	BHARAT HEAVY ELECTRICAL LIMITED		**Enquiry No. :**	C/4300/7/3385T
	UNIT'S ADDRESS: **HEEP, RANIPUR** **HARIDWAR - 249403** **UTTARANCHAL, INDIA**		**Due Date :**	
			Supplier Qtn. No.:	
	CONTACT PERSON FROM PURCHASE DEPTT.: **NAME:** **DESIGNATION:** **PHONE NO.:** **E-MAIL:** **FAX NO. :**		**Date :**	

TECHNICAL SPECIFICATIONS CUM COMPLIANCE CERTIFICATION FOR " ELECTRICAL HEATED GAS NITRIDING FURNACE":

NOTE :-

1. Vendor(OEM) must submit complete information against clause at Sl.No.. 23.0 The offer, complying this clause, would only be considered.

2. The vendor(OEM) should fill the "Offered" Column in compliance to specified requirements and also "Deviations" Column, where there is deviation from the requirement. Duly filled specification cum compliance certificate should be 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.

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

	ADDRESS OF THE SUPPLIER :	**ADDRESS OF THE INDIAN AGENTS :**
	TELEPHONE NOS.:	**TELEPHONE NOS.:**
	FAX NOS.:	**FAX NOS.:**
	E-MAIL ADDRESS :	**E-MAIL ADDRESS :**

SCOPE: SUPPLY, ERECTION & COMMISSIONING OF ELECTRICAL HEATED PIT TYPE GAS NITRIDING FURNACE COMPLYING

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
1.0	**PURPOSE & BASIC FEATURES**				
1.1	**Purpose:** Electrically heated Sealed retort pit type furnace for gas nitriding furnace shall be used for gas nitriding of of alloy and creep steels such as mandrel,cover,threaded ring, pilot valves etc. using dissociated ammonia.Usable internal dimensions shall be Dia.1500mm.x2000mm depth,.suitable for handling gross charge load of 2000 kg(inclding fixtures) and 560°C operating temperature..	Vendor to note & accept			
1.2	**BASIC FEATURES: T**he furnace design is to be in accordance with up-to date standards and special care is to be taken to ensure ease of operation and maintenance, accuracy of heating, safety etc. The furnace is basically of a fabricated mild steel chamber with reinforcements and a lid.. Both the chamber and lid are suitably insulated with refractory bricks and ceramic fiber modules. The Furnace should have one recirculating Fan for temperature uniformity and gas circulation in the retort.	Vendor to note & accept			
2.0	**SPECIFICATIONS:**				
2.1	**TECHNICAL DATA**				
2.1.1	**Electrically heated pit type sealed furnace.**	Vendor to offer			
2.2	**. GENERAL PARAMETERS**				
2.2.1	Batch capacity (Gross Load including fixtures)	2000kg.			
2.2.2	Useful retort dimensions				
2.2.3	Depth	2000 mm			
2.2.4	Diameter	1500 mm			
2.2.5	Over all dimensions (Indicative)	Vendor to specify			
2.2.6	Depth	Vendor to specify			
2.2.7	Diameter	Vendor to specify			
2.2.8	Working Height	Vendor to specify			
2.2.9	Heating rate :200° C./hr. in full load.	Vendor to confirm			
2.2.10	Cooling Rate : max. 50 ° C / hr	Vendor to specify			
2.2.11	Maximum Temperature : 650 ° C	Vendor to specify			
2.2.12	Temperature Uniformity in the zone	± 5° C of set value			
2.2.13	Mode of Temperature control :Proportional through Thyristor controls	Vendor to specify.			
2.2.14	Make of Thyristor Controller Siemens / Eurotherm (preferably)	Vendor to specify			
2.2.15	Model of Thyristor controller	Vendor to specify			
2.2.16	No of control zones - 2 minimum	Vendor to specify			
2.2.17	Power rating, aprox. 120KW	Vendor to specify			
2.2.18	Furnace outer wall temperature : 40 ° C above ambient temperature (approx.)	Vendor to specify			
2.3	**MECHANICALS**				
2.3.1	Casing plate material & thickness : 5 mm (minimum)	Vendor to specify			
2.3.2	Retort material & thickness : 6 mm (minimum),AISI304 The retort shall have a dished bottom reinforced with strong ribs to support the charge weight.The retort shall have a suitable charge grid to support the charge fixture. The retort shall be supported on the furnace casing and the sealing between the furnace and the retort shall be by asbestos rope.	Vendor to confirm			
2.3.3	Gas guide cylinder ,one no. : AISI304, 6mm.	Vendor to confirm			
2.3.4	One no. centrifugal type recirculating fan,7KW.on the retort cover.The fan impeller and shaft shall be of AISI 304.	Vendor to confirm			
2.3.5	Insulation details :Furnace shall be provided with ceramic fibre modules of adequte thickness along with stainless steel skids and washer.Furnace hearth shall be lined with firebricks backed with insulating bricks.The hollow of the retort cover shall also be filled with ceramic fibre.	Vendor to specify			

