



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY	Phone: +91 431 257 7653 Email : skaruna@bheltry.co.in , ajay@bheltry.co.in Web : www.bhel.com
NOTICE INVITING TENDER	

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2601700048	11.08.2017	05.09.2017

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	Solution Heat Treatment LPG Furnace with Quenching Facility 12 Ton Capacity as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.

Important points to be taken care during submission of offer

1. Compliance Form No: TMM /IND/05 to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
2. Delivery period required is 10 months from the date of P.O.
3. Commissioning and performance prove out shall be done at BHEL Thirumayam by the supplier
4. Time period required for commissioning and performance prove out shall be 3 Months from the date of intimation by BHEL
5. EMD for this tender Rs.2,00,000/- (Note: - For EMD exemption to MSME Vendors, Please refer Compliance form TMM/IND/05)
6. The capacity/supply details as required in clause 15.0 of the compliance form TMM/IND/05 for commercial terms acceptance is to be enclosed
7. In line with the mandatory requirement of Government of India, the integrity pact is to be executed by BHEL and its suppliers. Hence we are enclosing the scanned copy of integrity pact. We request you to kindly download the attached integrity pact and affix your signature and seal in all the pages. In the page no. 6 of 6, in addition to your signature and seal please get the witness signature and seal. The witness signature may be from any one of your organisation. Duly filled integrity pact shall be submitted along with the tender.



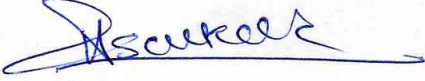
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8.	All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media. BHEL's General guidelines / instructions (refer MM/CE/GENL/001), compliance form and technical specification can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference.	
	Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For BHARAT HEAVY ELECTRICALS LIMITED  AJAY V. ASALKAR Sr. MANAGER MM / Capital Equipment BHEL, Tiruchirappalli - 620 014. Sr. Manager / Capital Equipment / MM

PART A: QUALIFYING CRITERIA FOR SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	BIDDER'S OFFER (With Details)	DEVIATION/ REMARKS
1.0	QUALIFYING CRITERIA FOR BID ACCEPTANCE		
1.1	Only those BIDDERS (Original Equipment Manufacturers), who have supplied and commissioned at least ONE number of following type of furnaces in India in the past TEN years (on the date of opening of Technical Bid of the Tender) and such a FURNACE is presently working satisfactorily (for more than one year from the date of commissioning at the customer's works), will be qualified to participate in the tender. The reference date is taken as the Technical Bid opening date of the Tender. (1) BOGIE HEARTH LPG FIRED HEAT TREATMENT FURNACE with a minimum charge capacity of 12 Tons and suitable for operating at a furnace temperature of 1100 Deg. C or higher and (2) BOGIE HEARTH FURNACE with a minimum charge capacity of 12 Tons and furnace temperature of 1250 Deg. C or higher and (3) FURNACE WITH WATER QUENCHING SYSTEM HAVING AUTOMATIC QUENCH FORK MECHANISM for charge handling from furnace for a minimum charge carrying capacity of 3 Tons.		

PART A: QUALIFYING CRITERIA FOR SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	BIDDER'S OFFER (With Details)	DEVIATION/ REMARKS
	- Also the Vendor should have the After-Sales-Service set up in India for attending the service in reasonable time without delay. Note: BHEL representatives will visit the working furnaces as declared by the vendors to assess the performance as part of Qualifying the vendor.		
1.2	However, if such a FURNACE had already been supplied to any of BHEL Unit/Division, then that FURNACE shall presently be working satisfactorily and any remarks on the performance of the subject FURNACE in total or any sub-system or bought-out items forming part of the subject FURNACE and the QUALITY of the AFTER-SALES SERVICE SUPPORT rendered by the BIDDER will be a reckoning point in technical evaluation of the TECHNICAL BID submitted.		
1.3	The BIDDER shall submit the following information, provided the BIDDER satisfies the above tender clause:		
1.3.1	Name and Complete Postal Address of the COMPANY / FIRM/INDUSTRY – Bidder's Customer, where the BIDDER supplied FURNACE (S) is/are working.		
1.3.2	Name and contact address with e-mail id and telephone & fax numbers of the customer's authorized person for seeking feedback on the performance of the furnace (as per the above Clause No. 1.1) is installed.		
1.3.3	Month and Year of installation and commissioning of the subject furnace (as per Clause No.1.1) at the customer's works.		

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SL.NO.	DESCRIPTION	BIDDER'S OFFER (With Details)	DEVIATION/ REMARKS
1.3.4	Application / End Use for which the subject furnace (as per Clause No.1.1) is deployed by the Bidder's Customer		
1.3.5	Along with the Technical Bid / Offer, the Bidder shall submit one Performance Feedback Certificate from the Bidder's Customer(s) for the satisfactory performance of the FURNACE supplied. For submitting the Performance Certificate in the original letter head of the customer, a sample format is provided in ANNEXURE -A.		
1.3.6	BHEL reserves the right to verify the information provided by the Bidder under the above listed tender clauses. In case, any of such information provided by Bidder is found to be false/ incorrect/mis-guiding, the offer shall be rejected.		
1.4	The BIDDER has to furnish the PROFILE of the Company bringing out the aspects such as the Source of Technology for Furnace Design, Manufacture, Installation & Commissioning		
1.5	Financial Background of the Company with copies of three year's Financial Balance Sheet – to assess the financial position for undertaking such a contract (in case of order realization on the Bidder) with sustainability and solvency.		
1.6	Detailed List of Manufacturing and Testing Facilities owned by the Bidder for the manufacture of the components / sub-assemblies required to build the entire furnace.		

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SL.NO.	DESCRIPTION	BIDDER'S OFFER (With Details)	DEVIATION/ REMARKS
1.7	Details on SERVICE-AFTER-SALES Set-Up in India including the Address of Agents / Service Centres in India, to attend to BHEL's Service Needs within response period of maximum 48 hours.		
1.8	Any Additional Data to supplement the competency, manufacturing capability and capacity of the BIDDER, for the tendered FURNACE.		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
1.0	PURPOSE & WORKPIECE MATERIAL:			
1.1	Purpose: To Carry out - 1. Solution Heat Treatment of Pressure Parts like Bend Pipes (Material- Inconel-617, Max Job temperature 1175 Deg.C). 2. Quenching of Hot Bends in demineralised water, required to be completed within 300 Seconds. 3. Heat Treatment Cycles comprising Stress Relieving, Normalizing & Tempering (Material- Carbon Steel and Alloy Steel like P91 & P22, Max Job temperature 1050 Deg. C and SR temperature of 615 Deg. C).			
1.2	Job Details: Material: 1. Inconel-617 2. Carbon Steel, Alloy Steel - P91/P92/P22. Configuration: Straight Pipes / Bend Pipes Weight of Job Lot: Not exceeding 12 Tons I. DIMENSION OF PIPE BENDS FOR SOLUTION HEAT TREATMENT (<i>Quenching facility to be designed for these job sizes</i>): 1) Internal Dia. 315 mm x 95 mm wall thick; Length 5 m, Bend Radius 1.5 m, Bend angle 90 deg. 2) Internal Dia. 610 mm x 38 mm wall thick; Length 5 m, Bend Radius 1.5 m, Bend angle 90 deg. II. FOR OTHER HEAT TREATMENT CYCLES Straight / bend pipes of suitable dimension which shall be accommodated in the furnace.			

