



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-28-May-20

CORRIGENDUM- 08

PROJECT	:	3X660 MW NPGCPL NABINAGAR STPP (FGD PKG)
PACKAGE	:	MISC. TANKS(SITE FABRICATED)
ENQUIRY NO	:	PE/PG/NB2/E-6402/2019 Dated. 05.03.2020
SUBJECT	:	TECHNICAL AMENDMENT

Type of Corrigendum			
Technical Corrigendum -	☒	Commercial Corrigendum -	☐

In reference to the above mentioned tender enquiry for **MISC. TANKS(SITE FABRICATED)** package

Please note the following.

1. All bidders are requested to go through the attached amendment to technical specification.
2. Bidders who have already submitted their offer, kindly submit their offer again in abc portal as the earlier submitted offer has been removed from systems.

All the other terms and conditions of the tender enquiry remain unchanged. All the bidders are requested to quote accordingly.

Yours faithfully,

For and on behalf of BHEL

Guru Das
Dy. Manager

Amendment No. 1 to Technical Specification for Miscellaneous FGD Tanks (PE-TS-457-167-A101) of 3x660 MW NABINAGAR STPP

Sl. No.	Ref. Clause	Page No.	Existing Provisions	To be read as
1	Section-III, Annexure-8, Tank Schedule	496-497	Tank Schedule	The inside lining of the secondary hydrocyclone tank, waste water tank, filterate water tank, and the sumps have been revised. The vinyl ester based flake glass lining shall be applicable for the said tanks. The changes have been marked in "Orange" in the attached tank schedule. For the type of inside lining of the tanks, only the details in the attached tank schedule shall be applicable. The revised tank schedule has been attached as annexure-A to this amendment.
2	Additional			The Specification of the vinyl ester based flake glass lining is attached as Annexure-B to this amendment.

Package: Miscellaneous FGD Tanks
Project: 3x660 MW NABINAGAR STPP
Doc. No: PE-TS-457-167-A101

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Date: May 23, 2020

8156/2020/PS-PEM-MAX



TITLE:

3x660 MW NABINAGAR STPP
TECHNICAL SPECIFICATION FOR
FGD TANKS

SPECIFICATION No: PE-TS-457-167-A101

SECTION-

REV. 00

DATE:

SHEET :