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2.3.6	Retort cover details .Fabricated with mild steel plate in cold part and AISI304 ,6mm thick in the hot part.The hollow is to be filled with ceramic fibre.The retort cover fits into the retort and gas tight sealing is to be ensured by water cooled neoprene sealing with hand wheel locking arrangement.The retort cover shall carry the Recirculating Fan and its drive arrangements ,Gas inlet and outlet pipes , thermocouple insertion tube and suitable counter weighted release valve.The retort cover shall be hydraulic(working pressure should not exceed 100 bar) lifting type with manual swivel arrangement.(Air filter, regulator moisture separator and air dryer-if compressed air is required in the machine)	Vendor to confirm			
2.3.7	Heating elements- the furnace shall be provided with approx 120KW heating capacity with NiCr 80/20 heating elements. They shall be of strip type supported by special heater support arrangements.All the elements shall be controlled by programmable master programme controller overriding the zonal PID controllers through Thyristors.	Vendor to specify			
2.3.8	Atmosphere control. The furnace atmosphere sahll be dissociated ammonia and the flow shall be controlled through two separate control valves operated from the control panel. The first valve shall provide normal operating flow and the second shall provde additional flow for purging when required.The gas is to be introduced into the furnace from a single port just under the recirculating fan . One no. on-line system for flow measurement and dissociation measurement shall also be provided.The following instruments shall be provided for atmosphere control- 1. Two nos Ammonia flow meters. 2. Two nos Solenoid valves . 3. One no filter.4. Two nos Shut off valves.	Vendor to specify			
2.3.9	Furnace Temperature control system.The furnace shall be provided with programmable type master programmable controller which receives input from the retort cover themocouple and acordingly overrides the zonal slave PID controllers through the thermocouples in the furnace wall. The heater control shall be thyristorised .Excess temperature protection has to be provided.Temperature recording shall be through six point temperature recorder(see 3.4)	Vendor to specify			
3.0	**INSTRUMENTATION**				
3.1	Programmable temp. controller (Master) Duty : Temp.control of furnace . a) Type : P.I.D. Programmable, universal input b) Make : Eurotherm/Chino/Honeywell/Massibus c) Range : 0 – 1000 Deg. C. d) Input signal : Universal e) Display : Dual Display, 5 digits f) Input Power : 220 V AC through Isolation Transformer. g) Output Signal : 4 – 20 mA DC h) Accuracy : ± 0.1% FSD i) Control Accuracy : ±1% FSD j) Temp. Repeatability : ± 0.5 Deg.C k) Size : 96 X 96 mm l) Alarm setting : 02 m) Memory : EEPROM n) Ambient Temperature : 0 - 50 Deg.C o) Tuning : Auto Tuning p) Other features : Display of Heating/cooling curve & actual furnace temperature graphically,Minimum 10 Ramp/Sock programming and store option should be available.	Vendor to specify			
	q) Sensor break protection must be provide (upscale or downscale) r) Ethernet or RS 485 communicationto be provided. s) Qty : 02 Nos.				
3.2	Programmable temp. controller (Slave) Duty : Temp.control of furnace . a) Type : P.I.D. Programmable, universal input b) Make : Eurotherm 2704/ Chino/Honeywell/Massibus c) Range : 0 – 1000 Deg. C d) Loops : 03 d) Input signal : Universal e) Input Power : 220 V AC through Isolation Transformer. f) Other Features : 4 digits Dual Display, 96x96x200 mm, 2 Nos Alarm Settings, EEPROM Memory, Ambient Temp.: 0-500C, Auto Tuning, Minimum 10 Ramp/Sock programming and store option should be available. g) Accuracy : ± 0.1% FSD, Control Accuracy: ±1%FSD h) Output Signal : 4 – 20 mA DC i) Temp. Repeatability : ± 0.5 Deg. C	Vendor to specify			
	j) Cascade or 2 loops control option to be available k) Sensor break protection must be provide (upscale or downscale) l) Ethernet or RS 485 communicationto be provided. m) Qty : 02 Nos.				