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.0	FURNACE:			
2.1.0	OPERATING PARAMETERS:			
2.1.1	Charge Capacity –Excluding pedestals.	12 Tons		
2.1.2	Following Heat Treatment Cycles need to be carried out: I. Solution Heat Treatment with water quenching, Material: Inconel 617 ROH: Max. 65 Deg.C/Hr (preferably not less than 50 Deg.C/Hr) Job temp. uniformity during ROH: As min. deviation as possible. Soaking: 1175±10 Deg. C II. Stress Relieving Material: Steel - CS/P91/P92/P22 ROH / ROC: 50 - 150 Deg.C/Hr. (depends on job thickness). Job temp. uniformity during ROH/ROC: ±37.5 Deg. C. Soaking: 615 – 760 ±10 Deg. C (depends on job material) III. Normalizing & Tempering Material: Alloy Steel - P91/P92/P22 ROH: 50 - 150 Deg.C/Hr. (depends on job thickness). Job temp. uniformity during ROH: ±37.5 Deg. C. Soaking temp.: 1050 ±10 Deg. C.	Vendor to note and confirm with heat calculation.		
2.1.3	Maximum Furnace Temperature	Vendor to specify		
2.1.4	Soaking time (1 Hr Per Inch of Thickness / Min. 30 Minutes) whichever is greater for all cycles.	Vendor to confirm		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
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2.2	FURNACE CONFIGURATION			
2.2.1	Single Bogie Configuration with Top Lifting Door	Vendor to confirm and provide details		
2.2.2	Self-Driven Car Bottom Bogie Traversing on embedded Rails, through electro-mechanical drive. Bogie positions as per Lay out proposed by BHEL (Annexure-B) 3 Positions: 1. Inside furnace chamber 2. Quenching Position 3. Loading /Unloading Position.	Vendor to confirm and provide details		
2.2.3	Automatic Quench Fork Facility for handling the hot Inconel job from bogie and quenching inside the DM water bath within 300 seconds.	Vendor to confirm and provide details		

2.3	FURNACE DIMENSIONS			
2.3.1	Bogie Dimension (Min.): 4m x 7.5m (Job loading surface area)	Vendor to confirm and provide details		
2.3.2	Chamber Wall to Wall dimensions (width x length)	Vendor to specify		
2.3.3	Inside height (from bogie top to roof bottom) of furnace chamber	Vendor to specify		
2.3.4	Minimum Door opening above top of piers on the bogie shall be 1.4 m. (Note: Max Height of Piers above Bogie surface: 350mm as per Drawing.)	Vendor to confirm and provide details		
2.3.5	Outer Dimension of the Furnace (width x length)	Vendor to provide details		
2.3.6	Total Height of the Furnace (Including Flue exhaust pipe, Door mast height etc.)	Vendor to provide details		
2.3.7	Dimension of Quenching System (width x length) including Fork Mechanism	Vendor to provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.3.8	Vendor to provide proposed detailed layout with major dimensions including Furnace Flue gas path, quenching system, total length for bogie travel up to job loading/unloading area inside existing Bay, etc.	Vendor to provide details		
2.4	COMBUSTION SYSTEM:			
2.4.1	The furnace has to be provided with the adequate number of Self-Recuperative Gas Burners suitably designed for pulse firing with LPG as fuel.	Vendor to confirm and provide details with catalogue and Heat calculation.		
2.4.2	LPG Gas inlet Pressure-(BHEL can supply at 2.0 kg/cm ²)	Vendor to Note		
2.4.3	Max LPG flow rate required at BHEL terminal point	Vendor to specify		
2.4.4	Burners Type- Self-Recuperative Gas Burners, Make: Kromschroder (Vendor to furnish model no. and technical details of burners)	Vendor to confirm and provide details		
2.4.5	Means of regulation: Pulse firing with control accessories using solenoid operated air & gas Valves, Pulse firing Rack, etc. Make: All elements of Kromschroder.	Vendor to confirm		
2.4.6	Number of Burners with calculation and arrangement details (Schematic drawing showing location of burners should be furnished along with the offer)	Vendor to provide details		
2.4.7	Burner Rating	Vendor to Specify		
2.4.8	Type of Temperature Control : PID Control (with the help of hardware based PID controller) with provision to adjust the parameters at operator end.	Vendor to confirm and provide details		
2.4.9	No. of Temperature control Zones (preferably 4)	Vendor to specify		
2.4.10	All Isolation valves for gas line shall be fire safe design.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.4.11	Vent valves opening position to be indicated in the control panel. The valve outlet to be extended and terminated above roof top.	Vendor to confirm		
2.4.12	All valve flanges shall be raised face with serrations.	Vendor to confirm		
2.4.13	All electrical inputs that are available with any instrument in the LPG line such as Igniter cables, scanner related items, junction boxes, transmitter, shall be with flame proof enclosure and double compression cable gland provision for cable entry/exit.	Vendor to confirm and provide details		
2.4.14	All cables shall be of copper (to the max. extent possible) and should be Flame Retardant Low Smoke design only.	Vendor to confirm and provide details		
2.4.15	Copper clad asbestos gasket to be used for flanged valves	Vendor to confirm		
2.4.16	Complete piping system with all mechanical components should withstand minimum twice the working pressure.	Vendor to confirm		
2.4.17	Entire LPG Gas Train System components should be of Kromschroder make.	Vendor to confirm		
2.4.18	All Instrument impulse line shall be of SS 316, Sch. 40.	Vendor to confirm		
2.4.19	Copper washer shall be provided to all pressure gauges and switches	Vendor to confirm		
2.4.20	All Flanges should be provided with copper earth links.	Vendor to confirm		
2.4.21	Suitable spectacle blind shall be provided near terminal point at gas train piping.	Vendor to confirm		
2.4.22	TIG root run welding shall be carried out for all welding joints in LPG line.	Vendor to confirm		
2.4.23	All pressure gauges and pressure switches to be provided with isolation valves.	Vendor to confirm		
	Forced Draught (FD) Fan:			
2.4.24	FD Fan with VFD of suitable capacity (including excess air) has to be provided to ensure proper combustion. Stand-by FD fan with VFD should also be provided in the system.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.4.25	FD Fan Details: Air flow: Air Pressure: Power Rating (KW): Type of blower: Centrifugal Preferred Make of Blower- CB-Doctor / Nadi / Howden	Vendor to provide details		
2.4.26	Bell mouth (Silencer) inlet to be provided with suitable filter on the suction side of FD fan. Vendor must provide suitable handling facility for cleaning the filter element by 1 person.	Vendor to confirm and provide details		
2.4.27	All the Fans (FD & ID) should comply with the following test parameters: 1. Full welding of impeller blades with the rotating base plate. 2. Availability of sufficient strengthening stiffeners in the body / support structure of the blower. 3. Noise level: Max. 85 ± 3 dBA @ 1.5-meter distance. 4. Vibration level: As per ISO-2372. Max. 2.8 mm/sec (RMS). 5. Dynamic balancing of impeller at rated speed.	Vendor to confirm and provide details		
	Dampers:			
2.4.28	Damper has to be provided between the furnace chamber and stack in the flue gas path to regulate draught.	Vendor to confirm		
2.4.29	The damper has to work on auto mode and its opening should get adjusted automatically depending upon the pressure required in the furnace (positive). (Complete details should be furnished with the offer)	Vendor to provide details		
2.4.30	Provision should be there to operate the damper in manual mode also.	Vendor to confirm		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.5	REFRACTORY LINING:			
2.5.1	For Shell and Doors: Ceramic fibre lining modules with back up layer of suitable density and thickness (conforming to ASTM-892 C-1993) to ensure that the skin temperature of the furnace does not exceed 30 Deg.C above ambient temperature. The anchor material should be SS310. 1. Vendor to furnish calculations for choice of insulation material 2. The supplier shall provide MSDS for all refractory material (including ceramic wool). 3. The supplier shall indicate the applicability of the ceramic material under Hazardous Wastes (Management, Handling and Trans boundary Movement) Rules, 2008.	Vendor to provide details		
2.5.2	Size of Ceramic fibre Block Modules (Size should be under the standard manufacturing range of the supplier)	Vendor to provide details		
(a)	Material	Vendor to specify		
(b)	Density	Vendor to specify		
(c)	Thickness	Vendor to specify		
(d)	Max. Service Temperature	Vendor to specify		
(e)	Preferred Make: M/s MMTCL or M/s Unifrax	Vendor to specify		
2.5.3	Size of Back up Blanket layer (Size should be under the standard manufacturing range of the supplier)	Vendor to provide details		
(a)	Material	Vendor to specify		
(b)	Density	Vendor to specify		
(c)	Thickness	Vendor to specify		
(d)	Max. Service Temperature	Vendor to specify		
(e)	Preferred Make: M/s MMTCL or M/s Unifrax	Vendor to specify		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.6	FURNACE DOOR:			
2.6.1	Number of Doors: One	Vendor to confirm		
2.6.2	Operation: Vertical Up / Down.	Vendor to confirm		
2.6.3	Steel construction with ceramic fibre modules lining inside and a set of heat resisting castings to IS 4522, Grade-13 or higher to suit the high temperature requirements around the periphery of the door and with suitable counter balance arrangement. Min. thickness shall be 20 mm.	Vendor to provide details		
2.6.4	VFD driven door drive unit consisting of reduction gear box, brake motor, grooved wire rope drum, pulleys, wire rope, etc.	Vendor to provide details		
2.6.5	Pneumatic door locking arrangement along with mechanical lock arrangement has to be provided to press the door against door opening in its closed position. (Complete details should be furnished)	Vendor to provide details		
2.6.6	Provision should be made on the door, furnace front & side walls and bogie for proper sealing during operation without flame leakage. (Complete details should be furnished with the offer)	Vendor to provide details		
2.6.7	Door Mast to be kept away from furnace front wall to protect the mast from high temperature exposure. (Complete details should be furnished with the offer)	Vendor to provide details		
2.6.8	In the unlocked position, and while lifting the door, it should move away from the furnace opening and move up without interfering on any furnace structure.	Vendor to provide details		
2.6.9	Interlock should be provided so that bogie can be operated only when door is completely open.	Vendor to confirm		
2.6.10	All the pneumatic equipment's and interlock elements are to be suitably protected from failure due to heat from the furnace	Vendor to confirm		
2.6.11	All pneumatic components shall be of Festo make.	Vendor to confirm		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
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2.7	FURNACE CONSTRUCTION (GENERAL):			
2.7.1	The complete furnace structure including the sidewalls and roof are to be manufactured from rolled steel sections and plates of suitable thickness (Minimum 10mm) (Complete details should be furnished with the offer)	Vendor to provide details		
2.7.2	The various load bearing members are to be designed conservatively to ensure rigidity of the complete casing.	Vendor to provide details		
2.7.3	A schematic diagram showing the layout of the furnace & associated systems with salient dimensions should be furnished along with the offer. The proposed lay out should match the indicative BHEL lay-out (Annexure-B).	Vendor to provide details		
2.7.4	The peripheral refractory (in furnace shell) has to be held and supported by a set of heat resistant steel castings, confirming to IS 4522, Grade-13 or higher to suit the high temperature requirements. Min. thickness shall be 20mm	Vendor to Specify		