ANNEXURE-A

TANK SCHEDULE (Signed and Stamped copy to be submmitted with the offer by Bidder)													
Sl.no.	Description	Primary Hydrocyclone feed tank	Filtrate water tank	Secondary Hydrocyclone feed tank	Waste water Tank	Limestone Slurry Storage tank	Auxiliary Absorbent Tank	Process Water tanks	Belt wash tank	Cake wash tank	Absorber Area Drain Pit	Gypsum Dewatering Area Drain Pits	Ball Mill Area Drain Pit
1	Tank Sl No.	1	2	3	4	5	6	7	8	9	10	11	12
2	Type of agitator	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Marine Propeller – Horizontal Type (Side Entry),	Not applicable	Not applicable	Not applicable	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)
3	Medium to be handled	Gypsum slurry	Gypsum slurry	Gypsum slurry	Gypsum slurry	Limestone slurry	Gypsum slurry	Process Water	Process/Clarified Water	Process/Clarified Water	Gypsum slurry	Gypsum slurry	Gypsum slurry
4	Duty	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Not applicable	Not applicable	Not applicable	Continuous	Continuous	Continuous
5	Agitator Location	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Not applicable	Not applicable	Not applicable	Outdoor	Outdoor	Outdoor
6	Operation	Continuous	Continuous	Continuous	Continuous	Continuous	Whenever FGD is under maintenance	Not applicable	Not applicable	Not applicable	Continuous	Continuous	Continuous
7	Pipe Material Specification												
a)	150 Nb & below	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6	Please refer corrigendum -6
b)	Above 150 Nb												
8	Tank details												
a)	Tank Shape	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Rectangular	Rectangular	Rectangular
b)	Tank name	Primary Hydrocyclone feed tank	Filtrate water tank	Secondary Hydrocyclone feed tank	Waste water Tank	Limestone Slurry Storage tank	Auxiliary Absorbent Tank	Process water tanks	Belt wash tank	Cake wash tank	Absorber Area Drain Pit	Gypsum Dewatering Area Drain Pits	Ball Mill Area Drain Pit
c)	Tank Material	IS:2062 E250 GR.BR (Refer Note-1)	IS:2062 E250 GR.BR (Refer Note-1)	IS:2062 E250 GR.BR (Refer Note-1)	IS:2062 E250 GR.BR (Refer Note-1)	IS:2062 E250 GR.BR (Refer Note-1)	IS:2062 E250 GR.BR (Refer Note-1)	IS:2062 E250 GR.BR (Refer Note-1)	IS:2062 E250 GR.BR (Refer Note-1)	IS:2062 E250 GR.BR (Refer Note-1)	RCC (refer note-2)	RCC (refer note-2)	RCC (refer note-2)
d)	Tank Quantity (in No.)	1	1	1	1	2	1	2	2	2	3	1	1
	Capacity of Tank (in m3)												
e)	Capacity (Hold Volume)	269.4	135.4	161.2	288.6	2089.8	1595.0	175.0	21.2	35.6	56.0	56.0	56.0
f)	Capacity (Effective)	215.51	97.40	121.58	234.75	1889.40	1570.00	127.23	11.31	22.13	27.20	27.20	27.20
	Dimension (in m)												
g)	Diameter	7.0	5.5	6.0	7.0	13.5	12.5	6.0	3.5	3.5	-	-	-
h)	Length	-	-	-	-	-	-	-	-	-	4	4	4
i)	Breadth	-	-	-	-	-	-	-	-	-	4	4	4
j)	Height	7.5	6.2	6.2	8.0	15.4	13.8	6.7	4.2	4.2	4	4	4
9	Quantity of Agitator per tank	1	1	1	1	1	3 (Refer note-2)	Not applicable	Not applicable	Not applicable	1	1	1
10	Total quantity of agitators (for three units)	1	1	1	1	2	3 (Refer note-2)	Not applicable	Not applicable	Not applicable	3	1	1
11 (i)	Slurry Analysis												
a)	Slurry to be handled	Gypsum slurry	Gypsum slurry	Gypsum slurry	Gypsum slurry	Limestone slurry	Gypsum slurry	Water	Water	Water	Gypsum slurry	Gypsum slurry	Limestone slurry
b)	Maximum solid particle size	200 mesh (75 μ)	200 mesh (75 μ)	200 mesh (75 μ)	200 mesh (75 μ)	200 mesh (75 μ)	200 mesh (75 μ)	-	-	-	6-7 mm	6-7 mm	6-7 mm
c)	Normal solid particle size, d50	325 mesh (43 μ)	325 mesh (43 μ)	325 mesh (43 μ)	325 mesh (43 μ)	325 mesh (43 μ)	325 mesh (43 μ)	-	-	-	6-7 mm	6-7 mm	6-7 mm
d)	Solid to be handled	gypsum along with Limestone & other impurities	gypsum along with Limestone & other impurities	gypsum along with Limestone & other impurities	gypsum along with Limestone & other impurities	Limestone + impurities	gypsum along with Limestone & other impurities	-	-	-	gypsum along with Limestone & other impurities	gypsum along with Limestone & other impurities	Limestone + impurities
e)	Chloride concentration	max 30000 ppm	max 30000 ppm	max 30000 ppm	max 30000 ppm	max 1000 ppm	max 30000 ppm	-	-	-	max 30000 ppm	max 30000 ppm	max 1000 ppm
f)	Hardness of particle	5-7 mho scale	5-7 mho scale	5-7 mho scale	5-7 mho scale	5-7 mho scale	5-7 mho scale	-	-	-	5-7 mho scale	5-7 mho scale	5-7 mho scale
g)	Slurry concentration, wt%	30 wt%	11%	16.60%	3%	30 wt%	30%	-	-	-	25%	25%	30 wt%
h)	Sp. Gravity of slurry	1.216	1.069	1.112	1.023	1.215	1.216	-	-	-	1.216	1.216	1.216
i)	Sp. Gravity of Lime Stone & Gypsum	2.32(avg)	2.32(avg)	2.32(avg)	2.32(avg)	2.32(avg)	2.32(avg)	-	-	-	2.32(avg)	2.32(avg)	2.32(avg)
j)	Viscosity of Slurry	10 cP	4 cP	4 cP	3 cP	30 cP	10 cP	-	-	-	10 cP	10 cP	30 cP
k)	pH	4 to 8	4 to 8	4 to 8	4 to 8	5 to 8	4 to 8	-	-	-	4 to 8	4 to 8	5 to 8
l)	SiO ₂ Content	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l	-	-	-	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l
m)	Temperature	Normal -63 deg C; Design-70 deg C.	Normal -59 deg C; Design-70 deg C.	Normal -63 deg C; Design-70 deg C.	Normal -45 deg C; Design-55 deg C.	Normal -63 deg C; Design-70 deg C.	Normal -63 deg C; Design-70 deg C.	Normal -27 deg C; Design- 35 deg C.	Normal -58 deg C; Design- 70 deg C.	Normal -58 deg C; Design- 70 deg C.	Normal -63 deg C; Design-70 deg C.	Normal -63 deg C; Design-70 deg C.	Normal -45 deg C; Design-55 deg C.
11(ii)	Process water Analysis												
a)	Calcium as CaCO3	-	-	-	-	-	-	131	131	131	-	-	-
b)	Magnesium as CaCO3	-	-	-	-	-	-	52	52	52	-	-	-
c)	Sodium as CaCO3	-	-	-	-	-	-	65	65	65	-	-	-
d)	Potassium as CaCO3	-	-	-	-	-	-				-	-	-

