

Rev 01	26-09-2025	K. Srinivasan	K. Rajmohan	A. Santhakumari	Modified as per customer comments of CAT-III approval.
Rev 00	23-12-2024	K. Srinivasan	K. Rajmohan	A. Santhakumari	Prepared in line with NLC EPC Bidding Document.No.18A03-SPC-G-001, Vol.II-A/Section-XII/Sub-section-B-PAINTING & related amendments and corrigendum no-5 pre-bid Dt.08.05.2021 (Page 256 to 260 of 400), Change in specification based on TCM resolution-Annexure A (Page 17 of 274) to Bidding Documents issued by NLC.
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CONSULTANT: 	DEVELOPMENT CONSULTANTS PVT. LTD. KOLKATA.				
PROJECT	NLC TALABIRA THERMAL POWER PROJECT 3X800 MW JHARSUGUDA, ODISHA				
EPC Contractor 	BHARAT HEAVY ELECTRICALS LIMITED HIGH PRESSURE BOILER PLANT, TIRUCHIRAPALLI - 620014.				
	Name	Date	Title		
Prepared by	K. Srinivasan	26-09-2025	PAINTING SCHEDULE - Annexure-I: SG & SCR COMPONENTS - Annexure-II: PIPING - Annexure-III: LP PIPING		
Reviewed by	K. Rajmohan				
Approved by	A. Santhakumari				

Annexure-I

Painting Scheme for SG & SCR Components

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)	Contract specification reference
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade		
1 PS1AC	<u>Collector & Separator Vessels (Except Internals)</u> 04 –321,323;	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	International orange Shade No: 592 of IS5	70	(Spec. Sl. No. 6, Page 18 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)
2 PS5	<u>Collector & Separator Vessels internals and Dd items (threaded and machined surfaces only)</u> 04-347;07-331,360,361,362,393;08-911,912, 08-913;09-304;12-306,314,317,324,327,328; 12-344,348,354,393;17-304,306,319;19-306; 19-307;21-602,605,700;24-352,700,803,813, 24-818,827,842,968;28-700;32-700;35-190, 35-701,721,722,723,724,725,726,727,728,730; 36-700,701,721,722,723;39-700;41-710; 42-700,710;43-710;45-710;47-710; 48-019,700;65-710;67-710; <u>SCR system:</u> SS-700,701,983;SR-272;SL-700; SL-701; SR-282,307,172,122,507,152,252,182; SR-207,512;SS-730; <u>Foundation materials:</u> 35-010; 39-012;	SSPC – SP3 Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04 DFT=25 μm per coat	1	--	--	--	--	--	25	
3 PS19B1	<u>Buck stays</u> 08-001,003,006,007,111,380,501,503,901,910; <u>Boiler supporting structures,</u> <u>Columns, Girders, Bracings</u> 35-131 to 138,141 to 148,151 to 158; 35-181 to 188, 211 to 214,221,222,231,232; 35-311, 312,321,322,331,332,341,342,351,352; 35-361,362,371,372,374,375,381 to 388; 35-390,441 to 448, 451 to 458; 35-511 to 518,521 to 528,531 to 538,993,995; <u>Silencer support:</u> 24-826;	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 (refer sheet 12 Sl.no.11 for details)	1	High Build Epoxy MIO coating cured with polyamide hardener coat DFT = 120 μm per coat (refer sheet 12 Sl.no.10 for details)	1	Aliphatic acrylic Polyurethane paint DFT = 30 μm per coat. (refer sheet 11 Sl.no.2 for details)	2	Phirozi blue to Shade No. 176 of IS 5.	260	(Spec. Sl. No. 1, Page 18 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)

For structural steel, all coats shall be applied at shop.

