

BHARAT HEAVY ELECTRICALS LIMITED
HPVP UNIT - VISAKHAPATNAM - 530012



M/S. Hindalco, Sambalpur 1x510 TPH UTILITY COAL FIRED BOILER PACKAGE

HPVP S.O. No. 8136

PAINTING SCHEDULE

Doc. no: PAINT-8136-DOC-00001

03	S KUMAR MANIKYAM Sr Manager/Engg.	Pabitra Kumar Sahoo DGM /-Engg.	Pabitra Kumar Sahoo DGM /-Engg.
Rev No	Prepared by	Reviewed by	Approved by

Rev. No	Date	Details of revision	Remarks
00	09-01-2026	NEW	<p>Prepared in line with BHEL standard painting scheme applicable for normal environment.</p> <p>Painting Schedule approved in code-1 dated 10-02-2026</p> <div style="border: 1px solid red; padding: 5px; margin-top: 10px;"> <p>There are many changes with respect to the approved Rev.02 painting schedule. In many areas, the specified DFT for painting has been reduced, and in sl. no. 3.5, the type of paint has been changed and there is no revision marks. Such changes are not acceptable</p> <p>BHEL must specify the reason for the change in the specification.</p> <p>While the inclusion of previously missed items can be considered acceptable, any reduction in paint quality or specification is not acceptable.</p> <p>R02 painting spec also attached alongwith this for the ready reference.</p> </div>
01	27-01-2026	UPDATED INLINE WITH COMMENTS	
02	07-02-2026	UPDATED INLINE WITH COMMENTS	
03	13-02-2026	Shade for Inorganic zinc silicate updated in Page 11	

TATA CONSULTING ENGINEERS LIMITED
CONTRACTOR DOCUMENT REVIEW STATUS

☐ 1 Approved, Further work can Proceed

☐ 1* Approved with minor comments. No resubmission is required. To be incorporated in As-Built. Good for Manufacturing/Construction / Fabrication subject to incorporation of comments.

☐ 2 Approved with comments. Work can proceed subject to incorporation of comments

☒ 3 Not Approved. Revise according to comments & resubmit

☐ 4 Retained for Information

☐ 4* Incorporate Comments & resubmit for Information & records

Approval conveyed herein neither relieves CONTRACTOR of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, system / performance requirements and conformity of supplies with National/ international statutory laws as may be applicable , nor does it limit the Employer's rights under the contract.

Reviewed by: BP/DDR/GA/HIL Date: 25-02-2026

RECORD OF REVISIONS

Sl. NO.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat at site		Finish coat at site			Total DFT µm (min)
				Paint	No. of coats /DFT	Paint	No. of coats	Paint	No. of coats	Shade	
1.1	1AC	Drum (Except Internals) 04 – 124	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1 / DFT= 30m per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20m per coat	Inter- national Orange Shade No: 592 of IS 5	70
1.2	1AC	Drum Suspension 04 - 144	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1/ DFT= 30m per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20m per coat	Inter- national Orange Shade No: 592 of IS 5	70
1.3	5	Drum Internals 04 – 134, 136, 138 Other Machine Components 43 – 101, 102, 103, 104, 105, 106, 107	Blasting according to SIS 055900 GRADE: SA 2 1/2	Rust Preventive Fluid to PR: CHEM: 09 – 04	1 DFT=20m per coat	--	--	--	--	--	20
1.4	1AE	Drum Transport Structures 04 - 194, 196, 35 - 810	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30m per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20m per coat	Yellow Shade No: 356 of IS 5	70
2.1	11	Foundation Materials and Pin: 35 - 010, 190 – 39 – 010, 020, 48 – 019 & Columns below "0" level of PG 35,36, 38 & 39	Blasting according to SIS 055900 GRADE: SA 2 1/2	--	Red Oxide (Rust preventive paint required)	--	--	No Paint		--	--