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3.3	Over temperature controller Duty :Protection against over temp. a) Type : Digital solid state P.I.D. Programmable, b) Make : Eurotherm/ Chino/Honeywell/Massibus c) Range : 0 – 1000 Deg. C. d) Loops : 02 d) Input signal : Universal. e) Output Signal : On / Off (Relay, 5 Amps, 230 V AC) f) Accuracy : ± 0.1% FSD g) Control Accuracy : ±1Deg.C h) Temp. Repeatability : ± 0.5 Deg.C i) Size : 96 X 96 X 200 mm j) Display : Dual display 5 digit. k) Alarm setting : 02 l) Memory : EEPROM m) Ambient Temperature : 0 - 50 Deg.C. n) Qty : 02Nos.	Vendor to specify			
3.4	Temperature recorder Duty : Recording of process temp. a) Type : 6 Point Graphic Recorder (Paperless recorder Which producesreal time display, stores data on a flash memory card and sends data via ethernet to a remote PC for real time monitoring and display) b) Range : 0-1000 Deg. C c) Input signal : Universal field Programmable d) Input Power : 220V AC e) Duty : Continuous f) Make : Eurotherm / Chino/ Honeywell g) Response time : 100 ms h) No. of inputs : 06 i) Data Memory : Compact flash card of minimum 1 GB (Memory card to be supplied by party) j) Accuracy : ±0.1% k) LAN Network Capability : Inbuilt l) No. of Colour : Six different for all different inputs m) Data Screen : User Programmable-Real-Time Trends or Data Screen or Bar graph screen or Dual end screen etc n) Burn Out : Up/Down o) Scale & Range : Field Selectable p) Power Supply : 230 Volt AC Qty : 02 Nos	Vendor to specify			
3.5	All the above instruments will be housed in an attractively finished sheet steel fabrication stand alone panel cubicle excepting the thermocouples which will be field mounted . The panel will be fully wired up internally	Vendor to specify			
4.0	**ELECTRICALS**				
4.1	The complete electricals will be designed for 415 V± 10%; 3 phase , 3 wire 50 Hz A.C.	Vendor to confirm			
4.2	**SCR Controller :** Zero fired thyristor controller with phase angle control to control heater power infinitely	Vendor to specify			
4.3	**Ammeter :** 2 (two)nos minimum . With selector switch for measuring line current . Make : AEPL /equivalent make.	Vendor to specify			
4.4	**Energy Meter:**1 (one) Energy meter to monitor power consumption.	Vendor to specify			
4.5	**Voltmeter :** 1 (one) no. with selector switch . Make AEPL /equivalent make	Vendor to specify			
4.6	**Motors forrecirculating fan drive :**TEFC, squirred cage induction motor, SI duty , class 'F' insulation with single phase preventor.	Vendor to specify HP and RPM of motor			
4.7	**Electrical panel:** One no. Mild steel fabrication separate electrical panel will house SCR controllers, Ammeter, Voltmeter, switches, inducting lamps,push buttoms etc.	Vendor to confirm			
4.8	**Cabling : To** provide all the power and control cabling except as stated under clause 7.3.	Vendor to confirm			
4.9	**Earthing :** Earthing of equipment will be done with GI/MS Flat/Wire and will be connected to existing earthing system.	Vendor to confirm			
5.0	**SAFETY INTERLOCKS :**				
5.1	Heating element cannot be switched ON unless the recirculating fan is ON and door is closed.	Vendor to confirm			
5.2	Heaters and circulating fan shall be put OFF in case either of them fails or the retort cover is open.	Vendor to confirm			
5.3	Door cannot be lifted unl;ess heating element is OFF.	Vendor to confirm			
5.5	All motors will be provided with thermal overload relays along with single phase preventor	Vendor to confirm			
5.6	Over temperature controller will switch OFF the heating element in case of failure of main controller	Vendor to confirm			
6.0	**ALARM COMMUNCIATION :** In the event of fault condition viz., over temperature or motor failure an audiovisual alarm communciation system comprising hooter and indicating lamps will activate	Vendor to confirm			
7.0	**SERVICES PROVIDED BY BHEL**				
7.1	Input Power Supply : 415 volt ± 10 % ; 50 Hz,. 3 phase, 3wire A.C.supply.	Vendor to accept & offer			
7.2	Compressed air at a pressure of 3 - 5 kg./cm2 gauge	Vendor to accept & offer			