2.8	PIPELINES & VALES			
2.8.1	All air piping from the blowers to the control valves and to other points in the furnace are in the scope of the vendor.	Vendor to confirm		
2.8.2	BHEL will provide Compressed Air (at 5 Kg/Cm ²), LPG and Water at one point terminated with shut-off valve near the Column C-33 of existing Bay-6 as shown in Lay-out Annexure-B. Entire Pipe lines (LPG, Air and Water) for the furnace and Quenching Tank from the BHEL termination point along with the required fittings and valves are in the scope of the vendor.	Vendor to confirm and provide details		
2.8.3	The pipe lines shall be of scheduled pipes meeting IS standards and designed to withstand min. three times the working pressure.	Vendor to confirm		
2.8.4	Required valves for control of gas and air are in the scope of vendor.	Vendor to provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.8.5	All hot air / flue pipe lines are to be insulated properly.	Vendor to confirm.		
2.8.6	Gas Train System should be provided with standby Filter arrangement. Details of components of gas train with specifications to be provided along with P&I Diagram.	Vendor to provide details		
2.9	FLUE DUCT:			
2.9.1	Flue duct to be connected to existing BHEL 40 Ton furnace chimney with suitable Insulation materials. BHEL Chimney Specification: Height is 20m and ID is Approx. 1m. <i>Note: Vendor shall study the condition & dimensions of existing 40 MT furnace chimney before quoting.</i>	Vendor to confirm and provide details		
2.9.2	Vendor to confirm suitability of Chimney capacity for operating both 40 MT and 12 MT Furnace together.	Vendor to confirm and provide details		
2.9.3	Maintenance platform – 4 Nos. and approach ladders for these platforms from ground with cage to be supplied and installed in the existing 40 Ton furnace chimney at suitable intervals, where the flue is connected as required by BHEL at site.	Vendor to provide details		
2.9.4	Flue Gas from Chimney shall satisfy the requirements of Tamil Nadu Pollution Control Board (TNPCB) norms with respect to emission of SO _x ; NO _x and Suspended Particulate Matter (SPM).	Vendor to confirm and provide details		
2.9.5	The demonstration (proving) of the parameters as per 2.9.4 is in the scope of vendor. Necessary calibrated measuring instruments used for this purpose has to be arranged by the vendor on returnable basis.	Vendor to confirm and provide details		
	Induced Draught (ID) Fan:			
2.9.6	ID Fan of suitable capacity, <u>if required</u> shall be provided before the stack to ensure balanced draught in existing 40 MT furnace chimney. A stand by ID fan also need to be provided, as applicable.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.9.7	ID Fan Details: Air flow: Air Pressure: Power Rating (KW): Type of blower: Centrifugal Preferred Make of Blower- CB Doctor/Nadi /Howden	Vendor to provide details		
2.10	FURNACE BOGIE:			
2.10.1	Number of Bogies: One	Vendor to Note		
2.10.2	Bogie Dimension to suit top Job loading surface area of min. 7.5m x 4m. Length: Width: Height from Ground : 800 mm (preferable)	Vendor to provide details		
2.10.3	Bogie Drive: Self-driven by motorized operation with VFD (Complete details should be furnished with the offer). Suitable arrangements to be made to protect the drives from exposure to high temperature.	Vendor to confirm and provide details		
2.10.4	Suitable refractory arrangements for the bogie to withstand the furnace temperature to be detailed out along with specification of insulation materials used.	Vendor to confirm and provide details		
2.10.5	The top surface of the bogie to be provided with suitable sized slots to accommodate job supporting piers. Note: For Inconel pipes, the piers shall be of shaped refractory blocks and for other pipes, the piers shall be of Heat resistant castings. (Complete details should be furnished with the offer)	Vendor to confirm and provide details		
2.10.6	Heat resistant Steel Castings confirming to IS-4522 Gr.13 or higher to be positioned around the periphery of the bogie to support the refractory. Bogie casting supports to be suitably designed with higher base width to with stand side thrust during job loading. Min. thickness shall be 20 mm.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
2.10.7	The peripheral bottom of the furnace hearth has to be lined with special shaped bricks to match with the shaped bricks on the bogie periphery. The peripheral bottom brick shall be of high alumina quality.	Vendor to confirm and provide details		
2.10.8	Double sand trough type bogie sealing arrangement shall be provided for effective sealing between bogie and the hearth. The top row of trough (both mating castings) to be of Heat Resistant Steel Castings confirming to IS-4522 Gr.13 or higher. Proper sealing arrangement with expansion gap to be provided in the trough castings to prevent fall of sand during bogie movement.	Vendor to confirm and provide details		
2.10.9	The bogie to be manufactured from rolled steel sections and plates of suitable thickness (Min 10mm). (Complete details should be furnished with the offer)	Vendor to confirm and provide details		
2.10.10	The Bogie structure has to be designed to give minimum deflection under different load conditions.	Vendor to confirm and provide details		
2.10.11	The complete bogie with refractory to be supported on the set of forged wheels through trolley arrangement – wheels shall be suitably guided.	Vendor to confirm and provide details		
2.10.12	It should be ensured that all the wheels share the load to the maximum extent.	Vendor to confirm		
2.10.13	The wheels are to be mounted on antifriction bearings through non-rotating axles in such a way that heat transfer from bogie structure to the bearings is reduced to the minimum. However, the driven wheels connected to the self-drive unit, may be with rotating axle.	Vendor to confirm and provide details		
2.10.14	KW Rating of Bogie Drive	Vendor to specify		
2.10.15	Vendor to provide suitable size maintenance pit for carrying out maintenance activity of bogie drive. Also the floor below the bogie to be lined with one layer of suitable grade refractory bricks.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
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2.11	JOB SUPPORT PEDESTAL			
2.11.1	I. For HT of Inconel pipes, suitable sized refractory shaped blocks to accommodate in the slots on the bogie and to withstand the load to be supplied. The material of these blocks to withstand the high temperature requirements of Solution HT and vendor to supply in total 2.5 times the quantity that is required to cover the entire slots on the bogie.	Vendor to provide details		
2.11.2	II. For HT of other Steel pipes, Job supporting Heat Resistant Steel Casting pedestals as per BHEL Drg. No. 3-M-18B-16-14957 to be supplied. Each pedestal as per above drawing shall be supplied in three parts. Material: IS 4522 grade-11. Number of job support pedestals (in 3 piece set) to be supplied is 8 Nos.	Vendor to provide details		

