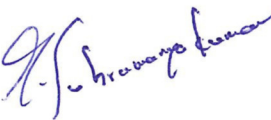


BHARAT HEAVY ELECTRICALS LIMITED
Heavy Plates & Vessels Plant, Visakhapatnam-530012

M/s NLC TALABIRA-1 x 70 TPH AUX. BOILER
HPVP S.O.NO: 8020
PAINTING SCHEDULE

Prepared by	T. RAVI KISHORE		Document No: 8020-ENPNT-DOC-002
Reviewed by	S. KUMAR MANIKYAM		
Approved by	P.K. SAHOO		

 DEVELOPMENT CONSULTANTS PVT. LIMITED.	
Reviewed only for general conformance with contract drawings and specifications. Contractor to be responsible for any errors and for fulfillment of detailed requirements of contract documents	
ACTION 2	DATE 10.10.2025
DISTRIBUTED BY. AD	
1	Approved
3	Returned with Comments. Please Resubmit.
✓ 2	Approved except as noted. Forward final drawings
4	For information only
SEE COVERING LETTER	
LETTER REF NO.	DATE.

RECORD OF REVISIONS

Rev. No.	Date	Details of revision	Remarks
0	04.09.2025	First Submission	

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1	Drum (Except Internals) 04-114,210	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate primer (Alkyd base) to IS 12744, DFT=30 μm / coat.	1	--	--	Synthetic Enamel (long oil alkyd) to IS 2932, DFT= 20 μm /coat.	2	International orange shade No. 592 of IS 5	70
2	Drum Suspension 04-144	SSPC-SP3/ Power Tool Cleaning	Rust preventive Fluid to PR: CHEM:09-04, DFT=25 μm / coat	1	--	--	---	-	---	25
3	Drum Internals, Foundation materials and DD items (threaded and machined surfaces only) 04-114, 210; 21-700; 24-351,625,627,642,700; 35-010, 700; 39-010; 42-700; 48-700; 81-318;	SSPC-SP3/ Power Tool Cleaning	Rust preventive Fluid to PR: CHEM:09-04, DFT=25 μm / coat.	1	--	--	--	-	--	25
4	Boiler Supporting Structures, Columns, Girders, Bracings: 35-110,210,310,410,610,611; 36-390,391;39-110,303; Galleries, Stair-ways & inter connecting Walkways 36-210-220,230,390 Buckstays 08-100 Note : For structural steel, all coats shall be applied at shop.	Blast cleaning to SA2 ½ (Near white metal) conforming to ISO 8501-1 with surface profile 50-75 μm	Inorganic Ethyl Zinc Silicate Primer DFT=80 μm per coat	1	High Build Epoxy MIO coating cured with polyamide hardener coat DFT=120 μm per	1	Aliphatic Acrylic Poly-Urethane paint DFT=30 microns per coat.	2	Phirozi Blue Shade No. 176 of IS 5	260

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
5	<u>Components >95°C Insulated other than components in Sl.No. 7 & 9 Headers, Pipes & Fittings outside the gas path</u> 10-170, 270; 12-850, 900, 993; 18-001; 21-600, 602, 603, 604, 700; 24-352, 600, 603, 620, 624, 627, 628, 635, 642, 700; 80-300, 345, 366, 417, 420, 421, 446,992. 450, 451, 453; 81-318; Hot Air: 48-200, 207	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 μm	Inorganic Ethyl Zinc Silicate Primer DFT=60 μm per coat	1	--	--	--	1	Grey	60
6	<u>Components >95°C uninsulated other than components coming in gas path.</u> 07-431; 09-001, 002, 003; 12-901; 19-114,124,701,702,901,902,903,992; 24-642; 28-220; 42-200, 300; 48-915; 81-104	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-40 μm	Inorganic Ethyl Zinc Silicate Primer DFT=40 μm per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr.II DFT= 20 μm per coat.	2	Aluminium	80
7	<u>Loose Tubes, SH. Coils</u> 11-170, 997	SSPC-SP2 or SSPC-SP3/ Hand tool / Power Tool Cleaning	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03 DFT=35μm Per coat.	1*	--	--	No Paint	No Paint	Red Oxide	35