Annexure-I

Painting Scheme for SG & SCR System

S. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)	Contract specification reference
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade		
3 PS19B1 (Contd.)	<u>Galleries, Stair-ways & inter connecting Walkways</u> 36-111 to 113, 151 to 153, 311 to 316; 36-321 to 326, 331 to 338, 341 to 346; 36- 351 to 356,361 to 366, 371 to 377; 36- 381 to 383, 391 to 395,610,613,620,740; 36- 993; 38-210,299, 310,410,510,610,710,993; <u>ID system structures.</u> 39-101,102,141,142,150,299,300,304,305; 39-306,993; <u>SCR structures:</u> SS-110 to 113,191,210,215,311,321,331, 341; SS- 361 to 364, 391 to 396, 440 to 443; SS-550 to 553, 610, 620, 901, 906 to 908; SS-952 to 955,961 to 965, 971 to 975, 999; <u>Duct supports</u> 48-015,115,145,205,225,265,385,435; 48-465,485,495,665; (Refer note 23 for handrails, step treads released under PGMA of this Sl.No.3) (Refer note 25 for bunker structures)	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 (refer sheet 12 Sl.no.11 for details)	1	High Build Epoxy MIO coating cured with polyamide hardener coat DFT = 120 μm per coat (refer sheet 12 Sl.no.10 for details)	1	Aliphatic acrylic Polyurethane paint DFT = 30 μm per coat. (refer sheet 11 Sl.no.2 for details)	2	Phirozi blue to Shade No. 176 of IS 5.	260	(Spec. Sl. No. 1, Page 18 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)
4 PS1Z3	<u>Components >95° C Insulated other than components in Sl.No.7 &9</u> Ring Headers, Down Comers, Hot air Headers outside the gas path etc. (Refer Note 8) 05-137,147,155,227,231,251,327,330,350; 07-102,110,125,217,223,231,232; 12-178,850,852,900;17-407,476,807; 18-001,002,010,701;19-701,702,903;21-600;24-811,824,828,836,837;	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	--	--	--	--	Grey	60	(Spec. Sl. No. 3, Page 18 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)
For structural steel, all coats shall be applied at shop.											

Annexure-I

Painting Scheme for SG & SCR System

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)	Contract specification reference
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade		
4 PS1Z3 (Contd.)	Hot Air: 48-018, 022,116,202,204,207,208; 48-212,214,222,224, 262,264,267,662,664,667; Flue Gas: 48-372,382,384,386, 432,434,462,464,482,484,492; 48-494,496,498; <u>SCR system:</u> SS-911 to 918,921 to 928, 931 to 938, SS-941,942, 945 to 948,996;	Blast cleaning to SA2 1/2 (Near white metal) with surface profile 35-50 μm	Inorganic Ethyl Zinc Silicate Primer DFT=60 μm per coat	1	--	--	--	--	Grey	60	(Spec. Sl. No. 3, Page 18 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)
5 PS 10B5	<u>Components >95° C uninsulated other than components coming in gas path.</u> Temp: >95° C & <400° C 24-807,820,860,865,867;42-200,300; Instrument tappings, doors: 48-200,915;	Blast cleaning to SA2 1/2 (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	Aluminum	80	(Spec 5a. Sl. No. 40, Page 16 of 30, Change in spec (section B of tender spec, Annexure C2A(Boiler))
6 PS 10	Components uninsulated other than components coming in gas path. (Temp: >400° C & <600° C) 09-003,004,005; 28-220; Components insulated (Temp: >400° C & <600° C) RH & SH headers 10-135,174,176,178,191,235,274,276,278; 10-283 to 285,291;15-136,178,236,278;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT 20 μm per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT 20 μm per coat	1	Aluminum	40	(Spec 5b. Sl. No. 40, Page 16 of 30, Change in spec (section B of tender spec, Annexure C2A(Boiler))
7 PS2	<u>Loose tubes, SH, RH & Eco. coils</u> 11-074,078,374,378,406,467,469,487,491,494,606,608; 11-684,694,716,717,718,767,768,769,787,791,916,917; 11-918,967,968,969,987,991;12-179,181,184,187,368; 12-405,514,524,544,554,600,800,803,805,862,903,914; 12-917,924,927,928,944,948,954,968;16-201,202,203; 16-270,278,379;19-092,402,804,814,824,853,884,914; 19-924,984;	SSPC – SP2 or SSPC – SP3 Hand tool / Power tool cleaning	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03 DFT=35 μm per coat	1*	--	--	No paint	No paint	Red Oxide	35	(Spec. Sl. No. 5, Page 22 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)

*-In lieu of dip painting, 2 coats of brush painting of Red oxide Zinc Phosphate primer to a coating thickness of 60 μ is also permitted in line with Sr.No.9.