3.0	QUENCHING AND CHARGE HANDLING SYSTEM WITH FORK MECHANISM: (CAPACITY: 12 TONS) <u>Purpose:</u> 1. This system is required for Quenching of Hot Inconel Pipe Bends in Demineralised water during Solution Heat Treatment process, as per clause 2.1.2(I). 2. The process shall be Fully automated from the starting time of opening the Furnace Door till complete Quenching of jobs inside water and shall be completed within 300 seconds.	Vendor to Confirm and time calculation to be submitted.		
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PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
3.1	QUENCH TANK			
3.1.1	Quench system has to be designed in such a way that after quenching of hot job, the rise in water temperature should not exceed 30 Deg.C above the ambient temperature.	Vendor to provide details		
3.1.2	Number of Tanks: One	Vendor to Note		
3.1.3	Quench Tank Dimension (Length x Width x Depth) and volume of water required.	Vendor to specify.		
3.1.4	To maintain Constant Agitation / Circulation, the quenching tank shall be provided with required no. of agitators and recirculation pumps and suitable strainers. Vendor to provide mounting details of agitators and recirculation pumps along with offer.	Vendor to provide details		
3.1.5	The tank shall be of Civil construction and Vendor to provide civil details of construction of Quench Tank including all the provisions that are required for mounting agitators, pumps, support rollers etc. inside the tank. Civil work will be done by BHEL free of cost.	Vendor to provide details		
3.1.6	Suitable water flow arrangement to be provided to ensure proper cooling of pipe inside surface also during quenching.	Vendor to confirm and provide details		
3.1.7	Demineralised water to be used for quenching of Inconel-617 Pipe Bends.	Vendor to note		
3.1.8	Vendor to supply One No. of DM Water plant for a capacity of minimum 3000 litres per hour of DM water with an inlet water quality of 750 ppm TDS treated to <10 ppm TDS with a ph value of 7-8. All consumables for the DM plant to prepare DM water of 2 times the quench tank capacity to be supplied. (Vendor to supply one set of spares for DM Plant as per OEM recommendation)	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
3.1.9	For DM water preparation, only raw water from overhead tank will be given at single point with shut off valve by BHEL. Complete piping from BHEL point till the tank is under vendor scope.	Vendor to note		
3.1.10	Suitable steel cover (min. 10mm thick) to close the quench tank whenever not in operation shall be supplied by vendor. The cover to be provided with suitable handling arrangement and sufficient stiffeners so as to avoid deflection when reasonably loaded.	Vendor to confirm and provide details		
3.1.11	Suitable pumping arrangement to be provided to drain out the water in the quench tank for cleaning & maintenance purpose.	Vendor to confirm and provide details		
3.2	CHARGE HANDLING SYSTEM FOR QUENCHING (CAPACITY: 12 TONS)			
3.2.1	Number of Charge Handling System: One (to be operated for Inconel-617 Pipes)	Vendor to Note		
3.2.2	Charge Handling System should be fully automatic with multiple fork type designed to handle min. 2 Inconel Pipe bends of size indicated in clause 1.2(I) for unloading from Bogie, quenching in water and again loading on the bogie after quenching.	Vendor to confirm and provide details		
3.2.3	Material of Construction of Fork:	Vendor to specify		
3.2.4	The fork shall be provided with slots to accommodate standard refractory bricks, so that the Inconel pipe will have the contact on the refractory bricks only during handling and quenching process. Sufficient quantity of refractory bricks suitable for 12 quenching cycles to be supplied by the vendor.	Vendor to provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
3.2.5	The charging machine shall be mounted on wheel assembly, and it should be possible to effect forward & reverse movement precisely with variable speed.	Vendor to provide details		
3.2.6	The forks shall be capable of lifting / lowering operation, effected by hydraulic cylinders.	Vendor to provide details		
3.2.7	The fork shall be moving up and down in the quench tank and suitable guide support rollers shall be provided in the machine and tank for smooth movement.	Vendor to provide details		
3.2.8	Local control desk: A local control desk with push buttons should be provided at a suitable location near the quench tank for operation of the fork, bogie and furnace door. In the desk, manual override facility should also be incorporated, so that in case of any problem in the automatic system, the movement can be effected in manual mode. The local control desk should be suitably interconnected with main panel.	Vendor to confirm and provide details about the controls that are available in the local desk.		
3.2.9	The fork shall be maintained free of oil / grease during quenching, so that DM water shall be maintained without mix-up of oil / grease.	Vendor to confirm and provide details		
3.2.9	All hydraulic components used shall be of Rexroth / Vickers make only.	Vendor to confirm and provide details		
3.2.10	Hydraulic seals shall be of Parker / Busak Shamban / Hunger / Merkel make only.	Vendor to confirm and provide details		
3.2.11	First fill of Hydraulic & Lubrication oil is under vendor scope. Preferably, these oils shall be of IOCL make.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
4.0	SAFETY ARRANGEMENTS: Following safety features in addition to standard safety features should be provided on the machine:			
4.1	Furnace should have adequate and reliable safety interlocks/devices to avoid damage to the furnace, work piece and the operator due to the malfunctioning or mistakes. Furnace functions should be continuously monitored and alarm/warning indications through lights/alarm number with messages on panel should be available. Detail list of interlocks to be submitted.	Vendor to provide details		
4.2	A detailed list of all alarms / indications provided should be submitted by the Vendor.	Vendor to provide details		
4.3	All the pipes, cables etc. should be well supported and protected.	Vendor to provide details		
4.4	Blower impellers should be statically & dynamically balanced to avoid undue vibrations and suitably guarded.	Vendor to provide details		
4.5	Emergency switches should be provided at suitable locations	Vendor to provide details		
4.6	Adequate Nos. of Gas leak detector to be provided to cover critical gas leak zones. The system should have independent control with alarm. Preferred make: Oldham.	Vendor to provide details with no. of detectors.		
4.7	Vendor to provide the test certificate with LPG sample for LEL as per standard for leak detector. Functional test with same sample to be done after commissioning of the instruments at site. Supply of standard sample gas is under vendor's scope.	Vendor to provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
4.8	The furnace heating operation is interlocked with the door operation so that burner firing cannot be started unless the door is closed.	Vendor to provide details		
4.9	The charge machine can be taken IN or OUT only when the door is UP and Bogie in required position.	Vendor to confirm		
4.10	All motor feeders in the switch gear panel are provided with short circuit and overload protection	Vendor to provide details		
5.0	LEVELLING & ANCHORING SYSTEM			
5.1	Complete anchoring system including foundation bolts, anchoring materials, levelling shoes, rails, wedges, etc. for the entire system should be supplied by the vendor.	Vendor to provide details		
6.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE:			
6.1	Vendor shall bring special tools required for erection & commissioning of the Furnace. Two sets of all Tools like Torque Wrench, Keys, Spanners, Grease Guns etc. for Furnace operation & maintenance, shall be supplied along with the furnace. Vendor to provide the list of such tools along with offer.	Vendor to confirm and provide details.		
7.0	INSTRUMENTATION & CONTROL SYSTEM:			
	Automatic Zone Temperature Control with Programming of Heat Treatment Cycle.			
7.1	All controls will be located in a Control Room adjacent to the furnace. BHEL will construct the Control room based on inputs to be provided by the vendor	Vendor to provide details		
7.2	Furnace temperature control for all zones Auto/Manual with PID tuning. Preferred Make: Yokogawa, Honeywell, Eurotherm	Vendor to provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
7.3	Furnace over temperature control for all Zones to be made available at control panel.	Vendor to provide details		
7.4	Vendor to offer temperature control for individual zones with inbuilt error message indication type burner sequential controller for individual burners. Preferred Make: Esapyonics, Honeywell, Kromschroder. (Complete details should be provided along with the offer).	Vendor to provide details		
7.5	Zonal Thermocouples: "R" type Thermocouples – Duplex type for zone & Safety Thermocouples and min. 8 Nos. Simplex type for job thermocouples with necessary compensating cables to be provided and suitable recorder with required measuring points to be supplied.	Vendor to provide details with No. of thermocouples.		
7.6	Compensating cables suitable for 'R' type thermocouples from job thermocouples to the Temperature recorder to be wired from the control panel to 4 locations of each side wall of the furnace for material temperature measurements. Holes for thermocouples to be provided in between the burners at suitable locations approved by BHEL. Similar compensating cables should be supplied for all the duplex thermocouples also from the individual thermocouple to the zonal temperature/ safety controllers. Supply of suitable length of compensating cables is vendor's scope.	Vendor to provide details		
7.7	Pressure switches for gas, air and control elements.	Vendor to provide details		
7.8	Furnace differential pressure transmitters and control elements	Vendor to provide details		
7.9	Instruments cables and compensating cables	Vendor to provide details		
7.10	Piping for air, LPG and pneumatics.	Vendor to provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
7.11	Junction boxes (Flame proof)	Vendor to provide details		
7.12	Any other requirement to complete the system	Vendor to provide details		
7.13	Possibility of over viewing the status in the control room.	Vendor to Confirm		
7.14	For excess temperature control of respective zone, it should be possible to set the limit value of each zone in the Control panel. In case any zonal temperature overshoots the maximum set value; it should control all safety systems along with raising audio visual alarm.	Vendor to Confirm and provide details		
7.15	Alarm annunciation	Vendor to Confirm and provide details		
7.16	Gas flow measuring system: Orifice type volumetric flow measurement with totalizer to be indicated in the control panel	Vendor to Confirm and provide details		
7.17	Safety system and alarm indication required are to be indicated.	Vendor to Confirm and provide details		
7.18	Separate panels should be provided for instruments and Burner sequence controller. Separate Control transformer (415V/230V) should be provided for the Instrumentation panel.	Vendor to Confirm and provide details		
