

01	19.03.2018	Revised Issue- Changes made as per TCS dtd 19.03.2018	MRM	RA	RA
00	24.02.2018	Fresh Issue	MRM	RA	RA
REV	DATE	DESCRIPTION / NOTE	PRD	CHD	APD

REVISIONS

TITLE :

QUALITY PLAN FOR TBG STRUCTURES

OWNER / PROJECT:



BANGLADESH-INDIA FRIENDSHIP POWER
COMPANY PVT. LTD, DHAKA, BANGALADESH 2x660
MW MAITREE STPP, RAMPAL, BANGLADESH

CUSTOMER CONSULTANT :

FICHTNER

M/s FICHTNER GmbH & Co KG,
Stuttgart, GERMANY

EPC CONTRACTOR :



BHARAT HEAVY ELECTRICALS LTD.
BOILER AUXILIARIES PLANT, RANIPET

	NAME	DATE	
PREPARED BY	RAJAMANICKAM.M	19.03.2018	STATUS : <i>FOR APPROVAL</i>
CHECKED BY	R ARUNACHALAM	19.03.2018	BHEL CUST NO : R4R5 & R4R6
APPROVED BY	R ARUNACHALAM	19.03.2018	BHEL DOC NO : MAIT:TBG:R4R5- R4R6
			REV NO : 01
			SHEET NO : 1 OF 1

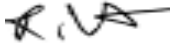
CUSTOMER DRG./DOC NO.: MAITREE-0-UAA-MQA-200340-RPT-A

 RANIPET		MANUFACTURER'S NAME AND ADDRESS M/S BHEL: BAP: RANIPET 632 406 TAMIL NADU & BIFPCL APPROVED VENDORS		MANUFACTURING QUALITY PLAN			PROJECT : 2X660MW MAITREE STPP PACKAGE : EPC CUST NO. : R4R5-R4R6 CONTRACT NO : BIFPCL/EPC-MAIN PLANT/2016/215 MAIN-SUPPLIER: BHEL, RANIPET							
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C / B					M	C	B	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
1.0	RAW MATERIAL													
1.1	Plates, Rolled Section	Chemical & Mechanical properties (*) Soundness of plates >25mm	Major	TC verification	100%	100%	As per material specification & Approved/ Mfr drawing ASTM A435	TC	√	P	V	V	(*) Typical TCs for plates of thk>40mm will be submitted to customer for verification	
			Major	TC verification	100%	100%		TC	√	P	V	V		
2.0	IN-PROCESS CONTROL	Welders are pre-qualified to AWS D1.1& procedures are pre-qualified as per AWS D1.1- WQR, PQR, WPS								P	V	V		
3.0	IN-PROCESS													
3.1	Fabrication of tower parts	Straightening*, Cropping, Stamping, drilling, Pitch, Length, Gauge distance, Heel grinding, Bending MS section*, Bending MS plate	Major	Measurement	Ist piece & Every 50 th Piece	Ist piece & Every 50 th Piece	Approved Drawing	R		P	V	-	*- Quantum Of Check- 100% by M	

		LEGEND: * RECORDS, IDENTIFIED WITH “TICK” (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, B: BIFPCL P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: BIFPCL SHALL IDENTIFY IN COLUM “B” AS ‘W’ TC- TEST CERTIFICATE, DR- DIMENSION REPORT		FOR BIFPCL USE	DOC. NO.:		REV..... CAT.....	
MANUFACTURER/ SUB-SUPPLIER					MAIN-SUPPLIER			
SIGNATURE							REVIEWED BY	APPROVED BY



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			ITEM: HOT DIP GALVNIZED LATTICE STRUCTURE SUB-SYSTEM:		QP NO.: MAIT: TBG: R4R5-R4R6 REV. NO.:01 DATE: 19.03.2018 PAGE: 02 OF 07 QP CAT: CAT. I AS PER VOL.I.B		PACKAGE : EPC CUST NO. : R4R5-R4R6 CONTRACT NO : BIFPCL/EPC-MAIN PLANT/2016/215 MAIN-SUPPLIER: BHEL, RANIPET							
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1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
3.2	Inspection of Welds	Weld Size, Weld Quantity	Major	Physical & DPT	100%	10% at random	ASME SEC V& AWS D1.1	R	√	P	V	-		
3.3	Inspection of fabrication parts (Black) before galvanizing	Dimension, Surface finish	Major	Measurement& Visual	ISO: 2859 Part-1, AQL- 6.5 SSP Level II	ISO: 2859 Part-1, AQL- 6.5 SSP Level II	Approved drawing	R	√	P	V	-		
3.4	Proto Assembly	Dimensions	Critical	Assembly	One Structure of Each Type	One Structure of Each Type	Approved drawing	R	√	P	W	W*	*One no per project	
		Fitup/ Fouling/ Notching	Critical	Assembly	-do-	-do-	Approved drawing	R	√	P	W	W*	*One no per project	

