Technical Compliance Form

Reference: Tender document For Fabrication, supply and commissioning of Waste Feeder Chamber and Primary Chamber assembly TENDER NOTICE NO: IPR/TN/PUR/TPT/ET/20-21/10 Dated 31-12-2020

- The vendor shall provide their acceptance/confirmation for each point.
- Please avoid to write Yes/Agree/Comply for numeric value/parameters in this compliance sheet.

Sr. no.	IPR technical specification	Vendor acceptance /remarks
1.	**Introduction:** Vendor shall confirm that they have read the introduction part carefully and has clear understanding of components application.	
2.	**Scope of work:**	
2.1	2.1. The job consists of three items (1) Waste feeder chamber assembly, (2) Primary chamber assembly and (3) support structure and service platform for various components and sub-assemblies mentioned in the point 2.7 below. The design and analysis of item no. (1) & (2) is performed by IPR and the respective engineering drawings are attached in Annexure-I. Vendor shall responsible for fabrication, inspection, installation and commissioning of components and sub-assemblies as per tender specification for item no. (1) & (2). For item no. (3), Vendor shall responsible for design, analysis, fabrication, inspection, erection and commissioning as per tender specification.	
2.2	Vendor shall be responsible for raw material procurement, precision fabrication, lining material installation, welding joints, assembly, inspection, testing, supply, installation, erection and commissioning of the waste feeder chamber assembly and primary chamber assembly as per the IPR's tender specifications & engineering drawing attached in Annexure-1.	
2.3	Vendor shall prepare 3D CAD model, detailed manufacturing/fabrication drawings of components and assemblies with tolerance from supplied IPR's engineering drawings and submit to IPR for approval.	
2.4	The Vendor shall quantify structural materials, lining materials, high temperature gasket, etc. for successful fabrication, inspection, assembly, testing, inspection, erection and commissioning of waste feeder chamber and primary chamber assembly. Detailed Bill of Material (BOM) to be submitted to IPR for review and approval before start of procurement.	
2.5	Vendor shall also prepare a list of additional items, if any, such as anchor, clamp, suitable binder, mortar, castable materials, retaining plate/ring, oxidizing materials etc. which would be necessary for holding and installing lining materials inside waste feeder chamber and primary chamber assembly. Vendor shall also have to submit BOM of such items to IPR for review and approval before start of procurement.	
2.6	Vendor shall also design, analysis and supply the following;	

	a) Suitable support structure for erection and commissioning of waste feeder chamber assembly and primary chamber assembly itself. b) Suitable support structure for linear movement of each assembly of door that connecting to respective electrode ports and auxiliary port of the primary chamber assembly. c) Suitable support structure for plunger mechanism and gate valves connecting with waste feeder chamber assembly. d) Suitable support structure for respective electrode assemblies those connecting with electrode ports on assembly of doors and electrode ports on primary chamber assembly respectively. e) Suitable service platforms to access individual components during service, repair and maintenance. f) The waste feeder chamber and primary chamber assembly including support structures and service platforms are going to be installed, erected and commissioned **Homi Bhabha Cancer Hospital (HBCH), Varanasi City** after completion of successful erection and site acceptance test at FCIPT, Gandhinagar. The performance of support structures and service platforms is responsibility of vendor. Thus, Vendor shall perform design and analysis of support structures, service platforms and foundation taking in to consideration relevant constrains and conditions at Varanasi City. The analysis shall be performed considering different load cases combination (i.e. Structural, Thermal, gravity, seismic and/or wind & other load, if applicable). g) Vendor should submit the detailed support structures and service platforms design and analysis document for point 2.6 (a) to (e) to IPR for review and approval.	
2.7	Vendor shall provide to IPR a compatible 3D CAD model of waste feeder chamber and primary chamber assembly along with support structures and service platforms as designed under point number 2.6 above. The Vendor would preferably use CATIA software to prepare the 3D CAD models. In case vendor is not able to arrange CATIA software, then vendor should make use of suitable other 3D CAD software but ensure compatibility of the 3D CAD Models with ANSYS software.	
2.8	Vendor shall also have to provide weight details of each component including lining materials installed in it for review by IPR. The thermal, structural and seismic analysis document of support structures and service platforms will be provided to IPR for review and approval. After the review, if the support structures and service platforms are found unsafe then vendor has to do the necessary changes in the design.	
2.9	Vendor shall make arrangement of quick release mechanical clamps to connect each door leak tight with electrode ports and auxiliary port of primary chamber respectively.	
2.10	Vendor shall make arrangement of 06 nos. ports for temperature and pressure measurement in consultation with IPR during preparation of fabrication drawings.	
2.11	Vendor shall provide appropriate lifting lugs & hooks on various components and assemblies for safe handling, transportation and also for safe maintenance work performed using crane. The	