**NABINAGAR POWER GENERATING CORPORATION
LIMITED**

3x660 MW NABINAGAR STPP

**TECHNICAL SPECIFICATION
FOR
GLASS FLAKE LINING FOR MISCELLANEOUS FGD TANKS
ANNEXURE-B TO AMENDMENT NO.1**



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR- PROJECT ENGINEERING MANAGEMENT
NOIDA, INDIA**

1. INTENT OF SPECIFICATION

- a) This Specification defines the minimum requirements of glass flake lining of Slurry Tanks & Slurry sumps in the Flue Gas Desulphurization (FGD) plant.
- b) Tanks / Sumps to be lined contain Limestone Slurry / Gypsum Slurry / Process water. Slurry Tank Details and Slurry conditions are given in Annexure-8 Tank Schedule. The glass flake lining shall offer better resistance to corrosion/erosion and shall be based on Vinyl ester resin. Thickness of glass flake lining required is 3 mm thk (minimum).
- c) This specification covers the general design, selection of suitable glass flake material/resin, manufacture, shop inspection (as per latest applicable statutes, regulation and safety codes in the locality where the lining are to be carried out) and delivery at site, surface preparation of lining surface, lining the surface to the satisfaction of the customer, jointly calculation of total area lined, inspection of the lining at site, handling over to the ultimate customer.
- d) Compliance to this specification shall not relieve the vendor of the responsibility of furnishing glass flake lining materials of proper design, materials and workmanship to meet the specified requirements.
- e) In case of deviation, it shall be listed in the vendor's proposal under separate section titled as "Deviation Schedule" to the enquiry documents. Any deviation not mentioned in this list, but mentioned elsewhere in the proposal will not be considered.

2.0**CODES AND STANDARDS:**

The glass flake lining shall conform to the latest version of Indian/British/American/International Standards. Nothing in this specification shall construe to relieve the contractor of the required statutory responsibility. The Glass Flake Lining material shall be designed for the corrosion protection of the Slurry tank. The lining shall be glass flake filled vinyl ester based coating system. Only Proven material has to be offered by the bidder

REFERENCE STANDARDS:

ASTM D 4285	Standard Test Method for Indicating Oil or Water in Compressed Air
ASTM D 4541	Standard Test Method for Pull-Off Strength of Coating Using Portable Adhesion Testers
ASTM E 337	Standard test Method for Relative Humidity by Wet and Dry Bulb Psychrometer
ASTM D 4618	Standard Specification for Design and Fabrication of Flue Gas Desulfurization System Components for Protective Lining Application
ASTM D 5162	Practice for Discontinuity (Holiday) Testing of Non-Conductive Protective Coating on Metallic Substrates

TECHNICAL SPECIFICATION FOR GLASS FLAKE LINING OF SLURRY TANKS

NACE Standard RP0178-2003	Fabrication Details, Surface Finish Requirements, and Proper Design Considerations for Tanks and Vessels to be lined for Immersion Service
ISO 8501-1, 1988	Preparation of Steel Substrates Before Application of Paints and Related Products - Visual Assessment of Surface Cleanliness
SSPC"PA2	Measurement of Dry Paint Thickness with Magnetic Gauges