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation &- Surface Profile	Primer coat		Intermediate coat at site		Finish coat at site			Total DFT µm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
22	1A	<p>Buck Stays and Structural Items: Buck stays 08 – 001, 101, 104, 107, 111, 400,700, 900,904 Boiler Supporting Structures 35, 36, 38,39,66 (EXCEPT FLOOR GRILS, LADDERS & STAIRS, HANDRAILS & POSTS)</p> <p>For No paint zones Refer note no: 19</p> <p>Duct Supports 48 – 005, 015, 025, 045, 055, 065, 085, 105, 115, 125, 145, 155, 185, 195, 200,205, 215, 225, 235, 245, 255, 265, 275, 295, 305, 315, 325, 335, 345, 355, 365, 375, 385, 415, 425, 435, 445, 455, 465, 475, 485, 495, 665, 805, 815, 825, 845, 855, 865, 875, 885, 995 Piping Centre: 80-800 to 882, 920 to 933, 940</p>	Blasting according to SIS 055900 GRADE: SA 2 1/2	Inorganic Zinc silicate	1 / DFT= 75 µm per coat	High build micaceous iron oxide epoxy	1 DFT= 75 µm per coat	High build micaceous epoxy polyamide (pigmented)	2 / DFT= 75 µm per coat	Dark Admiralty Grey Shade no. 632 is5	300

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation &- Surface Profile	Primer coat		Intermediate coat at site		Finish coat at site			Total DFT μm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
23	1AB	Floor grills, 35 – 811 36 - 810, 38 - 810, 811 39 – 810, Hand Rails 35 - 850, 36 - 850 38 - 850, 851 39 - 850, Ladders 35 – 820 36 – 820 38 – 820 39 – 820	Hot dip Galvanizing to a coating weight of 610 gm per sq. m (minimum) and to a coating thickness of 85.0 microns (minimum). Any damaged portion post preparation of components to be cold spray galvanized with Zinc rich primer (2 coats with each of 75 μm)								

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation &- Surface Profile	Primer coat		Intermediate coat at site		Finish coat at site			Total DFT µm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
3.1	10	Components >95 C Un-insulated other than components coming in Gas Path 09 - 001, 002, 003 24 – 220, 28 – 220 42 – 300,358 07-401,410,420,431,700 17-904,919,928 19-901,905,906,907 12- 901, 903, 906, 914, 917, 924, 928, 944, 948, 954,	Blasting according to SIS 055900 GRADE: SA 2 1/2	Heat Resistant Aluminium Paint to IS 13183 Grade-I	1 (DFT =15 microns)	- -	- -	Heat Resistant Aluminium Paint to IS 13183 Grade-I	1 (DFT =15 m per coat)	Aluminium	30

3.2	3	Components >95 C Insulated 05 - 137, 147,155,175, 227, 229, 231,251, 07 - 108, 109, 215, 216,218, 223, 225, 226, 229, 231, 232 10 – 135, 174, 178, 191, 235, 274, 278, 283, 284, 291,687 15 –174, 274,18 – 001,010, 020 19 – 701, 702, 753,763, 21 – 600 24 – 200, 215, 275, 500 42 - 128, 158, 48 –202, 204, 207,212, 214, 222, 224, 382,384, 432, 434, 462, 464 , 482, 484, 492, 494, 499, 662, 664, 667, 38011,120,250,360,211,212,213,451,4 52,541,543,304,810,820,850,440,48 – 380.	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30m per coat	-	--	--	--	Red Oxide	60
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Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat at site		Finish coat at site			Total DFT µm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
3.3	2	Heat Transfer Exchanger Coils: (SH, RH & Economiser Coils) Panels: 11- 682, 683, 684, 685, 687, 691, 694, Pipes: 11 - 236, 237,274, 278, 12 – 174, 184, 187, 535,803, 805, 850, 851, 852, 900, 16 –275, 277 19 -114, 124, 802	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03	1 DFT= 35m per coat	--	--	--	--	--	35
3.4	3	Components coming in Gas Path other than Coils 06 -400, 631, 637, 640, 647, 651, 655, 10 – 182, 183, 184, 185 16 – 988, 999 19 – 802,850,851 30 – 105, 211, 212, 219, 220, 31 –102,104, 105, 32 –310, 42 - 129	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30m per coat	--	--	--	--	Red Oxide	60