	location of the lugs & hooks should be ensured considering centre of gravity of the structure.	
2.12	Vendor shall also be responsible for compatible interfacing of fabricated components, lining materials installed and their assembly with gate valves, plunger mechanism and electrode assembly. The dimensions and weight of interfacing components will be provided by IPR during execution of PO.	
2.13	Vendor shall prepare components surface as per recommendation from OEM paint supplier and components should be painted externally with heat resistance alumina paint suitable to withstand temperature of 250°C with proper surface preparation.	
2.14	Service platforms and support structures shall be painted using black color after applying two coats of suitable anti-corrosive paint/chemical.	
2.15	The whole structure outer wall is electrically a single conducting body which will be grounded at single point using copper bar/plate which will be bolted on the structure.	
2.16	The vendor must follow, supply and assemble the components as per the list of preferred make prepared by IPR enclosed under Annexure –II.	
2.17	Vendor's scope of work also includes the following points: a) During the preparation of fabrication/manufacturing drawings, Vendor shall also study the fabrication feasibility and shall intimate to IPR for any modifications that may seem to be necessary for successful manufacturing/fabrication of components, sub-assemblies & assembly. After approval from IPR, vendor shall incorporate necessary modifications. b) The manufacturing/fabrication drawings shall clearly indicate the welding process, weld serial no. and weld joint design considered for production of joints during assembly. c) Vendor must also submit the fabrication methodology plan along with time line in respect of section- 11 (Delivery schedule) of this technical specification to IPR for approval. d) Vendor must also make a periodical review plan (part of MIP document) to be conducted by IPR's engineers at vendor's site. e) Procurement of bought out items should be from original equipment manufacturer (OEM) or their authorized distributers/suppliers. f) Procurement of all necessary raw materials, items and equipment with test certificates, wherever applicable. The test certificates should be submitted to IPR for approval. g) Design, development and manufacturing of tools, jigs, fixtures and other accessories required for manufacturing of components & assemblies for waste feeder chamber assembly, primary chamber assembly and lining materials installation. h) Vendor shall comply with IPR technical specification, 2D engineering drawings and check for manufacturing feasibility and process for manufacturing.	

