



Reference: null102:1473

Date:30-11-18

|                                                                                                                  |                                                                                                                                                                    |     |                                                              |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------------------------------------------------------------|
| From:                                                                                                            | SAMIR KUMAR BHOWMICK<br>GM(TF)                                                                                                                                     | To: | BHEL<br>BHEL sirifort New delhi                              |
|                                                                                                                  |                                                                                                                                                                    | CC: | Gauravbhatia@bhel.in<br>sajal@bhel.in<br>pmgrishipal@bhel.in |
| <b>SUBJECT : PSTPP, EPC - STEAM GENERATOR</b>                                                                    |                                                                                                                                                                    |     |                                                              |
| Please find enclosed following drawings/documents for necessary action at your end as indicated in purpose code. |                                                                                                                                                                    |     |                                                              |
| VENDOR DRG NO:                                                                                                   | null                                                                                                                                                               |     |                                                              |
| NTPC DRG NO:                                                                                                     | 9585-001-102-PVM-H-006A                                                                                                                                            |     |                                                              |
| REVISION NO:                                                                                                     | 02                                                                                                                                                                 |     |                                                              |
| DRG TITLE:                                                                                                       | Painting scheme for SG & Auxilliaries                                                                                                                              |     |                                                              |
| APP CATEGORY:                                                                                                    | I                                                                                                                                                                  |     |                                                              |
| RELEASE DATE:                                                                                                    | 30-11-18                                                                                                                                                           |     |                                                              |
| COMMENTS:                                                                                                        | This document is approved subject to application of<br>-Heat resistant Aluminium paint of Gr.-I instead of Gr-II & III<br>-All coats at shop for structural steel. |     |                                                              |



**Engineering Division**  
**ISO 9001:2008 Certified**

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**BHARAT HEAVY ELECTRICALS LIMITED**  
Tiruchirappalli - 620 014



**NTPC- PATRATU STPP, PHASE-I (3X800MW)**  
**RANCHI, RAMGARH DIST, JHARKHAND**  
**CUSTOMER NO: U8-1828/1829/1830 UNIT – I,II&III**  
**PAINTING SCHEDULE**  
NTPC Drawing No: 9585-001-102-PVM-H-006A

|             |                                             |                                                                                      |                                   |
|-------------|---------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------|
| Prepared by | K. Srinivasan<br>Senior Engineer/ Plant Lab |   | Document No: PL: C3 - PS / 1828   |
| Reviewed by | S. Thiagarajan<br>AGM/ PE/ FB               |  | Revision No: 01 Dated: 16-11-2018 |
| Approved by | A. Santhakumari<br>AGM / Plant Lab          |  | Sheet No. 01 of 13.               |

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**RECORD OF REVISIONS**

| <b>Rev. No</b> | <b>Date</b>       | <b>Details of revision</b>                                                                                                                                                                                                                                                                                                                                                                                          | <b>Remarks</b>                                                                                                                                                                                                                |
|----------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>00</b>      | <b>12-09-2018</b> | New                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Prepared in line with NTPC Bidding Doc. No. CS-9585-001-2 &amp; related amendments and clarifications to Bidding Documents issued by NTPC.</b>                                                                             |
| <b>01</b>      | <b>16-11-2018</b> | Sheet 3 – Gr.I aluminium paint indicated for Sl.no.1. Paint details indicated in sl.no.3.<br>Sheet 4 – furnace Inlet headers are included in Sl. No. 4.<br>Sheet 5 – Gr. I aluminum paint incorporated for RH & SH headers.<br>Sheet 7 – Coating thickness indicated in sl. no. 10.<br>Sheet 9 – Heat resistant aluminum paint provided for fuel pipes.<br>Sheet 13 – Power tool cleaning requirement is indicated. | <b>Modified as per comments for CAT.<br/>II approval by NTPC ‘Transmittal for comments on painting scheme of SG &amp; auxiliaries’ Ref: null 102: 1246<br/>Dt. 26.10.2018 &amp; NTPC drawing no: 9585-001-102-PVM-H-006A.</b> |