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7.3	Termination of electric power cable to incoming of furnace controls's switch-gear panel from BHEL's terminating point .	Vendor to accept & offer			
8.00	**REQUIREMENT FOR ELECTRICAL EQUIPMENT**				
8.1	Power Supply will be provided by BHEL at a single point near the furnace, as per layout recommended by Vendor. All types of switches, cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets including Voltage Stabilizer, Isolation Transformer & Air Compressor etc. , shall be supplied by the vendor.	Vendor to accept & offer			
8.2	**Tropicalisation:** All electrical / electronic equipment shall be tropicalized.	Vendor to offer			
8.3	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor to offer			
8.4	All electrical components in the cabinets should be mounted on DIN Rail and should be of standard make such as Siemens , L&T etc.,.	Vendor to offer			
8.5	All electrical / electronic panels to be provided with adequate door locks. All electrical & electronic panels including operator's panel should have sufficient illumination and power receptacles/plug points of 220Volts, 5/15 Amp AC with on/off switch. All electrical adapters/receptacles, fittings, consumables etc. should be Indian or should have compatibility with Indian equivalents.	Vendor to offer			
8.6	All motors shall conform to IEC or Indian Standards	Vendor to offer			
8.7	Vendor should ensure the proper earthing for the machine and its peripherals/accessories. Any material requirement for the same should be informed with foundation design/drawings. The vendor can take earthing connection from the nearest column of the production shop.	Vendor to offer			
9.00	**SAFETY ARRANGEMENTS** Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to offer			
9.1	Furnace should have adequate and reliable safety interlocks / devices to avoid damage to the furnace, job loaded inside furnace and the operator due to the malfunctioning or mistakes. Furnace functions should be continuously monitored and alarm / warning indications through lights/ alarm on the control panel should be available.	Vendor to offer			
9.2	A detailed list of all alarms / indications provided on furnace system should be submitted by the supplier.	Vendor to submit			
9.3	All the rotating parts used on furnace should be statically & dynamically balanced to avoid undue vibrations & noise.	Vendor to confirm			
9.4	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to offer			
9.5	Oil & water pipe lines should not run with electrical cable in the same trench.	Vendor to offer			
10.0	**ENVIRONMENTAL PERFORMANCE OF THE MACHINE :** The Furnace system should conform to following factors related to environment :	Vendor to offer			
10.1	Maximum noise level shall be 85 dB(A) at normal load condition, 1 meter away from the furnace with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16, if required. Supplier to demonstrate compliance to noise level, if so required.	Vendor to confirm			
10.2	There shall not be any hazardous emissions from the furnace during operation and sealing should be gas tight to prevent leakage of Ammonia gas.	Vendor to confirm			
10.3	No hazardous chemicals shall be required to be used in the furnace.	Vendor to confirm			
10.4	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm			
10.5	Paint of the furnace should be oil / heat resistant and should not get peeled off and mixed up with oil.	Vendor to confirm			
11.0	**SPARES :**				
11.1	Itemised breakup of mechanical, hydraulic / pneumatic, electrical and electronic spares including heating elements used in 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. One no. retort and one no. cover must also be included in the list of spares. The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered)	Vendor to offer			
11.2	**Mechanical &Hydraulic / Pneumatic Spares :** Following Spares are to be offered.	Vendor to offer			
11.2.1	All types of filter inserts of disposable type (20 nos. each type)	Vendor to offer			
11.2.2	All types of hydraulic/ pneumatic valves, pressure switches and flow switches (1 no. of each type), hydraulic pump (1 no.), pressure regulator (1 no. each type) , dial gauges (1 no. each type) , Flow control valve(2 nos each type) , Oil seals for Piston cylinders(5 nos each type). Flow meter for Ammonia gas (2 nos) , Flow meter for water circulation (5 nos), Recirculating Fan (5 nos) , Retort cover sealing ring (10 nos) , Recirculating Fan shaft (2 nos) , Bearings (10 nos each type).	Vendor to offer			
11.2.3	All types of O-rings & Hydraulic/Pneumatic Hoses (1 set of each type)	Vendor to offer			
11.3	**Electrical /Electronic Spares :** Following Spares are to be offered.	Vendor to offer			
11.3.1	Relays (2 Nos each type)	Vendor to offer			