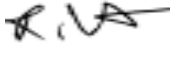
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1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.	
4.0	GALVANIZING														
4.1	Degreasing	Solution Strength PH Value	Major Major	Visual Chem	1 sample daily	1 sample daily	ISO 1461		R	√	P	V	V		
4.2	Rinsing	Cleanliness	Major	Visual	100%	100%	ISO 1461		R	√	P	V	V		
4.3	Pickling	Acid content& Iron content	Major	Chem	1 sample daily	1 sample daily	ISO 1461		R	√	P	V	V		
4.4	Rinsing	Cleanliness (Mill scale paint marks) etc	Major	Chem	1 sample daily	1 sample daily	ISO 1461		R		P	V	V		
4.5	Pre-fluxing	Dry fluxing Iron content Specific gravity pH value Temperature	Major Major Major Major Major	Chem Chem Chem Chem Measurement	100% 1 sample daily Hourly	100% 1 sample daily Hourly	ISO 1461 ISO 1461 ISO 1461 ISO 1461 ISO 1461	R R R R R			P P P P P	V V V V V	V V V V V		
 MANUFACTURER/ SUB-SUPPLIER		 MAIN-SUPPLIER		LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, B: BIFPCL P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: BIFPCL SHALL IDENTIFY IN COLUM "B" AS 'W' TC- TEST CERTIFICATE, DR- DIMENSION REPORT				FOR BIFPCL USE		DOC. NO.: _____ REV..... CAT.....					
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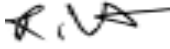
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1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
4.6	Pre-heating	Temperature	Major	Measurement	Hourly	Hourly	ISO 1461		R	√	P	V	V	
4.7	Hot- dip galvanizing	Temperature	Major	Measurement	Continuous Recording	Continuous Recording	ISO 1461		R	√	P	V	V	
		Immersion Time	Major	Measurement			ISO 1461		R	√	P	V	V	
		Removal of excess zinc while lifting from zinc bath by bumping process	Major	Physical			ISO 1461		R	√	P	V	V	
4.8	Quenching in running water	Cooling & cleaning	Major	Physical	Each Item	Each Item	ISO 1461		R	√	P	V	V	
4.9	Post treatment or dichromating	Solution strength	Major	Chem	Once in day	Once in day	ISO 1461		R	√	P	V	V	

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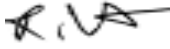
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		ITEM: HOT DIP GALVNIZED LATTICE STRUCTURE SUB-SYSTEM:	QP NO.: MAIT: TBG: R4R5-R4R6 REV. NO.:01 DATE: 19.03.2018 PAGE: 05 OF 07 QP CAT: CAT. I AS PER VOL.I.B	

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1.	2.	3.	4.	5.	6.	7.	8.		9.	D*	** 10.			11
4.10	Checks on member after galvanizing	Surface defects & finish	Major	Visual	100%	100%	ISO 1461		R	√	P	V	V	#-one random sample per 40MT or part thereof for each class of product
		Thickness Of Zinc Coating	Major	Test	One sample/ shift	One sample/ shift	As Per Spec.		R	√	P	W#	V	
		Mass of zinc coating	Major	Test	One sample/ shift	One sample/ shift	As per Spec		R	√	P	W#	V	
		Uniformity of zinc coating	Major	Chem	One sample/ shift	One sample/ shift	BS 729		R	√	P	W#	V	
		Adhesion Test of zinc coating (pivoted Hammer test/ Knife test)	Major	Physical	One sample/ shift	One sample/ shift	ISO 1461		R	√	P	W#	V	
4.11	Stenciling of mark	Marking	Major	Visual	100%	100%	Approved Drawing		R	√	P	V	V	

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					M	C / B					M	C	B	
1.	2.	3.	4.	5.	6.	7.	8.		9.	D*	** 10.			11
5.0	FINAL INSPECTION													
	Fabricated members after galvanizing	Surface Finish, Defects & Dichromating	Major	Visual	5% random sample	5% random sample	ISO 1461		R	√	P	W	W*	*Witness of one no/ project
		Dimensions	Major	Measurement	5% random sample	1% random inspection from each lot offered for inspection on single occasion	Approved drawing		R	√	P	W	W*	*Witness of one no/ project
6.0	Dispatch	Stenciling/Part no, Quality	Major	Review	100%	100%	Approved drawing		R	√	P	V	V	