| Sl. No.     | PGMA / Description                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Surface Preparation & Surface Profile                                                                                        | Primer coat                                                                                                           |              | Intermediate coat                                                                                                          |              | Finish coat                                                                                               |              |                              | Total DFT $\mu\text{m}$ (min) |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------|--------------|------------------------------|-------------------------------|
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                              | Paint                                                                                                                 | No. of coats | Paint                                                                                                                      | No. of coats | Paint                                                                                                     | No. of coats | Shade                        |                               |
| 1<br>PS10   | <u>Collector &amp; Separator Vessels (Except Internals), Supports</u><br>04 –321,323;                                                                                                                                                                                                                                                                                                                                                                                           | SSPC-SP3/<br>Power Tool<br>Cleaning                                                                                          | Heat Resistant Aluminum Paint to IS 13183<br><b>Gr. I</b><br>DFT 20 $\mu\text{m}$ per coat                            | 1            | --                                                                                                                         | --           | Heat Resistant Aluminum Paint to IS 13183<br><b>Gr. I</b><br>DFT 20 $\mu\text{m}$ per coat                | 1            | Aluminum                     | 40                            |
| 2<br>PS5    | <u>Collector &amp; Separator Vessels internals and Dd items (threaded and machined surfaces only)</u><br>04-347;07-331,360,361,362,393;<br>08-911,912,913; 09-304; 12-306,314;<br>12-317,324,327,328,344,348,354,393;<br>17-304,306,319;19-306,307;21-602,605,700;<br>24-352,700,803,813,818,827,842;<br>28-700;32-700;35-190,700,701;36-700;<br>39-700;41-710;42-700,710;43-710;<br>45-710;47-710;48-019,700;<br>65-710;67-710;<br><u>Foundation materials:</u> 35-010, 39-012 | SSPC – SP3<br>Power Tool<br>Cleaning                                                                                         | Rust Preventive Fluid to PR: CHEM: 09 – 04<br>DFT=25 $\mu\text{m}$ per coat                                           | 1            | --                                                                                                                         | --           | --                                                                                                        | --           | --                           | 25                            |
| 3<br>PS19C4 | <u>Buck stays</u><br>08-001,003,006,007,111,380,400,<br>08-501,503,901,910;<br><u>Boiler supporting structures, Columns, Girders, Bracings</u><br>34-101 to 105,200,300,390,<br>34-441 to 445, 511, to 515,<br>35-131 to 139, 141 to 149, 151 to 159,<br>35-181 to 189, 211, 212,<br>35-213,214,221,222,231,232,311,312,321,<br>35-322,331,332,341,342,351,352,361,362,<br>35-371,372,374,375, 381 to 388, 390,<br>35-441 to 448, 451 to 458, 511 to 518                        | Blast cleaning to SA2 ½<br>(Near white metal)<br><b>conforming to ISO 8501-1</b><br>with surface profile 40-60 $\mu\text{m}$ | Inorganic Ethyl Zinc Silicate<br>Primer<br>DFT=70 $\mu\text{m}$ per coat<br><br>(refer sheet 12 Sl.no.11 for details) | 1            | Epoxy based MIO pigmented intermediate coat<br>DFT 100 $\mu\text{m}$ per coat<br><br>(refer sheet 12 Sl.no.10 for details) | 1            | #Aliphatic acrylic Polyurethane paint<br>DFT 35 $\mu\text{m}$<br><br>(refer sheet 12 Sl.no.2 for details) | 2            | Grey White Shade To RAL 9002 | 240                           |

~~# Out of 2 coats of aliphatic acrylic Polyurethane finish paint, one coat shall be given at shop / subcontracting works and second coat shall be applied at site.~~

For structural steel, all coats shall be applied at shop as per technical specification.