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Painting Scheme for SG & SCR System

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)	Contract specification reference
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade		
8 PS1A	Miscellaneous and casing sheets 04-147,547;07-409,431,460,461,462,502,503,509; 07-531,560;12-506,906,907;17-919;21-601,604; 21-606;24-350,351,354,800,801,804 to 806; 24- 808 to 810,814,815,817,825,835,840,841; 24-855,950,955,960;30-233,234; 36-396,398;38-611; Fuel firing: 41-350,390,500; Steam blowing piping 42-001,002,005,010,046,065,070,120,152,154,157; 43-004,104,200;45-200,801,802,804,805; 45-858;47-281,283,858; Duct plates, expansion joints 48-911,912; Coal Feeding: 65-736; 67-204,272,276,283,801 to 803;95-088,091,485;97-585,592; \$Handling equipment: 99-099,100,300,400; Nitrogen blanketing system:24-966,967,969; Seal air ducting: 43-005, 105; Cold Air duct:48-012,014, 112,114, 141; Tempering Air: 48-142,144; #SCR system: SR -010,020,050,121,128,151; SR-158,171,178,181,188,251,258,271,278,281; SR-288,301,308,311,312,318,330,400,490,511; SR -518,611,621,900,990,997,998; SS-611,621,997,998; (Refer note 22 for chequered plates)	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 IS5	70	(Spec. Sl. No. 6, Page 18 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)

\$ - Final Shade is Golden yellow for Under hung crane, Chain Pulley Block, Ratchet Lever and Trolley with hoist. Black shade for Hook.

- Final Shade is Grey white (RAL 9002).

Annexure-I

Painting Scheme for SG & SCR System

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)	Contract specification reference
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade		
9 PS3	<u>Components >95° C coming in the gas path, Headers, Commissioning Spares & erection Materials etc.,</u> 06-400,401,431,434,437,441,444,447,451,453, 06-455,500,501,515,731,732,734,735,737,741, 06-744,745, 747,751,752,753,755,759; 07-309,315,316,318, 07-423,993;10-182,183,184,185;11-474;12-993, 12-994;17-174,504,506,900,903;19-704,753,763, 19-783,793,802,850,851,852;20-998;24-822,823, 24-993;30-103,105,212,215,219,223,224,235; 31-010,104;32-010,210,810;37-010;42-858; 48-993;65-200;67-200;96-193;97-282,590; 99-501;21-987,988;24-987,988,989;41-988; 42-988;41-997;42-997;43-997;45-997;47-997; 65-997;67-997; SC-324; SL-210;20-988; 99-514; SR-988;65-988; (Refer note 20 for info about 32-210)	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	(Spec. Sl. No. 6, Page 22 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)
10 PS6	<u>Hand rails and posts, ladders / rungs</u> 35-821,822,823,851; 36-820,821,822,823,851,852,853; 38-820,850;39-820,850; SS-820,850; <u>Floor Grills, Step treads</u> 35 - 811,812;36-811,812,813,814; 38 - 810; 39 - 810; SS-810,811,982;	SSPC – SP8/ Acid pickling	Hot dip Galvanizing to a coating weight of 610 g/m ² (minimum) and to a coating thickness of 85 μm . Refer Notes given below **								(Spec. Sl. No. 27, Page 21 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)

Notes **: The Hood ladders, Stringer channels, angles and plates shall be painted as per painting scheme prescribed in Sl. No: 03.

