एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
(केंद्रीय कार्यालय नोएडा)
Corporate Center NOIDA

Reference : CC-ENGG-8003-001-110-PVM-W-110B **Date :** 18/03/2025

From : Vikas Khare ADDL. GENERAL MANAGER	**To :** BHARAT HEAVY ELECTRICALS LTD NEW DELHI 110049 IN **Cc :** pmgvijay@bhel.in ksbura@bhel.in

Subject : EPC Package, Sipat-Stage-III

Please find enclosed following drawings/ documents for necessary action at your end.

Vendor Drg. No.	:	HWR-STG-001
Orgn. Drg. No.	:	8003-001-110-PVM-W-110B
Revision No.	:	00
Drg. Title	:	PAINTING SCHEDULE FOR TG & AUX
App. Category	:	CATREL
Release Date	:	18/03/2025

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Name of the Project/ Package	:	Sipat Super Thermal Power Project -III 1x800MW, EPC Package, Sipat-Stage-III
Drawing / Document Number	:	8003-001-110-PVM-W-110B
Drawing / Document Title	:	PAINTING SCHEDULE FOR TG & AUX

"We confirm that this document meets all the contract requirements including safety and statuary requirements and facilitate ease of operation and maintenance. In case any deviation is found, the Contractor shall carry out all required changes/ modifications without any cost implications to NTPC. In addition, Penalty on account of non-compliance of contract specification as deemed fit by the Employer shall be recovered"

	STEAM TURBINE ENGINEERING BHEL, HEEP, HARIDWAR INDIA	DOCUMENT NO.- **8003-001-110-PVM-W-110B** REV. - 00 | DATE: 13-03-2025

PROJECT: 1x800MW SIPAT STPP, STAGE III

CUSTOMER: NTPC LIMITED

DOCUMENT TITLE: PAINTING SCHEDULE FOR TG & AUX

NTPC DOCUMENT NO 8003-001-110-PVM-W-110B
DOCUMENT NO.: 10886-STE-TF-702
REV-00; DATE: 13-03-2025

BHARAT HEAVY ELECTRICALS LTD
UNIT: HEEP, RANIPUR, HARIDWAR

Rev	Date	Prepared by	Approved by	Remarks
00	13-03-2025	Arun Kumar, STE-TF	Sumit Banerjee	First submission
		Hardeep Singh Dogra, STE-TL	Anuj Jain	
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*Standard note: "BHEL confirms that this document meets all the contract requirements including safety and statuary requirements and facilitate ease of operation and maintenance. In case any deviation is found, BHEL shall carry out all required changes/ modifications without any cost implications to NTPC. In addition, Penalty on account of noncompliance of contract specification as deemed fit by the Employer (NTPC) shall be recovered".
*-For documents under AA category.

PAINTING SCHEME FOR STEAM TURBINE & AUXILIARIES
PROJECT: SIPAT TPS UNIT (1X800MW)
CUSTOMER DOCUMENT NO.:8003-001-110-PVM-W-110B

STEAM TURBINES & AUXILIARIES

Painting Scheme 1.

Paint (Coat)	Paint Type	No. of coat	Total DFT*
Primer Paint :	Epoxy base Zinc rich primer paint	2 Coat	70
Intermediate Paint :	Epoxy MIO &TiO2 Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint :	Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	60
		Total DFT	200

Details of Color Scheme:
(**Legend: W**-at BHEL works; V- at vendor's works; **S**-at site; N A -Not applicable)

No	Assembly	Shade as per IS-5 or Eq.	Primer	Int. Paint	Final Paint	Touch -up	Remarks
a	Bearing pedestals with assembled parts (outer unmachined surfaces)	Light Blue RAL 5012	W	W	W	S	
b	Front walls & Side Walls of LPT. (Outer unmachined surfaces)	Light Blue RAL 5012	W	W	W	S	
c	Rupture Diaphragm Assembly	Light Blue RAL 5012	W	W	W	S	
d	Hydraulic Turning motor	Light Blue RAL 5012	V	V	V	S	
e	LP upper parts (outer unmachined)	Light Blue RAL 5012	W	W	W	S	
f	Suspension arrangement for LPBP & overload valves (unmachined)	Graphite Black RAL 9011	V	V	V	S	

