

BHARAT HEAVY ELECTRICALS LIMITED
HEEP: HARDWAR-249 403 (UA)
Fax: 01334-223948/226462, Phone: 285291
E-mail: asanyal@bhelhwr.co.in

No. Cap/OT/07

Date: 22nd Mar.'07

OPEN TENDER (EXPRESSION OF INTEREST)

1. Sealed tenders (expression of interest) with the Tender No. and opening date clearly super scribed on the cover are invited from the manufacturers for the supply of the following items:-
2. Last date for taking tender documents and opening of tenders is indicated against each tender. Tenders will be received up to 1.45 P.M. on opening date and opened on the same day at 2.00 P.M. in the Tender Room.
3. Intending vendors must remit the tender fee of Rs. 2,000.00 for indigenous supplies (equivalent foreign currency \$ 50.00 / € 40.00) from foreign vendors against each tender along with the requisite EMD in the form of bank draft while submitting the tender documents as detailed in "Instruction to Bidders", after down loading from this web site.
4. BHEL will not be responsible for any type of postal delay / incomplete information from vendor.
5. Other terms and conditions will be as per tender documents.

| Sl. No. | Tender No. | Description of Equipment | Qty. (Nos.) | Last date to get from BHEL | Opening date |
|---------|---------------|--|-------------|----------------------------|--------------|
| 1. | C6743/6/8356T | 45KW Medium Frequency Induction Brazing M/C (as per enclosed specification) | 03 | 07.05.07 | 08.05.07 |
| 2. | C6743/6/8355T | 100KW Medium Frequency Brazing M/C (as per enclosed specification) | 01 | 08.05.07 | 09.05.07 |

(A. Sanyal)
DGM (Capital Purchase)



BHARAT HEAVY ELECTRICALS LIMITED
HEEP HARIDWAR INDIA-PIN 249403
FAX NO: 0091 1334 226462/223948
PHONE NO: 0091 1334 285291

Enq. No.:

Date of issue: 22nd Mar.'07
Due Date:

M/S.....

.....

Sub: Tender Enquiry No..

Dear Sir,

We are pleased to invite Expression of Interest., strictly as per enclosed terms and conditions and instruction to bidders, in sealed covers for the under mentioned equipment/systems.

| S.N. | Description | Qty. | Delivery Required | EMD (Earnest Money Deposit) |
|------|---|------|-------------------|--|
| 1. | 45KW Medium Frequency Induction Brazing M/C as per enclosed Specifications | 03 | 30.12.2007 | Rs. 50,000.00/- (Fifty thousand only or equivalent Foreign currency) |
| 2. | 100KW Medium Frequency Brazing M/C as per enclosed Specifications | 01 | 30.12.2007 | Rs. 50,000.00/- (Fifty thousand only or equivalent Foreign currency) |

Please submit your Techno-Commercial offer only for the above requirement subject to our terms and conditions. Your offer should reach us on or before the due date by 1.45 PM.

Bids shall be opened of those vendors **ONLY AFTER ENSURING PROOF OF EMD AND TENDER FEE (PLEASE SUBMIT SEPARATE DRAFTS FOR EMD AND TENDER FEE {drawn in favour of BHEL Hardwar} IN ANOTHER ENVELOPE SUPERSCRIBED WITH BOLD LETTERS "EMD & TENDER FEE")** at 2 PM on the due date in the presence of authorized representatives of the bidders who may like to be present. The authorized representative should bring authority letter from their parent company (Manufacturer) for attending the bid opening. All Govt. of India / PSU / State Govt. entities are exempted from submission of EMD. Purchase preference will be given to CPSE s as per GOI notification no. DPE/13(12) 2003-Fin. Dated 26th Oct'04.

KINDLY READ "INSTRUCTIONS TO BIDDERS", QUOTATION NOT IN ACCORDANCE WITH THE ABOVE INSTRUCTIONS ARE LIABLE TO BE DISQUALIFIED AND IGNORED.

Thanking You,
Yours Faithfully,
For & ON BEHALF OF BHEL, HARDWAR

(A. Sanyal)
DGM (Purchase Capital)

INSTRUCTIONS TO BIDDERS FOR OPEN TENDER
(Expression of Interest)

Only those bids will be opened which has been submitted with requisite EMD & tender fee.