	i) Fabrication of all components, sub-assemblies and assembly according to the approved fabrication drawings by IPR as per delivery schedule shown in section-11. j) Inspection and testing of materials, components & sub-assemblies at appropriate stages before the final assembly. Supply of appropriate test report to IPR before pre-dispatch inspection to be performed by IPR's engineers. k) Assembly of components and test their mechanical integrity at factory site as well as at IPR site. l) Vendor has to conduct Factory acceptance tests in the presence of IPR's engineers. m) Packaging and delivery of components to IPR with appropriate unloading instructions at IPR site after the dispatch clearance by IPR.	
3.	**Code and Standards:** The vendor shall comply with code and standards mentioned.	
4.	**Technical Specification:**	
4.1	Waste feeder chamber assembly (The vendor shall provide acceptance/clarification in separate sheet attached).	
4.2	Primary chamber assembly (The vendor shall provide acceptance/clarification in separate sheet attached).	
5.	**Materials:**	
II	Structural materials shall be tested by the vendor in procured condition for its chemical and mechanical properties as well as for any internal defect.	
III	The lining materials shall also be tested by the vendor for its thermo-physical properties mentioned under Annexure-III. The test certificate should clearly indicates the properties mentioned under Annexure-III for each lining material	
IV	Vendor shall submit test certificates of structural materials and lining materials to IPR issued by preferably NABL accredited laboratory or else Government Organization laboratory for acceptance of material properties by IPR before starting of the lining work at factory site.	
V	Vendor shall supply test specimens of structural materials and lining materials as per relevant ASTM standards. IPR may get the materials tested from third parties and in case, if material is found non-complying with IPR specification then the material will be rejected.	
VI	Vendor shall have to submit technical data sheet of lining materials in respect of properties mentioned under Annexure- III specifying particular brand/make for properties verification and technical qualification. Vendor shall also have to submit detail of recommended binders to be used for lining materials.	
VII	Vendor shall also submit test certificates of procured structural and lining materials provided by manufacturer or their authorized laboratory before starting of fabrication and lining work at factory.	
VIII	Vendor shall submit proof of materials procurement (i.e. invoice copy/challans/bills/purchase order along with delivery note from OEM/authorized distributes/dealers) in respect of Annexure-II.	
6.	**Instruction to vendor:**	

	Vendor shall confirm that they have read each point of this section and has agreed with it.	
7.	**Machining, Fabrication and cleaning:**	
VI	Vendor has to submit WPS, PQR, and WPQ and weld plan to IPR for approval before executing the work.	
VII	Vendor shall provide assembly marking on fabricated components for ease of assembly and disassembly of components of assemblies during repair and maintenance.	
VIII	The welding shall be carried out only by qualified welders. Qualification of welders shall be accordance with the requirements of ASME Boiler and Pressure Vessel Code, Section IX.	
X	Single pass weld up to a maximum extent is preferred. Interruption during welding should be reduced to a minimum possible extent.	
8.	**Lining materials installation:**	
I	Vendor shall start installation of lining materials at factory after getting acceptance form IPR on submitted test certificates of lining materials.	
II	Vendor shall carry out lining material installation as per approved fabrication drawings including lining work.	
III	IPR representative will witness lining materials installation work carried out by vendor at factory site.	
V	Kindly provide confirmation on point no. V under section 8.	
9	**Inspection and testing procedure :** The vendor shall read and accept all points mentioned in this section. For deviation in respective point, vendor should write clearly.	
10.	**Acceptance test:**	
10.1	**Factory Acceptance Test (FAT)** Vendor has to comply with acceptance test described under this section.	
10.2	**Site Acceptance Test (SAT)** Vendor has to comply with acceptance test described under this section.	
11.	**Delivery schedule:** Vendor shall follow the delivery schedule provided under this section. Any deviation should clearly indicate.	
12.	**Document to be submitted:** The vendor shall submit the document as listed under point 12.1 and 12.2 respectively.	
13.	**Insurance, packing, handling and supply:** Vendor shall agree with insurance, handling and supply terms?	
14.	**Guarantee/warranty:** Twelve (12) months from date of final acceptance for poor workmanship, welding/fabrication/painting, lining work installation, faulty material, electronics items etc. During this period if any fault occurs/detected in contractor's services, contractor shall rectify the same at no extra cost. In the event contractor fails to fulfil his guarantee obligations, IPR shall have the right to remedy or to have remedied the defect/fault, in both cases to contractor's account.	
15.	**Post warranty support:**	

	The vendor shall confirm that they will provide the post-warranty support for additional three years after expiry of warranty period i.e. 1 year for any of the mechanical damages or lining material damages in the supplied assembly at **Homi Bhabha Cancer Hospital (HBCH), Varanasi City**. However, the cost for such post-warranty support is "Not To Be Included" in the quotation against the present tender.	