PAINTING SCHEME FOR STEAM TURBINE & AUXILIARIES
PROJECT: SIPAT TPS UNIT (1X800MW)
CUSTOMER DOCUMENT NO.:8003-001-110-PVM-W-110B

g	Shaft Supports (IP & LP) & Casing Supports	Light grey ISC No. 631	W	W	W	S	
h	Assy fixture for HPT (unmachined)	Light Blue RAL 5012	W	W	W	S	
i	Turning over device (unmachined) for HPT	Light Blue RAL 5012	W	W	W	S	
j	Assy tools for main turbine (unmachined surfaces)	NA	W	W	W	S	TRP HE 1712 (Light Green/Light brown) (Rust preventive)
k	Assy device for valves & Support for valves	NA	W	W	W	S	Red oxide primer Grease TRP HE 1712 (Light Green/Light brown) (Rust preventive)
l	Support of Breech block (Valve support)	NA	W	W	W	S	TRP HE 1712 (Light Green/Light brown) (Rust preventive)
m	Mounting frame of bearing shell	Graphite Black RAL 9011	W	W	W	S	
n	Shaft Lifting device (LPT)	Light Blue RAL 5012	W	W	W	S	
o	Grating Coverings for LPT	NA	W	W	W	S	Red oxide primer Grease
p	Shaft seal lifting device & dev. Axial holding of LP shaft	Light Blue RAL 5012	W	W	W	S	
q	Stretching device for Breech Block & Breech Nut Heating Device	NA	V	V	V	S	
r	Hand barring gear	NA	W	W	W	S	TRP HE 1712 (Light Green/Light brown) (Rust preventive)

Following Item is not painted as it is of Stainless steel.

Compensators

Note: Any type of Imported Item is transported in Sea worthy packing and painting is done as per standard practice of vendor.

PAINITNG SCHEME NO	TYPE OF PAINT	COMPONENTS
2.	Heat resistant Aluminum paint (IS 13183) No. of coats: -2, Total DFT- 40µm	1. Casing and covers of valves (outside) 2. HPT &IPT outer casing & IPT supporting arm for Push-Rod (Outer Unmachined) 3. HP & IP stop and control valve casings outer (Unmachined) 4. LP Shaft Seal Casings 5. Cross over pipe Assembly 6. Overload Valve & overload valve casing assembly

Note: Above components are exposed to steam from inside and are covered with insulation.

Surface Preparation:

1- It is necessary that the surface to be painted is free from loose dust, mill scale, rust, grease, oil, old film etc. Surface cleaning and preparation is to be done for all the components as per BHEL standard practice. The surfaces before painting should correspond to standard degree of purity SA 2.5.
2- Checking of surface preparation / measurement of dry paint thickness, adhesion, gloss & finish of painted surface is to be done as per BHEL standard practice.

	STEAM TURBINE ENGINEERING BHEL, HEEP, HARIDWAR INDIA	DOCUMENT NO. 8003-001-110-PVM-W-110B REV. - 00 DATE: 12.03.2025

TURBINE INTEGRAL PIPING & AUXILIARIES

Painting Scheme .

Paint (Coat)	Paint Type	No. of coat	DFT*
Primer Paint	: Epoxy base Zinc rich primer paint	1 Coat	35
Intermediate Paint	: Epoxy TiO_2 Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	75
		Total DFT	180

* DFT – Dry Film Thickness (final) in microns.

Details of Color Scheme :
(**Legend** : **W**-at BHEL works; **V**- at vendor's works; **S**-at site; **NA**-Not applicable)

No	Assembly	Shade as per RAL	Primer	Int. Paint	Final Paint	Touch -up	Remarks
1	Turbine Integral Piping for Control Fluid System	NA	NA	NA	NA	NA	Painting is not applicable because the piping is in stainless steel.
2	Turbine Integral Piping for Lube Oil System	Grey 9002	V	V	V	S	Stainless Steel lines (wherever applicable) are not to be painted.
3	Turbine Integral Piping for Condensate Spray System	Grey 9002	V	V	V	S	
4	Turbine Integral Piping for CW to Lub Oil Coolers.	Grey 9002	V	V	V	S	Stainless Steel lines (if applicable) are not to be painted.
5	Turbine Integral Piping for CW to HPSU	Grey 9002	V	V	V	S	Stainless Steel lines (if applicable) are not to be painted.

