

**BHARAT HEAVY ELECTRICALS LIMITED**

CORPORATE RESEARCH &amp; DEVELOPMENT DIVISION

VIKASNAGAR, HYDERABAD - 500 093, INDIA

**ENQUIRY****PHONES: 23774494 (EXCHANGE)****DIRECT: 23882104/23882204/****23778474/23776772****FAX : 91 40 23770698**

To

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Enquiry No: Enq Date: Due Date: Delivery By:

720606911 23-DEC-06 13-JAN-07 31-MAR-07

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PLEASE SUBMIT YOUR QUOTATION IN SEALED COVER  
SUPERSCRIBED WITH ENQUIRY NO, ENQUIRY DATE AND  
DUE DATE SUBJECT TO OUR TERMS AND CONDITIONS  
ENCLOSED, FOR THE FOLLOWING MATERIALS SO AS TO  
REACH US ON OR BEFORE THE DUE DATE BY 12 NOON. THE  
TENDERS WILL BE OPENED AT 2 PM ON THE SAME DAY

-

Pin

Email :

Attn. .

PLEASE GIVE REFERENCE OF ENQ NUMBER , ENQ .DATE AND DUE DATE IN ALL YOUR CORRESPONDENCE FOR PROMPT ACTION. IN CASE IF YOU ARE NOT MAKING THE OFFER PLEASE POST A REGRET LETTER AND RETURN THE DOCUMENTS.

| SL NO | DESCRIPTION / SPECIFICATION   | UNIT | QTY |
|-------|---|------|-----|
| 1     | LPG FIRED SPRAY PYROLYSIS SYSTEM WITH TWIN REACTOR<br><br>AS PER ATTACHED SPECIFICATION<br><br>ANNEXURE - 1<br>(TECHNICAL SPECIFICATION)<br><br>ANNEXURE - 2<br>(TECHNICAL WRITE-UP FOR THE SYSTEM) | SET  | 1   |

NOTE: PLEASE SUBMIT YOUR OFFER IN TWO PARTS AS PER THE ENCLOSED ANNEXURE "AA" IN SEPERATE SEALED COVERS AS DETAILED BELOW:

1) FIRST COVER SHALLCONTAIN THE FOLLOWING:

a) TECHNICAL COMMERCIAL BID ALONG WITH COMPLIANCE STATEMENT, MENTIONING APPLICABLE DUTIES, TAXES etc., AND DELIVERY TIME CLEARLY, (TERMS, CONDITIONS AND COMPLIANCE FORM ENCLOSED)

b) A COPY OF THE PRICE BID WITHOUT THE PRICES (UNPRICED PRICE BID)

2) SECOND COVER CONTAINING PRICE BID

3) IF THE PRICE BID IS FOUND TO BE DIFFERENT FROM THE UNPRICED PRICE BID IN ANY WAY, YOUR OFFER WILL BE REJECTED

AS WE ARE ENGAGED IN R&D ACTIVITY "C" FORM WILL NOT BE ISSUED

Yours faithfully

for

PLEASE FILL UP THE ENCLOSED VENDOR REGISTRATION FORM AND  
SEND IT ALONG WITH YOUR QUOTATION. OTHERWISE YOUR  
QUOTATION WILL NOT BE CONSIDERED. (IGNORE THIS IF YOU HAVE  
ALREADY SUBMITTED THIS FORM)

BHARAT HEAVY ELECTRICALS LTD

N Narsimha Rao

Dy Manager

**Email: nnrao@bhelrnd.co.in**

**TECHNICAL SPECIFICATIONS**  
**LPG FIRED SPRAY PYROLYSIS SYSTEM WITH TWIN REACTOR**

**A. Broad Specification: ( For TWO set of Reactor )**

|                           |                          |
|---------------------------|--------------------------|
| a. Heating System         | : Liquid Petroleum Gas   |
| b. Feed rate (Liquid)     | : Up to 20 Liters /hr    |
| c. Water Evaporation rate | : Min 10 liter /hr       |
| d. Air Inlet              | : <b>up to 650 Deg C</b> |
| e. Air Out let Temp.      | : Up to 180 Deg C        |
| f. Feed Temp.             | : 30 Deg C               |
| g. Ambient Air temp.      | : 30 Deg C               |
| g. Powder Temp.           | : Min. 100Deg C.         |

**B. Technical Specification:****1. Feeding System. (For Both reactor)**

|                          |                                    |
|--------------------------|------------------------------------|
| a. Feed Tank             | : Two Nos.                         |
| b. Dimension of the tank | : to be specified                  |
| c. Capacity of the tank  | : 50 Liters.                       |
| d. Material of the tank  | : SS 316 ,                         |
| e. tank inner Lining     | : Rubber /Plastic.                 |
| f. Tank Stirrer          | : to be provided                   |
| g. Pumping System        | : to be specified.                 |
| h. Feed Funneling        | : 5 liters capacity to be provided |
| i. Feed Pump             | : System to be specified           |
| j. Feed Atomizer         | : SS316 with Teflon coated.        |
| k. Pump Type:            | : Peristaltic Type.                |
| L. Pump Control system   | : to be specified.                 |

**2. Spray Gun / Atomizer. (For Both Reactor)**

|                                |   |
|--------------------------------|---|
| a. Nos. of Spray Gun/ Atomizer | : 2 nos. .  |
| b. Types of Spray Gun          | : 1. High Pressure Single Fluid be specified.<br>2. High pressure TWO-Fluid . |
| c. Nozzle body                 | : SS 316 with wear resistant orifice plate and swirl.                         |
| d. Nozzle diameter             | : 0.3,0.5, 0.7 mm   |

**3. Hot Air System**

Air inlet filter .( For Both reactors)

|                         |                                       |
|-------------------------|---------------------------------------|
| a. Filter Specification | : To be mentioned.                    |
| b. Filter Material      | : Polypropylene or suitable           |
| c. filter Frame         | : MS with detachable Filter elements. |

**4. Delivery Fan.( For Both reactors)**

|              |  |
|--------------|--|
| a. Capacity  | : to be specified.   |
| b. Fan frame | : MS with Epoxy painted  |
| c. Damper    | : Inlet and out let damper to be provided.                                       |
| d. Ducts     | : proper ducting to be provided made out of MS.<br>Thickness not less than 3 mm. |

**4. Gas fired Heater Chamber. .( For Both reactors)**

- a. Gas Fired heater Chamber Size : To be specified.
- b. Shell Material : MS with suitable thickness.(SS 304)
- c. Efficiency : High Thermal Efficiency with low pressure Drop.
- d. The hot air line to be insulated with suitable cladding and necessary flanges and mounting Brackets For burner assembly and the aluminum cladding to be provided where ever required.