Annexures	**Vendor Acceptance/ remarks**
Annexure – I:	Vendor shall study each drawing of assembly, sub-assemblies, parts and BOM provided in respective drawing numbers. Kindly provide your acceptance.
Annexure – II	Provide your confirmation in separate sheet attached.
Annexure – III	Provide your confirmation in separate sheet attached.
Annexure – IV	Provide your confirmation in separate sheet attached.
Annexure – V	Vendor shall study each points mentioned under this annexure. Please provide your confirmation.

4.1 Waste feeder chamber assembly

Description	Specifications	Vendor Acceptance/ remarks
Feeder chamber manifold (FCM) assembly	➢ MOC: Specified in engineering drawings under Annexure-I. ➢ Lining materials thickness: (a) refractory layer = 115 mm (thick) (b) insulation layer type 1 = 200 mm (thick) (c) insulation layer type 2 = 5 mm (thick) ➢ Lining material specification: lining materials should be procured as per detail given under Annexure –II and Annexure-III respectively.	
Feeder Chamber 1 and Feeder Chamber 2	➢ MOC: Specified in engineering drawings under Annexure-I.	
Flanges	➢ MOC: Specified in engineering drawings under Annexure-I. ➢ Flange Type: I. Rotatable type flange to be connected with adjoining component of gate valves with proper interface on mutual discussion (see location in relevant 2D drawings under Annexure-I). II. Integral type flange to be connected at other components as per 2D drawings. ➢ Surface finish of gasket contact area of flange should be 3∇, other area shall have 2∇.	
Support structure	➢ MOC: Mild Steel (M.S.) of IS 2062 GRADE E300/E350 Quality A/BR. ➢ The support structure should enough to take load of whole assembly.	
Service platform	➢ MOC: Mild Steel (M.S.) of IS 2062 GRADE E300/E350 Quality A/BR. ➢ To access individual components during service, repair and maintenance. ➢ The width for service platform shall have to accommodate minimum 3 persons during operation, repair and maintenance. ➢ The service platform should be sturdy enough to take load of minimum 3 persons and/or other structures connecting it. ➢ **The design of service platform should be such that it can be dismantled and/or move away during repair/replacement of any components of waste feeder chamber assembly.**	
Sealing requirement	➢ Ceramic fibre gasket or equivalent properties gasket of min. 5 mm thickness that can withstand temperature regime of 800^0C - 1000^0C ➢ Fasteners MOC: SA-193 B7 or high strength heavy hexagonal type.	
Note: All dimensional details are included in the drawings. All the other fabrication related details have to be worked out by vendor and approval should be taken from IPR before starting of fabrication.		

4.2 Primary chamber assembly

Description	Specifications	Vendor Acceptance/ remarks
Cylindrical chamber assembly	➢ MOC: Specified in engineering drawings under Annexure-I. ➢ Lining materials thickness: (a) refractory layer = 115 mm (thick) (b) insulation layer type 1 = 200 mm (thick) (c) insulation layer type 2 = 5 mm (thick) ➢ Lining material specification: lining materials should be procured as per detail given under Annexure –II and Annexure-III respectively. ➢ Vendor shall design and supply support structures for connecting electrode assemblies with respective ports of primary chamber.	
Assembly of door for electrode ports	➢ MOC: Specified in engineering drawings under Annexure-I. ➢ Lining materials thickness: (a)refractory layer = 115 mm (thick) (b) insulation layer type 1 = 200 mm (thick) (c) insulation layer type 2 = 5 mm (thick) ➢ Lining material specification: lining materials should be procured as per detail given under Annexure –II and Annexure-III respectively. ➢ Vendor shall design and supply support structures for connecting electrode assemblies with port on doors. ➢ The support structure for door would rest on roller mechanism and/or guide rail and it is capable to travel minimum linear distance of 1 meter. ➢ The support structure should enough to take load of assembly of door and respective electrode assemblies.	
Assembly of door for auxiliary port	➢ MOC: Specified in the drawings under Annexure-I. ➢ Lining materials thickness: (a) refractory layer = 115 mm (thick) (b) insulation layer type 1 = 200 mm (thick) (c) insulation layer type 2 = 5 mm (thick) ➢ Lining materials specification: lining materials should be procured as per detail given under Annexure –II and Annexure-III respectively. ➢ The support structure for door would rest on roller mechanism and/or guide rail and it is capable to travel minimum linear distance of 1 meter. ➢ The support structure should enough to take load of door for auxiliary port.	
Flanges	➢ MOC: Specified in engineering drawings under Annexure-I. ➢ Flange Type: Integral type flange as per 2D drawings.	