3.0 SCOPE OF SUPPLY

- a) Complete selection and procurement/manufacture of all materials required for lining, storage, preparation of the surfaces for lining near site and installation of lining. All equipments required for lining shall be arranged by the vendor. Testing and supply of glass flake lining material for the duty condition specified in Table-1.
- b) Erection and Commissioning of the glass flake lining as per the requirement. Delivery of material to site, Storage of the material, surface preparation of the surfaces to be lined, lining the surface to the satisfaction of the customer and testing the lined surface for proper adhesion, complete coverage and intactness with the base material/surface shall be under bidder's scope, cost for Erection and Commissioning shall be included in the offer. The lining shall extend through all internal surfaces and over flange faces. The lining shall cover all the baffles inside the tank.
- c) To install the linings, full scaffolding access shall be provided to reach the internal walls and the entire area. Scaffold shall be properly erected with full planking in all work areas. Scaffolding shall not contact wall surfaces in work areas during lining application and surface preparation
- d) The execution of the surface preparation and lining shall be carefully planned in stages to obtain optimum lining quality with freedom from contamination and overspray or damage to lined surfaces from preparation in adjacent areas. Surface preparation will commence from the top and proceed progressively to the wall base and floor.
- e) Lining and preparation works shall be staggered or proceed progressively in order to meet cleanliness requirements or overcoating times indicated in this specification.
- f) Air-Compressor, Airless Spray pumps, hopper, blasting hose, lining hose, spray tip, blasting gun, spray gun and other equipment for blasting and spray application has to be arranged by vendor. Power & water required will be as per NIT. In case of Diesel compressor, vendor to arrange the diesel themselves. Compressed air and instrument air will not be provided. Any cold storage container, if required, shall be arranged by vendor. Any scaffolding shall be made of Steel only. Scaffolding material shall be arranged by vendor. All travel, TA/DA, Stay charges, site visit charges shall be in vendor's scope.
- g) Copies of Operation and Maintenance Manuals containing all details of reference drawings and technical data shall be furnished by the Bidder as specified elsewhere in the specification.

5.0 ATMOSPHERIC CONDITION REQUIREMENTS

This section deals with the atmospheric condition requirement to be checked while undertaking the Glass Flake Lining at site.

1. Blasting or Coating shall not be applied if following conditions prevail.

TECHNICAL SPECIFICATION FOR GLASS FLAKE LINING OF SLURRY TANKS

- When temperature of the surface to be coated is less than 3°C above the dew point, or the relative humidity is higher than 85%.
 - When the base metal temperature is greater than 60°C.
 - When the atmospheric temperature is below 4°C.
 - When there is, in the opinion of lining Contractor, the likely hood of an unfavourable change in the weather condition within 2 hours after coating.
 - When there is deposition of moisture in the form of rain or condensation.
 - Any other specific recommendations of lining manufacturer.
2. Humidity shall be calculated by bidder using whirling hygrometer whose thermometers are calibrated.
 3. Surface temperature shall be measured using suitable temperature gauge and calibration certificate of the same shall be provided by bidder.
 4. Record will be maintained throughout the execution period. Readings shall be taken once in every 4 hours up to the time work is in progress. The frequency of reading should be increased during adverse weather conditions.
 5. While working in unfavourable weather conditions (like monsoons or winters or if provided for in the contract or in large confined spaces where blasting and priming of the entire surface cannot be completed in one days operation, use of dehumidifier shall be resorted to. The dehumidification equipment will have to be maintained in such a way that the humidity is around 65% -75% inside the sump at all times during the work. No flash rusting of the blast surface should take place till the time it receives a primer coat.
 6. Where dehumidification equipment is to be used the humidity readings are to be taken inside and outside the equipments to be coated. Dehumidification machine shall be arranged by vendor.
 7. Dehumidification equipment may not be necessary for contained space working if work is done at near ideal atmospheric conditions as described above.
 8. In cases where dehumidification is not possible, alternate methods of warming up the work front like use of halogen lights, room heaters are to be adopted.
 9. Humidity is to be taken at the location where the blasting coating operations taking place.

5.1 APPLICATION & MEDIUM:

Glass flake lining is done in order to protect the slurry tanks & sumps which contain limestone/gypsum slurry. Coated surfaces are exposed to slurry whose conditions are given in Annexure-8.

6.0 PRELIMINARY CHECK REQUIREMENTS

This section deals with the preliminary check requirements to be done while doing the lining work.

