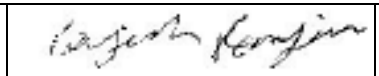
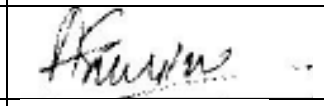
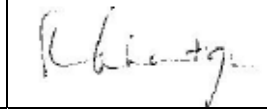
BHARAT HEAVY ELECTRICALS LIMITED
RAMACHANDRAPURAM::HYDERABAD-32

PULVERISERS ENGINEERING

AMRAVATI THERMAL POWER PROJECT, AMRAVATI, 5x270 MW
M/s ELENA POWER & INFRASTRUCTURE LTD.

PAINTING SCHEDULE FOR BOWL MILLS

PREPARED BY	RAJESH RANJAN		DOCUMENT NO:BA/PS/AMRAVATI /00 REV. NO: 00 , DATED 16.04.2010 SHEET : 01 OF 08
REVIEWED BY	AMAN SURIN		
APPROVED BY	SATISH GHATGE		

PAINTING SCHEME FOR XRP 943 BOWL MILL - AMRAVATI TPP, 5x270 MW

SL. NO	SURFACE LOCATION & PGMAs	SURFACE PREPARATION	PRIMER		INTERMEDIATE		FINISH COAT			TOTAL DFT
			PAINT (mat.code)	NO.OF COATS	PAINT (mat.code)	No. OF COATS	PAINT (mat.code)	NO.OF COATS	SHADE	µm min.
01	Journal Assembly 61-000 a) Oil swept inside unmachined surfaces	Kerosene Cleaning	-	-	-	-	White crank case sealer (HY5530078052) or Oil resistant Synthetic Enamel (AA5610032563	2	-	50
	b) Outer Surfaces	Abrasive blast clean to Sa2½ (IS0:8501-1:)	Alkyd Zinc Phosphate	4 to a DFT of 100 µ	-	-		-	-	100

PAINTING SCHEME FOR XRP 943 BOWL MILL - AMRAVATI TPP, 5x270 MW

SL. NO	SURFACE LOCATION & PGMAs	SURFACE PREPARATION	PRIMER		INTERMEDIATE		FINISH COAT			TOTAL DFT
			PAINT (mat.code)	NO.OF COATS	PAINT (mat.code)	No. OF COATS	PAINT (mat.code)	NO.OF COATS	SHADE	µm min.
02	Mill Drive and Bowl Assembly 61-100 a) Inside surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)			-	-	Amine Adduct Cured Epoxy Paint (HY561000 5949)	2	WHITE	50
	b)Outer Surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyd Zinc Phosphate Primer	2 to a DFT of 40 µ			Synthetic Enamel Colour (HY561002 6997)	3*	Grey RAL 9002	100

*** Out of 3 Finish coats, 2 are to be done in shop/Subcontract to a DFT of 40 µ and 3rd coat of 20 µ to be done at site. With this 80µ (40µ primer +40µ finish paint) DFT is to be done at shop and 20µ at site. Thus a total of 100µ DFT is achieved.**

PAINTING SCHEME FOR XRP 943 BOWL MILL - AMRAVATI TPP, 5x270 MW

SL. NO	SURFACE LOCATION & PGMAs	SURFACE PREPARATION	PRIMER		INTERMEDIATE		FINISH COAT			TOTAL DFT
			PAINT (mat.code)	NO.OF COATS	PAINT (mat.code)	No. OF COATS	PAINT (mat.code)	NO.OF COATS	SHADE	µm min.
03	Mill Side and Liner Assembly 61-200									
	a) Inside surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyd Zinc Phosphate Primer	2	-	-		-	-	40
	b) Outer Surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyd Zinc Phosphate Primer	2 to a DFT of 40µ	-	-	Synthetic Enamel Colour (HY/561002 6997)	3*	Grey RAL 9002	100