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11.3.2	Contactors (2 Nos each type)	Vendor to offer			
11.3.3	RTD temperature transmitter (1 No each type)	Vendor to offer			
11.3.4	Main Switch (1 Nos)	Vendor to offer			
11.3.5	Push Buttons (5 Nos each type)	Vendor to offer			
11.3.6	Indicating Lamps (10 Nos each type)	Vendor to offer			
11.3.7	Semiconductor Fuses (5 Nos each type)	Vendor to offer			
11.3.8	Special Fuses (5 Nos each type)	Vendor to offer			
11.3.9	Circuit Breakers (1 No each type)	Vendor to offer			
11.3.10	Thermocouple (2 nos each type) , Programmable temperature controller (1 no each type)	Vendor to offer			
11.3.16	Complete drive controller (1 no)	Vendor to offer			
11.4	All types of spares for total Furnace and accessories should be available for at least ten years after supply of the machine. If component or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required	Vendor to confirm			
11.5	Vendor to confirm that complete list of spares for Furnace and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the furnace.	Vendor to confirm			
12.0	**DOCUMENTATION :** Three sets of following documents (Hard copies) in English language should be supplied along with the machine	Vendor to offer			
12.1	Operating manuals of Gas Nitriding furnace.	Vendor to offer			
12.2	Detailed Maintenance manual of the furnace with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also.Electrical schematic , wiring diagram,cable layout , junction box diagram , circuit diagram and interface diagram of electronic PCB's used in the Furnace.Calibration certificate of all temperature controllers and recorders .**Drawing of furnace shell & recirculating fan with dimensions**	Vendor to offer			
12.3	Catalogues, Operation & Maintenance Manuals of all bought out items including drawings, wherever applicable.	Vendor to offer			
12.4	Detailed specification of all rubber items and pneumatic fittings	Vendor to offer			
12.5	Complete list of parts/items(Bill of materials) used in the furnace in English language.	Vendor to offer			
12.6	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to offer			
13.0	**PROVE-OUT HEAT TREATMENT OF BHEL COMPONENT**				
13.1	Vendor shall be fully responsible for heat treatment of proveout component as per heat treatment cycle to the full satisfaction of BHEL.	Vendor to accept & confirm			
13.2	Vendor shall be responsible for any deviation/rejection in proveout component due to malfunctioning of the furnace during proveout heat treatment. The cost of such component shall be refunded by the vendor to BHEL in case of rejection of the component.	Vendor to accept & confirm			
14.00	**TRAINING OF BHEL PERSONNEL**				
14.1	Training of BHEL furnace operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to confirm			
14.2	Training of BHEL maintenance personnel in maintenance of complete furnace & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to confirm			
15.0	Vendor shall submit the preliminary layout drawings for getting BHEL's approval within one month from the date of Letter of Intent (LOI) or Purchase Order, whichever is earlier. Complete Foundation Design including details viz. static / dynamic load details etc. and final layout drawings shall be submitted by the supplier within two months after getting BHEL's approval for Preliminary layout Drgs.. The layout should consist of all reqirements pertaining to complete machine including space requirement for all accessories/ attachments/ offered items. BHEL shall construct complete foundation for the furnace system under supervision of supplier and at vendor's responsibility. Vendor should arrange equipments required for the testing of foundation, if required by the vendor. The vendor shall also indicate detailed specifications/requirement of earthing material, grouting compound and grouting procedure etc. for foundation bolts of the machine.	Vendor to accept & offer			
16.0	Soil condition at BHEL, Haridwar is mentioned below : (a) Soil strata : Silty sand up to 2.5 meter depth (b) Average density of soil = 1.8 T/cubic m (c) Angle of internal friction = 35° (up to 3.0 m depth) (d) Coefficient of elastic uniform compression "Cu" = 3.0 Kg/cubic cm (at 7m depth for 10sq.m base area and 1.0 Kg/sq.cm confining pressure) (e) Bearing capacity at 1.5 meter depth = 10T/sq.m (f) Water table = 25 meter below ground level	For vendor's information.			
17.0	**ERECTION & COMMISSIONING**				
17.1	Erection & Commissioning of the complete Gas nitriding furnace and other accessories/attachments with all electrical & mechanical connections shall also be responsibility of the vendor.	Vendor to offer			