7.19	PI Diagram, schematic circuit diagram for instruments control system to be submitted along with offer	Vendor to Confirm and provide details		
7.20	Suitable UPS to be supplied by vendor for recording temperature for minimum 30 minutes in case of power failure	Vendor to Confirm and provide details		
7.21	Required Motor Control Centres shall be provided for control of all fans and blowers (This point should be separated from instrumentation and control)	Vendor to Confirm and provide details		
7.22	Burner purge cycles with adequate purging time for safe operation shall be provided.	Vendor to Confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
7.23	Manual Gas Shut Off Valve shall be provided apart from the safety shutoff valve in the gas train.	Vendor to Confirm and provide details		
7.24	Local push button Control Station shall be provided near the furnace for all manual operations of bogie/ door/ fork lift movement. The control desk should be so placed that the operator can see the door, bogie and fork lift while operating them using the desk buttons.	Vendor to Confirm and provide details		
7.25	Maintenance platform at suitable height for instrumentation to be provided in the furnace wall.	Vendor to Confirm and provide details		
7.26	All the control cables and signal cables should be routed suitably to protect them from interferences from power supply cables.	Vendor to Confirm		
7.27	Human Machine Interface: A PC based human machine interface panel should be provided in the control room. It should be equipped with the following features:	Vendor to Confirm		
7.27.1	The PC with 21" monitor should be supplied along with licensed version of Windows-7 software and all other necessary software's.	Vendor to confirm and provide details		
7.27.2	The PC should be used to display and store the temperature chart (different colour for different thermocouple) of the heat treatment cycle in portable and printable (such as PDF) format. Suitable interface for this purpose should be provided along with the system. It should have sufficient memory to store charts of at least 100 heat treatment cycles.	Vendor to confirm and provide details		
7.27.3	The PC unit should have sufficient provision to upload/ download the programs to/ from the zonal temperature controllers.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
7.28	There should be a provision to log and store the time taken by the system to complete the quenching of the job after heat treatment. This should be logged and stored in a separate individual file (not along with the temperature chart). Facility of recording the electrical energy consumption and LPG consumption per cycle should also be provided.	Vendor to confirm and provide details		
7.29	Temperature of DM water in quench tank to be displayed in PC display.	Vendor to confirm		
7.30	Provision to be made in the system to oversee and control the individual burners from the PC.	Vendor to confirm		
7.31	In the PC, fault annunciation page and alarm logging facility should be incorporated.	Vendor to confirm		
7.32	Instruments Calibration: Calibration certificates to be provided for process value measuring instruments, Transmitters, Thermocouples and compensating cables. Test certificates required for Pressure switches and solenoid valves, etc. are to be provided at the time of inspection of the furnace at vendor works. Vendor has to carry out re-calibration for the pressure transmitters at BHEL site during commissioning. Vendor to provide the Calibration certificate and test certificate from reputed labs at the time of inspection.	Vendor to Confirm and provide details		
7.33	Ignition & Flame Supervision: Spark igniter of high voltage type (H.V) to be used. The flame monitoring system to be with U.V. scanner for its reliability. UV scanner must be provided with suitable air cooling. The flame supervision circuit is linked to the gas solenoid valve for each burner.	Vendor to Confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
8.0	ELECTRICAL			
8.1	Tropicalization: All electrical / electronic equipment shall be tropicalized.	Vendor to confirm		
8.2	All Electric enclosures shall have IP 54 protection	Vendor to confirm		
8.3	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to provide details		
8.4	a) 415V with fluctuation of +/- 10%, 50HZ +/-3 %, 3 Phase AC power supply will be provided by BHEL at a single point near the furnace in the control room, as per layout recommended by Vendor. b) All cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the equipment/control cabinets, shall be the responsibility of vendor. c) Requirement of grounding/earthling with required material details should be informed by vendor well in advance so that it could be incorporated during construction of foundation.	Vendor to provide details		
8.5	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220 Volts, 5/15 Amp AC. All adapters / receptacles should have compatibility with Indian equivalents.	Vendor to provide details		
8.6	Motors & other electrical components (except brake motors) shall conform to IEC or Indian standards and shall confirm to energy efficiency of minimum Eff-1 standard.	Vendor to provide details		
8.7	All cables moving with traversing axes should be installed in caterpillar / Drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	Vendor to provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
8.8	Vendor should ensure the proper earthing for the furnace and its peripherals.	Vendor to provide details		
8.9	Laying and end termination of all cables (power cable, signal cable etc.) should be in vendor's scope. All the materials pertaining to the same is under vendor's scope.			
8.10	Vendor to install suitable energy meter for total electricity consumption for the furnace along with quenching system.	Vendor to provide details		
8.11	All the motors and electrical and instrumentation panels should be provided with double earthing. A lightning arrester should be provided for the existing chimney with proper insulation at suitable intervals. A separate earth pit should be provided for the lightning arrester by the vendor.	Vendor to provide details		
9.0	SPARES			
9.1	Itemized breakup of mechanical, Hydraulic, Pneumatic, electrical, electronic, instrumentation and Refractory spares used on the furnace in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis should be offered by vendor, the list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered)	Vendor to Confirm and provide details		
9.1.1	Mechanical & Pneumatic Spares: All types of Valves, filters, Pressure Switches, Transducers, Flow Switches, actuators etc.	Vendor to Confirm and provide details		
9.1.2	Electrical / Electronic: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor fuses, Special Fuses, Circuit Breakers, Main Power Switch, spars for Field Sensors etc.	Vendor to Confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS																																																			
9.2	Vendor to confirm that complete list of spares for machine and accessories, along with item part no / specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine.	Vendor to Confirm and provide details																																																					
9.3	Following spares are to be supplied along with furnace. The price for the same to be included in the cost of main supply. <table> <tr> <th>SNo.</th> <th>ITEM</th> <th>Qty.</th> </tr> <tr> <td>1.</td> <td>Air solenoid valve: 50% of total quantity used in the system (min. 1 no.) in each type.</td> <td></td> </tr> <tr> <td>2.</td> <td>Gas Solenoid Valve: 50% of total quantity used in the system (min. 1 no.) in each type.</td> <td></td> </tr> <tr> <td>3.</td> <td>Gas Regulator: 1 No.</td> <td></td> </tr> <tr> <td>4.</td> <td>Filter element for gas filter: 2 Nos.</td> <td></td> </tr> <tr> <td>5.</td> <td>UV Flame Detector: 50% of total quantity used in the system.</td> <td></td> </tr> <tr> <td>6.</td> <td>Thermocouple-duplex (for Zone): 8 Nos</td> <td></td> </tr> <tr> <td>7.</td> <td>Thermocouple-simplex (for Job): 16 Nos</td> <td></td> </tr> <tr> <td>8.</td> <td>DP transmitter for gas: 50% of total quantity used in the system (min. 1 no.) in each type.</td> <td></td> </tr> <tr> <td>9.</td> <td>DP transmitter for air: 50% of total quantity used in the system (min. 1 no.) in each type.</td> <td></td> </tr> <tr> <td>10.</td> <td>Pressure switch for gas: 50% of total quantity used in the system (min. 1 no.) in each type.</td> <td></td> </tr> <tr> <td>11.</td> <td>Pressure switch for air: 50% of total quantity used in the system (min. 1 no.) in each type.</td> <td></td> </tr> <tr> <td>12.</td> <td>Furnace Pressure transmitter: 1 No</td> <td></td> </tr> <tr> <td>13.</td> <td>Pulse firing Rack with power supply unit: 2 Nos.</td> <td></td> </tr> <tr> <td>14.</td> <td>Push button: 50% (min. 1 no.) of each variety</td> <td></td> </tr> <tr> <td>15.</td> <td>Relays: 30% (min. 1 no.) of each variety</td> <td></td> </tr> <tr> <td>16.</td> <td>Indication lamp: 30% (min. 1 no.) of each variety</td> <td></td> </tr> </table>	SNo.	ITEM	Qty.	1.	Air solenoid valve: 50% of total quantity used in the system (min. 1 no.) in each type.		2.	Gas Solenoid Valve: 50% of total quantity used in the system (min. 1 no.) in each type.		3.	Gas Regulator: 1 No.		4.	Filter element for gas filter: 2 Nos.		5.	UV Flame Detector: 50% of total quantity used in the system.		6.	Thermocouple-duplex (for Zone): 8 Nos		7.	Thermocouple-simplex (for Job): 16 Nos		8.	DP transmitter for gas: 50% of total quantity used in the system (min. 1 no.) in each type.		9.	DP transmitter for air: 50% of total quantity used in the system (min. 1 no.) in each type.		10.	Pressure switch for gas: 50% of total quantity used in the system (min. 1 no.) in each type.		11.	Pressure switch for air: 50% of total quantity used in the system (min. 1 no.) in each type.		12.	Furnace Pressure transmitter: 1 No		13.	Pulse firing Rack with power supply unit: 2 Nos.		14.	Push button: 50% (min. 1 no.) of each variety		15.	Relays: 30% (min. 1 no.) of each variety		16.	Indication lamp: 30% (min. 1 no.) of each variety		Vendor to Confirm		
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PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
	17. Limit switches: 50% (min. 1 no.) of each variety 18. Contactors: 30% (min. 1 no.) of each variety 19. Fuse: 40% (min. 1 no.) of each variety 20. Self-recuperative Burner Assembly: 50% of total quantity in each type used in the system. 21. Burner sequential controller: 50% of total quantity in each type used in the system. 22. Excess temp controller: 1 No 24. Hydraulic / Lubrication / Pneumatic Hoses: 50% of total quantity in each type used in the system (min. 1 no.). 25. FD Fan filter element: 2 Nos. 26. DP transmitter for LPG flow measurement: 1 No 27. LPG flow totalizer: 1 No 28. Timers: 1 No. in each type. 29. Emergency Switch: 6 Nos. 30. Ignition transformer: 4 Nos. 31. Heat resist. HT cable for ignition transformer: 6 Nos. 32. Hydraulic Valves: 1 Set (1 no. in each type) 33. Seal kit for Hydraulic cylinders (all types): 2 Sets. 34. Seal Kit for Pneumatic cylinders: 2 Sets. 35. Bogie Drive Motor: 1 No. 36. Spares for DM water Plant: 1 Set. 37. All type of Castings: 20% (min. 1 no.) of total quantity in each type used in the furnace. 38. All type of shaped Refractory Bricks: 30% (min. 1 no.) of total quantity in each type used in the furnace.			