**5. Gas burner. .( For Both reactors)**

- a. Gas Burner : To be specified the make and the model.
- b. Turned down ratio : to be specified.
- c. Burner management & Control system : To be specified.
- d. Type of Temp. Sensor : K type Thermocouple
- e. Control Panel : System drawing to be provided,

**6. Hot Air Duct : to be provided with all flanges ,bends, packing and suitable Aluminum cladding****7. Reaction chamber : (Air distributor)**

- a. Type of Disperser : Vertex .( For Both reactors)
- b. Mounting : Top of drying Chamber.
- c. Hot air parts : SS 316

**C. Reactor :****1 Reactor No. 1. ( For Pyrolising )**

- a. Temperature : Up to 650 Deg C
- b. Material : SS 316
- c. Height &Dia : 4 mts and Dia : 1 Mts( Diviation any to be incorporated later stages of discussion)
- d. Nos. Of Zone : To be specified.
- e. Temperature Sensor : In all the zone. (Type K)
- f. Control system : Independent.

**2. Reactor No. 2.**

Similar to reactor No.1

- a. Temperature : Up to 650 Deg C
- b. Material : SS 316
- c. Height &Dia : 5 mts and 1 Mts ( Diviation any to be incorporated at later stages of discussion)
- e. Dia : To be specified as per design.
- f. Nos. Of Zone : To be specified.
- g. Temperature Sensor : In all the zone. (Type K)
- g. Control system : Independent.
- h. Inside wall to be Cladded with **Titanium Metal** with suitable thickness.

Note: Both the reactor should have independent Control and measurements system. However the Exhaust system could be common for both the reactor.

3.. **Electromagnetic Hammer** : To be provided .( **For Both reactors**)

**D. Air Handling System : ( Required for Both Reactor)**

- 1 Cyclone Separator. : To be Specified
2. Pulse Air Jet Bag Filter : Suitable system specification to be specified keeping the finesse of the product .  
: Pulsing arrangements with solenoid valves pipes ,air lock rotary valves is to be provided
3. Powder collection. :  
  - a. Capacity of the jar : 10 LTR ,Transparent & Heat Resistant.
  - b. Coupling : Quick Coupler
  - c. No. of Jar required (For Both Reactor) : 12 nos. of various capacity 10 ltr and above.
  - d. Flow shut –Off valves : pneumatic gate valve.
4. **Wet Scrubber: (Common for both reactor )** : Detailed system to be specified and suitable deviation if any can be incorporated at later stages.
5. **Exhaust System: (Common for both reactor ):**  
  - a. ID Fan : Capacity to be specified.
  - b. The inside surface area of fan casing to be lined with FRP.
  - c. Chimney Height : to be specified as per Pollution norm

**E. Control & Instrumentation Panel :**

Control & instrumentation panel to be provided with suitable Power control switch & fuse units in pre-wired Condition with load protector. Individual operation for all the connected system like electromagnetic hammer . The temperature controller to be of reputed make with zonal indicators etc.

Field mounted instruments like Pressure Gauge / Manometer etc if ant to be provided for both the reactor.

All Safety features to be incorporated .

**F. GENERAL :** The total fabrication of the system has to be well supported by MS frame work and Ladder frame , Plat-form etc. for the smooth operation of the system. Civil work required has to be intimated with Suitable drawings.

## **LPG-FIRED SPRAY PYROLYSIS SYSTEM WITH TWIN REACTORS**

### ***About Spray Pyrolysis System and the Technique:***

The Spray Pyrolysis System (LPG fired) is used to synthesize fine/ultra-fine ceramic/metallic powders in a continuous mode from its liquid precursors. In this technique, the liquid precursor (normally aqueous) is first atomized (fine droplets or aqueous mists) with the help of a high-pressure two-fluid/multi-fluid nozzle gun and the generated mists are sent into the reactor, wherein hot air (at specified temperature depending on the system) is also allowed to sent in the same reactor that come in contact with the precursor mists. A dehydration and then a decomposition reaction of the precursor mists takes place inside the reactor that generates solid powders and decomposed gases. The so-derived powders are collected in different collection bags through a cyclone separator depending on the size fraction and the decomposed gases are released through the chimney via a wet scrubber attached in the system. It is important that the derived powders are collected at a temperature close to 100 degC, otherwise the resultant powders are often get contaminated with water vapor and the decomposed gases.

In the present Spray Pyrolysis System, provision is to be made for having two independent reactors with the same base equipment, which means that both the reactors would function independently and provisions for controlling the technical parameters in each reactor, starting from the gas burner to the powder collection system including control system for two separate reactors are to be provided.

### **Broad Specification of the LPG-fired Spray Pyrolysis System :**

|                        |                            |
|------------------------|----------------------------|
| Heating System (Fuel): | Liquid Petroleum Gas (LPG) |
| Feed Rate (Liquid)     | : Up to 20 liters/hr       |
| Water Evaporation Rate | : Min 10 liters/hr         |
| Air inlet temp.        | : Up to 650 Deg C          |
| Air outlet temp.       | : Up to 180 Deg C          |
| Ambient air temp.      | : ~ 30 Deg C               |
| Feed temp.             | : ~ 30 Deg C               |
| Powder temp.           | : >100 Deg C               |

## **EQUIPMENT TECHNICAL SPECIFICATIONS**

### **A. FEEDING SYSTEM**

#### **FEED TANK (TWO NO.S FOR TWO REACTORS):**

This is a tank to store the precursor liquid from which the precursor would flow to the reaction chamber by an atomizer at a desired rate. Also, the precursor liquid need to be pumped from the ground floor to the tank and suitable arrangement for pumping the precursor liquid to the feed tank need to be arranged.