6.1 CHLORIDE CONTAMINATION TEST:

The 2% ferricyanide paper method will generally be used to determine the chloride contamination as described below:

1. Apply de-mineralized water on approximate 12 cm² area of substrate and wait for 3 to 4 minutes.

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2. Remove excess moisture by patting the substrate with clean lint free cloth.
3. Press a ferricyanide paper of approximate 12 cm² area against the substrate for approximately 5 seconds and remove the paper.
4. Total absence of blue spots on paper indicates the substrate is free from soluble salts
5. Light speckling paper indicates the substrate has still contamination but it is as the acceptance level. The component should be released for further process.
6. Large blue spots on the paper indicate the substrate is heavily contaminated.
7. In this case the following procedure to be done before coating.
 - i. Pressures wash the substrate with copious amount of town water.
 - ii. Dry the substrate completely.
 - iii. Re-blasts the surface.
 - iv. Follow the salt contamination checking procedure again till you get the desired results.
8. The Ferricyanide papers should be stored by vendor in air tight container before and after use and the shelf life of Ferricyanide paper shall be one month.

6.2 ABRASIVE DRYNESS CHECK:

The abrasive to be used will be checked for dryness by taking a small quantity of abrasive on a filter /tissue paper and checking of traces of moisture absorbed in the filter/tissue paper. Frequency of test shall be once in day prior to blasting operation.

6.3 COMPRESSED AIR DRYNESS CHECK:

Compressed air to be used for blasting shall be free from oil & moisture and shall be tested adopting "Blotter Test" by vendor. A piece of blasting Paper will be held in front of blast hose nozzle to check for traces of oil/moisture captured by the blotting Paper. Frequency of test shall be once in day prior to blasting operation.

7.0 SURFACE PREPARATION

This section deals with the methods of surface preparation before coating application

7.1 MASKING:

1. Bidder to ensure that areas not being coated are fully and adequately masked.
2. Bidder to ensure that stud holes, dowel/oil ways etc. are suitably masked or plugged to prevent ingress of blasting abrasives.

7.2 SURFACE PREPARATION METHODS:

The method of surface preparation dry abrasive manual blasting shall be done as follows:

1. Surface to be coated shall be abrasive blasted. Before this operation, removal of existing coating to be carried out by chipping, grinding or by other suitable means. The walls of the tanks are painted with min 60μ DFT of Red Oxide Phosphate(rust proof primer), which is to be removed by vendor during blasting. Clean & dry Copper Slag Abrasive shall be used for ferrous base substrate.
2. Bidder is requested to go through all sections of the Typical GAD drawing of Slurry tank. Vendor may raise their observations during pre-bid query. Any other new requirements brought forward during technical evaluation stage shall not be considered by BHEL.
3. The minimum recommended compressed air required for Blasting shall be 7.0 m³/min at 6 kg/cm² pressure. NACE No.1/SSPC-SP-5 equivalent to SA 2½ of Swedish Standard blast profile (75 to 100 Microns) to be followed for cleaning the surface.
4. The blasted surface shall be cleaned with dry compressed air/vacuum cleaner or with clean brush so that there is no presence of Dust & other foreign material. The surface will be then checked for chloride contamination (Refer Clause.5.1 for Chloride contamination check procedure). If

TECHNICAL SPECIFICATION FOR GLASS FLAKE LINING OF SLURRY TANKS

contamination is found then the surface to be washed and reblasted till contamination gets removed. Vendor to ensure that the blasted surface free from chloride contamination

5. When cleanliness and blast profile are acceptable, the masking tape adjacent to the area to be coated shall be peeled back to prevent overlap and subsequent edge contamination.
6. If the blasted surface has not been primed within specified time or if there is any previous visible sign of blast condition change then the surface shall be checked for metallic salt contamination and shall be reblasted. Where large areas are required to be blasted in a day, blasting shall be carried out from morning to evening ensuring weather condition. This shall be followed by a light sweep blast of the entire area, before priming. The blast cleaned surface shall be blown off with dry oil free compressed air or vacuum cleaned. A cell tape shall be thoroughly pasted to the cleaned surfaces. The tape shall be removed after a minute to check presence of dust if any. Comparator shall be used by vendor for checking the blast profile.

8.0 COATING APPLICATION

This section deals with the methods & requirements of coating application.