- 1.0 The tenders shall be submitted as Techno -Commercial Bid along with vendor evaluation form as described below on or before the due date.
- **The Quotation should be from the Principal / Original Manufacturer, failing which the quotation is likely to be ignored.**
 - Any corrections / amendments shall be properly & fully authenticated with signature.
- 1.1 TECHNO-COMMERCIAL BID shall comprise of following documents:
- a) Complete Technical offer in TWO sets (one original + one copy).
 - b) Catalogue of the Equipment,
Complete reference of the past supply of equipment for the same or similar specification giving details of customer with Name of the contact person, Fax no, phone no, E-mail if available.
 - c) General Terms & Conditions as per **Annexure-I**
 - d) Acceptance of commercial terms by vendor as per **Annexure II**.
 - e) Deviation with reference to specification to be laid down on separate sheet.
 - f) Validity of offer should be at least 180 days from tender opening.
 - g) Quality plan to be submitted on the prescribed format as per BHEL Quality requirements for approval, Quality plan should enclose vendor's own standard, test procedures, list of sub vendors for Bought out items cross-referred, if any.
 - h) Acceptance to submit Security Deposit and Performance Bank Guarantee as per enclosed format **Annexure-III**.
 - i) Warranty 24 months from commissioning of the equipment unless other wise specified in the technical specifications.
 - j) The rating of the company quoting for this tender from a third party (independent agency) preferably by M/S Dun and Bradstreet should be submitted. (DUN NUMBER), however this is not mandatory.
 - k) Any additional documents (please specify).
 - l) Consortium Bank List is at **Annexure-IV**. Bank Guarantees necessarily to be submitted through any of them.

The VREF duly filled up will be assessed for manufacturing capability, quality systems being followed, organizational soundness and financial worthiness.

- 2.2 The techno-commercial part and part containing vendor Registration/ evaluation form will be opened on the date and time specified in the covering letter, in the presence of those tenderers who wish to attend.
- 2.3 BHEL reserves the right to open the price bid (part-II) along with the opening of techno-commercial offer at its option and in that case vendor will be informed accordingly.

The decision to go for reverse auctioning or processing through supplementary bid will be solely at the discretion of BHEL management

3.0 MARKING OF ENVELOPE:

3.1 The following shall be subscribed on the envelopes:

1. EMD AND TENDER FEE. : is enclosed
2.
 1. TENDER NO. AND ITEMS DESCRIPTION.
 2. DUE DATE FOR OPENING.
 3. "TECHNO-COMMERCIAL BID"

Note: No price bid to be submitted along with this offer.

3.2 Envelopes not marked as above are liable to be ignored and will not be opened.

4.1 Tenders when finalized shall be in the name of the bidder only and change of name during tender evaluation (without certificate from registrar of company) and after submission of the tender is liable to make the offer ineligible for participation.

4.2 All test certificates / Guarantee certificates to be submitted in TRIPLICATE prior to despatch of materials for review and acceptance by BHEL.

IN CASE YOU ARE NOT MAKING AN OFFER AGAINST THIS ENQUIRY, THEN PLEASE ARRANGE TO SEND A LETTER OF REGRET IF YOU HAVE COLLECTED THE TENDER DOCUMENTS FROM BHEL / HAVE RECEIVED NIT AGAINST THIS TENDER.

Thanking You,

Yours faithfully,
For & on behalf of BHEL, Hardwar.

(A. Sanyal)
DGM (Capital Purchase)

GENERAL TERMS AND CONDITIONS OF RA

Against this enquiry for the subject item /system with detailed scope of supply as per enquiry specifications, BHEL may resort to “REVERSE AUCTION PROCEDURE” i.e., ON LINE BIDDING ON INTERNET.

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
3. BHEL will inform the vendor in writing in case of reverse auction, the details of Service Provider to enable them to contact & get trained.
4. Business rules like event date, time, Start price, bid decrement, extensions etc. also will be communicated through service provider for compliance.
5. Vendors have to fax the Compliance form in the prescribed format (provided by Service provider) before start of Reverse auction. Without this, the vendor will not be eligible to Participate in the event.
6. BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at “Total Cost to BHEL” like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the vendor to enable them to fill-in the price and keep it ready for keying in during the Auction.
7. Reverse auction will be conducted on scheduled date & time.
8. At the end of Reverse Auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to Fax the duly signed Filled-in prescribed format as provided on case-to-case basis to BHEL through Service provider within 24 hours of Auction without fail.
10. Any variation between the on-line bid value and the signed document will be considered as sabotaging the tender process and will invite disqualification of vendor to conduct business with BHEL as per prevailing procedure.
11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL’s standard practice.