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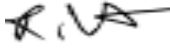
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Notes:

- 1) All structures shall be inspected and despatched in despatchable welded sections.
- 2) Loose items and other minor items like fasteners, clips, clamps, plates, rolled sections & fabricated items of rolled sections etc (as applicable) which do not involve trial assembly or matching at shop of Cat-I PGMAs can be considered as Cat- III items.
- 3) Materials shall be procured in compliance to Functional Technical Specification.
- 4) Inspection and tests shall be in compliance with BHEL document/ approved quality control procedure for the product.
- 5) Welding shall be carried out by qualified welders with traceable WPQ in line with approved WPS and qualified PQR with approved welding consumables, as per AWS.
- 6) NDT shall be carried out by qualified personnel with compliance to approved NDT procedures and acceptance norms as per ASME section V.
- 7) Gauges and measuring instruments, with valid calibration only shall be used.
- 8) Documents given as Reference and Acceptance norms are vendor specs unless otherwise stated.
- 9) Cleaning, Preservation and painting of products shall be carried out as per Approved Painting schedule.
- 10) Finished products shall be packed to comply with approved packing schedule.
- 11) Latest revision of standards & specification shall apply.

RECORD OF REVISION

REV NO	EFFECTIVE DATE	DETAILS OF REVISION MADE
REV.00	24.02.2018	Original Issue- First submission
REV.01	19.03.2018	Revised Issue- Changes made as per the TCS dated 19.03.2018

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03	04.06.2018	Revision 03	YS	KSB	JPS
02	05.03.2018	Revision 02	YS	KSB	JPS
01	16.12.2017	Revision 01	YS	KSB	JPS
00	09.10.2017	FRESH ISSUE	YS	KSB	JPS
	DATE	DESCRIPTION/ NOTE	PRD	CHD	APD

REVISIONS

TITLE:

PAINTING SCHEDULE FOR ENTIRE PLANT

OWNER/ PROJECT:



BANGLADESH-INDIA FRIENDSHIP POWER PVT. LTD, DHAKA,
BANGLADESH 2x660 COMPANY MW MAITREE STPP,
RAMPAL, BANGLADESH

OWNER CONSULTANT:



M/s FICHTNER GmbH & Co KG,
Stuttgart, GERMANY

EPC CONTRACTOR :



BHARAT HEAVY ELECTRICALS LTD.

	NAME	DATE	
PREPARED BY	YS	04/06/2018	STATUS: FOR APPROVAL
CHECKED BY	KSB	04/06/2018	REV 03
APPROVED BY	JPS	04/06/2018	

DOC NO.: MAITREE-0-BFA-FF-100000-GEN	Rev 03
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Index

1. Scope & Philosophy
2. General Requirements
3. Codes & Standards
4. Surface Preparation and Cleaning of Surfaces in the Shop
5. Cleaning to be performed on site
6. Cleaning of prime and intermediate coats (if required)
7. Application procedure
8. Galvanizing
9. Appendix-A

1. Scope & Philosophy

This document covers the Painting Scheme including Corrosion Protection, Coating and Galvanizing requirements applicable for the entire power plant packages, equipment, structures, piping etc. and any other surfaces.

Corrosion Protection, Coating and Galvanizing requirements shall conform to Contractual requirement stipulated in B0.6.5.

This documents contains list of annexure (mentioned at appendix-A) for Painting Scheme to be followed for various packages, equipment, items and structures.

Painting scheme shall be approved item/ equipment wise and not package wise i.e Painting scheme once approved for any equipment, items and structures etc shall be applicable for all similar equipment, items and structures in entire power plant.

2. General Requirement

Coating material shall only be supplied by manufacturers with international experience and their products can be obtained internationally.

It is the responsibility of the Contractor to ensure that, for all supplied equipment (including that from sub suppliers):

- The protection system is perfectly suitable for the Site conditions and for the specific purpose.
- The shop paints provide a sufficient protection during transport, storage and erection.
- The shop paints are suitable for handling and erection conditions (slinging, Site welding works etc.) and are compatible with the Site finishing coats
- All necessary precautions are taken in order to prevent damage to paints during storage, handling, welding.
- The necessary repairs are carefully executed as soon as possible.
- The colour RAL number of the finishing coat has been approved by the Employer, including identification code for piping.
- All items/equipment shall be painted as per the specification.