| S. No.                  | PGMA / Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Surface Preparation & Surface Profile                                                                               | Primer coat                                                                                                     |              | Intermediate coat                                                                                                       |              | Finish coat                                                                                             |              |                              | Total DFT $\mu\text{m}$ (min) |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------|--------------|------------------------------|-------------------------------|
|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                     | Paint                                                                                                           | No. of coats | Paint                                                                                                                   | No. of coats | Paint                                                                                                   | No. of coats | Shade                        |                               |
| 3<br>PS19C4<br>(Contd.) | 35-521 to 528; 35-531 to 538, 995;<br><u>Galleries, Stair-ways &amp; inter connecting Walkways</u><br>36-111,112,113, 151,152,153,<br>36-311,312,313,314,315,316,<br>36-321,322,323,324,325,326,331,332,333,<br>36-334,335,336,337,338,341,342,343,344,<br>36-345,346,351,352,353,354,355,356,361,<br>36-362,363,364,365,366, 371 to 377,381,382;<br>36-391 to 395<br>36-610,613,620,621,740;<br>38-210,299,310,381,410,510,610, 710;<br><u>ID system structures.</u><br>39-101,102,141,142,150,299,300,301,<br>39-304,305,306,993;<br><u>Duct supports</u><br>48-015,115,145,<br>205,225,235,265,345,355,365,385,<br>48-435,465,485,495,665; | Blast cleaning to SA2 ½ (Near white metal) <b>conforming to ISO 8501-1</b> with surface profile 40-60 $\mu\text{m}$ | Inorganic Ethyl Zinc Silicate Primer DFT=70 $\mu\text{m}$ per coat<br><br>(refer sheet 12 Sl.no.11 for details) | 1            | Epoxy based MIO pigmented intermediate coat DFT 100 $\mu\text{m}$ per coat<br><br>(refer sheet 12 Sl.no.10 for details) | 1            | #Aliphatic acrylic Polyurethane paint DFT 35 $\mu\text{m}$<br><br>(refer sheet 12 Sl.no.2 for details)  | 2            | Grey White Shade To RAL 9002 | 240                           |
| 4<br>PS9                | <u>Components &gt;95° C Insulated other than components in Sl.No.7 &amp;9</u><br>Ring Headers, Down Comers, Hot air Headers outside the gas path etc.<br><br>05-137,147,155,227,231,251,327,330,350;<br>07-102,110,125,217,223,231,232;<br>12-178, 850,852, 900;<br>17-407,476,807; 18-001,002,010,701;<br>19-701,702,903;21-600;24-811,824,828;<br>24-836,837;42-020,030,128,150,158;                                                                                                                                                                                                                                                        | SSPC-SP3/ Power Tool Cleaning                                                                                       | Heat Resistant Aluminium Paint to IS 13183 <del>Gr. II</del> <b>Gr. I</b> DFT 20 $\mu\text{m}$ per coat         | 1            | --                                                                                                                      | --           | Heat Resistant Aluminium Paint to IS 13183 <del>Gr. II</del> <b>Gr. I</b> DFT 20 $\mu\text{m}$ per coat | 1            | Aluminum                     | 40                            |

~~# Out of 2 coats of aliphatic acrylic Polyurethane finish paint, one coat shall be given at shop / subcontracting works and second coat shall be applied at site.~~

For structural steel, all coats shall be applied at shop as per technical specification.