PAINTING SCHEME FOR XRP 943 BOWL MILL - AMRAVATI TPP, 5x270 MW

SL. NO	SURFACE LOCATION & PGMAs	SURFACE PREPARATION	PRIMER		INTERMEDIATE		FINISH COAT			TOTAL DFT
			PAINT (mat.code)	NO.OF COATS	PAINT (mat.code)	No. OF COATS	PAINT (mat.code)	NO.OF COATS	SHADE	µm min.
04	Separator Assembly 61-300									
	a) Inside surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyd Zinc Phosphate Primer	2 to a DFT of 40µ	-	-		-	-	40
	b) Outer Surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyed Zinc Phosphate Primer	2 to a DFT of 40µ	-	-	Synthetic Enamel Colour (HY5610026997)	3*	Grey RAL 9002	100

PAINTING SCHEME FOR XRP 943 BOWL MILL - AMRAVATI TPP, 5x270 MW

SL. NO	SURFACE LOCATION & PGMAs	SURFACE PREPARATION	PRIMER		INTERMEDIATE		FINISH COAT			TOTAL DFT
			PAINT (mat.code)	NO.OF COATS	PAINT (mat.code)	No. OF COATS	PAINT (mat.code)	NO.OF COATS	SHADE	µm min
05	Mill Discharge Valve Assembly PGMA-61400 a) Outer Surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyed Zinc Phosphate Primer	2 to a DFT of 40µ	-	-	Synthetic Enamel Colour (HY5610026997)	3*	Grey RAL 9002	100

PAINTING SCHEME FOR XRP 943 BOWL MILL - AMRAVATI TPP, 5x270 MW

SL. NO	SURFACE LOCATION & PGMAs	SURFACE PREPARATION	PRIMER		INTERMEDIATE		FINISH COAT			TOTAL DFT
			PAINT (mat.code)	NO.OF COATS	PAINT (mat.code)	No. OF COATS	PAINT (mat.code)	NO.OF COATS	SHADE	µm min.
06	Coupling Guard 61-700 b) Inside surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyd Zinc Phosphate Primer	2 to a DFT of 40µ	-	-		-	-	40
	b) Outer Surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyd Zinc Phosphate Primer	2 to a DFT of 40µ	-	-	Synthetic Enamel Colour (HY5610026997)	3*	Grey RAL 9002	100

PAINTING SCHEME FOR XRP 943 BOWL MILL - AMRAVATI TPP, 5x270 MW

SL. NO	SURFACE LOCATION & PGMAs	SURFACE PREPARATION	PRIMER		INTERMEDIATE		FINISH COAT			TOTAL DFT
			PAINT (mat.code)	NO.OF COATS	PAINT (mat.code)	No. OF COATS	PAINT (mat.code)	NO.OF COATS	SHADE	µm min.
07	Seal Air Assembly, Coal Sampling Platform, PGMA-67400, Lube Oil System and Loose Items a) Outer Surfaces	Abrasive blast clean to Sa2½ (ISO:8501-1)	Alkyd Zinc Phosphate Primer	2 to a DFT of 40µ	-	-	Synthetic Enamel Colour (HY5610026997)	3*	Grey RAL 9002	100

BHARAT HEAVY ELECTRICALS LIMITED
Tiruchirappalli - 620 014

PAINTING SCHEME FOR
AMRAVATI TPP-5 X 270 MW
M/s. ELENA POWER & INFRASTRUCTURE LTD.,(EPIL)
NANDGAONPETH, AMRAVATI DIST.,MAHARASTHRA
CUSTOMER NO:U2/ 1220 TO U2/ 1224

Prepared by	**L. Gragori Manager / P. Lab**		**Document No: Q: PL: C3 - PS /1220**
Reviewed by	**S.Dhanabal DGM/PE / FB**		**Revision No: 00 Dated: 19-01-2010**
Approved by	**Dr.G.Ravichandran SDGM /P. Lab**		**Sheet No. : 1 of 11**

N/ CHEM/CONTRACTS 09/ELENA-AMRAVATI TPP-5 X270 MW_00.DOC.