	➢ Surface finish of gasket contact area of flange should be 3∇, other area shall have 2∇.	
Support structure	➢ MOC: Mild Steel (M.S.) of IS 2062 GRADE E300/E350 Quality A/ BR. ➢ The support structure should enough to take load of whole assembly. ➢ Support structure welded with primary chamber assembly shall be designed such that minimum clearance of 1.2 meter shall be available from floor level to the bottom part of primary chamber assembly (Please refer drawing no. IPR/APD/20/A3/CBWTF).	
Service platform	➢ MOC: Mild Steel (M.S.) of IS 2062 GRADE E300/E350 Quality A or BR. ➢ To access individual components during service, repair and maintenance. ➢ The width for service platform shall have to accommodate minimum 3 persons during operation, repair and maintenance. ➢ The service platform should be sturdy enough to take load of minimum 3 persons and/or other structures connecting it. ➢ **The design of service platform should be such that it can be dismantled and/or move away during repair/replacement of any components of primary chamber assembly.**	
Sealing requirement	➢ Ceramic fibre gasket or equivalent properties gasket of min. 5 mm thickness that withstand temperature regime of 800^0C - 1000^0C ➢ Fasteners MOC: SA-193 B7 or high strength heavy hexagonal type.	
Note: All dimensional details are included in the drawings. All the other fabrication related details have to be worked out by vendor and approval should be taken from IPR before starting of fabrication.		

Annexure – II: LIST OF APPROVED MAKE

Sr. No.	Item Description	Make/brand	**Vendor Acceptance/ remarks**
1.	Plate, pipe, forged, rod, etc. materials as specified in the engineering drawings under Annexure-I.	Tata, SAIL, RINL, Jindal, Fortran Steel Private Limited, Phenix creation simplified **or equivalent make/brand**.	
2.	Structural Rolled Steel sections-beams, channels, tee, flats, angles, bars (round, square, hexagonal) of Mild Steel (M.S.) IS 2062 GRADE E300/E350 Quality A or BR.	Tata, SAIL, RINL, Jindal, Fortran Steel Private Limited, Phenix creation simplified **or equivalent make/brand.**	
3.	Structural Hollow steel sections (Square & Rectangular) and tubular sections of Mild Steel (M.S.) IS 2062 GRADE E300/E350 Quality A or BR.	Tata, Asian, APL Apollo tubes Ltd., Phenix creation simplified, Fortran Steel Private Limited **or equivalent make/brand.**	
4.	Structural tubular sections of Mild Steel (M.S.) IS 2062 GRADE E300/E350 Quality A or BR.	Tata, Asian, APL Apollo tubes Ltd., Phenix creation simplified, Fortran Steel Private Limited **or equivalent make/brand.**	
5.	Refractory layer.	Brick of Calderys, Carborundum Universal Limited (CUMI), MG Materials India, Promat, Mogan Advance materials or **equivalent make/brand** that conforms to technical specification mentioned under Annexure-III.	
6.	Insulation layer type 1.	Brick of Calderys, Carborundum Universal Limited (CUMI), Promat, MG Materials India, Mogan Advance materials **or equivalent make/brand** that conforms to technical specification mentioned in Annexure-III.	
7.	Insulation layer type 2.	Ceramic fiber paper of Mogan Advance materials, Unifrax, Ceramaterials, Calderys, MG Materials India, Carborundum Universal Limited (CUMI) **or equivalent make/brand** that conforms to technical specification mentioned in Annexure-III.	
8.	Castable material	Calderys, Carborundum Universal Limited (CUMI), Promat, MG Materials India, Mogan Advance materials **or equivalent make/brand** that conforms to technical specification mentioned in Annexure-III.	