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
8	Miscellaneous Piping & Supports: 24-350, 351, 352, 353, 601, 604, 625, 626, 640, 641,992; 80-920, 921, 922, 936; 97-599; 99-100 <u>Steam Blowing Piping:</u> 42-002; Fuel Firing: 41-200,201,500; 42-010, 011, 152;80-650; Duct Plates, Expansion Joints: 48-911; <u>Auxiliary Cooling water</u> Piping: 80-460; <u>Service Air</u> Piping: 80-612; <u>Dosing System:</u> 81-127, 128 (Refer Note-7)	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate primer (Alkyd base) to IS 12744, DFT=30 μm per coat.	1	--	--	Synthetic Enamel paint (long oil alkyd) to IS 2932, DFT= 20 μm Per coat.	2	Smoke Grey Shade No:692 of IS 5	70
9	Components >95°C coming in the gas <u>path, Headers, Commissioning Spares</u> <u>& Erection materials etc.,</u> 04-988; 05-137, 147, 231, 241; 06-609, 614, 616, 630, 640, 657,997; 07-201, 202, 204, 211, 212,214, 601,992, 993, 997; 12-993; 19-850, 993; 20-988, 998; 30-215,223; 31-010,108; 32- 010,310,33-021,201,210, 212,321; 37-010, 810; 48-993; 97-590	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate primer (Alkyd base) to IS 12744, DFT=30 μm per coat.	2	--	--	No paint	No paint	Red Oxide	60
10	<u>Hand Rails and posts, ladders/rungs</u> <u>36-820, 850;</u> <u>Floor Grills, Step Treads</u> 36-811	SSPC- SP8 /Acid Pickling	Hot dip Galvanizing to a coating weight of 610 g/m ² (minimum) and to a coating thickness of 85 microns. Refer Notes given below **							

Notes **- The Guard plates, Hood Ladders, Stringer channels, angles and plates shall be painted as per painting scheme prescribed in Sl. No: 4

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
11	<u>Cast carbon steel valves (conventional)</u> <u>Cast Alloy Steel</u> <u>Valves</u> <u>(Conventional)</u> <u>All API valves, QCNRV, SV & SRV, Silencers</u> 24-665, 673, 24-998 (Refer Note-07); 80-901; 97-500;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant silicone Aluminium Paint to IS 13183 Gr. II/I DFT= 20µm per coat.	1	--	--	Heat Resistant silicone Aluminium Paint to IS 13183 Gr. II/I DFT= 20µm per coat	1	Aluminium	40
	Forged Valves	Chemical Cleaning	Phosphating to a coating weight of 1500 mg per sq.ft.	--	--	--	--	--	--	--
12	Soot Blower components 20-301, 304, 801, 621, 803	Blast cleaning to SA2 ½ (Near white metal) with surface profile 15-30 µm	Red Oxide Zinc Phosphate primer (Alkyd base) to IS 12744, DFT=30µm Per coat.	2	--	--	Synthetic Enamel paint (long oil alkyd) to IS 2932, DFT=20µm Per coat.	2	Verdigris Green Shade No. 280 of IS 5	100
13	<u>For CLH & VLH***</u> PGs 07, 12, 19, 21, 24, 48 & 80 80-920, 80-921, 922, 936	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-40 µm	Epoxy Zinc Rich Primer with to IS 14589 Gr.II (latest) % VS=35 (min) DFT=40 microns per coat	1	--	--	Aliphatic Acrylic Poly-Urethane paint to IS 13213 (latest) %VS=40 (min) DFT=30.0 microns per coat	1	Phirozi Blue Shade No. 176 of IS5	70

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
14	<u>All Columns below '0' level (embedded in concrete)</u> 35-110	SSPC-SP3/ Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09-04) DFT=25 microns per coat	1	--	--	--	--	----	25