| Sl. No.              | PGMA / Description                                                                                                                                                                                                                                                                                                                                                                             | Surface Preparation & Surface Profile                                   | Primer coat                                                                                                         |              | Intermediate Coat |              | Finish coat                                                                                                        |              |           | Total DFT $\mu\text{m}$ (min) |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------|-------------------|--------------|--------------------------------------------------------------------------------------------------------------------|--------------|-----------|-------------------------------|
|                      |                                                                                                                                                                                                                                                                                                                                                                                                |                                                                         | Paint                                                                                                               | No. of coats | Paint             | No. of coats | Paint                                                                                                              | No. of coats | Shade     |                               |
| 4<br>PS9<br>(Contd.) | Hot Air:<br>48-018, 202,204,207,208,212,214,<br>222,224,232,234,262,264,662,664,667;<br><br>Flue Gas:<br>48-342,344,352,354,362,364,372,382,384,386,<br>432,434,462,464,482, 484 ,492,494, 498;                                                                                                                                                                                                | SSPC-SP3/<br>Power Tool<br>Cleaning                                     | Heat Resistant<br>Aluminium<br>Paint to<br>IS 13183<br><del>Gr. II</del> Gr. I<br>DFT 20 $\mu\text{m}$ per<br>coat  | 1            | --                | --           | Heat<br>Resistant<br>Aluminium<br>Paint to IS<br>13183 <del>Gr. II</del> Gr. I<br>DFT 20 $\mu\text{m}$<br>per coat | 1            | Aluminum  | 40                            |
| 5<br>PS 9            | <u>Components &gt;95° C uninsulated other than components coming in gas path.</u><br><br>Temp: >95°C & <400°C<br>20-511; 24-807,820,860,865,867;<br>42-200,300,358;<br>Instrument tappings, doors<br>48-200,915;                                                                                                                                                                               | SSPC-SP3/<br>Power Tool<br>Cleaning                                     | Heat Resistant<br>Aluminium<br>Paint to<br>IS 13183<br><del>Gr. II</del> Gr. I<br>DFT 20 $\mu\text{m}$ per coat     | 1            | --                | --           | Heat<br>Resistant<br>Aluminium<br>Paint to IS<br>13183 <del>Gr. II</del> Gr. I<br>DFT 20 $\mu\text{m}$<br>per coat | 1            | Aluminum  | 40                            |
| 6<br>PS 10           | Components uninsulated other than components coming in gas path.<br>(Temp: >400°C & <600°C)<br>09-003,004,005; 28-220;<br>Components insulated (Temp: >400°C & <600°C)<br>RH & SH headers<br>10-135,174,176,178,191,235,274,276,278,283,<br>10-284,285,291; 15-136, 178,236,278;                                                                                                               | SSPC-SP3/<br>Power Tool<br>Cleaning                                     | Heat Resistant<br>Aluminium<br>Paint to<br>IS 13183 Gr. I<br>DFT 20 $\mu\text{m}$ per<br>coat                       | 1            | --                | --           | Heat<br>Resistant<br>Aluminium<br>Paint to IS<br>13183 Gr. I<br>DFT 20 $\mu\text{m}$<br>per coat                   | 1            | Aluminum  | 40                            |
| 7<br>PS2             | <u>Loose tubes, SH, RH &amp; Eco. coils</u><br>11-074,078,374,378,406,467,469,<br>11-487,491,494,606,608,684,694,716,717,718,<br>11-767,768,769,787,791,916,917,918,967,968,<br>11-969,987,991;12-179,181,184,187,368,<br>12-405,514,524,544,554;<br>12-800,803,805,903,914,917,924,927,928,944,948,<br>12-954,968; 16-201,202,203,270,278,379;<br>19-092,402,804,814,824,853,884,914,924,984; | SSPC – SP2<br>or<br>SSPC – SP3<br>Hand tool /<br>Power tool<br>cleaning | Red Oxide<br>Zinc<br>Phosphate Dip<br>coat primer to<br>PR: CHEM:<br>09 – 03<br>DFT=35 $\mu\text{m}$<br>per<br>coat | 1*           | --                | --           | No paint                                                                                                           | No<br>paint  | Red Oxide | 35                            |