3. Codes and standards

Corrosion Protection, Coating and Galvanizing requirements will conform to the below mentioned applicable standards or equivalent:

- Product data of coating manufacturer
- DIN 2403 Indication of pipe-lines according to flowing material
- DIN 4762 Surface roughness
- ISO 8503 Surface roughness

- DIN 8201 Part 1-9 tight blasting agents
- DIN 50976 Corrosion protection, hot dip batch galvanizing of single parts, requirements and testing
- DIN 55928 Part 1-9 corrosion protection of structural steel work through protective coatings and topcoats
- ISO 8501 Preparation of steel substrates before application of paints and associated products
- ISO 12944 Paints and varnishes corrosion protection of steel structures by protective paint systems
- RAL Colour card
- ISO 8501-1 Preparation of steel substrates before application of paints and related products
- SSPC Vol. 1 and 2 Steel structure painting council

4. Surface Preparation and Cleaning of Surfaces in the Shop

All surfaces to be painted will be thoroughly cleaned of all grease, oil, paint residues, welding splashes, loose mill scale, dust, rust and any other foreign matter. Mechanical cleaning by power tool and scrapping with steel wire brushes will be adopted to clear the surfaces. However, in certain locations where power tool cleaning cannot be carried out, sand scrapping may be permitted with steel wire brushes and/or abrasive paper. Cleaning with solvents will be resorted to only in such areas where other methods specified above have not achieved the desired results. Cleaning with solvents will be adopted only after written approval of the Purchaser/Consultant.

Sharp edges have to be rounded off. Contaminations caused by salts, acids and alkali solutions shall be eliminated by rinsing with water up to a pH value of 6-8. Soluble salt contamination is to be tested using the Weber Reilly test method (or similar approved) and pH is to be tested using universal indicator paper strips prior to continuation with the blasting.

The preparation of substrates shall be carried out on the basis of the specifications of ISO 12944 part 4 and ISO 8501. The preparation of steel before application of paint and related products shall be in line with ISO 11124 for metallic blast cleaning abrasives and ISO 11126 for non-metallic blast cleaning abrasives. No recycled blast grit may be utilised.

After blasting, an anchor profile of 25 - 50 μm shall be achieved. Blasted surfaces have to be provided with a prime coat of the approved coating system immediately within 4 hours of blasting. All blasting and priming must take place outside of the high humidity periods of the day (i.e. maximum relative humidity of 80%).

5. Cleaning to be performed on site

Steel work protected by shop primer after arrival on site must be cleaned of salt, sand, oil, etc. before the first coat of paint is applied on site. Shop primer damaged during transport must be rectified by blast-cleaning and coating before application of the site coats. Wood surfaces shall be sanded clean. All nail holes shall be puttied and sanded

before priming, unless the specific coating system allows for coating onto damp concrete, in which case only with approval from the Employer.

If a protective coating of concrete is required, concrete shall be allowed to cure before painting. Transport and erection damages, as well as damages which result out of additional welding have to be repaired as soon as possible. The damaged areas have to be derusted with rotating or steel brushes, abrasive wheels, and abrasive blasting according to DIN ISO 8501-1.

6. Cleaning of prime and intermediate coats (as required)

To prevent contamination by mineral oil products, areas with prime and intermediate coat have to be treated with suitable cleaning agent. Cleaning has to be done free of residues, e.g. with alkaline detergents and thorough washing done with fresh water. Rusty spots have to be removed according to required purity. Metallic areas which are provided with temporary corrosion protection have to be cleaned. No oxidation products shall remain on the surface. Further care shall be taken that on hot components, no destructive or reaction products will be released when heating which could injure insulation.

7. Application procedure

When using the provided coating material, strict adherence to all application instructions given in product data of coating manufacturer is necessary. To obtain the maximum performance, technical data as well as application instructions for the individual coating material have to be strictly followed.

For a multi-layer coating system each layer has to have a different colour shade in order to clearly identify number of coats applied. The last finish coat has to be applied in the specified colour shade.

All paintings shall be performed according to ISO 12944. The durability of all paintings shall be high which corresponds to 15 years.

The interval between applying the different coats has to follow according to suppliers specifications. Each layer shall be cleaned and released from spray dust before the next layer will be applied. Prior to applying a further layer, the last one has to be repaired. All coatings have to be applied without retarding.

Following application procedures are allowed:

- prime coats by airless spray
 - areas like disconnections, angles, corners, etc. which are difficult to be reached can be applied by brush or roller
- finish coats
 - o at works by airless spray, roller or brush
 - o at site by roller or brush or airless spray.

Control areas in accordance with the coating supplier's instructions have to be applied. For this procedure, a schedule for control areas has to be prepared by the

Contractor and coating supplier which corresponds with the requirements of the warranty agreement.