Annexure-I

PAINTING SCHEME FOR VALVES

Sl.No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)	Contract specification reference
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade		
11 @PS 9/10	<u>Cast carbon steel valves (Conventional)</u> <u>Cast alloy steel valves (Conventional)</u> <u>All API valves, QCNRV, SV & SRV Silencers,</u> 21-800,825; 24-885; Safety valves & ERV 21-850; 24-880,881,883; SCR system: SR-103,203,303;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant silicone Aluminium Paint to IS 13183 Gr.II/I DFT= 20 μm per coat	1	--	--	Heat Resistant silicone Aluminium Paint to IS 13183 Gr.II/I DFT= 20 μm per coat	1	Aluminum	40	(Spec 5b. Sl. No. 40, Page 16 of 30, Change in spec (section B of tender spec, Annexure C2A(Boiler))
	Forged valves	Chemical cleaning	Phosphating to a coating weight of 1500 mg per Sq.ft.	--	--	--	--	--	--	--	
1AS2	<u>Soot Blower components (e.g. Soot blower housing with temp <95° C)</u> 20-051,054,201,204,511,794,962; (Refer note 19 for valve head assembly)	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= 30 μm per coat	2	--	--	Syn. Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20 μm per coat	2	Verdigris Green Shade No. 280 of IS5	100	(Spec. Sl. No. 6, Page 18 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)
	HP / LP system	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr.I DFT= 20 μm per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr.I DFT= 20 μm per coat	1	Aluminum	40	(Spec 5b. Sl. No. 40, Page 16 of 30, Change in spec (section B of tender spec, Annexure C2A(Boiler))

@ Heat resistant silicone based aluminum paint to IS 13183 Gr.II shall be applied for temperature up to 400 deg.C, Gr. I shall be applied for temperature >400 deg.C and up to 600 deg.C.

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Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)	Contract specification reference
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade		
12 PS15	For CLH & VLH* PGs 07,08,12,17,19,21,24,47,48 &80 07-402,403,405;12-517,528; 17-904,906; 19-506,507,904,905, 906,907; 24-353; 48-206,395;	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-40 μm	Epoxy zinc rich primer To IS 14589 Gr. II (latest) % VS=35, (min) DFT=40 microns per coat	1	--	--	Aliphatic acrylic Poly-urethane paint to IS13213 (latest) % VS=40.0 (min) DFT= 30.0 microns per coat	1	Phirozi Blue Shade No. 176 of IS5	70	
13 PS10B4	<u>Components > 95°C & <200°C, un-insulated Fuel pipes</u> 47-200, 289;	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. III DFT 20 μm per coat	1	Heat Resistant Aluminium Paint to IS 13183 Gr. III DFT 20 μm per coat	1	Aluminum	80	(Spec. Sl. No. 4, Page 18 of 24, Sub Section-B (painting), Section-XII, Vol. II-A)
14 PS5	All Columns below '0' level (embedded in concrete) PGs 34,35,36,38, 39	SSPC-SP3/ Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04 DFT=25 μm per coat	1	--	--	--	--	--	25	

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

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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 equipments, pipings 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. Vendor standard practice has to be followed for PGMA not specified in this document.
6. This painting Schemes is valid for only Customer No: U8/1836,1837 & 1838, NLCIL TALABIRA TPP - 3X800 MW.
7. No painting is required for Stainless Steel, non-ferrous & galvanized components.
08. Wherever inside surfaces of components under PGMA 48 – XXX & others, 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.
09. 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 ≤ 25 mm/tubes/drain pipes & bent rods 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 Vol. II-A/Section-VI, Cl.2.10.13.
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 weldable primer.

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16. 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. 3 & 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 400 deg.C) and PS10 (up to 600 deg.C).

20. Corner plate, sheet channel and fixing pins of PGMA 32-210, SL-210 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 <5mm, surface preparation can be power tool cleaning to St3 and painting shall be in line with PS1A.

23. Handrails, step treads of PGMA under Sl. No. 3 need to be need to be galvanized in line with scheme of 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. Painting of bunker structures to be in line with painting scheme of supporting structures (Sl. No. 3).

26. 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 as per ISO 12944.

27. For items meant for Spares and subcontracting where no further processing is involved, the painting scheme selected shall be the same as that of similar product configuration/ description.

28. For ammonia storage tank PGMA SR-100, surface preparation to blast cleaning Sa2.5 (surface profile 35- 50 μ m), three component epoxy based zinc rich primer (90% by weight of zinc dust pigment in its dry film) DFT 75 μ minimum and water based acrylic urethane finish paint, DFT 2x50 μ minimum, white shade. Total DFT is 175 μ .