8.	Welding rod.	Esab India (7018 or 7014) or equivalent.	
9.	Construction chemicals (if any).	M.C.Bauchemie, FosrocSika, Cico, Pidilite, Sika, Ashford, BAL, Krishnaconchem or equivalent.	
10.	Joint Filler/silicon paint.	Wacker, Dowcorning, Sika, Chokshi or equivalent.	
11.	Paint, primer, putty.	Asian, Berger, Nerolac, ICI, Birla (putty) Roofit(Putty) or equivalent.	
12.	Polish.	MRF, Asian, ICI, Taralac or equivalent.	
13.	Adhesives.	Fevicol, Kitcol, Araldite, BAL or equivalent.	
14.	Anchor fastener/bolts.	Sundaram, Hilti.Fischer or equivalent.	

Annexure – III: Technical specification for lining materials

I. Refractory layer

Parameters	Properties	**Vendor acceptance/remark**
Maximum service temperature, (^{0}C)	1600^{0}C - 1850^{0}C	
Bulk density, (kg/m3)	1100 - 1300 kg/m3	
Cold Crushing strength, (kg/cm^2)	$\geq$ 30 kg/cm^2	
Thermal conductivity, (W/m-K)	$\leq$ 0.61 W/m-K @ temperature 800^{0}C	
Note: Side arc/End arc brick is recommended wherever applicable.		

II. Insulation layer type 1

Parameters	Properties	**Vendor acceptance/remark**
Classification temperature, (^{0}C)	1250^{0}C - 1550^{0}C	
Bulk density, (kg/m3)	700 - 950 kg/m3	
Cold Crushing strength, (kg/cm^2)	$\geq$ 20 kg/cm^2	
Thermal conductivity (W/m-K)	$\leq$ 0.41 W/m-K @ temperature 800^{0}C	
Note: Side arc/End arc brick is recommended wherever applicable.		

III. Insulation layer type 2

Parameters	Properties	**Vendor acceptance/remark**
Classification temperature, (^{0}C)	1250^{0}C - 1550^{0}C	
Bulk density, (kg/m3)	150 - 250 kg/m3	
Tensile strength, (kPa)	$\geq$ 200 kPa	
Thermal conductivity, (W/m-K)	$\leq$ 0.10 W/m-K @ temperature 400^{0}C	

IV. Castable material

Parameters	Properties	**Vendor acceptance/remark**
Classification temperature, (^{0}C)	1200^{0}C - 1700^{0}C	
Bulk density, (kg/m3)	700 - 1300 kg/m3	
Cold Crushing strength, (kg/cm^2)	$\geq$ 25 kg/cm^2	
Thermal conductivity (W/m-K)	$\leq$ 0.40 W/m-K @ temperature 600^{0}C	

Annexure – IV

The vendor shall submit the quote for the following **spares mandatorily in price Bid**. Vendor should also specify the quantity offered. **The quantity mentioned in the price-bid format is tentative**.

Sr. No.	**Description**	**Qty.**	**Vendor acceptance/remark**
1	Refractory layer	200 Nos.	
2	Insulation layer type 1	350 Nos.	
3	Insulation layer type 2 (Rolls)	01 No.	