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17.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning for the machine . All features and functions, as mentioned at Sl. No. 20 (Machine Acceptance) shall also be part of the commissioning activity.	Vendor to offer			
17.3	Tools, Tackles, instruments and other necessary equipment required to carry out all erection & commissioning activities should be arranged and brought by the supplier.	Vendor to accept			
17.4	Commissioning spares, required for commissioning of the complete furnace within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to accept			
17.5	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to submit			
17.6	Terms & conditions for Erection & Commissioning should be furnished in detail separately by vendor along with offer.	Vendor to submit			
17.7	Portion, if any, of the machine, accessories/attachments and other supplied items where paint got rubbed or peeled off during transit or erection should be repainted and matched with the original adjoining paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colours/shades of paints used. The vendor shall ensure performing touching after commissioning but before final acceptance.	Vendor to offer			
18.0	**AMBIENT CONDITIONS & THERMAL STABILITY**				
18.1	Total machine including all supplied items should work trouble free and should give specified accuracies under existing power supply and ambient operating conditions, as mentioned below at Sl. Nos. 19.4	Vendor to accept & confirm			
18.2	**Power Supply (AC):** Voltage = 415V ± 10% of fluctuations , Frequency= 50Hz ± 3% , No. of phases = 3 phase with neutral.	Vendor to accept & confirm			
18.3	**Compressed Air Supply** : available at Pressure 3 - 5 Kg /cm^2 gauge.	Vendor to accept & confirm			
18.4	**Ambient Operating Conditions:** Temperature = 5 to 45 degree Celsius Relative Humidity = 95% max. Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition without any temperature controlled enclosure/shop. Max. temperature variation is 25 deg Celsius in 24 hours.	Vendor to accept			
18.5	**Thermal Stability:** Thermal Stability of the complete furnace components and all supplied items including controlsfor their troublefree operation with specified accuracy in the specified Ambient Conditions should be ensured and confirmed by vendor.	Vendor to offer & confirm			
18.6	The complete furnace system should be suitable for continuous operation to its full capacity for 24 hours a day and 7 days a week throughout year. Vendor to ensure and confirm the same.	Vendor to offer & confirm			
19.0	**MACHINE ACCEPTANCE** **(Tests/Activities to be performed & demonstrated by Vendor at BHEL works while commissoning the furnace)**	Vendor to accept & confirm			
19.1	Demonstration of all features of the furnace, control system & accessories to the satisfaction of BHEL for efficient and effective use of the furnace.	Vendor to accept & confirm			
19.2	**Job Proving:**The complete furnace should be tested (for the performance of the furnace and all sub systems) by continuously running for 96 hrs to its full capacity (with respect to load and maximum temperature etc.). If any break down occurs during this test, the test should be repeated for 96 hrs from that time.	Vendor to accept & confirm			
19.3	Two weeks of supervision by Vendor of independent operation of the furnace by BHEL after job proveout.	Vendor to accept & confirm			
19.4	Training of BHEL furnace operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to accept & confirm			
19.5	Training of BHEL maintenance personal in maintenance of complete furnace & accessories etc by the supplier's experts / engineers during their stay at BHEL works.				
20.0	**PACKING**				
20.1	Sea worthy & rigid packing for all items of furnace,controls, mechanical movement System, all Accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes. In case machine is despatched in container, the container shall be brought upto BHEL, Haridwar. De- stuffing of container shall be carried out at BHEL, Haridwar by the vendor's representative. Any type of material handling equipment required for the de-stuffing of the container shall be brought by the vendor at Haridwar on returnable basis.	Vendor to offer & confirm			
21.0	**GUARANTEE**				
21.1	Guarantee for complete Furnace and all supplied accessories/attachments/equipments/items for 24 months from the date of acceptance of the machine.	Vendor to offer			
22.0	**GENERAL**				
22.1	Furnace / Machine Model No.	Vendor to inform			
22.2	Total connected load (KVA)	Vendor to inform			
22.3	Total Space required (Length, Width, Height) for complete furnace and accessories/attachments.	Vendor to inform			
22.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Vendor to offer			