Tank capacity: 50 Liters

Material: Rubber/Plastic lined using SS316 body, so that corrosion is prevented for corrosive precursor liquids. At the same time, plastic/rubber lined material should be resistant to the corrosive precursor liquids.

The tank shall be SS316 jacketed with insulation. A water funnel is in SS 316 of capacity 5 Ltrs. to be connected with valve provided in feed line for feeding water to the plant during starting and stopping operations. Feed stirrer is to be provided in each feed tank (For stirring arrangement).

#### **FEED LINE:**

For connecting the feed tank to feed pump and to the atomizer made out of SS 316 with Teflon coated.

#### **FEED PUMP ASSEMBLY:**

A peristaltic type feed pump of suitable make consisting of SS 316 liquid contact parts and with drive assembly and A.C. variable frequency drive to be provided to control the feed flow.

#### **SPRAY GUN / ATOMIZER (TWO NO.S):**

This is a spray gun by which the liquid precursor is pressurized and mixed with air and fine droplet/mist is created. Spray gun/Atomizer could be of different types and suitable atomizer/s to be provided. One atomizer could be of two-fluid spray gun type (High pressure) and another type of centrifugal type atomizer (high pressure). The nozzles shall consist of nozzle body in SS 316 and wear resistant orifice plate and swirl chamber with a ceramic insert (alumina/zirconia base).

|                 |   |
|-----------------|---|
| Type            | i) High pressure, Single Fluid & ii) High pressure Two-fluid, as well |
| Body            | SS 316  |
| Nozzle diameter | Nozzles with different diameter to be provided (0.3, 0.5, 0.7 mm)     |
| Inserts         |   |
| Chamber         | ceramic   |
| Orifice         | ceramic   |
| End Plate       | ceramic   |

## **B. HOT AIR SYSTEM**

### **AIR INLET FILTER:**

Comprising of MS frame with detachable filter elements. The filter elements are to be made of washable type material like polypropylene or any suitable material.

### **DELIVERY FAN:**

Suitable delivery fan with FD Air blower, with MS & Epoxy painted, and motor (reputed make) to be supplied. The fan housing and base frame are to be made of MS. The material of construction of Impellor and shaft are to be in M.S. The air quantity is to be adjusted by means of a damper situated at the inlet/outlet of fan.

### **AIR DUCT:**

The duct is to be made of M.S, thickness min 3 mm. Air duct including necessary transition pieces, flanges and gaskets, etc. connecting the delivery fan and the air heater.

### **DIRECT GAS FIRED HEATER :**

The air heater is to be designed with special attention to high thermal efficiency with low pressure drop and to be manufactured to suitable design. The air heater to be consisting of:

- \* Inner shell to be made of SS 304 with suitable thickness
- \* Outer cylinders/shells made out of spray & metallized MS
- \* All necessary flanges for inlet and outlet air
- \* Mounting bracket for the burner
- \* Inspection and cleaning openings
- \* High Insulation materials with suitable thickness & with suitable Aluminum cladding

### **GAS BURNER:**

Suitable Burner with High/Medium/Low control for firing of gas (LPG), and the same is to be mounted on air heater.

It is to contain :

- \* Combustion air filter
- \* Combustion air fan in Aluminum/suitable metallic construction, complete with drive motor and accessories.
- \* Burner control panel with relays, sequence controller etc.

### **HOT AIR DUCT:**

For conveying the hot air from the air heater to air distributor, the duct is to be completed with transition pieces, flanges, bends, packing, hardware's and insulation supports & aluminum/suitable metallic cladding. The duct is to be made of SS 304 with suitable thickness & suitably insulated and cladded with aluminum/suitable metallic sheets.

## **C. REACTION CHAMBER SYSTEM**

### **AIR DISTRIBUTOR:**

The air disperser is to be of vertex type for mixing the dry air with sprayed feed, mounted on the top of drying chamber to ensure uniform distribution of air in the chamber. Hot air contact parts are made of SS 316 material.

### **REACTORS / REACTION CHAMBERS (Two Numbers):**

#### ***Reactor 1:***

It is a cylindrical shell with flat top and conical bottom which is to be fabricated out of SS 316L sheets with suitable thickness and the reactor is used for pyrolysing the sprayed liquid. The height and diameter of the reactor could of design specific and the primary objective of the reactor is to carry out the pyrolysis/combustion of the sprayed liquid completely and efficiently at a specified temperature upto 650 degC. As the temperature would be varying in different zones in the reactor, a temperature measurement system along with the display are to be provided in various zones across the length of the reactor, by suitably mounting/inserting appropriate thermocouples

The reaction chamber consists of :

- \* Access/opening/door towards the bottom (the cylindrical part).
  - Aprrox. Height of the reactor would be 4 meters with an internal dia of 1 meter (design specific depending on the effective water evaporation rate and thermal efficiency of the entire system)
- Thermocouples to be provided in different zones of the reactor (one in every half-meter inside the reactor) to indicate the temperature profile in each zone & to be displayed in temperature display system in the control panel
  - \* MS stiffening rings are welded to the chamber with SS pad plates.
  - \* Light sight glasses in different zones to view from the outside
  - \* Spraying chamber along with the cylindrical and conical portions to be insulated with suitable refractory at cylindrical portion and further to be cladded with aluminum sheet

#### ***Reactor 2:***

The reactor 2 is similar to Reactor 1, other than its physical dimension and internal structure. Height of the reactor is to be at least one meter more than that of the Reactor 1, that is ~ 5 meter, keeping internal diameter similar (design is left to the fabricator, for maintaing thermal efficiency of the system). However, the ID of this reactor could be made smaller (depending on the targeted water evaporation rate and heat balance for the powder temp, >100 degC). Additionally, the inside wall of the reactor is to be cladded with Titanium metal with suitable thickness.