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SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
10.0	DOCUMENTATION Five sets of following documents (Hard Copies) in English shall be supplied along with Furnace Materials . Note: One set of all the documents (hardcopy and softcopy in Pen drive) to be submitted to the BHEL inspector at the time of inspection at vendor's works to check the sufficiency of documents.	Vendor to Confirm and provide details		
10.1	Operating & Maintenance Manuals of Furnace & Quenching system. The O&M Manual should contain the following:	Vendor to confirm		
10.1.1	GA Drawing of the Furnace	Vendor to confirm		
10.1.2	GA Drawing of Individual Mechanisms.	Vendor to confirm		
10.1.3	Sub-Assembly Drawings for all sub-systems with exploded views and Bill of Materials giving specification, make, part No., Qty. used, etc. for maintenance purpose	Vendor to confirm		
10.1.4	Dimensional Sketches (plan, front and side view) of the entire panel and detailed view of position and layout of controls, display and other man machine interface will be submitted for ergonomics	Vendor to confirm		
10.1.5	Overall lay-out and Foundation drawing with load details.			
10.1.6	P&I Diagram with pipe size, pressure, flow and complete Bill of materials, specification of components and make.	Vendor to confirm		
10.1.7	Furnace control and burner control circuits with termination drawing	Vendor to confirm		
10.1.8	Furnace Operation Procedure for start-up purging, shutdown, Power failure interruption, Gas fluctuation condition, etc. with all safety instructions.	Vendor to confirm		
10.1.9	Furnace commissioning data	Vendor to confirm		
10.1.10	Calibration certificates for all the Panel instruments, Transmitters, Thermocouples and test certificates for Pressure switches, and modulating motors and cables	Vendor to confirm		
10.1.11	Electrical Wiring Drawings – Power & Control Circuits	Vendor to confirm		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
10.1.12	Hydraulic and Pneumatic Circuit Diagram with BoM giving the complete specification, model no., make and quantity of items used.	Vendor to confirm		
10.1.13	Engineering manual for the controller	Vendor to confirm		
10.1.14	Backup program with necessary Licensed software, communication module to up load / down load the program for the controller to be provided. In case of program corruption, provisions should be made to upload the program back to the controller.	Vendor to confirm		
10.1.15	Trouble Shooting Chart for Main and all Sub-Systems	Vendor to confirm		
10.1.16	O&M Manual with complete details & drawings for DM water Plant. The detail shall include specification, make and quantity of items used.			
10.1.17	Catalogues, O&M Manuals and engineering manuals of all bought out items including drawings, wherever applicable.	Vendor to confirm		
10.1.18	The vendor shall submit complete Master List of spare parts used in the furnace along with item part/model number/ compete technical specification, name and address of the spare supplier	Vendor to confirm		
10.1.19	Two additional sets of all the above documentation on CD & Pen Drive.	Vendor to confirm		
10.2	The vendor is required to submit the following documents positively along with the offer for Technical evaluation: 1. General Arrangement Drawing with major and critical dimensions. 2. Drive arrangement Drawings for Bogies and Door with list of Bought out Items (including make) 3. P&I Diagram with Bill of Materials and schematic circuit diagram for instruments control system. 4. Electrical Circuit with Bill of Materials.	Vendor to confirm		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
	5. Refractory arrangement drawing. 6. Casting arrangement drawing. 7. Heat Load / balance calculations with selection of burners, blowers, insulation materials, etc. 8. Sand sealing arrangement Drawings. 9. Schematic diagram showing the layout of the furnace & associated systems with critical and major dimensions. 10. Gas Train components – make and arrangements. 11. Quenching system - GA drawings with BoM. 12. Quenching system - Hydraulic & Pneumatic Circuit as applicable with BOM. 13. Quenching system - Time calculation sheet for quenching. 14. List of all general and special tools for Furnace operation & maintenance. 15. Quality Plan 16. Details of DM water Plant and 17. Erection Schedule with terms and conditions for erection and commissioning.			
10.3	The vendor is required to submit the following documents for verification / approval by BHEL after placement of Order (The BoM for each drawing should provide the details like specification, Model No., make and quantity): 1. General Arrangement Drawing with major and critical dimensions. 2. Drive arrangement Drawings for Bogies and Door with list of Bought out Items (including make) 3. P&I Diagram with Bill of Materials and schematic circuit diagram for instruments control system. 4. Electrical Circuit with Bill of Materials. 5. Refractory arrangement drawing. 6. Casting arrangement drawing.	Vendor to confirm		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
	7. Heat Load / balance calculations with selection of burners, blowers, insulation materials, etc. 8. Sand sealing arrangement Drawings. 9. Gas Train components – make and arrangements. 10. Quenching system - GA drawings with BoM. 11. Quenching system - Hydraulic & Pneumatic Circuit as applicable with BOM. 12. Quenching system - Time calculation sheet for quenching. 13. List of all general and special tools for Furnace operation & maintenance. 14. Quality Plan 15. Details of DM water Plant and 16. Erection Schedule with terms and conditions for erection and commissioning.			
11.0	FOUNDATION			
11.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Purchase order. The layout should consist of all requirements pertaining to complete furnace including space requirement for Control Room, Blowers, quench tank, DM plant, Charge Handling system, Rails etc. Vendor shall furnish the foundation layout and static and dynamic load details within 2 months from the date of Purchase order. BHEL shall design and construct complete foundation for the furnace as per the Vendor's recommendation.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
12.0	FURNACE INSPECTION & ACCEPTANCE			
12.1	The furnace materials and bought-out items shall be offered for inspection to BHEL for completeness of supply at supplier's works prior to dispatch	Vendor to confirm and provide details		
12.2	Vendor to offer the Blowers for inspection by BHEL at manufacturer's works and complete testing to be done in front of BHEL engineer to prove out the critical parameters of blowers as stated in clause 2.4.27.	Vendor to confirm		
12.3	The furnace shall be tested by the vendor for its performance prove-out as per BHEL Specifications, at BHEL after erection & commissioning.	Vendor to confirm and provide details		
13.0	PACKING			
13.1	Rigid packing for items like fans, blowers, drives, electric / electronic panels and controls and such other items susceptible to damage during transit.	Vendor to confirm		
14.0	ERECTION & COMMISSIONING			
14.1	Vendor to take full responsibility for carrying out the erection, start up, testing & commissioning of the furnace & its control & all types of other supplied equipment. The Vendor shall arrange manpower & tools for the same	Vendor to confirm and provide details		
14.2	Service requirement like power, air & water shall be provided by BHEL at only one point as indicated earlier, free of cost. Fabrication consumables like electrode at site is in the scope of vendor. Facilities for Material handling and lifting during erection at site like cranes to be arranged by the vendor, as there is no EOT crane available in the site.	Vendor to confirm and provide details		
14.3	Successful proving of BHEL components by the Vendor shall be considered as part of commissioning. All tests, as mentioned in clause 12.0 (Furnace Acceptance) shall from part of the commissioning activity.	Vendor to confirm and provide details		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
14.4	The Vendor should bring tools, Tackles and other necessary test equipment required to carry out all above activities.	Vendor to confirm and provide details		
14.5	The Vendor shall bring commissioning spares required for commissioning of the machine.	Vendor to confirm and provide details		
14.6	Vendor to deploy sufficient no. of skilled manpower including one Supervising Engineer for erection & Commissioning, so as to complete the E&C as per committed and approved Schedule without delay.	Vendor to confirm and provide details		
15.0	PAINTING			
15.1	For Furnace, Bogies & Quench fork mechanism Primer painting: One coat of primer painting at vendor's works and one coat of primer after erection	Vendor to confirm		
15.2	Final painting: 1. Vendor to paint the complete furnace chamber, bogie, parts of chimney, etc with two coats of heat resistant Al paint (of grade 250 deg C). 2. The entire flue path with 2 coats of heat resistant Al paint (of grade 400 deg. C). 3. Quench Fork mechanism to be painted with 2 coats of Yellow / Orange paint with black strips. 4. All new fabricated items to be painted after 1 coating of primer paint	Vendor to confirm		
15.3	For Fans, Control Panel and Hydraulic Power pack: Two coats of IS 281 Synthetic Enamel Apple Green / Smoke grey Colour Paint.	Vendor to confirm		
15.4	Air & Gas Pipelines: Two coats of White & Yellow colour synthetic enamel paint or as per instructions of BHEL and with indication of direction of flow marked at suitable intervals	Vendor to confirm		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY

SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
16.0	TRAINING			
16.1	The Vendor shall impart training to BHEL's Operators and Maintenance crew in Operation and Maintenance (Mechanical, Electrical / Electronics and Control system) after the commissioning of the Machine at BHEL works for not less than 15 working days	Vendor to confirm		
17.0	GUARANTEE			
17.1	12 months from the date of commissioning and acceptance at BHEL works or 18 months from the date of supply whichever is earlier.	Vendor to confirm		
18.0	GENERAL			
18.1	Furnace Model No.	Vendor to specify		
18.2	Total connected Load in kW	Vendor to specify		
18.3	Floor area required (Length, Width, Height) for complete machine & accessories.	Vendor to specify		
18.4	Total weight of the furnace (with tentative weight for individual assemblies / modules)	Vendor to specify		
19.0	GENERAL TERMS			
19.1	The BIDDER shall submit the offer in TWO PARTS. 1. Technical Offer [with PART A & PART B] & Commercial Offer [without Price Portion] and 2. Price Bid.	Vendor to confirm		
19.2	The Technical Offer shall contain a comparative statement of Technical Specifications listed by BHEL and the Offer Details submitted by the Bidder, against each clause. IMPORTANT: A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement where specific details are required, may lead to disqualification of the Technical Offer without any notice from BHEL.	Vendor to confirm		