Number and performance of the control areas have to be done in accordance with ISO 12944 part 7 and have to be documented in writing. No application shall take place either in the condition of the relative humidity not within the given limit or in case of poor weather conditions such as fog, dust, rain, snow, hail or when it can be assumed that such conditions of poor weather will arise within 2 hours after application. Temperature of the coated parts has always to be above 5 °C and 3 K above dew point.

All specified dry film thicknesses (DFT) are minimum thicknesses. Welding seams executed at site have to be taped with an adhesive tape of about 30-50 mm after surface preparation (blasting or manual derusting) and prior to application in the manufacturing plant and to be coated with stripping coat.

Chequered plates, nap plates, etc. have not to be covered with adhesive tape, but have to be coated with stripping coat in a dry film thickness of at least 150 µm. Edging lines on steel structure have to be taped prior to application and after blasting in sufficient width or have to be protected with varnish before application. Thickness of prime coat may be 50 µm maximum. During repairing works at site on shop-primed structures, it is important that different coats will have different colour shades. Numbers of layers have to be the same as the original coating system to be used.

Application of temporary primer on structures which have to be insulated has to be in accordance with a sufficient corrosion protection for the period of storage respectively erection time.

8. Galvanizing

Galvanizing work shall conform in all respects to ISO 1461 or equivalent standards and shall be performed by the hot dip process unless otherwise specified.

It is essential that details of steel members and assemblies which are to be hot-dip galvanized should be designed to suit the requirements of the process. They should be in accordance with ISO 12944.

Vent holes and drain holes shall be provided to avoid high internal pressures and air locks during immersion and to ensure that molten zinc is not retained in pockets during withdrawal. Careful cleaning of welds is necessary before welded assemblies are dipped.

All defects of the steel surface including cracks, surface laminations, laps and folds shall be removed in accordance with BS 4360. All drilling, cutting, welding, forming and final fabrication of unit members and assemblies shall be completed, where feasible, before the structures are galvanized.

The minimum coating thickness shall be as specified in Table 1 of BS 729. Structural steel items shall be first grit-blasted to BS 4232, second quality, (Sa 2 1/2) or pickled in a bath, and the minimum average coating weight on steel Sections 5 mm thick and over shall be 900 g/m², on steel Sections 2 – 5 mm thick 600 g/m².

Galvanized contact surfaces to be joined by high-tensile friction-grip bolts shall be roughened before assembly so that the required slip factor is achieved. Care shall be taken to ensure that the roughening is confined to the area of the mating faces.

Protected slings must be used for off-loading and erection. Galvanized work, which is to be stored at the works or on site shall be stacked so as to provide adequate ventilation for all surfaces to avoid wet storage staining (white rust).

Small areas of the galvanized coating damaged in any way shall be restored

by:

- cleaning the area of any weld slag and thorough wire brushing to give a clean surface
- The application of two coats of zinc-rich paint, or the application of a low melting point zinc alloy repair rod or powder to the damaged area, which is heated to 300 °C or the treatment with suitable cold galvanizing paint, such as ORAPI n.z.a.b 706. All zinc rich paint used for such repairs must contain a minimum of 81% by mass of zinc in the dry film.

Connections between galvanized surfaces and copper, copper alloy or aluminium surfaces shall be protected by suitable tape wrapping.

Appendix-A

#	Painting Schedule for	Document No.	Remarks
1.	Steam Generator & Aux	MPS-1	
2.	Turbogenerator, Steam Turbine, Condenser, Turbine Integral System, Auxiliaries, Control Instrument of STG & Associated Auxiliaries.	MPS-2	
3.	Fire Protection System	MPS-3	
4.	Flue Gas Desulphurization (FGD) System	MPS-4	
5.	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures	MPS-5	
6.	Air Pre Heater (APH), Electrostatic Precipitator (ESP) FAN and Gates & Dampers	MPS-6	
7.	MISC TANKS – SITE FABRICATED I.E. CONDENSATE STORAGE TANKS, DM WATER STORAGE TANKS, SERVICE WATER STORAGE TANKS AND DESALINATED WATER STORAGE TANK	MPS-7	
8.	Low Pressure Piping	MPS-8	
9.	Ash Handling Plant	MPS-9	These packages shall comply with Painting specifications as per contractual specifications
10.	Pumps, Mills & Auxiliaries		
11.	Drain Cooler, LP Heaters, Deaerator, HP Heaters And Oil Cooler		
12.	Coal Handling Plant		
13.	Limestone & Gypsum Handling Plant		
14.	RE Joint		
15.	Mill Reject System		
16.	Chimney		
17.	D/G EOT Cranes		
18.	Sewage Treatment Plant		
19.	Pre Treatment Plant		
20.	Fuel Oil Handling System		
21.	Weigh Bridge		
22.	Electrical & Associated Systems		
23.	Other Balance of Plant Packages		