Both the reactors should have independent control and measurement system. However, the exhaust system could be common for the both the reactors.



**ELECTROMAGNETIC HAMMERS :**

Hammers for dislodging the powder from the chamber wall in case of deposition on the chamber cone is to be provided.

**FLAP VALVES:**

Flap valve are to be provided for continuous discharge of the powder at the bottom of cyclone separator, pyrolysing chamber and bag filter.

**POWDER DUCT :**

Powder duct made of SS 316 is to be provided to convey the drying air and the powder from drying chamber to the cyclone separator, cyclone to bag filter, bag filter to scrubber and scrubber to exhaust fan. Thermocouple for measuring outlet air temp and display are to be provided. Powder ducts are different for different reactors.

## **D. AIR HANDLING SYSTEM**

### **CYCLONE SEPARATOR :**

High efficiency cyclone separator for separating coarse and finer fraction of the derived powders using SS 316L material of suitable thickness along with suitable powder handling system to be provided for discharge/collection of powder.

### **PULSE AIR JET BAG FILTER:**

There could be very fine powder with the density comparable to the exhaust air that escapes along with the exhaust gases/decomposed gases. To separate these carry forward very fine powder along with the exhaust air and arrangements to be made for collecting these powders. The filter material of construction is to be of SS 316 body with SS 316 bag plate. The bags could be of suitable materials, bag retainers are of SS 316.

Accessories: Pulsing arrangements with solenoid valves, pipes, and air header. Air lock rotary valve is to be provided attached with the bag filter.

### **POWDER COLLECTION SYSTEM:**

Powder collection system should be provided with a pneumatic gate valve or equivalent or suitable valve for easy removal of powder collection jars and fitting of new empty jars therein. The capacity of the jar need to be about 10 liters each and the engagement of the jar should be through quick coupler. The jar material is preferably to be transparent and heat resistant at the collection temperature. For each reactor, at least six jars with different capacity (at least 10 liters and higher) are to be provided.

### **WET SCRUBBER :**

A water scrubber of MS construction to be provided for water scrubbing of exhaust gas from the cyclone to the atmosphere. The scrubbing system is to include a collection tank of ~ 25 Ltrs capacity, nozzles, venturi, circulating pump, and pipe connections. The inside surface of the tank, venturi, scrubber etc are to be rubber lined. The wet scrubber unit could be common for both the reactors.

### **EXHAUST FAN:**

Suitable make ID Exhaust air blower of MS construction is to be provided. The fan is to be of centrifugal type, with motor assembled on a common base frame. The scope of supply here is to include V-belt, base frame, flexible connections for air inlet and outlet, butterfly valve etc.

The supply is to include the followings :

- Housing with inspection opening and drain.
- SS 316 impellor statically and dynamically balanced.
- Flexible connections for air inlet and outlet.
- The inside surface of casing is to be lined with FRP.

**EXHAUST CHIMNEY:**

Suitable chimney out of MS material is to be provided. The duct should lead the spent air from exhaust fan to atmosphere.

Handling/Operation/Maintenance Structure:

Suitable structure need to be provided for handling/maintenance & operational needs

Suitable compressor for the spray pyrolysis requirement

## **E. CONTROL & INSTRUMENT PANEL BOARD**

The panel should have a front plate of acrylics or suitable material in which a flow chart of the system to be clearly shown/ printed.

The instrument panel is to be pre-wired to terminal connections and equipped with the following

- Power supply with suitable switch & fuse unit.
- Individual motor starters with load protection device.
- Individual switches for electromagnetic hammers
- Ammeter & Volt meter for incoming Power supply
- System indicating lamps
- Temp. controller for air outlet temp, Temperature controller for air inlet temp. and temp indicators for different zones of both the reactors separately

Field mounted instruments: PT 100 Sensor, Pressure gauges / Manometer etc.

### **SAFETY FEATURES:**

- Individual motor starters with MCB, safety linked with powder collecting system
- Annunciation panel and safety interlocks of the system

### **CABLES & CONDUITS:**

PVC insulated, PVC sheathed armored cables to interconnecting various motors & control panel and all cables & wires are to be provided with numbered Ferrules.



## BHARAT HEAVY ELECTRICALS LIMITED

CORPORATE R&D DIVISION, VIKAS NAGAR, HYDERABAD – 500 093, AP, India

Ph: 0091-40 – 23778474, FAX: 0091-40 – 23770698

### General Terms and Conditions of Enquiry & Contract for the Purchase of Goods/ Services

1. The quotation and any order resulting from this enquiry shall be governed by these General Terms and Conditions of enquiry and contract for the supply of goods and the supplier quoting against this enquiry shall, unless specifically stipulates any different terms or conditions, be deemed to have read and agreed to the same.
2. Sealed quotations in double cover with tenderer's distinctive seal, superscribing enquiry number, date and due date are to be submitted so as to reach on or before due date & time, addressed to **Additional General Manager(MM), Bharat Heavy Electricals Limited, Corporate Research & Development Division, Vikasnagar, Hyderabad, Andhra Pradesh, India – PIN-500 093, India.**

In the case of **Two-part bid**, each inner cover shall clearly be labeled as a) **Technical & Commercial Bid** containing technical data/ drawings/ catalogues/ quality plans along with commercial terms and conditions & copy of the price bid with the price columns left blank (unpriced price bid), b) **Price bid** containing prices quotes. Installation and/or Commissioning charges shall be spelt out in absolutely lucid terms, taking into account total charges, rather than quoting vaguely, such as charges per man-day or charges per engineer per day etc. **If the price bid was found later to be different from the unpriced price bid in any way, the offer will be rejected summarily.**