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

| Sl. No.    | PGMA / Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Surface Preparation & Surface Profile | Primer coat                                                                                                     |              | Intermediate Coat |              | Finish coat                                                                                         |              |                                                | Total DFT $\mu\text{m}$ (min) |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------|-------------------|--------------|-----------------------------------------------------------------------------------------------------|--------------|------------------------------------------------|-------------------------------|
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       | Paint                                                                                                           | No. of coats | Paint             | No. of coats | Paint                                                                                               | No. of coats | Shade                                          |                               |
| 8<br>PS1A1 | <p>Miscellaneous and casing sheets<br/>07-409,431,460,461,462,502,503,509,531,560;<br/>12-506,906,907; 17-919; 21-601,604,606;<br/>24-350,351,354, 801,804,805,806,808,809,<br/>24-810,815,817,821,825,826,835,840,841,855,<br/>24-950,955,960;30-233,234;<br/>36-396,611, 999; 38-611; 39-302;</p> <p>04-147, 547</p> <p>Fuel firing: 41-350,390,500;</p> <p>Steam blowing piping<br/>42-001,002,005,010,046,065,070,120,152,154,<br/>42-157;<br/>43-004,104, 200;<br/>45-200,801,802, 804,805,806,858;<br/>47-281,283, 858;</p> <p>Duct plates, expansion joints<br/>48-911,912;</p> <p>Coal Feeding<br/>65-736; 67-204,272,276, 283,801,802,803;<br/>95-088,089,091,485;96-186;97-585, 592;</p> <p>\$Handling equipment:99-099,100,300,400,600;</p> <p>Impulse lines: 24-800<br/>Seal air ducting: 43-005, 105;<br/>Cold Air duct:48-012,014, 112,114, 141<br/>Tempering Air: 48-142,144</p> | SSPC-SP3/<br>Power Tool<br>Cleaning   | Red Oxide<br>Zinc<br>Phosphate<br>Primer<br>(Alkyd<br>Base)<br>to IS 12744<br>DFT= 30 $\mu\text{m}$<br>per coat | 2            | --                | --           | Synthetic<br>Enamel paint<br>(Long Oil<br>Alkyd)<br>to IS 2932<br>DFT= 20 $\mu\text{m}$<br>per coat | 2            | Smoke<br>Grey<br>Shade<br>No:<br>692 of<br>IS5 | 100                           |

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

| Sl. No.       | PGMA / Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Surface Preparation & Surface Profile | Primer coat                                                                                                                                                  |              | Intermediate coat |              | Finish coat |              |           | Total DFT $\mu\text{m}$ (min) |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------|--------------|-------------|--------------|-----------|-------------------------------|
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       | Paint                                                                                                                                                        | No. of coats | Paint             | No. of coats | Paint       | No. of coats | Shade     |                               |
| 9<br><br>PS3  | <u>Components &gt;95° C coming in the gas path, Headers, Commissioning Spares &amp; erection Materials etc.,</u><br>06-400,401,431,434,437,441,444,<br>06-447,451, 453,455,500,501,731,732,<br>06-734,735,737,741,744,745,747,751,752,753,<br>06-755, 759; 07-309,315,316,318,423,883,993;<br>10-182,183,184,185; 11-474;<br>12-883,993;17-174,504,506,900,903;<br>19-704,753,763,783,793,802,850,851,852;<br>20-988,998; 21-987,988;<br>24-822,823, 987,988, 989, 993;<br>30-105,211,215,219,223,224,235;<br>31-010,104; 32-010,210,810; 35-993;<br>36-993;37-010;38-993; 41-997;<br>42-858,997;43-997;45-997;47-997;48-993;<br>65-200,997; 67-200,997;95-988;96-193; 97-282,590;<br>99-501; 41-988; 42-988; | SSPC-SP3/<br>Power Tool Cleaning      | Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744<br>DFT= 30 $\mu\text{m}$ per coat                                                                   | 2            | --                | --           | No paint    | No paint     | Red oxide | 60                            |
| 10<br><br>PS6 | <u>Hand rails and posts, ladders / rungs</u><br>34-810,820,850; 35-821,822,823,851;<br>36-821,822,823,851,852,853;<br>38-820,850;39-820,850;<br><u>Floor Grills, Step treads</u><br>35 – 811,812;36-811,812,813,814<br>38 – 810, 39 – 810                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SSPC – SP8/<br>Acid pickling          | Hot dip Galvanizing to a coating weight of 610 g/m <sup>2</sup> (minimum) and to a coating thickness of 87 $\mu\text{m}$ .<br><br>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: 03.