***- For components other than CLH & VLH, Painting scheme shall be as given in Sl. No. 8.

NOTES:

1. Rust Preventive Coating should be given on HSFG Bolt and nut threads. If required, one coat of Rust preventive shall be applied after tightening of the same.
2. Machined surfaces and all retainers are to be applied with a coating of Temporary Rust Preventive oil.
3. All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves, 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.
4. Ground shade/ Colour of Finish paints & identification tag/Band for equipment's, piping's pipe service, boiler supporting structures and other boiler components shall be followed as per NLC Talabira EPC document Vol-IIA/ Section-XII/Sub-Section-B, Painting.
5. PGMA's under Sub-Vendor items are not indicated. For all bought-out and sub-vendors items including PGMA's mentioned above falling under the scope of BHEL, the same scheme as for main equipment as covered in this document shall be followed.
6. This painting Scheme is valid for only Customer No: 8020 (BHEL-HPVP Unit), Auxiliary Boiler -1X70 TPH NLC Talabira Project.
7. No painting is required for Stainless Steel, non-ferrous & galvanized components.
8. Wherever inside surfaces of components under PGMA 48 – XXX & other PGMA's, need protection till erection, two coats of Red-oxide zinc phosphate primer paint to IS12744 to a DFT of 60 microns shall be applied, after power tool cleaning. This includes duct inside surfaces, truss, beams, gusset plate, guide vanes, divider plates, rectifier, divider vanes, etc coming in the gas path.
9. The Temporary Rust Preventive coating that already been applied on any components, tubes, pipes etc., shall be visually inspected for good adherence. If the coating is intact, direct coating of alkyd based red oxide paints over the coating is permitted. In case, the coating has peeled off over a large area, then the coating is to be removed by suitable solvents / heating to 350–400 °C for an hour before primer paint application –but, in this case, it should be ensured that the minimum surface cleanliness required for primer paint application shall be SSPC – SP2 (equivalent – Hand Tool cleaning).
10. In components, wherever plates / sheets of thickness less than or equal to 5 mm and rods of <25mm/tubes/drain pipes are used, power tool / hand tool cleaning to SSPC – SP3 / SP2 shall be followed and the painting shall be done as described in SI.No.8.
11. For all commissioning components-erection materials (xx-993) two coats of Red oxide Zinc Phosphate Primer shall be applied to meet the temporary protection till erection, after power tool cleaning.
12. Touch-up paintings, making good any damaged shop painting and completing any unfinished portion of the shop coat shall be carried out as per clause applicable painting scheme.
13. All components covered under different PGMA's are to be painted. In case any component is left out, the same shall be deemed to be included under the relevant section based on paint logic approved.
14. For very small components like clamps etc. which are not having feasible dimensions for blast cleaning, painting scheme of SI.No.8 shall be followed.
15. For very small components with weldable primer at edges, the entire component shall be applied with weldable primer. Structural members having welded connections at site, relevant area can be painted with primer paint instead of Weldable primer
16. All Painting scheme for all temporary structures like 04-196,SS-999 shall be PS 1AE i.e. 1 coat of Red oxide Zinc Phosphate primer (Alkyd Base) to IS 12744-DFT-30 µ and 2 coats of Synthetic Enamel paint (Long Oil Alkyd) to IS 2932-DFT-2X20 µ Shade Yellow –Shade No. 356 of IS 5- Total DFT 70 µ. These are to be cut & removed at site after erection. (It excludes components covered under Sr. No. 4 & 10 of description table).
17. For internal protection of Pipes, tubes, headers and other pressure parts, Volatile Corrosion Inhibitor (VCI) pellets shall be put (after sponge testing/ draining/ or drying) and subsequently end capped. The dosage of VCI pellets shall be approximately 100 g/ Cu.m. For tubes typically 4 – 5 tablets per end are to be put. For C & I items, the dosage of self-indicating Silica Gel (colourless) shall be 250 g/ cu.m. (About 2 to 3 bags weighing approximately 100 grams each). VCI pellets shall not be used for stainless steel components and its composite associates.
18. All threaded components of spring assemblies and turnbuckles shall be galvanized and achromatized to 15 microns minimum thickness.