3. **Tender/ Technical bid Opening:** Unless specified otherwise, tenders/ technical bids will be opened on appointed date and time as mentioned in the enquiry or as communicated changed date/time, if any, in the presence of such of those tenderers who may be present.
4. **Delayed/ Late Tender:** Tenders, which have been posted by registered post through the postal department in time before opening date but received after tender opening, shall be treated as regular tenders. Other tenders received after tender opening time shall be treated as late tenders and normally they may be rejected.
5. The Quotation should be free from overwriting and erasures. Corrections and additions, if any, must be attested. Supplier should indicate in the quotation dimensions (Size), weight, rate etc., in the metric system unless the enquiry calls for different unit.
6. **Validity of Quotation:** All quotations shall be kept open for acceptance for a period of ninety days from the date of opening of Tenders/ Technical bid and this shall be deemed to be an express condition of all quotations. The rate shall be quoted in both figures and in words.
7. In the case of Two-part bid, the vendor should furnish technical clarifications, if any, within stipulated time mentioned, failing which, it will be construed that the vendor is not interested in the tender and BHEL shall not consider the offer for further evaluation.
8. **Revision of Pricebid:** In the event of any bidder, after finalizing the technical specifications and scope of supply, opting to revise and submit their latest price bid, then BHEL reserves the right to open their original / previous price bid also while evaluating revised bid.
9. **Pricebid Opening:** Unless specified otherwise in the enquiry, the Price bids of technically qualified vendors shall be opened with prior intimation in the presence of such of those tenderers who may be present.
10. **Conformity to Specifications:** The material should be of the best quality and shall be conforming to our specification given in our enquiry. Unless otherwise agreed upon by BHEL, no payment shall be due by BHEL in respect of any sample. Offers without details of specifications/ applicable catalogues will not be considered and are liable to be rejected.
11. **Terms of Delivery:** All suppliers shall quote the lowest prices on ex-works and FOB/FCA basis. Foreign suppliers will also indicate their Indian agent's name and address with percentage of agency commission out of the quoted price, if any. Name and Address of the supplier's Bankers address should also be given. Indian suppliers for the indigenously manufactured/ imported stock shall quote on Ex-works /Free-on-Rail/Road /FOR-destination basis, indicating packing & forwarding charges, if any, separately.
12. **Taxes and Duties:** Unless specified otherwise in the enquiry, BHEL do not provide "C" or "D" Form as it is engaged in R&D. All Indian suppliers shall clearly mention Sales Tax/ VAT, Excise Duty, and Service Tax etc, if any, payable in addition to the quoted price and indicate applicable rates/ percentage, item-wise. It will be paid

only if Registration Number under State(TIN)/ Central Sales Tax or Service Tax is specifically mentioned in the Bill/Invoice. Vendors without a Sales Tax/VAT registration and applicable Service Tax registration will not be considered.

13. **Insurance:** Insurance will be arranged by BHEL in case of Ex-Works as well as FOB basis supplies.
14. **Terms of Payment:** Full payment will be made within 30 days after receipt, inspection and acceptance of the material (and where involved, Erection and commissioning of the material/ equipment at BHEL/Destination) by Crossed cheque and no Bank commission charges are admissible. The Cheque will be sent by registered post and BHEL is in no way responsible if loss occurs due to delay by postal authorities and cheques falling into improper hands or through forgery or fraud. Suppliers having RBI-SEFT-enabled accounts can seek payment through Electronic Fund transfer. For foreign suppliers, the preferred payment term will be on Sight Draft basis and bank charges inside India will be to BHEL account and outside India will be to supplier's account.
15. Suppliers shall quote competitive price and best delivery for all the items mentioned in the enquiry. BHEL reserves the right to reject partial quotations and to place order on overall landed cost basis. Correct date of effecting supplies in the event of an order should be indicated in the offer. If the supplier's quoted terms are different from BHEL standard payment terms, interest @10.5% per annum (or as indicated in the enquiry) will be loaded to the quoted prices for difference of payment period.
16. **Packing:** The supplier shall be responsible for the goods being properly and adequately packed so as to prevent any loss, damage or deterioration during transit and indicate packing charges, if any, separately.
17. **Part/ Split Ordering:** BHEL reserves right to Order part of the item/ quantity of the enquiry and split the order among qualified vendors.
18. In case the goods enquired are on Rate Contract basis with any other unit of BHEL, such fact should be clearly indicated in the quotation giving full particulars of Rate Contract number, validity and price and also your willingness to comply with order if placed against such Rate Contract. A true copy of Rate contract signed by the supplier should be sent with the quotation.
19. **Inspection:** On receipt, the goods shall be subjected to inspection and also test, if necessary, and our decision regarding the acceptability of the goods shall be final and binding on the suppliers.
20. **Consequences of Failure To Deliver:** The time stipulated for delivery of goods shall be deemed to be the essence of the contract and delivery must be completed within the stipulated date/s. In the event of supplier's failure to supply the goods by the stipulated date/s, BHEL shall be entitled to levy a penalty of ½% per week for the delayed no of weeks or part thereof for the undelivered portion of PO subject to a maximum of 10% total order value.
21. **Withdrawal from the Contract:** In case the supplier withdraws the quotation after its acceptance by BHEL or fails to supply the goods as per the terms and conditions of contract, or at any time repudiated the contract wholly or in part, BHEL shall be at liberty to cancel the Purchase Order and to recover from the supplier the extra cost and other loss incidental to the breach of contract on the part of the supplier.
22. **Guarantee/ Warranty certificate and Manufacturer's Test report:** Invariably in all cases where it is so stipulated, the supplier should furnish Guarantee/ Warranty certificate valid for a period of 18 months from date of supply or 1 year from the date of receipt, acceptance and commissioning(or more, if provide by oem) whichever earlier and manufacturer's Test report along with the goods, failing which, BHEL shall have the right to reject the goods.
23. All ferrous/ non-ferrous items shall be colour coded as per bureau of Indian standards/ or IS standards/ BHEL Standards.
24. **Recovery of Dues:** BHEL shall recover any amount due from the supplier or any amount outstanding to the credit of the supplier with BHEL R&D unit or any other BHEL unit(s) and/or by legal action.
25. **Arbitration & Forum for Legal Proceedings:** All disputes arising in connection with indigenous/ foreign supplies shall be settled through arbitration held at Hyderabad, AP, India and arbitration shall be appointed by Arbitration Tribunal of the Federation of Andhra Pradesh Chambers of Commerce and Industry, Hyderabad, AP, India. The Courts at Secunderabad/ Hyderabad, AP, India shall have jurisdiction in respect of any suit or other legal proceeding arising from or relating to this contract