**PAINTING SCHEME FOR VALVES**

| Sl.No.            | PGMA / Description                                                                                                                                                                                                                    | Surface Preparation & Surface Profile | Primer coat                                                                                                  |              | Intermediate coat |              | Finish coat                                                                                                  |              |                                         | Total DFT $\mu\text{m}$ (min) |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------|-------------------|--------------|--------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------|-------------------------------|
|                   |                                                                                                                                                                                                                                       |                                       | Paint                                                                                                        | No. of coats | Paint             | No. of coats | Paint                                                                                                        | No. of coats | Shade                                   |                               |
| 11<br><br>PS 9/10 | <u>Cast carbon steel valves (Conventional)</u><br><u>Cast alloy steel valves (Conventional)</u><br><u>All API valves, QCNRV, SV &amp; SRV Silencers,</u><br><br>21-800,825, 24-885;<br>Safety valves & ERV<br>21-850; 24-880,881,883; | SSPC-SP3/<br>Power Tool<br>Cleaning   | Heat Resistant Aluminium Paint to IS 13183 <del>Gr.II/I</del> <b>Gr. I</b><br>DFT= 20 $\mu\text{m}$ per coat | 1            | --                | --           | Heat Resistant Aluminium Paint to IS 13183 <del>Gr.II/I</del> <b>Gr. I</b><br>DFT= 20 $\mu\text{m}$ per coat | 1            | Aluminum                                | 40                            |
|                   | Forged valves                                                                                                                                                                                                                         | Chemical cleaning                     | Phosphating to a coating weight of 1500 mg per Sq.ft.                                                        | --           | --                | --           | --                                                                                                           | --           | --                                      | --                            |
| 1AS2              | <u>Soot Blower components</u><br><br>20-051,054,201,204,794,962.                                                                                                                                                                      | SSPC-SP3/<br>Power Tool<br>Cleaning   | Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744<br>DFT= 30 $\mu\text{m}$ per coat                   | 2            | --                | --           | Syn. Enamel paint (Long Oil Alkyd) to IS 2932<br>DFT= 20 $\mu\text{m}$ per coat                              | 2            | Verdigris Green<br>Shade No. 280 of IS5 | 100                           |
|                   | HP / LP system                                                                                                                                                                                                                        | SSPC-SP3/<br>Power Tool<br>Cleaning   | Heat Resistant Aluminium Paint to IS 13183 Gr.I<br>DFT= 20 $\mu\text{m}$ per coat                            | 1            | --                | --           | Heat Resistant Aluminium Paint to IS 13183 Gr.I<br>DFT= 20 $\mu\text{m}$ per coat                            | 1            | Aluminum                                | 40                            |

| Sl. No.      | PGMA / Description                                                                                                                                                     | Surface Preparation & Surface Profile                                               | Primer coat                                                                                       |              | Intermediate coat |              | Finish coat                                                                                               |              |                                      | Total DFT $\mu\text{m}$ (min) |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------|-------------------|--------------|-----------------------------------------------------------------------------------------------------------|--------------|--------------------------------------|-------------------------------|
|              |                                                                                                                                                                        |                                                                                     | Paint                                                                                             | No. of coats | Paint             | No. of coats | Paint                                                                                                     | No. of coats | Shade                                |                               |
| 12<br>PS15   | <u>For CLH &amp; VLH*</u><br>PGs 07,08,12,17,19,21,24,47,48 & 80<br>07-402 to 405,505;12-517,528;<br>17-904,906<br>19-506,507,904,905, 906,907;<br>24-353; 48-206,395; | Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 $\mu\text{m}$ | Epoxy zinc rich primer<br>To IS 14589 Gr. II (latest)<br>%VS=35, (min)<br>DFT=40 microns per coat | 1            | --                | --           | Aliphatic acrylic Poly-urethane paint to IS13213 (latest)<br>%VS=40.0 (min)<br>DFT= 30.0 microns per coat | 1            | Phirozi Blue<br>Shade No. 176 of IS5 | 70                            |
| 13<br>PS8B   | <u>Components &gt; 95°C, un-insulated Fuel pipes</u><br>47-200, 289;                                                                                                   | SSPC-SP3/ Power Tool Cleaning                                                       | Heat Resistant Aluminium Paint to <del>IS 13183 Gr. III</del> DFT 20 $\mu\text{m}$ per coat       | 1<br>Gr. I   | --                | --           | Heat Resistant Aluminium Paint to <del>IS 13183 Gr. III</del> DFT 20 $\mu\text{m}$ per coat               | 1<br>Gr. I   | Aluminum                             | 40                            |
| 14<br>PS 1BE | All Columns below '0' level (embedded in concrete)<br>PGs 34,35,36,38, 39                                                                                              | SSPC-SP3/ Power Tool Cleaning                                                       | HB Chlorinated Rubber Based Zinc Phosphate primer<br>%VS=40, (min)<br>DFT=50 microns per coat     | 1            | --                | --           | No paint                                                                                                  | No paint     | Grey                                 | 50                            |