RECORD OF REVISIONS

Rev. No	Date	Details of revision	Remarks
00	19-01-2010	NEW	BHEL STD Painting scheme for Normal Atmosphere.

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			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** – 114, 116, 118, 124, 126, 128, 210, 212, 214, 270	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 / DFT= 30µm per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20µm per coat	Inter-national Orange Shade No: 592 of IS 5	70
1.2	1AC	Drum Suspension **04** -142, 144, 146, 148	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1/ DFT= 30µm per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20µm per coat	Inter-national Orange Shade No: 592 of IS 5	70
1.3	5	Drum Internals **04** – 134, 136, 138 Other Machined Components: **43** – 101, 102, 103, 104, 105, 106, 107	SSPC-SP1 or SP3 Solvent / Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04	1 DFT=25µm per coat	--	--	--	--	--	25
1.4	1AE	Drum Transport Structures **04** - 194, 196, **35** - 391, 810	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30µm per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20µm per coat	Yellow Shade No: 356 of IS 5	70
2.1	11	Foundation Materials and Pin: **35** - 010, 011, 012, 013, 020, 030, 190 **38** – 010 **39** - 010, 011, 012, 020, 030, 040 48 – 019 & Columns below " 0 " level of PG 35,36, 38 & 39	--	No Paint	--	--	--	No Paint	--	--	--

Sl. No.	Scheme 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	
2.2	1A	Buck Stays and Structural Items: Buck stays **08** – 001, 003, 006, 007, 101, 104, 107, 111, 380, 382, 400, 500, 501, 503, 700, 900, 901, 904, 907, 910 Boiler Supporting Structures **35** – 100, 110, 111, 112, 120, 121, 122, 130, 131, 132, 133, 134, 135, 136, 140, 141, 142, 143, 144, 150, 151, 152, 153, 160, 161, 162, 171, 172, 173, 174, 181, 182, 183, 184, 185, 186, 191, 192, 193, 194, 195, 196, 210, 211, 212, 213, 214, 220, 221, 222, 230, 231, 232, 240, 250, 310, 311, 312, 320, 321, 322, 330, 331, 332, 340, 341, 342, 350, 351, 352, 360, 361, 362, 380, 381, 382, 383, 390,392, 410, 420, 430, 440, 441, 442, 443, 451, 452, 453, 461, 462, 463, 471, 472, 473, 481, 482, 483, 500, 510, 511, 512, 513, 514, 520, 521,522, 523, 524, 530, 531, 532, 533, 540, 541, 542, 550, 551, 552, 561, 562, 563, 571, 572, 573, 581, 582, 583, 591, 592, 593, 594, 595, 596, 597, 598, 599, 610, 612, 613, 710, 711, 712, 713, 715	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30µm per coat	–	–	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20	Smoke Grey Shade No: 692 of IS 5	70
			SA2·5	Epoxy based zinc phosphate	2(60)			Polyamide cured high build epoxy	2 (150)		→ operating Temp upto 65°c
		36 – 110,120, 130, 150, 200, 210, 211, 212, 220, 221, 222, 230, 231, 232, 240, 241, 242, 250, 251, 252, 260, 261, 262, 270, 271, 272, 280, 281, 282, 290, 291, 292, 300, 301, 302, 310, 311, 312, 313, 314, 315, 316, 320, 321, 322, 323, 324, 325, 326, 327, 330, 331, 332, 333, 334, 335, 340, 341, 342, 343, 344, 345, 346, 347, 348, 350, 351, 352, 353, 354, 355, 360, 361, 362, 363, 370, 371, 372, 380, 381, 382, 383, 390, 391, 392, 393, 394, 395, 396, 397, 410, 420, 430, 490, 491, 492, 510, 520, 610, 612, 620, 621, 630, 631, 632	SA2·5	Ethyl Silicate zinc rich	1(65)			Heat resistant aluminium	2(30)		→ operating temp 65–300° c
		38 – 110, 120, 130, 210, 211, 299, 310, 311, 380, 381, 390, 410, 510, 511, 512, 513, 521, 522, 610, 611, 612, 620, 710, 712, 720, 730	SA2·5*	—do—	1(65)			Heat resistant silicon aluminium	2(24)		operating temp → above 300° c
		39 - 100, 101, 102, 110, 120, 121, 130, 140, 141, 142, 143, 150, 160, 200, 210, 300, 301, 303, 304, 305, 306, 311, 312, 323, 390, 391, 392, 393, 901									
		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									