29. DFT of the coating system shall be determined in accordance with SSPC-PA2 in line with the following procedure.

- a. Five spots shall be taken for every 10m² of painted areas. Each spot (3.8cm) covers three gauge readings.
- b. if the structure is less than 30m², each 10m² should be measured.

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- c) if the structure is between 30 and 100m², select 3 random 10m² test areas and measure.
d) For structure exceeding 100m², select 3 random 10m² testing areas for the first 100m² and select 1 random 10m² testing area for each additional 100m².
e) Coating thickness tolerance: Individual reading taken to get a representative measurement for the spot are unrestricted (usually low or high readings are discarded). Spot measurements (the average of 3 gauge readings) must be in the range of $\pm 20\%$ of minimum total DFT.
f). Where total dry film thickness accordance with the above procedure falls below the specified minimum, an additional coat of finish paint shall be applied.

Following parameters to be inspected for surface preparation and painting of components.

Components	Surface preparation	Painting
Structures, CLH/VLH, etc (Sl. No. 3,4,5,12,13)	a) Surface finish - Visual comparator for blast cleaning to Sa2.5 level. b) Surface profile check – by comparator or any suitable method. c) Salt test – by using salt contamination kit Ambient and steel temperature, relative humidity, dew point to be recorded prior to blasting & painting	Visual examination & dry film thickness of each coat.
Pressure parts, ducts, etc. (Sl. No. 1,2,6,7,8,9,11,14)	Cleanliness of power tool cleaned surfaces.	Visual examination & dry film thickness of each coat.

30. Paint application requirements:

- a. Two pack coatings shall be mixed in the ratio recommended by manufacturer to ensure proper and complete curing of the coatings. The base and hardener are to be separately mixed first to obtain a homogenous mixture. The hardener is to be added to the base slowly, with continuous mixing / agitation and not the reverse.
b. Any addition of thinner to achieve the application viscosity should be made only after the components are thoroughly mixed. Excess thinner is not recommended, as increase in volume, leads to lower DFT, sagging, longer curing time, etc.
c. Paints containing Zinc, MIO pigments shall be continuously stirred with use of a mechanical agitator whilst being applied, to ensure uniformity over the surface area.
d. Conventional air spray: the correct combination of air volume, air pressure and fluid flow to give good atomisation to be ensured to get a defect free painted surface.
e. Air spray (pressure pot) is recommended in cases where large quantities of paint are to be applied as paint in the tank can be prevented from settling, reduces application time and also enables the gun to be turned to any angle to coat objects effectively without spilling paint.
f. Transport and erection of painted structures shall be carried out only after the drying time specified by the paint manufacturer has elapsed. Handling & packing of painted material shall be appropriate to avoid damage to painting, such as the use of non-metallic slings, etc for handling and by minimizing handling after painting.

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 IS5	Mode of appln.	Over coating interval, Hrs.
1	Epoxy Zinc rich primer to IS14589 Gr.II (latest)	8	2	35	40	Grey	--	Spray	24
2	Aliphatic acrylic Polyurethane paint as per IS13213	13	2	40	30	Phirozi blue	176 of IS5	Airless Spray	24

Annexure-I

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 IS2932 (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	Aluminum	--	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.

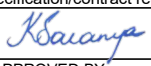
Annexure-I

Painting of Damaged Areas

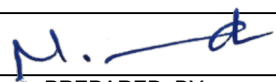
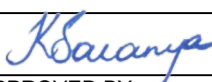
(Areas where the paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion and where the steel has rusted appreciably, should be repainted as follows)

Sl.No.	Components	Surface Prepa- ration	Primer coat		Intermediate coat		Finish coat			Total DFT μm
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1	Paint damaged components fall under Sl.no: 3	Power tool cleaning of minimum 25mm of surrounding areas to bare metal	Epoxy zinc rich primer to IS 14589 Grade II	2 T.DFT 80μ (min)	As given in scheme	1	As given in scheme	2	As given in scheme	As given in scheme
2	Paint damaged components fall under Sl.no: 1,2,4,5,6,7,8,9,11,12,13,14.	Power tool cleaning to bare metal	As given in scheme							