The rights and remedies of BHEL stated in these General terms and conditions shall be in addition and supplemental to its rights and remedies under law and custom or usage of trade or business and shall in no way be deemed to limit, curtail, supercede or derogate from its said rights and remedies.



**ANNEXURE “AA**  
**BHARAT HEAVY ELECTRICALS LIMITED**  
**CORPORATE RESEARCH & DEVELOPMENT DIVISION**  
**VIKASNAGAR, HYDERABAD – 500 093. INDIA**

**MATERIALS MANAGEMENT DEPARTMENT**  
**(Information for Technical & Commercial bids with general terms)**

**ENCLOSURE TO ENQ No:**

**DATE:**

- a) Please indicate( \_/ ) for applicable or ( X ) for not applicable against each clause of the enquiry
- b) Vendor shall confirm their compliance for applicable clauses ( \_/ ) in their offer without deviation.

**1) Technical offer:-**

- a) Vendors to confirm compliance to all points of specifications, attached if any. Deviations if any should be specified in the offer.
- b) Vendors shall furnish relevant technical Documents / Catalogues. Drawings and Quality plan duly taking care of Purchase Specification and Quality requirements along with their offer in duplicate for Purchaser’s review / Verification.

**2) Two Part Bid:-**

Vendor shall submit their offer in 2 parts.

**2.1 Technical Bid:-** Containing relevant technical data, drawings, catalogues, Quality Plan etc, along with Commercial Terms and Conditions and a copy of the price bid with the price columns left blank (unpriced price bid). If the price bid was found later to be different from the unpriced price bid in any way, the offer will be rejected.

**2.2 Price Bid:-** Containing the Price(s) quoted. Installation and or commissioning charges shall be spelt out in absolutely lucid terms taking into account the total charges rather than quoting vaguely such as charges as per man day or charges per Engineer per day etc.,

Technical bids will be opened on the due date of the enquiry or any other date fixed by BHEL. Further, vendor should furnish clarifications, if any, required within seven days after the same is sought by Purchaser. If no clarifications/reply received within 7 days, it will be construed that vendor is not interested in the tender and Purchaser will finalise tender accordingly. Price bids received on due date along with technical offers will be recorded and opened subsequently with due intimation to vendors after finalising of technical scope of supply.

These bids shall be submitted in separate sealed covers superscribing the nature of the offer (technical bid or price bid). BHEL Enq No. Due date etc.

**Note: In case of non-compliance with the TWO\_-PART-BID ie.. clause number 2 and subclauses 2.1 and 2.2. Purchaser reserves the right to summarily reject all such offers.**

**3) Delivery:-**

**Vendor shall confirm supply of materials as per the delivery schedule indicated in the enquiry.**

**4) Negotiations:-**

**Vendor shall quote competitive price and best delivery to avoid negotiations.**

**5) Commercial Terms & Conditions:-**

**Terms of Delivery:**

- a) **Vendors shall clearly indicate terms of delivery Viz: Ex-Works/FOR Despatching station/FOR Despatching station FOR Destination/FOB port of loading/FAS Port of loading in their offer. If the terms of delivery is Ex-Works, then vendors shall clearly indicate the following:**
  - 1. Packing and forwarding charges.**
  - 2. Documentation / Handling charges if any**
  - 3. FOB FAS charges (Inland Freight & Insurance charges from vendor works to port of Loading).**
- b) **All Indian Vendors shall clearly specify the Excise Duty in percentage applicable for their supplies. Offers containing expressions such as “Extra as applicable” or “As applicable at the time of Delivery” will be summarily rejected.**
- c) **CST/Local Sales Tax in percentage shall be clearly indicated.**

**6) Validity of Quotation:-**

**Validity of offer should be 90 days after the opening of price bid.**

**7) Part or split ordering:-**

**Purchaser reserves the right to order part of item / quantity of the enquiry.**

**8) For clauses not mentioned in this document see the enclosed “GENERAL TERMS AND CONDITIONS OF ENQUIRY AND CONTRACT FOR THE PURCHASE OF GOODS”**

- 9) In case your terms of payment are different from our standard payment terms, interest at the rate of 10.5% per annum (or BHEL’s standard rate of interest) will be loaded to your prices for the difference of period of payment.**





**BHARAT HEAVY ELECTRICALS LIMITED**  
**CORPORATE R&D Division**  
**Vikasnagar, Hyderabad – 500093, India.**

**Suppliers' compliance statement to basic conditions of enquiry**

**(In case Order to be placed on Indian supplier in Indian currency)**

| <b>Condition</b>             | <b>BHEL R&amp; D's terms</b>   | <b>Supplier's compliance</b><br>(indicate Yes/No. if 'No', state terms desired) |
|------------------------------|--|---|
| 1) Validity of offer         | 90 days from the tender opening date   |   |
| 2) Delivery requirements     | Free delivery at our stores or FOR destination (as indicated in the enquiry)   |   |
| 3) Warranty                  | Unless specifically mentioned in the enquiry, all supplied items to be provided with warrantee for one year (or more, if provided by the OEM) from the date of acceptance/commissioning. In case of equipment involving erection and commissioning, warrantee shall be for 18 months from the date of dispatch or 12 months from the date of commissioning, whichever is earlier |   |
| 4) Terms of payment          | Full payment will be made within thirty days after receipt, inspection and acceptance of the material at BHEL R&D (and where involved, erection and commissioning of the material/equipment at BHEL/destination), by Crossed Cheque and no Bank commission charges are admissible.   |   |
| 5) Taxes & Duties            | Unless specifically mentioned in the enquiry, we do not provide 'C' or 'D' form. Supplier to specify rates of taxes and duties element wise and related percentages.   |   |
| 6) Penalty for late delivery | 0.5% per week beyond the delivery date as mentioned in the Purchase order on undelivered portion subject to a maximum of 10% of the total order value  |   |