Coating System (refer Contract Book No.3 Clause B0.6.5)

Coating System (refer Contract Book No.3 Clause B0.6.5)									
									MPS-4
System No.	Surface location	Item Description/ PGMA details	Temp in Celsius	Surface Preparation	Coating systems	No. of coats	Generic type	Dry film thickness (DFT) per coat micro m	Total DFT (Micro m)
1	Structural steel works, piping, vessels, tanks INDOOR	Indoor surfaces (Structural steel works, piping, vessels, tanks) of FGD system	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80
					Finish	1	Epoxy High Solid	80	80
									160
2	Structural steel works, piping, vessels, tanks OUTDOOR	Outdoor surfaces (Surface exposed to atmosphere of Structural steel work, piping, vessel, tanks) of FGD system	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80
					Intermediate	1-2	Epoxy High Solid	160	160
					Finish	1	2-Comp Polyurethane	50	50
									290
3	Piping, tanks, etc INDOOR and OUTDOOR, Insulated	Piping, Tanks Indoor and Outdoor (Insulated) of FGD system	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	50	50
4	Pump, motors, other equipment OUTDOOR	Pumps, motor and other equipment (Outdoor) of FGD system	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80
					Intermediate	1	Epoxy High Solid	110	110
					Finish	1	2-Comp Polyurethane	50	50
									240
5	Pump, motors, other equipment INDOOR	Pumps, motor and other equipment (Indoor) of FGD system	>120	SA 2.5	Primer	1	Zinc-Epoxy	80	80
					Finish	2	Epoxy High Solid	50	100
									180
6	Piping, reactors OUTDOOR Insulated	Piping, reactors Outdoor (Insulated) of FGD system	<120	SA 2.5	Primer	1	Zinc-Ethysilicate	75	75
7	Stack OUTDOOR	FGD System components does not fall under this category	<120	SA 2.5	Primer	1	Zinc-Ethysilicate	75	75
					Finish	2	Silicone Acrylic	50	100
									175
8	Steel Surfaces Uninsulated	FGD System components does not fall under this category	200-450	SA 2.5	Primer	1	Zinc-Ethysilicate	75	75
					Finish	2	Silicone Aluminium	25	50
									125
9	Galvanized Surfaces	Floor grills, Hand rails and Step Treads (As specified in drawing; if not specified, system 2.0 to be followed for painting)- Hot dip galvanizing to a coating weight of 610 gm per sq.M (minimum) and to a coating thickness of 85 microns (min) on steel sections 2-5mm thick and 900 gm per sq.M (minimum) for steel sections more than 5mm thick.	upto 120	Mechanical cleaning from contaminants and zinc salts by means of washing or steam jetting or sweep-blasting with fine stand	There is no finish coat on galvanized surfaces as there is no sea climate with chloride exposure	-	-	-	-
10	Steel Surfaces permanently in contact with water, also river water splash zone	Steel surfaces permanently in contact with water such as process water tank and Emergency water tank of FGD system	medium temp upto 60 degree Celsius	SA 2.5	Prime and finish coat in one	1	Glassfake reinforced High Solid Epoxy	500	500
11	Plant/Cooling Water pipes	Plant / cooling water pipes of FGD system	GRP, or steel lined concrete pipes with cathodic protection and coating according to AWWA C 203						

* Additional 1 x Finish Coat 2-Comp. Polyurethane, 50 micro m, when exposed to UV or weathering conditions and color retention is required

