79942	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats) 	40	100
22	Hopper Ridges– Temp > 95°C	79943	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60

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23	Hopper Upper part – Temp> 95°C	Insulated side	79944	Power Tool Cleaning to st3 (SSPC-SP3)	Heat Resistant Aluminum paint to IS 13183 Gr. II (200 °C to 400 °C) (Two Coats)	40	NIL	--	40
		Flue Gas Swept Surface			Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
24	Hopper Middle & Lower part– Temp > 95°C	Insulated side	79945	Power Tool Cleaning to st3 (SSPC-SP3)	Heat Resistant Aluminum paint to IS 13183 Gr. II (200 °C to 400 °C) (Two Coats)	40	NIL	--	40
		Flue Gas Swept Surface			Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
25	Insulator Support Panel– Temp > 95°C	Insulated Side	79946	Power Tool Cleaning to st3 (SSPC-SP3)	Heat Resistant Aluminum paint to IS 13183 Gr. II (200 °C to 400 °C) (Two Coats)	40	NIL	--	40
		Flue Gas Swept Surface			Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
26	Roof Panel Assy– Temp > 95°C	Insulated Side	79947	Power Tool Cleaning to st3 (SSPC-SP3)	Heat Resistant Aluminum paint to IS 13183 Gr. II (200 °C to 400 °C) (Two coats)	40	NIL	--	40
		Flue Gas Swept Surface			Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
27	Casing Structure– 95°C	Temp >	79948	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
28	Casing (Shell, Side Panels, Gables & GD Housing)– Temp > 95°C	Insulated Side	79949	Power Tool Cleaning to st3 (SSPC-SP3)	Heat Resistant Aluminum paint to IS 13183 Gr. II (200 °C to 400 °C) (Two coats)	40	NIL	--	40
		Flue Gas Swept Surface			Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60

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					PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
29	ESP Funnel Assembly – Temp > 95°C	Insulated Side	79950	Power Tool Cleaning to st3 (SSPC-SP3)	Heat Resistant Aluminum paint to IS 13183 Gr. II (200 °C to 400 °C) (Two coats)	40	NIL	--	40
		Flue Gas Swept Surface			Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	
30	ESP Pent House– Temp <95°C (Other than columns) Columns- Refer to SI no: 38		79955	Power tool cleaning to St3(SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
31	Splitters & Guide Vanes– Temp > 95°C		79957 79989	Power tool cleaning to St3(SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
32	ESP Performance Test Equipment– Temp < 95°C		79961	Power tool cleaning to St3(SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
33	Water Washing System– Temp < 95°C		79966	Power tool cleaning to St3(SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100
34	Hand Rail Post, Bend, ERW Tubes, Floor Grill and Step Tread		79965 89610 89611 89612 89613	Gratings- Blast cleaning to Sa 2½ Other Items- Power tool cleaning to St3(SSPC-SP3) and acid cleaning	Hot Dip Galvanizing to 610 gm sq. Meter (minimum) and to a coating thickness of 85 µm (minimum)				
35	Commissioning Spares		79988	As per respective item , as listed in the painting schedule					
36	Tools & Tackles– Temp < 95°C		79996	Power tool cleaning to St3(SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS2932 Shade: Grey White RAL 9002 (Two coats)	40	100

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
37	Approach Platform For Hopper	79965	Blast Cleaning to Sa 2.5 Near White metal finish of ISO 8501-1 with surface roughness profile to 40-60 µm	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946, (Solid by volume- 60% (min)) Metallic Zinc content- 80% (min) in dry film, DFT = 70µm per coat (min) Zinc dust composition quality shall be Type-II as per ASTM D520-00 Intermediate Coat: One coat of two component Polyamide cured Epoxy based MIO pigmented (containing lamellar MIO min 30% on pigment) Intermediate coat (solid by volume- 80% (min) DFT = 100µm per coat (min)) Finish Coat: Two coats of Two Pack Aliphatic isocyanate cured Acrylic Finish Paint to IS 13213 (solid by volume- 55% (min) DFT = 35 µm per coat (min) , with gloss retention (SSPC paint spec no.36, ASTM D4587, d2244, d523 of level 2 after min. 1000 hours exposure, gloss loss less than 30 and colour change less than 2.0ΔE Total- 70 µm (min) Shade Light Blue RAL5012 Note: 1. The total paint thickness (Primer (70 µm) + Intermediate (100 µm) + Finish coat (70 µm) shall be minimum 240 µm . 2. DFT of individual paint coat shall be ensured separately and the same shall meet the specified minimum DFT of each coat as given above. 3. Bottom of base plate including below zero level portion marked in EP Supporting Columns which will be embedded in concrete, those surfaces shall be prepared by manual cleaning to ST3 and provided with primer coat of chlorinated rubber based zinc phosphate primer of min. 50 µm DFT.				
38	Supporting Structure for ESP, Penthouse columns (Refer note 5 for surface embedded in concrete)	79955 79981						
39	Other than galvanized items vide sl. No. 34, like Stair stringer Channels, Bracket, Support Bracket, Frames Loose Channels , Toe Plates, Stiffener Plates and Angles for EP Galleries ,Stair and Walk Way	79965 89610 89611						