8.1 MIXING:

1. All coating material tins shall be individually stirred thoroughly to obtain a homogenous consistency.
2. While doing spray application, the tins which come in pre measured kits will be fully mixed individually using a pneumatic stirrer. While doing hand application only small batches of 1 Kg. capacity shall be taken. Here the mixing will be done by using a metal spatula.
3. The mixing ratios as specified in the respective data sheet will be strictly adhered to. The base will be weighed out in kgs using mechanical weighing machines calibrated at site using any standard factory packed commercial product available freely in the market. The catalyst will be measured out in ML using marked syringes or measuring cylinders.

8.2 APPLICATION PROCESS:

1. The preparation and application of coating is done as per relevant product data sheet. Reference will be made to product datasheet or where appropriate, contract specifications for carrying out coating.
2. Coating in confined spaces should be done when the ambient temperature is low to avoid excess build up of styrene fumes.
3. The entire thickness will be built in multiple coating.
4. Each coat will consist of minimum two passes of wet on wet in perpendicular directions.
5. The Dry film thickness will built of each coat will be checked and recorded.
6. All the other people working with the paint will be provided with eye splash goggles and masks.
7. Glass flake lining material shall be chosen considering the slurry conditions given in Annexure-III
8. Minimum and maximum intercoat intervals are as follows.
 - a. For primer coat -At 20°C minimum 2 hours, maximum 14 hours.
 - b. For build-up coats-minimum tack free of previous coat, maximum 3 days.
9. Primer coat shall be of 75-100 µm thickness
10. Built up Coat shall be of 3000-3100 µm in multiple coats.
11. Total System DFT: 3000 microns approx
12. All weld joints phase transition joints will receive a stripe coat by brush in the same sequence of coating on the shell.

8.3 CURING & FINISH:

1. Curing:

The completed linings shall be allowed to cure for a minimum of 48 hrs at 30°C prior to being placed in service. However, curing time shall be as per the datasheet provided by vendor for a proven material.

2. Finish:

It is to be noted that the coating will follow the profile of substrate. Any unevenness or other defects in the substrate may be reflected in the finish coating also. The finished coating shall have a matt/semi-glossy finish. A few local paint sag marks will not affect performance of coating and cannot be completely avoided. Hence this is permitted.

9.0 INSPECTION AND TESTING OF GLASS FLAKE LINING

After the completion of lining, the following tests shall be conducted by the vendor to assess the quality of glass flake lined surfaces.

1. Lining shall be visually inspected to ensure that it shall be free from poor weed out fibers, entrapped air and exposed fires. The Glass flake lining shall also be subjected to testing at site as per relevant standards.
2. Testing of coatings is normally carried out as soon as they are sufficiently cured to give true thickness & to withstand damage by the test equipment. If defects are found, repair will be carried out as per clause 10.0
3. Spark test shall be carried out at appropriate areas in the presence of Purchaser. Vendor should conduct holiday test as per relevant standards. If the performance is found not to meet the requirements as specified, the Glass flake lining shall be rectified or replaced by the Vendor without any additional cost to the Purchaser. The repair shall be carried out as per clause 10.0
4. Proper documentation with details of tests conducted by the vendor for evaluation of glass flake lining shall be submitted to the purchaser.

10.0 REPAIRING PROCEDURE FOR GLASS FLAKE COATING

1. If the exposed or damaged surface less than 10cm² then such repair can be carried out without grit blasting. Any area in excess of this amount should be grit blasted using a vacuum blaster where possible.
2. In case of damage area less than 10cm² then it can be repaired as following.
 - a. De-contaminate surrounding area by using a suitable solvent such as methylated spirit, acetone, xylene etc. After washing clean and allow solvent to evaporate.
 - b. Roughen up exposed metal & clean using rotary wire brush or a coarse emery paper with at least 60 grade grit. Brush away residues then further roughen surface of the existing coating up to 100 mm away from the damaged area. Brush away residues & ensure the whole area is clean.
 - c. Apply a thin coat of material to the surface of the exposed metal only taking care not to cover more than a few millimetre of the existing coating. Allow this freshly applied material to become tack-free.
 - d. Brush styrene monomer over the whole surface to be repaired (i.e. the whole area roughened by emery) & allow to evaporate from the surface.
 - e. Apply at least 2 main coats material over the treated area taking care not to brush on to any roughened or contaminated areas. The Glass flake should be allowed to harden sufficiently to bear the weight of next coat before application of further coats. However, it does not need to be tack-free between coats.