\* BHEL R&D reserves the right to reject any offer due to non-compliance with the above conditions and/or non-receipt of this form in duly filled condition

\* Any other elements of cost in addition to the above may please be specified in detail

**(Signature and Stamp/Seal of Vendor)**



**BHARAT HEAVY ELECTRICALS LIMITED**  
**CORPORATE R&D Division**  
**Vikasnagar, Hyderabad – 500093.**

**IMPORTED**

**Suppliers' compliance statement to basic conditions of enquiry**

**(In case Order to be placed on the Principal and foreign currency)**

| Condition                     | BHEL R& D's terms   | Supplier's compliance<br>(indicate Yes/No. if 'No', state terms desired) |
|-------------------------------|---|--|
| 01) Validity of offer         | 90 days from the tender opening date ( or as per enquiry)   |  |
| 02) Delivery requirements     | FCA – Nearest International Airport (or as indicated in the enquiry)  |  |
| 03) Warranty                  | Unless specifically mentioned in the enquiry, all supplied items to be provided with warrantee for one year (or more, if provided by the OEM) from the date of acceptance/ commissioning. In case of equipment involving erection and commissioning, warrantee shall be for 18 months from the date of dispatch or 12 months from the date of commissioning, whichever is earlier |  |
| 04) Terms of payment          | Sight draft.<br>All bank charges inside India will be to BHEL R&D account and out side India will be to suppliers account. Documents through State Bank of India, HAL Complex, Balanagar, Hyderabad, AP, India-500 042.   |  |
| 05) Agency commission         | Pl specify percentage charges, if any. Indian agency/agent commission will be in Indian Currency only.  |  |
| 06) Erection/ Commission      | As per enquiry  |  |
| 07) Documentation             | As per enquiry  |  |
| 08) Insurance                 | BHEL will arrange Insurance based on intimation to our Insurance agency, United India Insurance Co., DO-2, Secunderabad, AP, India.   |  |
| 09) Penalty for late delivery | 0.5% per week beyond the delivery date as mentioned in the Purchase order on undelivered portion subject to a maximum of 10% of the total order value   |  |

\* BHEL R&D reserves the right to reject any offer due to non-compliance with the above conditions and/or non-receipt of this form in duly filled condition

\* Any other elements of cost in addition to the above may please be specified in detail

**(Signature and Stamp/ Seal of Vendor)**



BHARAT HEAVY ELECTRICALS LTD.  
Corp. R&D DIVISION  
VIKAS NAGAR,  
HYDERABAD-500 093 (INDIA)

## VENDOR REGISTRATION FORM

[FORM TO BE SUBMITTED\* BY THE BIDDER ALONG WITH TECHNICAL-BID]

Before filling please refer to instructions on page-4

### 1.0 VENDOR PROFILE:

1.1 & 1.2 Name and address of the vender:

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Phone Nos.:

Fax No.:

Email:

1.4 Local representative of the vender in India/ Hyderabad:

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Phone Nos.:

Fax No.:

Email:

Contact person:

Mobile No.:

2.0 & 2.1 Type of Organisation:

|                |             |                      |                               |
|----------------|-------------|----------------------|-------------------------------|
| PROPRIETORSHIP | COMPANY     | SISTER CONCERN       | ANY OTHER<br>(Please specify) |
|                |             |                      |                               |
| PARTNERSHIP    | CORPORATION | Small Scale Industry |                               |
|                |             |                      |                               |

3.0 Annual Turn Over:

Name and address of the Banker:

| Sr.No. | Bank | Address |
|--------|------|---------|
|        |      |         |
|        |      |         |
|        |      |         |

4.0 REGISTRATION PARTICULARS

4.1 IT Permanent Account No.(PAN):

4.2 & 4.3 State and central sales tax Registration No.:

4.4 ED/ Service Tax Registration No.:

PF Account No.:

Labour Licence No.:

ESI Account No.:

5.2 Contact person:

Mobile No. :

5.3 Total Number of employees:

| Graduates<br>(Engr./Scientists/Mgmt/Fin.) | Consultants | Workers      |             |           |
|---|-------------|--------------|-------------|-----------|
|   |             | Sup./Skilled | Semiskilled | Unskilled |
|   |             |              |             |           |
|   |             |              |             |           |

6.0 Wish to register for supplies/ services other than one bidding for :

| <u>Sr.No.</u> | <u>Service/Supplies</u> | <u>Capacity</u> |
|---------------|-------------------------|-----------------|
| <u>1</u>      |                         |                 |
| <u>2</u>      |                         |                 |
| <u>3</u>      |                         |                 |
| <u>4</u>      |                         |                 |
| <u>5</u>      |                         |                 |
| <u>6</u>      |                         |                 |
| <u>7</u>      |                         |                 |

6.1 Reference list :

(Only recognized public and private sector companies, attach if printed copy available)

| <u>Sr.No.</u> | <u>Customer</u> | <u>Volume / Year</u> |
|---------------|-----------------|----------------------|
| <u>1</u>      |                 |                      |
| <u>2</u>      |                 |                      |
| <u>3</u>      |                 |                      |
| <u>4</u>      |                 |                      |
| <u>5</u>      |                 |                      |
| <u>6</u>      |                 |                      |
| <u>7</u>      |                 |                      |