* → area where it is not possible to sandblast, may be cleaned by power brushing as per St-3 with the consent of owner/consultant

→ Polyamide cured high built epoxy.

Sl. No.	Scheme 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	
2.3	1A	Hangers: **36** - 740, 741, 742, 743, 744	SSPC-SP3/ Power Tool Cleaning SA2-5	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 Epoxy Based Zinc phosphate	2(60) DFT= 30µm per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2(150) DFT= 20µm per coat	Smoke Grey Shade No: 692 of IS 5	70
2.4	1AB	Hand Rails & Posts **35** - 850, 851 **36** - 850, 851, 852, 853 **38** - 850, 851 **39** - 850, 851 Refer Note – A	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30µm per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20µm per coat	Black	70
2.5	6	Floor grills, Guard plate** **35** – 811 **36** - 010, 810, 811, 812, 813, 814, 815, 816, 840 **38** - 810, 811 **39** – 810, 811, 840, 841	Floor Grills : Hot dip Galvanizing to a coating weight of 610 gm per sq.m (minimum) and to a coating thickness of 85.0 microns (minimum). ** Guard plates will be painted as given in Sl. No. 2.2.								
2.6	1AB	Ladders & Stairs **35** – 820, 821, 822, 823 **36** – 820, 821, 822, 823 **38** – 820, 821 **39** – 820, 830, 831 **48** - 466 Refer Note – A	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30µm per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20µm per coat	Black	70

NOTE – A

For hand rails & Post, Ladder & stairs follow the following painting :-

1. Surface preparation & surface profile – SA 2.5
2. Primer coat, (Paint) – Epoxy based zinc phophate, No. of coat 2(60) ie 2 coat
3. Finish coat, (Paint) – Polyamide cured high built epoxy, No. of coat 2(150) ie 2 coat & total DFT 150 µm.