6	Turbine Integral Piping for Turbine Drainage System	Grey 9002	V	NA	NA	S	Pipes are insulated at site. Only Primer Paint (with min. DFT as 40 microns) as per table above shall be applicable.
7	Turbine Integral Piping for Seal Steam System	Grey 9002	V	NA	NA	S	Pipes are insulated at site. Only Primer Paint (with min. DFT as 40 microns) as per table above shall be applicable.
8	Turbine Integral Piping for Overload Valve Piping System	Grey 9002	V	NA	NA	S	Pipes are insulated at site. Only Primer Paint (with min. DFT as 40 microns) as per table above shall be applicable.
9	Spring Cages	Black 9011	V	V	V	S	
10	Hangers and supports for turbine integral piping	Black 9011	V	V	V	S	
11	Dampers	Black 9011	V	V	V	S	
12	Valves of Turbine Integral Piping	Grey 9002	V	V	V	S	Painting is not applicable for Stainless Steel Valves of TIP. Painting is only applicable for Carbon Steel Valves of TIP
13	Oil Module	Grey 9002	V	V	V	S	Painting is not applicable for Stainless Steel components of Oil Module. RAL5012 Blue applicable for components like Motors.

14	Control Panel For Lube Oil Purifier	External (Front & Rear) – Grey 9002 External (Side) - Blue 5012 Internal- Blue 5012	V	V	V	S	
15	Lube Oil Purifier	Grey 9002/ Opal Green 6026	V	V	V	S	Identification Tag/Band of White 9010 colour. Legend in black letters.
16	Gear Pump & return Pump (with motors)	Pumps : Grey 9002 Motors : Blue 5012	V	V	V	S	Identification Tag/Band of White 9010 colour. Legend in black letters.
17	Leakage/Dirty oil tank & waste oil tank	Grey 9002	V	V	V	S	Identification Tag/Band of White 9010 colour. Legend in black letters.
18	Spray Nozzle	NA	V	V	V	S	Painting is not applicable because the spray Nozzles are in Stainless Steel.
19	HPT Steam Evacuation Valve	Grey 9002	V	V	V	S	Identification Tag/Band of White 9010 colour. Legend in black letters.

PAINTING SCHEME
FOR
TURBOGENERATOR AND AUXILIARY SYSTEMS

Sl No | **Details**

01 **The following are the details of painting scheme:**

Paint (Coat)	**Paint Type**	**No. of coat**	**DFT***
Primer Paint	: Epoxy based Zinc rich primer paint	2 Coats	70
Intermediate Paint	: Epoxy TiO_2 Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	1 Coats	60
		Total DFT	200

* DFT – Dry Film Thickness (final) in microns.

02 **Details of Color Scheme :**
(**Legend** : **W**-at BHEL works; **S**-at site; **V**-at vendor's works; **NA-** Not Applicable)

No	**Assembly**	**Shade as per IS-5 or Eq.**	**Primer**	**Int. Paint**	**Final Paint**	**Touch-up**	**Identification Tag / Band Colour**	**Remarks**
A	Turbogenerator (Stator, end-shields etc.)	Blue RAL 5012	W	S	S	NA	White RAL 9010	
B	Exciter	NA	W	NA	NA	NA		
C	Exciter Cover	Blue RAL 5012	W	S	S	NA	White RAL 9010	
D (i)	S.O. Unit – Air Side *(Including Seal oil Pump & excluding Motor of Seal oil Pump)*	Grey RAL 9002	W	W	W	S	White RAL 9010	
D (ii)	Motor of Seal oil pump-Air side (AC & DC)	Blue RAL 5012	V	V	V	S		
E (i)	S.O. Unit-H2 Side (*(Including Seal oil Pump & excluding Motor of Seal oil Pump)*	Grey RAL 9002	W	W	W	S	White RAL 9010	
E (ii)	Motor of Seal oil pump-H2 side	Blue RAL 5012	V	V	V	S		
F	Seal Oil cooler	Blue RAL 5012	W	W	W	S	White RAL 9010	
G	Seal Oil Valve Rack	Grey RAL 9002	W	W	W	S	White RAL 9010	
H	S.O. Storage Tank	Grey RAL 9002	W	W	W	S	White RAL 9010	
I	Liquid Detector Rack	Grey RAL 9002	W	W	W	S	White RAL 9010	
J	S.O. Piping & S.O. system impulse piping	Grey RAL 9002	V/ W	S	S	NA	Light Brown ISC 410	Legend - SO
K	Gas Unit	Grey RAL 9002	W	W	W	S	White RAL 9010	
L	H2 Distributor	Grey RAL 9002	W	W	W	S		