\*- 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 HSEFG Bolt and nut threads.
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 NTPC doc. ref no: QS-01-DIV-W-4, Rev.00.
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. For SCR system, vendor's painting scheme to be followed.
6. This painting Schemes is valid for only Customer No: U8/1828, 1829 & 1830, NTPC PATRATU - 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 <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. Painting scheme for all temporary structures like 04-196 shall be PS 1AE i.e. 1 coat of Red oxide Zinc Phosphate primer (Alkyd Base) to IS 12744-DFT-30μ 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. These are to be cut & removed at site after erection. (It excludes components covered under Sr. No. 3 & 9 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 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 Sl. No. 8.

23. Handrails, step treads of PGMA under Sl. No. 3 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. 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 (durability high) as per ISO 12944.

### 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                     | 50                                | Grey        | --                 | Spray          | 24                          |
| 2       | Two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% (min) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 Delta – E). | 13                                            | 2           | 55                     | 35                                | Grey white  | RAL 9002           | Airless Spray  | 24                          |
| 3       | Heat resistant Aluminium paint to IS 13183 Grade I/II (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       | HB Chlorinated Rubber Based Zinc Phosphate Primer-Colour Grey                                                                                                                                                                                                                           | 8                                             | 1           | 40                     | 50                                | Grey        | --                 | Brush / Spray  | 12                          |
| 10      | Two component polyamide cured epoxy based polyamide cured MIO pigmented intermediate coat. (containing lamellar MIO minimum 30% on pigment)                                                                                                                                             | 8                                             | 2           | 80                     | 100 (min)                         | Brown/ grey | --                 | Airless Spray  | 24                          |
| 11      | Two component moisture curing zinc (ethyl) silicate primer, metallic Zinc content 80% (min), Zinc dust quality shall be as per ASTM D 520 Type 2.                                                                                                                                       | 8                                             | 2           | 60                     | 70 (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<br>Prepa-<br>ration                                                            | Primer coat                                       |                                | Intermediate<br>coat  |                 | Finish coat           |                 |                       | Total<br>DFT<br>μm    |
|--------|-------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------|-----------------------|-----------------|-----------------------|-----------------|-----------------------|-----------------------|
|        |                                                 |                                                                                        | Paint                                             | No. of<br>coats                | Paint                 | No. of<br>coats | Paint                 | No. of<br>coats | Shade                 |                       |
| 1      | Paint damaged components fall under<br>Sl.no: 3 | Power tool<br>cleaning of<br>minimum 6"<br>of<br>surrounding<br>areas to bare<br>metal | Epoxy zinc rich<br>primer to IS<br>14589 Grade II | 2<br><br>T.DFT<br>70μ<br>(min) | As given in<br>scheme | 1               | As given in<br>scheme | 3               | As given in<br>scheme | As given in<br>scheme |