Sl. No.	Scheme 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	
3.1	10	Components >95° C Un-insulated other than components coming in Gas Path **09** - 001, 002, 003 **21** - 800, 850, 875, 997 **24** – 120, 160, 173, 180, 185, 190, 195, 220, 260, 273, 280, 285, 290, 320, 345, 360, 373, 380, 385, 390, 395, 420, 460, 480, 485, 490, 495, 520, 560, 573, 580, 585, 590, 660, 680, 685, 690, 820, 860, 880, 885 **28** – 220 **42** – 300, 318, 328, 348, 358 **48** - 380	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Grade-I	1 (DFT =20 microns) per coat	--	--	Heat Resistant Aluminium Paint to IS 13183 Grade-I	1 (DFT =20 µm per coat)	Aluminium	40
3.2	3	Components >95° C **Insulated** **05** - 137, 139, 147, 153, 154, 155, 158, 159, 175, 188, 195, 220, 227, 229, 231, 236, 241, 246, 251, 265, 281, 283, 296, 330, 340, 341, 350, 493, 879, 900 **07** - 101, 102, 104, 106, 107, 108, 109, 200, 201, 202, 203, 204, 211, 212, 214, 215, 216, 217, 218, 221, 222, 223, 225, 226, 229, 231, 232 **10** – 100, 120, 122, 135, 136, 140, 141, 151, 170, 174, 178, 179, 180, 191, 195, 218, 220, 222, 235, 236, 240, 241, 251, 270, 274, 278, 279, 280, 283, 284, 291, 295, 315, 687 **15** – 136, 138, 147, 174, 177, 192, 193, 236, 238, 274, 279, 292, 293, 999 **17** – 138, 177, 776, 807, 900, 903 **18** – 001, 002, 003, 010, 020 **19** – 701, 702, 753, 903 **21** – 600 **24** – 100, 115, 175, 200, 215, 275, 295, 300, 315, 375, 475, 500, 568, 600, 620, 675, **42** - 020, 021, 025, 030, 031, 032, 033, 036, 037, 038, 128, 150, 153, 158, 159, **48** –032,034,035,132,135,202, 204, 207, 208, 212, 214, 217, 221, 222, 224, 227, 228, 229, 232, 234, 242, 244, 252, 254, 261, 262, 264, 267, 272, 274, 276, 282, 284, 292, 294, 302, 304, 307,308, 309, 311, 312, 314, 318, 319, 322, 324, 332, 334, 342, 352, 362, 364, 372, 374, 381, 382, 384, 386, 388, 389, 392, 412, 414, 422, 424, 426, 432, 434, 438, 439, 442, 444, 452, 454, 462, 464, 467, 468, 469, 472, 474, 482, 484, 486, 487, 488, 489, 491, 492, 494, 496, 497, 498, 499, 602, 612, 622, 632, 646, 652, 654, 656, 662, 664, 666, 667, 668, 669, 676, 686, 696	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30µm per coat	-	--	--	--	Red Oxide	60

Sl. No.	Scheme 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	
3,3	2	Heat Exchanger Coils: (SH, RH & Economiser Coils) **11** - 036, 037, 038, 074, 077, 078, 095, 135, 136, 138, 170, 174, 175, 178, 179, 235, 236, 237, 238, 248, 250, 251, 271, 272, 274, 275, 277, 278, 279, 280, 336, 337, 338, 340, 342, 356, 358, 370, 374, 377, 378, 395, 585, 587, 591, 606, 608, 616, 618, 682, 683, 684, 685, 686, 687, 688, 691, 694, 716, 717, 718, 767, 768, 769, 787, 791, 882, 883, 884, 885, 887, 916, 917, 918, 967, 968, 969, 986, 987, 988, 991, 994, 999 **12** – 135, 136, 170, 174, 178, 184, 187, 335, 395, 495, 515, 535, 551, 619, 800, 803, 805, 850, 851, 852, 900, 901, 903, 906, 914, 917, 924, 927, 928, 944, 948, 954, 968, 988, 999 **16** – 077, 079, 132, 235, 236, 237, 238, 256, 275, 277, 279, 281, 377, 379 **19** - 001, 104, 105, 114, 124, 184, 802, 814, 824, 884, 914, 924, 984	SSPC – SP2 or SSPC – SP3 Hand tool / Power tool cleaning	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03	1 DFT= 35µm per coat	--	--	--	--	--	35
3.4	3	Components coming in Gas Path other than Coils **06** - 033, 036, 037, 041, 043, 046, 047, 052, 054, 089, 090, 091, 092, 093, 094, 130, 133, 136, 137, 141, 143, 146, 147, 152, 154, 189, 190, 191, 192, 193, 194, 231, 331, 350, 400, 430, 466, 467, 500, 530, 609, 611, 613, 614, 616, 620, 621, 623, 624, 630, 631, 633, 634, 636, 637, 639, 640, 641, 643, 644, 646, 647, 649, 650, 651, 652, 653, 654, 655, 657, 658, 659, 670, 689, 690, 691, 692, 693, 694, 695, 709, 713, 714, 715, 716, 720, 723, 730, 731, 733, 734, 737, 740, 741, 743, 744, 747, 749, 750, 751, 753, 755, 789, 790, 830, 840, 850, 851, 857, 895, 896, 897 **10** – 182, 183, 184, 185 **16** – 988, 999 **19** – 703, 704, 708, 763, 783, 850, 851, 900, 988, 999 **30** – 010, 104, 105, 211, 212, 216, 217, 218, 219, 220, 223, 227, 228, 233, 235, 993, **31** – 010,101, 102, 103, 104, 105, 108, 301, 993 **32** – 001, 002, 005, 006, 007, 008, 009, 011, 012, 021, 022, 023, 024, 025, 026, 027, 031, 033, 041, 042, 043, 044, 050, 055, 061, 073, 110, 120, 210, 620, 720, 810, 910, 993 **42** - 129	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30µm 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,	SSPC-SP3/ Power Tool Cleaning	General purpose Aluminium paint to IS 2339	2	--	--	--	--	Alumunum	40