PART B: SOLUTION HEAT TREATMENT LPG FURNACE (CAPACITY: 12 TON) WITH QUENCHING FACILITY				
SL.NO.	DESCRIPTION	PARAMETERS	BIDDER'S OFFER	DEVIATION REMARKS
19.3	The Technical Offer shall be supported by Product Catalogues & Data Sheets and also technical details of Bought-Out-Items with copies of Product Catalogue to the extent possible.	Vendor to confirm		
19.4	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply & Work at BHEL Site and the Un-Priced Part of the Price-Bid, for the confirmation of the above.	Vendor to confirm		
19.5	DELIVERY - The bidder shall quote the best possible delivery. However, the delivery shall not exceed TEN months. The Delivery Period includes the process of seeking approval by BHEL for the General Arrangement Drawing for the Total Furnace and the Specifications/makes of the Bought-Out Items. The delivery period shall be reckoned from date of release of LOI/Purchase Order to dispatch of last item from the Bidder's / Sub-vendor's Works.	Vendor to confirm		

ENCLOSURES: **ANNEXURE - A: Performance Format**

ANNEXURE – B: BHEL Proposed Lay out and

Drawing. No. 3-M-18B-16-14957: Charge Support Pedestal

ANNEXURE-A

PERFORMANCE CERTIFICATE

The performance certificate should be produced **on Customer's Letter Head.**

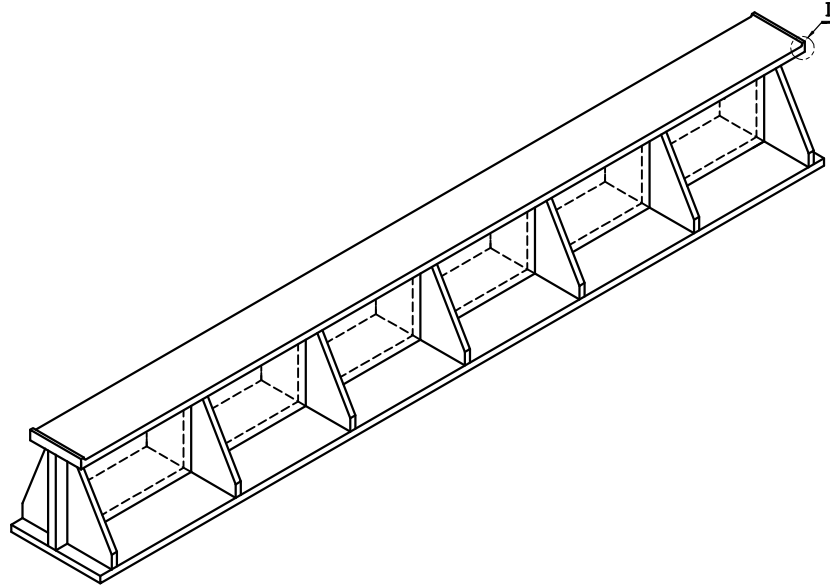
1. Supplier of the FURNACE	
2. Make & Model of the FURNACE	
3. Month & Year of Commissioning	
4. Application for which FURNACE is deployed / used	
5. FURNACE SPECIFICATIONS: a) Length b) Width c) Vertical Clearance d) Operating Temperature e) Charge Carrying Capacity f) Fuel g) Total Connected Load in kVA	
6. Quench Fork Mechanism: a) Load carrying Capacity b) Tank Capacity c) Type of Drive d) Forward Stroke Length e) Vertical Stroke Length f) Total Connected Load in kVA	
7. Performance of the FURNACE (Strike off whichever is not applicable)	Satisfactory / Good / Average / Not Satisfactory
8. Performance of the QUENCH MECHANISM (Strike off whichever is not applicable)	Satisfactory / Good / Average / Not Satisfactory
9. After Sales Service rendered by the Furnace Supplier - OEM (including SUB-VENDORS)	Satisfactory / Good / Average / Not Satisfactory
10. Any Other Special Remarks	
Date:	Signature & Seal of the Issuing Authority

BHEL Enq. No. 2601700048

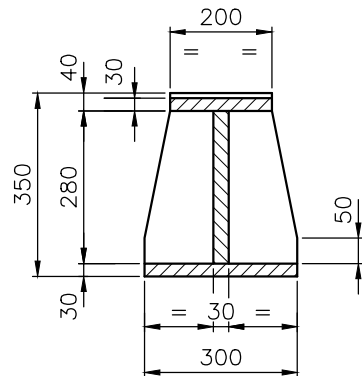
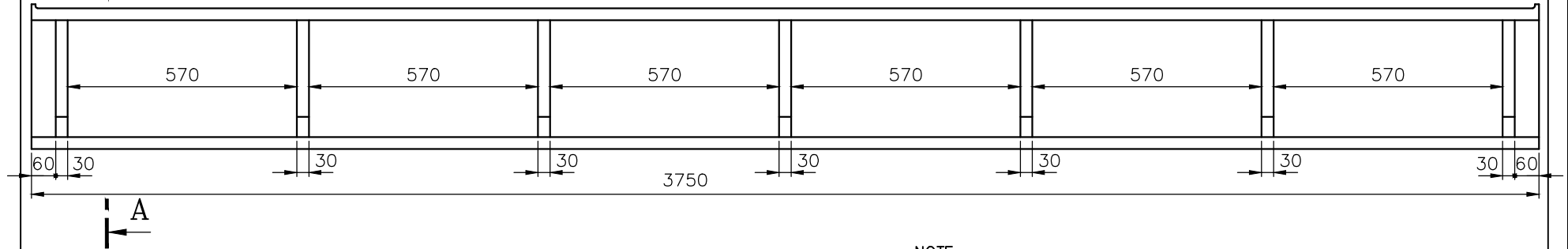
CAUTION: THIS DRAWING IS OUR SOLE PROPERTY AND SHOULD NOT BE USED IN ANY FORM FOR ANY PURPOSE WITHOUT THE WRITTEN PERMISSION OF BHARAT HEAVY ELECTRICALS LIMITED TRICHIRAPPALLI - 620 014.

ALL DIMENSIONS ARE IN MM

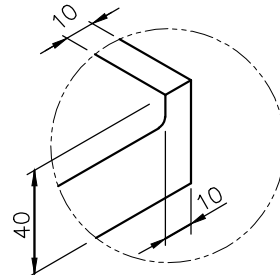
BHEL enq. No.2601700048



FOR TENDERING PURPOSE ONLY



SECTION-AA



DETAIL-D

NOTE:-

FINAL DRG. TO BE SUBMITTED BY SUPPLIER FOR BHEL APPROVAL

* HEAT RESISTANT STEEL CASTING

SHARP CORNERS TO BE REMOVED

		* IS: 4522 GR.11		808.32		
No. of Pieces	DESCRIPTION	MATERIAL	STANDARD	NET.WT.IN KGS.	DRAWING No.	ITEM No.
	REFERENCE: REF.DRG.NO. FB-100005-2		ALTERATIONS:	DCN REF	DATE	SIGN.
SCALE	DRN/TCO: S.Selvamanickam					
1:10	CHED. R.Ramamoorthy					
1:2	APPD. C.S.Jayasheelan					
	DATE 01.08.12					
MACHINE: GAS FIRED DOUBLE ENDED BOGIE HEARTH FURNACE			TYPE: WESMAN 70T			
TITLE: PEDESTAL (JOB SUPPORT)			DRAWING No: 3M18B1614957			
			Sheet No: No. of Sheets:			