

Heavy Power Equipment Plant Bharat Heavy Electricals Limited, Ramachandrapuram - 502032, Andhra Pradesh, INDIA.	Enquiry No. & Dt.:	
	Due Date :	
	Supplier's Ref.:	
	Date :	

Specification cum Compliance Certificate for Electric Oven

Note:-

1. The Column " VENDOR'S OFFER WITH TECHNICAL DETAILS & REMARKS" of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.

2. The offer and all documents enclosed with offer should be in English language only.

Name & Address of the Supplier:	Name & Address of the Indian Agent:
Telephone No.	Telephone No.
Fax No.	Fax No.
e-mail :	e-mail :

Scope: Supply, Erection & Commissioning of Electric Oven complying with specification as below.

Sl.No.	Description for BHEL Requirement		Vendor's offer with technical details & Remarks	
1.0	Purpose:			
1.1	The Electric Heating oven/ furnace shall be used for heating of gas turbine wheels for sizes upto frame 9FA.	Vendor to Note		
1.2	The maximum heating up temperature of components shall be approximately 200°C.	Vendor to Confirm		
1.3	The heating oven is to be designed to take a payload of 15 tons capacity which is provided with wire rope slings and sheave pulleys for trolley movement in shop floor by shop floor crane.	Vendor to Confirm		
2.0	SPECIFICATION:			
2.1	Chamber Length - 2650 mm (Minimum)	Vendor to Confirm		
2.2	Chamber Width - 2650 mm (Minimum)	Vendor to Confirm		
2.3	Chamber Height - 1800 mm (Minimum)	Vendor to Confirm		
2.4	Maximum Loading - 15000 kgs.	Vendor to Confirm		
2.5	Type of loading - Horizontal (Front loader)	Vendor to Confirm		
2.6	Heating Capacity	Vendor to inform		
2.7	Operating Temperature - 200°C (max)	Vendor to Confirm		
2.8	Power Supply - 3 phase, 415 V, 50 Hz AC	Vendor to Confirm		
3.0	EQUIPMENT CONFIGURATION :			
	Electrical Heating Oven shall consist of an autoclave. The autoclave is loaded / unloaded by manual trolley.	Vendor to Confirm		
3.1	SHELL :			

SI.No.	Description for BHEL Requirement		Vendor's offer with technical details & Remarks	
	<p>The oven is fabricated as three walled chamber. Outer wall, middle wall and inner wall shall be made out of not less than 2mm thick MS Plate of IS 2062 grade. Suitable stiffeners are provided to have a rigid structure. Heavy duty angles are provided in between the outer and inner wall. Oven is designed for a working height of 650mm from the floor level.</p> <p>The oven is to be lagged by a suitable heat insulating material so as to keep the temperature in the neighbourhood of oven not to exceed 5°C over the ambient and finally covered with Aluminium cladding.</p>	Vendor to Confirm		
3.2	DOOR			
	Sliding type door driven by electro mechanical geared motor through sprocket and chain arrangement. Counter weight system is added in the door drive for easy movement. 4 Nos. manual tightening wheels are provided for locking the door.	Vendor to Confirm		
3.3	TROLLEY			
	The trolley of the oven is made of outer wall of 2mm thick and top of the trolley is made out of minimum 16mm thick MS Plate. Suitable angles and channel stiffeners are provided to withstand a load of 15000 Kgs. The trolley is fitted with 4 Nos. wheel allowed to run on rails (Rail gauge 1675mm). Bogie is driven by electro mechanical gear driven motor of suitable capacity through suitable arrangement.	Vendor to Confirm		
3.4	INSULATION			
	Oven will be insulated with 150mm thick rock wool slab. Insulation is stuffed in between outer wall and middle of the shell and inner wall and outer wall of both door and bogie.	Vendor to Confirm		
3.5	HEATING SYSTEM			
	Suitable heaters along the side wall of the oven shall be provided. Heaters shall be maintained from the top without entering into the oven. Air heaters are provided in between middle wall and inner wall of the oven.	Vendor to Confirm		
3.6	AIR CIRCULATION SYSTEM			
3.6.1	Suitable no. of air circulating fans are to be provided for rapid and equi-distribution of heat for thorough heating of charge inside the vessel. The air circulating fans are to be designed for operation at 200°C.	Vendor to Confirm		
3.6.2	Dry hot air entry and exit ports located suitably on the vessel for the supply of dry air for scavenging the humid air during heating phase. Alternate system to be provided for opening the door directly without dry hot	Vendor to Confirm		
3.6.3	All seals, gaskets, light fitting and wiring should be able to withstand variation of pressure and temperature.	Vendor to Confirm		
3.7	JOB LOADING METHOD			