Sl. No.	Scheme 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	
4	15	Constant Load and Variable Load Hangers (CLH / VLH) **(See NOTE 14)** **07** - 400, 401, 402, 403, 404, 405, 410, 420, 431 **10** - 200 **17** – 904, 906, 919, 929 **19** – 901, 904, 905, 906, 907 **24** - 346, 351	Abrasive blast cleaning to Sa 2 ½ 35- 50 microns	Epoxy zinc rich primer to IS 14589 Gr. II %VS=35 (min)	1 DFT=40 µm / coat	--	--	Aliphatic acrylic Poly-urethane paint %VS=40 (min)	1 DFT=30 µm per coat	Phirozi Blue Shade No. 176 of IS5	70
5.1	1A	Miscellaneous and Casing Sheets: **07**-500, 501, 600, 601, 997, 999, **19** – 101, 102,**21** - 601, 987, **24** - 101, 125, 130, 135, 140, 201, 225, 230, 235, 240, 301, 325, 335, 340, 350, 370, 374, 400, 401, 425, 430, 435, 440, 470, 471, 473, 501, 525, 535, 540, 570, 601, 625, 635, 640, 800, 801, 815, 825, 987, 989, 996, 998 **35** - 994, 995, **36** - 613, 903, 999, **37** - 010, 110, 210, 310, 410, 510, 610, **39** - 302, 924 Fuel Firing: **41** – 100, 110, 200, 310, 320, 330, 340, 350, 390, 410, 420, 430, 450, 460, 470, 997 Steam Blowing Piping: **42** – 002, 003, 005, 010 **42** – 040, 045, 050, 055, 060, 065, 070, 111, 112, 113, 114, 118, 119, 120, 121, 122, 123, 124, 130, 131, 132, 151, 152, 154, 155, 156, 157, 160, 165, 170, 176, 180, 195, 196, 989, 997, 998 **43** – 000, 001, 002, 003, 004, 005, 006, 007, 008, 997, 999 **45** – 050, 120, 160, 161, 180, 181, 220, 221, 260, 261, 321, 325, 326, 401 **47** – 121, 122, 123, 124, 125, 129, 140, 141, 142, 143, 144, 145, 146, 149, 161, 162, 163, 164, 165, 169, 180, 181, 182, 183, 184, 185, 189, 200, 201, 202, 203, 204, 205, 209, 221, 222, 223224, 225, 241, 242, 243, 244, 245, 246, 247, 248, 249, 261, 262, 263, 264, 647, 648, 649, 650, 746, 953, 959, 963 Duct Plates and Expansion Joints: **48** – 002, 004, 007, 011, 012, 014, 017, 018, 022, 024, 028, 032, 034, 040, 042, 044, 052, 054, 062, 064, 066,072, 074, 082, 084, 092, 094, 102, 104, 107, 112, 114, 116, 122, 124, 132, 142, 144, 152, 154, 162, 172, 182, 184, 192, 194 Coal Handling: **65** – 051, 060, 070, 260, 402, 403, 460, 724, 736, 738, 786 **67** – 204, 251, 256, 261, 266, 271, 272, 276, 277, 283, 286, 400, 801, 802, 803, 804, 999 **99** – 201, 299	SSPC-SP3/ Power Tool Cleaning SA 2·5 SA 2·1 SA 2·5	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 Epoxy based Zinc phosphate Ethyl silicate zinc rich Ethyl silicate zinc rich	1 DFT= 30µm per coat 1(65) 1(65) 1(65)	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 polyamide cured high build epoxy Heat resistant aluminium heat resistant silicone aluminium	2 DFT= 20 2(150) 2(30) 2(24)	Smoke Grey Shade No: 692 of IS 5	70
5.2	3	Erection Materials and Commissioning Components: **04** - 988, **05**-993, **06**-993, **07** – 988, 993, 12-993, **24** – 993, **28** – 993, **35** – 993, **36** – 993, **37** – 993, **38** – 993, **39** – 993, **48** – 988, 993, **65** – 988, 97-585,**99** – 045, 099, 501, 502	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30µm / coat	--	--	--	--	Red Oxide	60