19. Soot blower components i.e Valve head assembly having high surface temperature (> 200 and <600 deg. C) shall be applied with protective coating as per PS9* (up to 400deg.C) and PS10 (up to 600 deg.C).
20. Corner plate, sheet channel and fixing pins of PG 32 shall be painted as per scheme PS3 to total DFT of 60 microns.
21. It is mandatory that for finish coat each layer shall have a permanent DFT and free from any paint defects like sags, wrinkles etc. Total DFT of a component correspond to respective painting scheme has to be ensured and recorded by inspection agency as per QP.
22. For chequered plates having thickness ≤ 5 mm, surface preparation can be power tool cleaning to SP3 and painting shall be in line with PS1A.
23. Handrails, step treads of PGMA under Sl. No. 4 need to be galvanized in line with scheme for handrails (i.e. Sl .No. 10).
24. Inside surfaces of fabricated structure (e.g. Box type column) shall be painted with two coats of red oxide primer paint during fit up stage.
25. 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.
26. Surfaces prepared as per the surface preparation scheme indicated herein shall be applied with primer paint within 6 hours after preparation of surfaces.

Painting Scheme - Details for procurement & application purposes

Sl. No.	Generic nature of paint	Theoretical covering capacity (Sq. m per litre)	No. of Pack	Volume Solids, % (min)	DFT in microns per coat (approx.)	Shade	Shade No. to IS 5	Mode of application	Over coating interval, Hrs.
1	Epoxy Zinc rich primer to IS 14589 Gr.II (latest)	8	2	35	40	Grey	--	Spray	24
2	Aliphatic acrylic Polyurethane paint as per IS13213	8	2	40	30	Phirozi blue	176 of IS 5	Airless Spray	24
3	Heat resistant Aluminium paint to IS 13183 Grade I/II/III (latest)	10	1	--	20	--	--	Brush/ Spray	24
4	Red oxide zinc phosphate primer paint to IS 12744 (latest)	10	1	--	30	--	--	Brush/ Spray	12
5	Red oxide Zinc Phosphate Dip coat primer paint to PR: CHEM: 09-03	10	1	--	35	--	--	Dip	12
6	Long oil alkyd synthetic enamel finish paint to IS 2932 (latest)	17	1	--	20	Reqd. Shade	corrpdg. Shade no.	Brush/ Spray	12
7	Temporary Rust preventive fluid to PR: CHE: 09 – 04	10	1	--	25	--	--	--	12
8	General purpose Aluminium paint to IS 2339 (latest)	10	2	--	20	Aluminium	--	Brush	12
9	Self- priming surface tolerant high build epoxy paint	8	2	80	100	---	--	Brush / Spray	12
10	High Build Epoxy MIO coating cured with polyamide hardener, intermediate coat as per IS 16943.	5	2	60	120 (Min)	Brown	--	Airless Spray	24
11	Inorganic ethyl self-curing zinc silicate primer as per IS 14946, metallic Zinc content 75% (min) in the dry film by weight	7	2	60	80 (Min)	Grey	--	Airless Spray	24

The covering capacity of paints specified is only approximate. The paints and Rust preventive fluid shall be procured from BHEL's approved suppliers.

Painting of Damaged Areas

(Areas where the paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion and where the steel has rusted appreciably, should be repainted as follows)

Sl. No.	Components	Surface Preparation	Primer coat		Intermediate coat		Finish coat		Shade	Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats		
1	Paint damaged components fall under Sl.no: 4	Power tool cleaning of minimum 25 mm of surrounding areas to bare metal	Epoxy zinc rich primer to IS 14589 Grade II	2 T. DFT 80 μ (min)	As given in scheme	1	As given in scheme	2	As given in scheme	As given in scheme