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22.5	Total weight of the Furnace after erecting at BHEL, Hardwar.	Vendor to inform			
22.6	Weight of the heaviest assembly of the Furnace system.	Vendor to inform			
22.7	Dimensions of largest part of the Furnace System.	Vendor to inform			
22.8	Vendor to submit reference list of customers where similar furnaces have been supplied mentioning broad specifications of the supplied furnace i.e. Model, Furnace size, pay load, maximum temperature, year of supply and customer feed back, if any, etc.	Vendor to submit			
22.9	Detailed catalogues, sketches /drawings / photographs pertaining to the offered furnace system and accessories/attachments/items should be submitted with the offer.	Vendor to submit			
22.10	Hydraulic, Pneumatic & Oil pipings should be preferably metallic except places where flexible pipings are essential. All the pipes required for the same shall be supplied by the vendor.	Vendor to confirm			
22.11	All Cables and Hoses etc. should be well supported & protected in trays / brackets / drag chains etc.All the power/control cables used in the furnace should be of copper and of reputed make.	Vendor to confirm			
23.0	**QUALIFYING CONDITIONS**				
23.1	Only those vendors, who have supplied and commissioned at least one Big size Electrical Gas Nitriding Furnace of same or higher sizes for similar applications of Gas Nitriding of alloy steel component in the past ten years (on the date of opening of tender) and such furnace is presently working satisfactorily for more than one year after commissioning (on the date of opening of tender) , should quote. However if similar furnace(s) has/had been supplied to BHEL ,then the furnace should be presently working satisfactorily for more than six months after its commissioning and acceptance (on the date of opening of tender) should quote. The following information should be submitted by the vendor about the companies where similar furnaces have been supplied. This is required from all the vendors for qualification of their offer.	Vendor to comply & submit with the offer			
23.1.1	Name of the customer / company where similar furnace is installed.	Vendor to inform			
23.1.2	Complete postal address of the customer.	Vendor to inform			
23.1.3	Month & Year of commissioning.	Vendor to inform			
23.1.4	Broad specification of the furnace(s) supplied (Chamber Size dia x depth, Max. Payload, Maximum temperature) and application for which the furnace is supplied.	Vendor to inform			
23.1.5	Name and designation of the contact person of the customer.	Vendor to inform			
23.1.6	Phone, FAX no. and e-mail address of the contact person of the customer.	Vendor to inform			
23.2	Performance certificate from the customers regarding satisfactory performance of furnace supplied to them (Original Certificate or Through E-mail directly from the customer). The original performance certificate may be returned after verification by BHEL, if required.	Vendor to submit			
23.3	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 accept & confirm			