11.0 PERFORMANCE GUARANTEE

The lining shall be guaranteed for uninterrupted minimum life of 25,000 hrs. Performance parameters to be guaranteed by the vendor and tolerances permitted shall be as indicated in the data sheet. Glass Flake lining or any portion thereof is liable for rejection, if it fails to give any of the guaranteed performance parameters. During Guarantee period any defects noticed due to faulty material and workmanship, shall be rectified by vendor free of cost.

12.0 PACKING

The part items of the Glass flake lining should be identified by Tag numbers and should be packed as to minimize the possibility of damage during storage or transit. The packing should be suitable for tropical conditions. BHEL site will arrange for the space for storage. Vendor shall make arrangements for storing the Glass flake lining materials in AC containers at site. The list of items identified as despatchable units shall be furnished along with unit weight and the quantity for preparation of packing slip at BHEL end for dispatch to site and for easy identification, storage and erection at site.

Notes:

1. Lining material chosen shall withstand a maximum service temperature of 85 deg C.
2. Procedure for lining application duly certified by lining manufacturer shall be submitted for approval.

13.0 DOCUMENTATION**DATA TO BE FURNISHED BY THE VENDOR AFTER RECEIPT OF PURCHASE ORDER**

1. List of Drawing and documents to be submitted for review, approval and information with submission dates.
2. Quality Assurance Plan to be submitted for approval.
3. Detailed dimensional General Arrangement drawing of the lining surfaces. This drawing shall indicate all the design data and information about the material, scope of work and weight of the material supply, Packing procedure etc.
4. Installation, operation and maintenance manual.
5. Surface preparation and Lining procedures.

SUGGESTED PRICE FORMAT		Doc No:	PE-PF-457-167-A101		
		Rev No:	1		
		Date of issue	26.05.2020		
NAME OF PROJECT:		3x660 MW NPGCPL NABINAGAR STPP (FGD PKG)			
NAME OF PACKAGE:		MISCELLANEOUS TANKS FOR FGD PACKAGE (SITE FABRICATED)			
TECHNICAL SPECIFICATION:		PE-TS-457-167-A101			
S. No.	DESCRIPTION	UNIT	QTY	HSN Code	
1.0	Total lump sum firm price inclusive of all prevailing taxes, duties and other levies for Supply part and Services part comprising of design (i.e.preparation and submission of drawing /documents including "As Built" drawings and O&M manuals), engineering, manufacture, fabrication, assembly, inspection / testing at vendor's & sub-vendor's works, painting, maintenance tools & tackles,consumables alongwith spares for erection, startup and commissioning as required, forwarding, proper packing, shipment and delivery at site, unloading, handling, transportation & storage at site, in-site transportation, assembly, erection & commissioning, final painting at site, minor civil work,and carrying out Performance guarantee / Functional / Demonstration tests at site (as applicable), training of customer/client O&M staff and final handing over to end customer in flawless condition for project and package specified above complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.	Lot	1		
2	MAJOR BREAK-UP OF PRICES GIVEN IN 1.0 ABOVE.				
2.1	Total lump sum firm price inclusive of all prevailing taxes, duties and other levies for Supply part comprising of design (i.e.preparation and submission of drawing /documents including "As Built" drawings and O&M manuals), engineering, manufacture, fabrication, assembly, inspection / testing at vendor's & sub-vendor's works, painting, maintenance tools & tackles,consumables alongwith spares for erection, startup and commissioning as required, forwarding, proper packing, shipment and delivery at site for the total scope defined as per BHEL NIT & tender technical specification as specified above, amendment & agreements till placement of order. (Break-Up as per Annexure-I)	Lot	1	7208 52 10	
2.2	Total lumpsum firm prices inclusive of all prevailing taxes, duties and other levies for Services part comprising of unloading, handling, transportation & storage at site, in-site transportation, assembly, erection & commissioning, final painting at site, minor civil work and carrying out Performance guarantee / Functional / Demonstration tests at site (As applicable),Training to customer/ client personnel covering hands on experience of operation and maintenance and handover in flawless condition of the package to the end customer complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification as specified above, amendment & agreements till placement of order. (Break-Up as per Annexure-II)	Lot	1	998871	
Notes: 1.) PG to consider and suitably incorporate taxes, duties and other commercial aspects. 2.) Bidder to quote the Prices in 'figures' along with corresponding 'words'. 3) The lining material shall be guaranteed for an uninterrupted minimum life of 25000 hrs.					
Particulars of bidder / authorised representative					
Name	Designation	Signature	Date	Company Seal	