PAINTING SCHEME FOR
Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures

MPS-5

Coating System (refer Contract Book No.3 Clause B0.6.5)									
System No.	Surface location	Item Description/ PGMA details	Temp in Celsius	Surface Preparation	Coating systems	No. of coats	Generic type	Dry film thickness (DFT) per coat micro m	Total DFT (Micro m)
1	Structural steel works, piping, vessels, tanks INDOOR	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80
					Finish	1	Epoxy High Solid	80	80
									160
2	Structural steel works, piping, vessels, tanks OUTDOOR	Structural steel of AHP/ CHP, PHS, RODM Structures & Bunkers and supporting structures	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80
					Intermediate	1-2	Epoxy High Solid	160	160
					Finish	1	2-Comp Polyurethane	50	50
									290
3	Piping, tanks, etc INDOOR and OUTDOOR, Insulated	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	50	50
4	Pump, motors, other equipment OUTDOOR	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80
					Intermediate	1	Epoxy High Solid	110	110
					Finish	1	2-Comp Polyurethane	50	50
									240
5	Pump, motors, other equipment INDOOR	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	>120	SA 2.5	Primer	1	Zinc-Epoxy	80	80
					Finish	2	Epoxy High Solid	50	100
									180
6	Piping, reactors OUTDOOR Insulated	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	<120	SA 2.5	Primer	1	Zinc-Ethysilicate	75	75
7	Stack OUTDOOR	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	<120	SA 2.5	Primer	1	Zinc-Ethysilicate	75	75
					Finish	2	Silicone Acrylic	50	100
									175
8	Steel Surfaces Uninsulated	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	200-450	SA 2.5	Primer	1	Zinc-Ethysilicate	75	75
					Finish	2	Silicone Aluminium	25	50
									125
9	Galvanized Surfaces	Floor grills, Hand rails, Step Treads and Switchyard Structures (As specified in drawing; if not specified, system 2.0 to be followed for painting)- Hot dip galvanizing to a coating weight of 610 gm per sq.M (minimum) and to a coating thickness of 85 microns (min) on steel sections 2-5mm thick and 900 gm per sq.M (minimum) for steel sections more than 5mm thick.	upto 120	Mechanical cleaning from contaminants and zinc salts by means of washing or steam jetting or sweep-blasting with fine sand	There is no finish coat on galvanized surfaces as there is no sea climate with chloride exposure	-	-	-	-

APPROVED ON CONDITION
Checked and approved subject to
necessary corrections.

Date: 15-Jun-2018

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

10	Steel Surfaces permanently in contact with water, also river water splash zone	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	medium temp upto 60 degree Celsius	SA 2.5	Prime and finish coat in one	1	Glassfabe reinforced High Solid Epoxy	500	500
11	Plant/Cooling Water pipes	Power House Structures, Bunker Shells, AHP/CHP Structures, RODM & Sub Station Structures does not fall under this category	GRP, or steel lined concrete pipes with cathodic protection and coating according to AWWA C 203						



Ranipet

**Painting schedule for APH, ESP FAN and Gates & Damper for Maitree
Super Thermal Power Project,Rampal District –Bagerhat, Bangladesh**
India Friendship Power Company(Pvt.) Limited(BIFPCL)
(BHEL WO NO: R676-R677,R4M8-R4M9,R4N2 & R4N0))

PS MAIT Rev 01 DTD 24/10/2017

Page No: 1 of 1

SI No	Description	Surface preparation	Primer/ DFT	Intermediate DFT	Finish DFT	Total DFT
1.0	Indoor surfaces (Structural steel works,piping,vessels,tanks, pump,motor, other parts/equipment of APH, ESP,FAN, Gate and Damper,etc)	Blast cleaning SA2.5	One coat of Epoxy zinc phosphate, 80 μ m per coat	NIL	One coat of Epoxy high solid paint, , 80 μ m per coat	160 μ m (min)
2.0	Outdoor surfaces (Surface exposed to atmosphere of APH, ESP,FAN and Gates&Damper,etc)	Blast cleaning SA2.5	One coat of Epoxy zinc phosphate, 80 μ m per coat	One/two coats of epoxy high solid, total dft of 160 μ m	One coat of 2-component polyurethane paint, 50 μ m per coat	290 μ m (min)
3.0	Insulated parts of indoor/outdoor surfaces	Blast cleaning SA2.5	One coat of Epoxy zinc phosphate, 80 μ m per coat	NIL	NIL	80 μ m (min)
4.0	Uninsulated steel surfaces of temperature 200-450 deg celsius	Blast cleaning SA2.5	One coat of Inorganic ethyl zinc silicate, 75 μ m per coat	NIL	Two coats of Silicone Aluminium, 25 μ m per coat	125 μ m (min)
5.0	Outdoor stacks	Blast cleaning SA2.5	One coat of Inorganic ethyl zinc silicate, 75 μ m per coat	NIL	Two coats of Silicone Acrylic, 50 μ m per coat	175 μ m (min)
6.0	Floor grills , step treads , Hand rails,etc of ESP and other items	Hot dip galvanizing to a coating weight of 610 gm per sq.M (minimum) and to a coating thickness of 85 microns (min)				

1. Painting of APH, ESP, Fan and G&D commissioning spares and Mandatory spares shall be as per respective items as above.
2. No painting for SS, Aluminium and Galvanized items.
3. All components covered under different SL no. are to be painted. Incase any component is left out, the same shall be deemed to be included under the relevant section.