Annexure-II

 BHARAT HEAVY ELECTRICALS LIMITED QA / PIPING TRICHY			PAINTING SCHEME FOR PIPING									QPNo: 1836:QPC:11	
			PROJECT NAME : - NLC Talabira Thermal Power Project - (3 X 800 MW)									REV.NO: 00	
			BHEL CUSTOMER Nos : 1836, 1837, 1838									Date : 22.04.2026	
Sl. NO	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat			Finish coat			Total DFT Microns (Min.)	REMARKS	
			Primer	No of coats & DFT	Paint	No of coats & DFT	Shade	Paint	No of coats & DFT	Shade			
1	2	3	4	5	6	7		9	10	11	12	13	
1	Insulated Piping, components (MS / HRH / CRH / Aux Steam lines, Tanks & Vessels ...& Pipe Clamps).	Blast cleaning to Sa2½ with surface profile 35-50 microns	Inorganic Ethyl Zinc Silicate Primer as per IS 14946	1 (60 microns min. per coat)	-----	-----	-----	-----	-----	Grey	60		
2	Uninsulated Piping, components (Spray Water / Condensate lines, Pipe Clamps...,Tanks & Vessels and ECW Tank)	SSPC-SP3/ Power Tool Cleaning	Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1 (min.DFT = 30 microns per coat.)	-----	-----	-----	Synthetic enamel paint (long Oil alkyd) to IS 2932	2 (min.DFT = 20 microns per coat)	Smoke Grey Shade No 692 of IS 5 (Refer Note 5)	70		
3	Structures & All auxiliary structural steel components for pipe supports	Abrasive Blast cleaning to SA2 ½ (Near white metal) Min 35 Micron	Inorganic Ethyl Zinc Silicate Primer as per IS 14946	1 (min.DFT = 80 Micron per coat)	High Build Epoxy MIO coating cured with polyamide hardener coat as per IS 16943	1 (DFT=120 Micron Min Per coat)	-----	\$ Aliphatic Acrylic PU Paint as per IS13213	2 \$ (min.DFT = 30 Microns per Coat)	Phirozi blue to Shade No. 176 of IS 5. (Refer Note 5)	230 shop + 30 site	Refer Note:5	
4	Hangers & Supports-(CLH,VLH)	Blast cleaning to Sa2½ with surface profile 35-50 microns	Epoxy Zinc rich primer to IS 14589 Gr.II,% VS = 35 Min	1 (40 microns per coat)	-----	-----	-----	Aliphatic Acrylic Polyurethane paint to IS13213 ,%VS = 40 min	1 (30 microns per coat)	Phirozi Blue Shade No.176 of IS 5	70	Refer Note:3	
5	Valves & Gr-91 Clamps	SSPC-SP3/ Power Tool Cleaning	Heat resistant Aluminum Paints to IS 13183 Gr.I	1 (20 microns per coat)	-----	-----	-----	Heat resistant Aluminum Paints to IS 13183 Gr.I	1 (20 microns per coat)	Aluminum	40		
6	Stainless steel / Galvanized items	No painting											
7	Hangers & Supports-(Other than CLH,VLH)	Blast cleaning to Sa2½ with surface profile 35-50 microns	Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1 (min.DFT = 30 microns per coat.)	-----	-----	-----	Synthetic enamel paint (long Oil alkyd) to IS 2932	2 (min.DFT = 20 microns per coat)	Smoke Grey Shade No 692 of IS 5 (Refer Note 5)	70		
\$:- Out of 2 coats of Aliphatic Acrylic PU finish paint, one coat of Aliphatic Acrylic PU finish paint shall be given at shop / subcontracting works and second coat of Aliphatic Acrylic PU finish paint shall be applied at site after erection by brush and / or spray. Note.1:Piping above 60 Deg C are insulated. However if Piping above 60 degC is uninsulated, then as per technical specifications, it has to be painted in accordance with S No.1. 2:Plates, Pipes & Tubing Cut to size at site : Shall follow 2 coats of 60 microns of Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 . 3:Carbon steel & Alloy steel (upto Gr22) Pipe Clamps : Painting shall be same as pipe material; For Gr-91 clamps : S. No:5 of this painting scheme to be followed 4:Weld Edges for Pipes : Shall be painted with weldable primer with minimum 25 microns. 5:Shade for finish coat to be done at site shall be as per project specification/contract requirement.													
M.  PREPARED BY : M MANOJ PANDI MGR/Piping Quality			K.  APPROVED BY: K. SARANYA MGR/Piping Quality			For Customer use MDL : 1836:QPC:QA:11						Page 1/1	