operating temp (Deg C)

upto 65 –

operating temp b/w 65 – 300°C

operating temp. above 300°C

Sl. No.	Scheme 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	
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	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr.I	2	--	--	--	--	--	40
6.2	--	Forged valves	Phosphating	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	SSPC-SP3/ Power Tool Cleaning SA 2.1	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 Epoxy based zinc phosphate	1 DFT= 30µm per coat 2(60)	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 Polyamide cured high build epoxy	2 DFT= 20 2(150)	Verdigris Green Shade No. 280 of IS5	70
6.4	36	On Shore OFE Components	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber based Zinc Phosphate Primer DFT= 50µm per coat	2	--	--	Chlorinated Rubber Based Finish Paint DFT= 30µm per coat	2	French Blue Shade No: 166 of IS 5	160
6.5	35	Off Shore Components	SSPC-SP3/ Power Tool Cleaning	High Build Epoxy Mastic Aluminium Primer-	1 DFT= 100µm per coat	--	--	Aliphatic acrylic Poly-urethane paint %VS=40 (min) IS 13213	1 DFT=30 µm per coat	French Blue Shade No: 166 of IS 5	130
6.6	8A	Hand Wheels Refer Note-A	SSPC-SP3/ Power Tool Cleaning	General Purpose Aluminium Paint to IS 2339	2 DFT= 100µm per coat	--	--	--	--	--	40

PS for Arrows shall be as per valves and the final shade will be 'Post Office Red-Shade No. 538 of IS 5

NOTES:

1. **This painting scheme covers a comprehensive list of PGMAs being used in 125 / 210 / 250 / 500/600 MW and Industrial Boilers under Fossil Boilers working in normal environment, in an effort to standardise the painting scheme. Therefore, the entire list of PGMAs will not be applicable for any specific project and only those PGMAs applicable for the project may be used, while choosing the painting scheme applicable.**
2. Rust Preventive coating should be given on HSFG Bolt & Nut threads. → specify DFT (min).
3. All threaded & machined surfaces and all retainers 'A' & 'C' types 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.
5. PGMAs 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 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).
9. **All currently active PGMAs 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 equipments, piping, pipe service, boiler supporting structures and other boiler components shall be followed as per tender. Code.
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 Sl 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 Sl. 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 Sl. No. 5.1 of the table. (i.e., one coat of Red Oxide 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/ 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 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 Red oxide Zinc Phosphate primer (Alkyd Bse) to IS 12744-DFT-30 μ and 2 coats of Synthetic Enamel paint (Long Oil Alkyd) to IS 2932-DFT-2X20μ. Shade Yellow –Shade No. 356 of IS 5- Total DFT 70μ.