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	The oven is capable of holding 3 Nos. turbine wheel one above the other with 100 mm spacer. (Spacer is not in scope)	Vendor to Confirm		
3.8	SEALING ARRANGEMENT			
	Bogie and the shell are provided with sand sealing arrangement to avoid leakage of heat between shell and bogie. Ceramic fiber ropes are provided along the periphery of the door to avoid leakage between shell and the door.	Vendor to Confirm		
3.9	CONTROL PANEL			
3.9.1	A dust proof electric control system will be provided with digital temperature indicator cum controller and temperature scanner. It shall be duly wired and ferruled as per Indian standard housing the following:	Vendor to Confirm		
3.9.2	All cables inside & outside of control panel shall be of copper conductor of suitable rating. The colour of control cable should be red and all cables for power shall be RED/Yellow/ Blue for phases and green for neutral.	Vendor to Confirm		
3.9.3	Micro Processor based PID temperature Controller – Make: Yokogawa or Eurotherm	Vendor to Confirm		
3.9.4	Safety temperature Controller – Make: Yokogawa or Eurotherm	Vendor to Confirm		
3.9.5	Two Channel scanner to display job temperature	Vendor to Confirm		
3.9.6	Temperature sensors : (1) Duplex RTDs for oven temperature control - 2 no's (2) Ø 6mm K- type Inconel MI Thermocouple of sufficient length for measuring job temperature - 2 no's	Vendor to Confirm		
3.9.7	Digital Voltmeter	Vendor to Confirm		
3.9.8	Digital Ammeter	Vendor to Confirm		
3.9.9	Selector switches	Vendor to Confirm		
3.9.10	Energy Meter	Vendor to Confirm		
3.9.11	Thyristor / IGBT	Vendor to Confirm		
3.9.12	Switch gears & Fuse gears – Suitable switch gears for heater circuit and main circuit	Vendor to Confirm		
3.9.13	Main Isolator - Indicating Lamps, Various switches, Push buttons etc.	Vendor to Confirm		
3.9.14	415V ± 10%, 50HZ ± 3 Hz, 3 Phase AC (4 wire system) Power Supply will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor.	Vendor to Confirm		
4.0	INTERLOCKS			
4.1	Interlock between heater circuit and fan motor circuit	Vendor to Confirm		

SI.No.	Description for BHEL Requirement		Vendor's offer with technical details & Remarks	
4.2	Interlock between trolley and door	Vendor to Confirm		
4.3	Interlock between heater circuit and trolley	Vendor to Confirm		
5.0	PAINTING			
	Oven outer shall be painted with suitable enamel paint (colour of your choice) after proper surface treatment, inner will be painted with heat resistant aluminium paint. Control panel will be Siemens grey colour powdercoated.	Vendor to Confirm		
6.0	INSTALLATION:			
	The oven is to be installed on our prepared foundation, details of which will be furnished by manufacturer. Suitable ladders and platforms should be provided to reach top of the vessel and various equipments fitted at height.	Vendor to Confirm		
7.0	ERECTION AND COMMISSIONING			
	The offer should include the charges for complete transportation, erection and commissioning of the furnace and ancillary equipments with duration. Supplier commissioning engineer's services should also be available at site for setting all controls while demonstrating the working of the plant.	Vendor to Confirm		
8.1	Pre Despatch Inspection: Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL at Suppliers works.			
8.2	Tests/ Activities/ Load test to be carried out at BHEL works while commissioning the machine			
8.2.1	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine .	Vendor to Confirm		
8.2.2	Training of BHEL personal in the area of operation, Safety and maintenance of complete equipment & accessories etc by the supplier's engineers during their stay at BHEL works.	Vendor to Confirm		
8.2.3	Proveout of the equipment			
8.2.3.1	Load test at full load shall be carried out for complete one cycle of processing of job and various parameter shall be checked like time taken to complete the cycle of processing.	Vendor to Confirm		
8.2.3.2	At no load with all the heaters (Power consumed by the oven) on the heating capacity of the oven as well as the time taken by the empty oven to reach a temperature of 200°C from ambient will be recorded.	Vendor to Confirm		
8.2.3.3	After this, the oven will be put under load test and the above two parameters as indicated above will again be noted and recorded.	Vendor to Confirm		
9.0	SPARES			