Annexure-II

| TENDER NO. SL. NO. | DESCRIPTION | VENDOR'S CONFIRMATION |
|--|--|--------------------------|
| 1) <u>Payment terms:</u> | 80% of the material cost to be paid against delivery / dispatch documents. Balance 20% of material cost and E&C and proving charges will be paid after satisfactory erection & Commissioning. (Through Bank for Indigenous & L/C in case of Import). | |
| NOTE: | | |
| a) As per payment terms, minimum 20% will be released by BHEL after successful erection, commissioning and job proving. b) Further this 20% will be released against submission of performance bank guarantee valid for entire warrantee period from the date of commissioning. c) The security deposit is to be as per the tender condition. | | |
| Loading on payment terms if not agreed by vendor will be as follows: Loading: Advance amount, if any (Amount – X) 1.5% per month for the quoted delivery period for the amount 'X' Payment at the time of dispatch against shipping/dispatch documents (Amount Y): "1.5% per month for the amount X+Y exceeding 80% of contract value i.e. 1.5% of (X+Y-0.8Z) where Z is the contract value. As such loading of 6% will be done for imported and 3% for indigenous items." | | |
| In case any bidder does not accept any of the condition at (a) to (c) above then, their offer is likely to be rejected by BHEL and technical bid will not be processed, and no correspondence in this regards will be entertained | | |
| 1.2 <u>P.B.G. TERMS:</u> Performance Bank Guarantee to be submitted on the prescribed format equal to the value of 10% of the total order value valid WARRANTY / GUARANTEE agreed period. This bank guarantee in the format to be prescribed by BHEL shall have to be submitted before release of last balance payment. | | |
| 1.3 <u>CURRENCY OF PAYMENT:</u> (Euro / Dollar / CHF etc.) | | |
| 1.4 For indigenous supply the currency shall be Indian Rupees. | | |

| | |
|--|--|
| <p>1.2 SUPERVISION CHARGES: For Indian Suppliers: It should be quoted in Rupees.</p> <p>For Foreign suppliers: If supervision is being carried out by persons residing in India, it should be quoted in Indian Rupees.</p> | |
| <p><u>1.6 TAXES:</u></p> <p>All statutory taxes, if any, will be deducted at source & to be borne by the beneficiary. Tax deduction certificate shall be issued at the end of financial year if required.</p> | |
| <p><u>2. Security Deposit:</u></p> <p>Vendor has to submit security equal to the amount of 5% of the total order value in the currency of order within one month of receipt of order in the form of Bank Guarantee in BHEL format valid for two months beyond shipment.</p> | |
| <p><u>2.1 Submission of Bank Guarantee :</u></p> <p>All bank guarantee for security deposit as well as proforma bank guarantee should be from one of the BHEL consortium banks and the bank guarantee should be in the proforma as prescribed by BHEL. The performance bank guarantee as well as the list of consortium banks is displayed at BHEL web-site www.bhelhwr.co.in however, in case the bank guarantee is not from BHEL consortium banks, then the vendor has to confirm bank guarantee on consortium bank and the bank charges are to be borne by the bidder.</p> | |
| <p><u>3. Liquidated damages:</u></p> <p>L.D. shall be applicable for delayed delivery @ 0.5% per week and part thereof subject to a maximum of 10% for total P.O. value. If any vendor do not accept the LD @ of 0.5% per week and part thereof subject to a maximum of 5% of total PO value, their offer will be ignored. Vendors accepting LD terms different from the proposed terms of 0.5% maximum 10% will be loaded @ %age deviation from the range of 10% on their prices (FOB for imported and ex-factory for indigenous). If the vendor does not accept as above their offer is likely to be ignored and technical bid will not be processed.</p> | |
| <p><u>4) Delivery of the equipment:</u> * Categorically indicate time period required for delivery of the equipment.</p> <ul style="list-style-type: none"> Firm delivery period for the equipment to be stated w.e.f. date of LOI/ Order. <p>Commissioning & Handing over of complete system in weeks.</p> | |