→ BHEL ~~fault~~ specify ~~use~~ what PGMA & DUs stand for.

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	--	Spray	24
7	120013310200	Aliphatic acrylic polyurethane paint to IS13213	10	2	40	30	Phirozi – Blue./French Blue	176/166	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-	8	2	80	100	Aluminium	---	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. ** Values are indicative.

BHARAT HEAVY ELECTRICALS LIMITED
PIPING CENTRE, CHENNAI– 17
QUALITY ASSURANCE & CONTROL DEPT.

PAINTING SCHEME FOR PIPING

PROJECT NAME: - AMRAVATI THERMAL POWER PROJECT– (5X 270 M W)

BHEL CUSTOMER Nos: 7109, 7110,7111,7112,7113.

QPNO : 7109:QPC:11
REV.NO : 01
Date : 01.02.2011

Sl. NO	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat			Finish coat				REMARKS
			Primer	No of coats & DFT	Paint	No of coats & DFT	Shade	Paint	No of coats & DFT	Shade	Total DFT Microns (Min.)	
1	2	3	4	5	6	7		9	10	11	12	13
1	Insulated Piping, components (MS / HRH / CRH / Aux Steam lines, ... IBD,CBD tanks)	SSPC-SP3/ Power Tool Cleaning	Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	2 (30 microns per coat.)	—	—	—	—	—	Red Oxide	60	
2	Uninsulated Piping, components (Spray Water / Condensate lines ...,Tanks & Vessels)	SSPC-SP3/ Power Tool Cleaning	Red Oxide - Zinc Phosphate (Alkyd base to IS: 12744)	2 (25 Microns per coat)	—	—	—	Synthetic enamel Long oil Alkyd to IS: 2932	3 ** (35 microns per coat) (2 at shop + 1 at site)	Smoke Grey (Shade No. 692 of IS: 5)	120 at shop + 35 at site	** 1 coat of DFT-35 microns finish coat at site
3	Structures	SSPC-SP3/ Power Tool Cleaning	Red Oxide - Zinc Phosphate (Alkyd base to IS: 12744)	2 (25 Microns per coat)	—	—	—	Synthetic enamel Long oil Alkyd to IS: 2932	3 ** (35 microns per coat) (2 at shop + 1 at site)	Smoke Grey (Shade No. 692 of IS: 5)	120 at shop + 35 at site	** 1 coat of DFT-35 microns finish coat at site
4	Hangers & Supports - (CLH)	Abrasive Blast cleaning to Sa 2 1/2 (35-50 microns)	Epoxy Zinc rich primer to IS 14589 Gr.II,% VS = 35 Min	1 (40 microns per coat)	—	—	—	Aliphatic Acrylic Polyurethane paint ,%VS = 40 min	1 (30 microns per coat)	Phirozi Blue Shade No.176 of IS 5	70	
5	Hangers & Supports - (VLH)	SSPC-SP3/ Power Tool Cleaning	Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1 (30 microns per coat.)	—	—	—	Synthetic enamel paint long oil alkyd to IS 2932	2 (20 Microns per Coat)	Smoke Grey Shade No 692 of IS 5	70	
6	Pipe Clamps.	SSPC-SP3/ Power Tool Cleaning	Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	1 (30 microns per coat.)	—	—	—	Synthetic enamel paint long oil alkyd to IS 2932	2 (20 Microns per Coat)	Note 1	70	
7	Stainless steel / Galvanized items	No paint										

Note 1 - Smoke grey shade for Carbon Steel ; White shade for Alloy Steel Clamps.

PREPARED BY : VIVEKANANDA YELLU, PE / QA	APPROVED BY: G.PANNEER SELVAM, DGM / QA	For Customer use

Approved
A.K. Tandon
Name : Jaivir Singh
Sign. : Dt. : 10.02.11
Indiabulls Power Limited
Gurgaon