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

5. PAINTING OF DAMAGED AREAS

Areas where paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion property and where the steel has got rusted appreciably - these areas are to be repainted as per the following procedure:

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER, INTERMEDIATE & FINISH
1	Paint damaged Components falling under sl.no. 02, 10 of FAN and sl.no. 37,38,39 of ESP	Surface preparation by manual cleaning. Minimum 6" of surrounding areas with existing coat to be roughened by wire brush & emery paper for best adhesion by patch primer	1. Primer: One coat of Self priming Epoxy Zinc rich primer to IS:14589 Gr.II to DFT of 70 µm (min.) 2. Intermediate and Finish: As given in respective scheme as above 3. If primer is intact, intermediate and finish to be done as per the respective scheme.
2	Paint damaged components falling under other sl. Nos. of APH, FAN, GATE & DAMPER and ESP		Primer and Finish : As given in respective scheme

6. GENERAL NOTES

- No painting is required for Galvanized, non-ferrous & stainless steel items, except as indicated above.
- Machined items are to be applied with coat of temporary rust preventive oil
- PGMAs covered in sub-supplier (ie., Purchased) items viz., support bearing / slide bearing and other sub-delivery components of ESP etc., are not indicated in the above list. However, the Painting Schedule for all items supplied by all sub-suppliers and BOI under the scope of BHEL shall be same as for main equipment covered in this document. For all site erection shop materials Red Oxide Zinc Phosphate Primer shall be applied to meet the temporary protection.
- In sub-assembly, wherever plates / sheets of thickness less than or equal to 5mm and rods are used, very minor items like clamps, small items etc. tiny items of weight less than 25 Kg - Power Tool or Hand Tool Cleaning to SSPC - SP 3 / SP 2 and painting as per FAN, sl. No. 6 shall be followed.
- Ground shade / colour of finish paints and identification tag/band for equipments, fans, piping, pipe services, supporting structures and other components followed as per NTPC doc ref no: QS-01-DIV-W-4, Rev.00.
- DFT shall meet the specified value. In case of non-meeting of DFT in number of coats specified, subsequent coats shall be applied to meet specified DFT.
- All components covered under different PGMAs are to painted. In case any component is left out, the same shall deemed to be included under the relevant section.
- All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves, HSFG bolts shall be coated with temporary rust preventive fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
- Weld edges made for site welding shall be manual cleaned by wire brush and shall be applied with weldable primer.
- All steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of corrosivity category C3 (durability high) as per ISO 12944.
- Heat resistant aluminum paint – the usage of Gr – I or Gr – II in place of Gr – III or Gr – I in place of Gr-II is technically acceptable.
- The primer coat shall be applied in shop immediately after blast cleaning by airless spray technique. Intermediate coat shall be applied in shop after an interval of minimum 24 hours (from the application of primer coat) by airless spray technique.

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

7. PAINTING SCHEME - DETAILS OF PROCUREMENT & APPLICATION PROCESSES

SL NO	TYPE OF PAINT	SPECIFICATION OF PAINT	NO OF PACK	VOLUME OF SOLIDS (% MIN)	MODE OF APPLICATION	OVER COATING INTERVAL (IN HOURS)	SHADE
01	Epoxy Zinc phosphate primer	IS 13238	2	40	Spray	24	Grey
02	Zinc Ethyl silicate primer (% Zn on dry film= 80 (min))	IS 14946	2	60	Airless Spray only	24	Grey
03	Epoxy High solid- Polyamide cured Epoxy based MIO pigmented intermediate coat	--	2	80	Airless Spray	16	Brown
04	Aliphatic acrylic polyurethane paint	IS 13213	2	55	Airless Spray	16	Light blue RAL 5012
05	Heat resistant aluminum paint	IS 13183	1	--	Brush/ Spray	24	--
06	Chlorinated rubber based zinc phosphate primer	--	1	40	Brush/ Spray	12	Grey
07	Long oil alkyd Synthetic enamel finish paint	IS 2932	1	35	Brush/ Spray	12	Corresponding shade no
08	Red oxide Zinc phosphate primer	IS 12744	1	--	Brush/ spray	12	--

Note: Application of paint as per paint/ primer manufacturer's instruction

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

8. PAINTING REQUIREMENTS AS STIPULATED IN TENDER DOCUMENT

SL NO	AREAS	TENDER DOCUMENT REFERENCE		
01	ESP and Auxiliaries like ESP, APH, Fans, GAD	Technical specification Section - VI, Part-B, Sub section A-12 Page 6 of 8 to 8 of 8		
02	Structures of ESP, Packer plates, Base frames of motor and actuators	Technical specification Section- VI, Part-B, Sub section D-1-6, Civil works Design Criteria Page 22 of 25 and page 23 of 25, clause 6.04.03 and Section- VI, Part-A, Sub section IID, Civil works Page 6 of 8, clause 1.00.02		
03	Touch up painting on damaged areas	Technical specification Section- VI, Part-B, Sub section D-1-6, Civil works Page 24 of 25. clause 6.04.03, Note 4.		
04	Galvanizing of gratings, hand railings and ladders	Technical specification Section- VI, Part-B, Sub section D-1-6, Civil works Page 24 of 25. clause 6.04.05 & 6.04.06		