Annexure-III

 BHARAT HEAVY ELECTRICALS LIMITED QA / PIPING TRICHY			PAINTING SCHEME FOR LP PIPING (CW / ACW / ECW / Plant water, Compressed Air Piping, LDO system, ETP, etc.) PROJECT NAME : - NLC Talabira Thermal Power Project - (3 X 800 MW) BHEL CUSTOMER Nos : 1836,1837,1838									QPNo: 1836:QPC:12 REV.NO: 00 Dt : 18.04.2026	
SI. NO	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat			Finish coat			Total DFT Microns (Min.)	REMARKS	
			Primer	No of coats	Paint	No of coats	Shade	Paint	No of coats	Shade			
1	2	3	4	5	6	7	8	9	10	11	12	13	
1	(a) Internal Surface - CW/ACW Pipe (for pipe - dia - 1000 mm and above)	Blast Cleaning SSPC SP-10 SA 2½ (Refer Note 1)	Epoxy Zinc rich primer to IS14589 Gr.II (Refer Note 2)	1 (50 Microns Min. per coat)	----	----	----	Coal tar epoxy (Refer Note 2)	2 (75 Microns Min. per coat)	----	200 Microns (Refer Note 3)	(Refer Note 3)	
	(b) Holiday test (Refer Note 3)	Holiday testing by low voltage (75 Volts Min.) wet sponge Holiday detector or by High voltage (Voltage per micron of DFT is as recommended by Paint Manufacturer subjected to minimum of 5V / Micron). Holiday test Equipment to be calibrated before testing.											
2	External Surface of CW --Buried Piping / Encased in concrete (For pipe dia- 1000 mm and above) (Temporary Protection for transportation from works to site). **Further protection to be done by BHEL Erection Group as per Contract requirement.	SSPC-SP3 / Power Tool Cleaning	Red Oxide Zinc Phosphate (Alkyd base to IS 12744)	1 (30 Microns per coat)	----	----	----	----	----	----	30 Microns		
3	External Surface a) Over ground piping of ACW.(For all diameters) b) External Surface of ECW, Plant water (For all diameters) c) LDO system.	Abrasive Blast cleaning to Sa 2 1/2 (35-50 microns)	Inorganic Ethyl Zinc Silicate Primer as per IS 14946	1 (80 microns min. per coat.)	High Build Epoxy MIO coating cured with polyamide hardener coat as per IS 16943	1 (120 microns min. per coat.)	----	Aliphatic acrylic Polyurethane paint as per IS13213	2 (30 Microns min. per Coat)	(Refer Note 4)	260 Microns	(Refer Note 4)	
4	Galvanised and Stainless steel Piping	No painting											
Notes: 1. Blast cleaning to near white metal to obtain roughness as per epoxy paint data sheet. 2. Application of Epoxy based Zinc rich Primer, Coal Tar Epoxy shall be done as per manufacturer's data sheet / recommendation, meeting the thickness requirements as per this document. 3. Witness by BHEL / BHEL nominated inspection agency. 4. Color code for water piping is Sea Green to Shade No. 217 of IS 5. Color code for air piping is sky blue to Shade No. 101 of IS 5. Color code for Light diesel oil (LDO) system piping is Dark Brown to Shade No. 412 of IS 5. ** Shade for finish coat to be done at site shall be as per project specification/contract requirement.													
 PREPARED BY : M MANOJ PANDI MGR/Piping Quality			 APPROVED BY: K. SARANYA MGR/Piping Quality			For Customer use MDL : 1836:QPC:QA:12				Page 1/1			