	M	CO2 Distributor	Grey RAL 9002	W	W	W	S		
	N	N2 Distributor	Grey RAL 9002	W	W	W	S		
	O	CO2 Vapouriser	Grey RAL 9002	W	W	W	S		
	P	Refrigeration Gas Dryer	Grey RAL 9002	V	V	V	S		
	Q	H2 Piping	Grey RAL 9002	W	S	S	NA	Canary Yellow ISC 309	Legend - H
	R	CO2 Piping	Grey RAL 9002	W	S	S	NA	Canary Yellow ISC 309	Legend – CO2
	S	Gas system impulse piping	Grey RAL 9002	W	S	S	NA	Canary Yellow ISC 309	
	T	ACW Piping for H2 coolers	Grey RAL 9002	W	S	S	NA	Sea Green ISC 217	Legend - ACW
	U	Bearing Vapour Exhauster	Grey RAL 9002	V	V	V	S		
	V (i)	PW pump & filter unit *(Including PW Pump & excluding Motor of PW Pump)*	Grey RAL 9002	W	W	W	S	White RAL 9010	
	V (ii)	Motor of PW Pump	Blue RAL 5012	V	V	V	S		
	W	PW coolers	Blue RAL 5012	V	V	V	S	White RAL 9010	
	X	PW Piping & impulse piping	Grey RAL 9002	W	S	S	NA	Sea Green ISC 217	Legend - DMW
	Y	PW tank	Grey RAL 9002	W	W	W	S	White RAL 9010	
	Z	Hanger & Pipe supports	Black RAL 9011	W	S	S	NA		
	AA	Ion Exchanger	Grey RAL 9002	W	W	W	S		

Note (For painting in BHEL scope at site):- For painting work at Site, Identification tags and for touch-up paints (if required), procurement of painting materials and execution of painting work are in scope of BHEL Site Office (PS-Region).

CONDENSER AND HEAT EXCHANGERS

Sl No	

Following painting scheme is selected based on specification for all components except Gland Steam Condenser:

Paint (Coat)	Paint Type	No. of coat	DFT*
Primer Paint	: Epoxy base Zinc rich primer paint	2 Coat	70
Intermediate Paint	: Epoxy TiO_2 Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	60

. Total DFT 200 microns

For Gland Steam Condenser:

Paint (Coat)	Paint Type	No. of coat	DFT*
Finish (Final) :	Heat Resistant Aluminium paint (Gr-1 as per IS :13183)	2 Coats	40

Total DFT 40 micron

* DFT – Dry Film Thickness (final) in microns.

A. **Details of Color Scheme (Outside Surfaces):**

(**Legend**: **W**-at BHEL works; V- at vendor's works; **S**-at site; **NA-**Not applicable)

		Assembly	Shade as per IS-5 or Eq.	Primer	Int. Paint	Final Paint	Touch -up	Re-marks
01		Condenser	Blue RAL 5012	W	W	S	NA	
		L.P. Heater No.1/2	-- Do --	W	W	W	S	
		Turbine Oil Cooler (PHE Type)	-- Do --	V	V	V	S	All surface other than stainless steels shall be painted.
		Gland Steam Condenser	Al-Paint (Gr-1 as per IS :13183)	NA	NA	W	NA	
		Hydrogen Coolers	Grey RAL 9002	W	W	W	S	

		Air Exhauster for Gland Steam Condenser	Grey RAL 9002	V	V	V	S	
		PTFE Sliding Support Bearing for Condenser	Blue RAL 5012	V	V	V	NA	
02	For painting work at Site, paint & painting materials are to be arranged at site by BHEL-Site.							

Following Item is BOI item. Painting is done as per standard practice of vendor/OEM:

- Condenser Air Evacuation Equipment.
-Turbine Oil Cooler (Plate type heat Exchanger-PHE)

B.	**Details of Painting (Inside Surfaces):**						
	Assembly	**Shade as per IS-5 or Eq.**	**Primer**	**Int. Paint**	**Final Paint**	**Touch-up**	**Remark**
01	Condenser						
	# Cooling water side surfaces (water boxes inside)	Black	W (DFT 70 microns) (Epoxy based Zinc rich primer)	--	S (High Build Black Coal Tar Epoxide Paint, Total DFT 0.25mm)	NA	
	# Tube plate surface towards water box side.	-do-	S @	--	-do-	-do-	After tubing.
	# Shell side inside surfaces (steam side)	Shell side inside surfaces are supplied coated with Steam Washable Paint at Works. This paint is to be washed before commissioning					

02		L.P.Heater No.1/2 & Gland Steam Condenser	These are supplied with Nitrogen filled. Hence inside painting is not applicable.	
	For painting work at Site, paint & painting materials are to be arranged at site by BHEL-Site.			

@ Tube plate surface is supplied painted with steam washable paint which is to be cleaned before applying Primer on water box side surface.