01	17.08.2018	Revised Issue- Revised as per the TCS dtd 17.08.2018	MRM	KCG	KCG
00	30.07.2018	Fresh Issue	MRM	KCG	KCG
REV	DATE	DESCRIPTION / NOTE	PRD	CHD	APD

REVISIONS

TITLE :

CATEGORIZATION LIST FOR TBG STRUCTURES

OWNER / PROJECT:



BANGLADESH-INDIA FRIENDSHIP POWER
COMPANY PVT. LTD, DHAKA, BANGALADESH 2x660
MW MAITREE STPP, RAMPAL, BANGLADESH

CUSTOMER CONSULTANT :

FICHTNER

M/s FICHTNER GmbH & Co KG,
Stuttgart, GERMANY

EPC CONTRACTOR :



BHARAT HEAVY ELECTRICALS LTD.
BOILER AUXILIARIES PLANT, RANIPET

	NAME	DATE	
PREPARED BY	RAJAMANICKAM M	17.08.2018	STATUS : <i>FOR APPROVAL</i>
CHECKED BY	K.C. GANDHI PARIMALAM	17.08.2018	BHEL CUST NO : R4R5& R4R6
APPROVED BY	K.C. GANDHI PARIMALAM	17.08.2018	BHEL DOC NO : BAP:QA:MECH:PGMA CAT:SYS: R4R5
			REV NO : 01
			SHEET NO : 1 OF 1

CUSTOMER DRG./DOC NO.: MAITREE-0-UAA-MQA-200352-RPT



Bharat Heavy Electricals Limited
Boiler Auxiliaries Plant
Ranipet – 632 406, Vellore Dist., (TN)

PGMA Categorization for QP and Vendor Category

Customer: BANGLADESH INDIA FRIENDSHIP POWER COMPANY PVT. LTD (BIFPCL)
Project: MAITREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (2X660MW)- EXPORT CONTRACT
Package: EPC PACKAGE
Contract No.: BIFPCL/EPC-MAIN PLANT/NOA/2016/215 DTD. 31.01.2016

BHEL, RANIPET CUST NO: R4R5-R4R6

DOC.NO.:BAP:QA:MECH:PGMA CAT:SYS:R4R5 REV.01 Dtd. 17-08-2018

PRODUCT : SWITCH YARD STRUCTURES

SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
1	TT010	200KV Transmission Towers	MQP	I	I
2	TT020	400KV Transmission Towers	MQP	I	I
3	TT030	Building Structures	SQP	III	III
4	TT040	Fasteners	Drg/Catalogue	III	III
5	TT045	Miscellaneous structure	Drg	III	III

NOTES:

- 1) All other items which are very minor in nature of the above mentioned PGMA's shall be considered as Cat-III item and same will be procured as per BHEL system.
- 2) Loose items like pins, clips, clamps, fasteners, plates, angles, channels & fabricated items of rolled section which do not involve trial assembly or matching at shop of Category- I PGMA's can be considered as Cat-III items
- 3) For items indicated in Cat-I, the quantum of inspection for BIFPCL/consultant witness will be as per approved QP

BHEL, RANIPET CUST NO: R4R5-R4R6		
DOC.NO.:BAP:QA:MECH:PGMA CAT:SYS:R4R5	REV.01	Dtd. 17-08-2018
PRODUCT : SWITCH YARD STRUCTURES		

OP Category :

Category - I	Quality Plan Approval by BIFPCL, where physical inspection by customer/ consultant is envisaged. Final acceptance by BIFPCL, based on physical inspection witness by BIFPCL/ consultant.
Category - II	Quality Plan / Inspection Check List Approval by BIFPCL, However no physical inspection by BIFPCL is envisaged. Final acceptance by BIFPCL based on Witness by BHEL and Verification of documents by BIFPCL
Category - III	Main supplier (BHEL) approves the sub-vendor Quality plans. Final acceptance by BIFPCL based on the verification of Certificate of Conformance, issued by Main supplier (BHEL).

Vendor Category:

Category - I Acceptable to / Approved by BIFPCL

Category - II Details required for BIFPCL review

Category - III No Specific Vendor Approval by BIFPCL is required

RECORD OF REVISIONS		
REVISION	BIFPCL/CONSULTANT COMMENTS	BHEL REPLY
01	Building Structure to be reclassified as II, with W by BHEL and V by BIFPCL.	Building structures are made of rolled sections which will be encased in concrete. Hence we request to consider it as Cat- III item itself.

Prepared by Rajamanickam M Dy. Mgr/ QA	
Reviewed & Approved By K C Gandhi Parimalam DGM/QA	