Sl.No.	Description for BHEL Requirement		Vendor's offer with technical details & Remarks	
9.1	Itemized breakup of spares required for the equipment in sufficient quantity as per the recommendation of vendor for 2 years of trouble free operation on three shift continuous running basis should be offered and supplied by vendor.(Unit price of each item of spare should be indicated seperately in the price bid).Vendor to submit the unpriced list with technical offer.	Vendor to Confirm		
9.2	Spares should include i) Duplex RTD - 1 no. ii) Ø 6mm K type Inconel MI Thermocouple - 2 no's iii) One set of heating elements iv) Heat proof cable - 500 meters, v) Door & Table movement up/down chain and sprocket - one set	Vendor to Confirm		
9.3	Spare should include - 1) Torque wrench suitable for machine parts, 2) Allen key mm & inch, 3) Spanners set - upto 36, 4) Ratchet spanner set with extension rod	Vendor to Confirm		
10.0	MISCELLANEOUS			
10.1	The offer should be descriptive and complete. Details of all equipments and accessories like vessel, door heating system, sealing arrangement, job loading and movement system with general arrangement drawings and catalogues to be enclosed with the offer. Offer without complete details are liable to be rejected.	Vendor to Confirm		
10.2	Firm should give breakup prices of all major items and activities.	Vendor to Confirm		
10.3	The following drawings and information are to be furnished along with the offer:	Vendor to Confirm		
10.3.1	Details and drawing of trolley, door supporting and sealing arrangement including door locking.	Vendor to Confirm		
10.3.2	Details of various controls (Electric/ Mechanical, Instrumentation, safety devices etc.)	Vendor to Confirm		
10.3.3	Electrical control and power schematic diagram	Vendor to Confirm		
10.3.4	Apart from the details in this specification, if anything else is required for its functioning, the same shall be specifically brought out and indicated.	Vendor to Confirm		
11.0	DOCUMENTATION			
	Three sets of following documents (Hard copies) in English language should be supplied along with the equipment.	Vendor to Confirm		
11.1.1	Operating manuals of the plant.	Vendor to Confirm		
11.1.2	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also. Part names on all drgs & circuit diagrams should be written in English only.	Vendor to Confirm		
11.1.3	Catalogues, O&M Manuals of all bought out items including drawings,wherever applicable.	Vendor to supply		
11.1.4	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to submit		
11.1.5	Detailed specification of all rubber items and hydraulic/lube fittings.	Vendor to Confirm		
12.0	QUALIFYING CONDITIONS			

Sl.No.	Description for BHEL Requirement		Vendor's offer with technical details & Remarks	
12.1	Only those vendor, who have supplied and commissioned at least two Electric Heating oven for similar application in the past ten years and such oven is presently working satisfactorily for more than one year (on the date of opening of the Tender) after commissioning should quote. The following information is to be submitted by the vendor about the companies where similar heating oven have been supplied.	Vendor to Confirm		
12.2	Name of the customer/ company where similar equipment is installed. (copy of purchase order to be furnished.)	Vendor to Confirm		
12.3	Complete postal address of the customer.	Vendor to Confirm		
12.4	Month & Year of commissioning	Vendor to Confirm		
12.5	Application for which heating oven vacuum is supplied with details of accuracies achieved on the job	Vendor to Confirm		
12.6	Name and designation of the contact person of the customer	Vendor to Confirm		
12.7	Phone/ Fax / Email address of the contact person of the customer	Vendor to Confirm		
12.8	performance certificate from the customer regarding satisfactory performance of the equipment supplied to them	Vendor to Confirm		
12.9	BHEL reserves the right to verify information submitted by vendor, in case the information is found to be false / incorrect, the offer shall be rejected.	Vendor to Confirm		
13.0	PACKING (To ensure receipt of items in good condition)	Vendor to specify details		
14.0	GUARANTEE :			
14.1	As per BHEL Terms and Conditions	Vendor to confirm		
14.2	Service beyond guarantee period	Vendor to confirm		
14.3	Supplier shall be responsible for service after sales of the equipment.	Vendor to confirm		