3.5	8A	Uninsulated Fuel Pipes 47 – 229, 265, 266, 267, 268, 269 Duct for Tube Mill: 48 – 802, 804, 812, 814, 817, 822, 824, 832, 834, 842, 844, 852, 854, 857, 862, 864, 867, 872, 874, 882, 884,	Blasting according to SIS 055900 GRADE: SA 2 1/2	General purpose Aluminium paint to IS 2339	2	--	--	--	--	Alumun um	40
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SL. No.	Schem e No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat at site		Finish coat at site			Total DFT µm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
4	15	Constant Load and Variable Load Hangers (CLH / VLH) (See NOTE 14) 07 - 401, 410, 420, 431 10 – 200 17 – 904, 919, 19 –904, 905, 906, 907 24 - 351	Blasting according to SIS 055900 GRADE: SA 2 1/2	Epoxy zinc rich primer to IS 14589 Gr. II %VS=35 (min)	1 DFT=40 m / coat	--	--	Aliphatic acrylic Poly- urethane paint %VS=40 (min) t	1 DFT=30 m per coat	Phirozi Blue Shade No. 176 of IS5	70
5.1		Miscellaneous and Casing Sheets: 07-500, 501, 601, 997, ,21 - 601, 24 - 201, 225, 235, 240, 350, 470, 471, 473, 501, 525, 535, 540, 570, 601, 625, 635, 640, 800, 801, 815, 850, , 36 - 613, 37 - 010, Fuel Firing: 41 –350, 390, Steam Blowing Piping: 42 – 002, 005, 010 42 –065, 070, 120,152, 154, 157, 43 –, 004, 005, 45 –220, 221,47 –201, 209, Duct Plates and Expansion Joints: 48 –012, 014, 112, 114, 142, 144 Coal Handling: 65 –736, 276, 283, 801, 802, 803,	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30m per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20	Smoke Grey Shade No: 692 of IS 5	70
5.2	3	Erection Materials and Commissioning Components: 04 - 988, 05-993, 06-993, 07 – 993, 12-993, 24 – 993, 28 – 993, 35 – 993, 36 – 993, 37 – 993, 38 – 993, 39 – 993, 48- 993, 65 – 988, 97-585,99 – 045, 099, 501, 50	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30m / coat	--	--	--	--	Red Oxide	60

SL. No	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat at site		Finish coat at site			Total DFT μm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
6.1	10	Cast carbon steel valves (Conventional) Cast alloy steel valves (Conventional) All API valves, QCNRV, SV & SRV Silencers, Water Level gauge HP / LP system 22-101,889	Blasting according to SIS 055900 GRADE: SA 2 1/2	Resistant Aluminium Paint to IS 13183 Gr.I	2	--	--	--	--	--	40
6.2	--	Forged valves	Blasting according to SIS 055900 GRADE: SA 2 1/2	Coating weight of 1500 mg per sq.ft.	--	--	--	--	--	--	--
6.3	1AS	Soot Blower components 20-001,003,004,021,051,054,201,204,301,304,331,511,794,801,821,831,962,972	Blasting according to SIS 055900 GRADE: SA 2 1/2	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30m per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20	Verdigris Green Shade No. 280 of IS5	70
6.6	8A	Hand Wheels	Blasting according to SIS 055900 GRADE: SA 2 1/2	General Purpose Aluminium Paint to IS 2339	2 DFT= 100m per coat	--	--	--	--	--	40

PS for Arrows shall be as per valves and the final shade will be „Post Office Red-Shade No. 538 of I

NOTES:

1. This painting scheme covers a comprehensive list of PGMA's being used in 125 / 150/ 210 / 250 / 500 MW and Industrial Boilers under Fossil Boilers working in normal environment, in an effort to standardise the painting scheme. Therefore, the entire list of PGMA's will not be applicable for any specific project and only those PGMA's applicable for the project may be used, while choosing the painting scheme applicable.
2. Rust Preventive coating should be given on HSFG Bolt and Nut threads at site.
3. All threaded and machined surfaces & Retainers are to be applied with a coating of Temporary Rust Preventive oil.
4. All surfaces of foundation 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 at site.
5. PGMA's under Sub-Vendor items are not indicated. Please refer respective Engineering Document for all sub-vendor items. Wherever it is not specified, it shall be as per the painting scheme of the applicable PGMA.
6. No painting is required for Aluminium, Stainless Steel components and galvanized items. Abrasive blast cleaning to SSPC-SP6 (Sa 2) grade shall be done to prepare the surface of hot worked pipes prior to application of primer.
7. Wherever inside surfaces of components under PGMA 48 – XXX, need protection till erection, and all running meter items for spares and main item two coats of Red-oxide zinc phosphate primer paint to IS12744 to a DFT of 60 microns shall be applied, after power tool cleaning. 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.
8. The Temporary Rust Preventive coating that has already been applied on any component, tubes, pipes etc., shall be visually inspected for good adherence. If the coating is intact, direct coating of alkyd-based 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).
9. All currently active PGMA's are covered. Requirements for Missing / new PGMA s will be included under the relevant section, following the appropriate paint logic.
10. Ground shade/colour finish paints & identification tag/ band for equipment's, piping, pipe service, boiler supporting structures and other boiler components shall be followed as per tender.
11. In components, wherever plates/sheets of thickness less than or equal to 5 mm, tubes/ rods/drain pipe are used, power tool /hand tool cleaning to SSPC-SP3/ SSPC-SP-2 shall be followed and the painting shall be done as described in SI no: 5.1.
12. Touch-up painting of damaged areas shall be carried out as per clause applicable painting scheme.
13. Only weldable primer shall be applied on surfaces, which require to be welded subsequently at site. At those locations no other paint shall be applied.
14. DUs coming under Constant Load Hangers (CLH) shall be painted as per the system - PS 15 indicated in SI. No. 4 of the table. However, for DUs coming under Variable Load Hangers (VLH), the painting shall be as per Painting Scheme PS 1A indicated in SI. No. 5.1 of the table. (i.e., one coat of Zinc Phosphate Primer followed by two coats of Synthetic Enamel Paint –shade smoke grey, total DFT – 70 microns)
15. 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 gm/ Ch.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 gm/ 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.
16. All threaded components of spring assemblies and turnbuckles shall be galvanized and achromatized to 15 microns minimum thickness.
17. Painting scheme for all temporary structures shall be PS 1AE i.e. 1 coat of Zinc Phosphate primer (Alkyd Base) to IS 12744-DFT-30 and 2 coats of Synthetic Enamel paint (Long Oil Alkyd) to IS 2932-DFT-2X20 Shade Yellow –Shade No. 356 of IS 5- Total DFT 70.
18. One no. of primer to be coated at shop only. Balance primer, intermediate or finish paint to be coated at site only.
19. The matching faces of HSFG Bolt connections should not be painted (If required rust preventive temporary coating can be applied to the max DFT of 30 µm)

Painting Scheme – Details for procurement & application purposes

Sl. No	Material Code of Paint	Generic nature of paint	Theoretical Covering Capacity Sq. m per Litre	No. of pack	Volume solids, % (min) **	DFT in microns (min) per coat	Shade	Shade No. to IS5	Mode of appln	Over coating interval, Hrs.
1	120016131800	Heat Resistant Aluminium paint to IS 13183 Grade I	10	1	-	-	Aluminium	-	Brush / Spray	24
2	120011111900	Red oxide Zinc Phosphate primer paint to IS 12744	10	1	-	-	Red Oxide	-	Brush / Spray	12
3	120011121900	Red oxide Zinc Phosphate Dip coat primer paint to PR: CHEM: 09-03	10	1	-	-	Red Oxide	-	Dip	12
4	120011311200	Long oil alkyd synthetic enamel finish paint to IS2932	10	1	-	-	Reqd. shade	Corrpdg. Shade no.	Brush / Spray	12
5	120011140000	Temporary Rust preventive fluid to PR: CHE: 09 – 04	10	1	-	-	Amber	-	Brush / Spray	12
6	120012141700	Epoxy Zinc rich primer to IS14589 Gr. II	8	2	35	40	GREY	-	Brush / Spray	24
7	120013310200	Aliphatic acrylic polyurethane paint to IS13213	10	2	40	30	Phirozi – Blue. /French Blue	176/166	Brush / Spray	24
8	120017101800	De Oxy Aluminate Weldable Primer- Colour Aluminium	10	1	-	-	Aluminium	-	Brush / Spray	24
9	120014111700	HB CR Based Zinc Phosphate Primer	10	1	40	50	GREY	-	Brush / Spray	12
10	120014300100	CR Based Finish Paint	10	1	30	30	French Blue	166	Brush / Spray	12

11	12001213800	High Build Epoxy Mastic Aluminium Primer-	10	1	80	100	Aluminium	-	Brush / Spray	24
12	180030810000	Inorganic zinc silicate	8	2	57	65	Grey	-	Spray	12

The covering capacity of paints specified is only approximate.

The paints and Rust Preventive fluid shall be procured from BHEL"s approved suppliers. ** Values are indicative.