7.0 & 8.0 Infrastructure / facilities :

| <u>Sr.No.</u> | <u>Facility (with specifications)</u> | <u>Age/ Year procured</u> |
|---------------|---------------------------------------|---------------------------|
| <u>1</u>      |                                       |                           |
| <u>2</u>      |                                       |                           |
| <u>3</u>      |                                       |                           |
| <u>4</u>      |                                       |                           |
| <u>5</u>      |                                       |                           |
| <u>6</u>      |                                       |                           |
| <u>7</u>      |                                       |                           |
| <u>8</u>      |                                       |                           |
| <u>9</u>      |                                       |                           |
| <u>10</u>     |                                       |                           |

9.0 Registration with other BHEL Unit/Units:

| <u>Sr.No.</u> | <u>9.1.1 Unit</u> | <u>9.1.2 Registration No.</u> |
|---------------|-------------------|-------------------------------|
| <u>1</u>      |                   |                               |
| <u>2</u>      |                   |                               |
| <u>3</u>      |                   |                               |
| <u>4</u>      |                   |                               |

Any Other information :

Declaration:

The information furnished above is true and authentic.

**(CEO / Proprietor)**

**SEAL:**

**Date:**

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The competent authority reserves the right to accept or reject the registration. Registered vendors will be informed by mail / email, as convenient. Contact Sr.DGM (MM) for clarification/ additional information on registration.  
A separate communication will be sent to you in case of non-registration, citing reasons thereof.

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### **Instructions**

1. Answer all items, use NA for items not applicable.
2. BHEL units do not require this registration.
3. Submit the form in duplicate.
4. Use additional sheets for want of space if required.
5. Attach copies of latest documents in respect of items 4.0 (Registration no.s)
6. Photographs of registered office and the chief executive/proprietor shall be furnished.
7. Use A4 sheets for this document and the enclosures.

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\* REGISTERED BIDDERS, HAVING BHEL (R&D) REGISTRATION NO./ HAVE SUBMITTED THIS FORMAT EARLIER, NEED NOT FURNISH THIS INFORMATION SECOND TIME (UNLESS DESIRE TO UPDATE IT).



**BHEL CORPORATE R & D**  
**VIKAS NAGAR- HYDERABAD - 500 093**  
**ANDHRA PRADESH – INDIA**  
**SUPPLIER REGISTRATION FORM**

(FOREIGN SUPPLIER)

ALL COLUMNS SHOULD BE PROPERLY FILLED IN THE SPACE PROVIDED FOR. WHEREVER IT IS NOT APPLICABLE PLEASE WRITE “NOT APPLICABLE”. INCOMPLETE OR INCORRECT FORMS MAY NOT BE CONSIDERED.

**1.0 GENERAL INFORMATION:**

1.1....NAME OF COMPANY

1.2....DETAILS OF HEAD OFFICE:

ADDRESS :  
TELEPHONE :  
FAX :  
.EMAIL :  
.WEB SITE :

1.3....DETAILS OF FACTORY/WORKS:

ADDRESS :  
TELEPHONE :  
FAX :  
.EMAIL :  
.WEB SITE :

1.4....DETAILS OF MARKETING AGENT

ADDRESS :  
TELEPHONE :  
.FAX :  
.EMAIL :  
.WEB SITE :

1.5 CHIEF EXECUTIVE

NOTE: PLEASE ATTACH SEPARATE SHEETS, IF SPACE FOUND IS INADEQUATE

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AUTHORISED SIGNATORY

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**BHEL CORPORATE R & D**  
**VIKAS NAGAR – HYDERABAD – 500 093**  
**ANDHRA PRADESH – INDIA**

**SUPPLIER REGISTRATION FORM**

(FOREIGN SUPPLIER)

- 1.6 CONTACT PERSON(S)  
FOR PRODUCT OFFERED  
NAME(S)  
OFFICIAL CAPACITY  
ADDRESS:  
TELEPHONE  
FAX  
E-MAIL
- 1.7 YEAR OF ESTABLISHMENT
- 1.8 PRODUCTION CAPACITY PER ANNUM
- 1.9 PARTICULARS OF PRODUCT INCLUDING  
SPECIFICATION AND RANGE OFFERED  
FOR REGISTRATION  
( ATTACH BROCHERS AND CATALOGUE)
- 1.10 NAME(S) OF BANKERS
- 1.11 BANKER'S CERTIFICATE
- 1.12 PORT OF LOADING
- 1.13 NEAREST AIRPORT
- 1.14 NAME OF THE INDIAN AGENT, IF ANY  
WITH AUTHORISATION LETTER
- 1.15 ANY OTHER INFORMATION:

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AUTHORISED SIGNATORY

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**BHEL CORPORATE R & D**  
**VIKAS NAGAR – HYDERABAD – 500 093**  
**ANDHRA PRADESH – INDIA**

**SUPPLIER REGISTRATION FORM**

(FOREIGN SUPPLIER)

**2.0 FINANCIAL INFORMATION**

2.1...TOTAL CAPACITY

2.2...ANNUAL TURN OVER FOR LAST 3 YEARS

2.3...WHEHER CREDIT LICENSE ACCEPTABLE      YES/NO

**3.0    QUALITY MANAGEMENT SYSTEMS**  
**ENCLOSED FORMAT PART-B**

3.1    EXPERIENCE LIST FOR SAME/SIMILAR ITEMS  
TO BE ENCLOSED

**4.0.....FUTURE EXPANSION PLANS:**  
(GIVE DETAILS)

**5.0    LIST OF ENCLOSURES:**  
INCLUDING BROUCHERS, CATALOGUES, TECHNICAL  
LITERATURE etc...

**6.0    ANY OTHER INFORMATION**

SIGNATURE OF SUPPLIER  
NAME  
DESIGNATION  
DATE  
.....OFFICIAL SEAL

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AUTHORISED SIGNATORY

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