| | |
|--|--|
| <p>5) <u>Settlement of Disputes:</u></p> <ul style="list-style-type: none"> • Settlement of disputes through arbitration shall be in accordance with Arbitration Rules of Conciliation and Arbitration of the ICC, Paris. The venue of arbitration shall be Delhi. The courts of Delhi shall have exclusive jurisdiction. • For Indigenous Source. The venue of arbitration shall be Haridwar Courts, which will have exclusive jurisdiction. | |
| <p>6) <u>Authorization of pre-inspection:</u></p> <p>BHEL is authorized to pre inspect the material at your works. The material will be dispatched only after getting clearance form BHEL .</p> | |
| <p>7) <u>Drawing / Data approval:</u></p> <p>Any drawing / data approval required from BHE after placement of order shall be the responsibility of the vendor and any delay on account of the same shall be the responsibility of the vendor and have no bearing on the penalty applicable.</p> | |
| <p>8) <u>Drawing / design / information use:</u></p> <p>_ The vendor will have to give an undertaking that the drawing / design / information enclosed with the enquiry / proposed order will not be parted to any agency and will also not be used for manufacturing for any other customer.</p> | |
| <p>9) <u>Time period for Foundation / Erection & Commission:</u></p> <p>_ Vendor will have to ensure deputation of their people for erection & commissioning or for attending to any complaint during guarantee period within 7 days of intimation. In case of delay BHEL will be within their rights to get the job completed at the risk and cost of the supplier.</p> | |
| <p>10) <u>5 Sets of O&M Manual:</u></p> <p>5 Sets of Operation & Maintenance Manual shall have to be supplied along with the equipment. Final payment will be released only after receipt of the required documentation.</p> | |
| <p>11) <u>Training:</u></p> <p>Vendor shall provide required training to BHEL personnel free of cost.</p> | |
| <p>12) <u>Purchasing of BOI items:</u></p> <p>Vendor shall purchase the BOUGHT OUT ITEMS only from vendors of repute and indicate the same to BHEL at the time of approval of GA drawing. BHEL reserves the right to visit / inspect the works of supplier and that of their sub contractors before or after placement of order.</p> | |

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|---|--|
| <p>13) <u>Spares, tooling, jigs and fixtures:</u> The equipment being new, above items shall be needed in bulk at a later stage. However two separate lists of spares, tooling, jigs and fixtures should be sent along with quotation.</p> <ol style="list-style-type: none"> 1. Items which you recommend very necessary to be available along with the equipment. 2. Item which may be required at a later stage. (The price validity of these items should be for a minimum period of two years from the date of commissioning of the equipment). | |
| <p>14) Warranty/ Guarantee: 24 months from the date of commissioning.</p> | |
| <p>15) Details of Contact person Name, Designation, Department complete postal, E-mail address & Fax no, phone, Mobile no. to be mentioned.</p> | |
| <p>16) Phyto sanitary Certificate essential for packages (Wooden).</p> | |
| <p>17) Validity: Validity of the offer should be 180 days from tender opening.</p> | |
| <p>18) Bank Charges: Bank Charges to be borne by vendor.</p> | |
| <p>Note: Attach separate sheet for additional information if necessary. The above terms & condition supersedes the terms & conditions found contradictory written else where in the tender enquiry.</p> | |

NOTES :-

- a) Item wise breakup of the prices shall be as per TECH. SPECIFICATION / DISCUSSIONS; ELSE, THE BID IS LIABLE FOR REJECTION.
 - b) Bidder to note that total price indicated above SL 1.1-1.6 shall be considered for evaluation and hence should be complete in all respects for the full scope defined and considering all terms and conditions. Optionals as indicated in specification will not be taken for evaluation.
 - c) Any item not included in this price quoted above and shown separately will not be taken cognizance of and shall be ignored while evaluation.
- 3.0 Total weight -- /Gross / Net in Kg. Also package size essentially should be indicated if not exact then approximate.
- 4.0 Following details shall be provided in separate Annexure.
A) Unit prices for variable items.
B) Prices for any other OPTIONAL items.
- 5.0 **Excise duty:** Concession forms requirements etc. to be stated wherever applicable.

NOTE:

1. BHEL will evaluate the technical bids against essential criteria/requirements. BHEL may seek clarifications, if required, from the qualified bidders only. These clarifications will be communicated to the eligible vendors and they will be asked to attend techno-commercial discussions on specified dates. The bidders will be given 15 days notice to come prepared with the required documents/ clarifications. No extension will be given. **The offers of those bidders, who are unable to respond in this time frame, are likely to be ignored.**
2. The vendors found technically acceptable against their original technical offer and subsequent technical discussion BHEL will communicate equivalent scope of supply to the qualified bidders who will be required to submit their final bid in two parts. Un-priced technical part-I & price bid part-II **OR** vendor will be furnished a common scope and will be made to participate in the process of reverse auction if required.
It is clarified that no correspondence – technical or commercial – other than the above bids is permissible. In case any uncalled for correspondence– technical or commercial – is received, the same will be ignored and entire bid also may be ignored. It is also clarified that no commercial discount will be acceptable.
3. All the bidders whose offers have been accepted by BHEL will be given one-week notice for opening price bid.

Date

Signature

Name

Designation

Department

M/S

LIST OF CONSORTIUM BANK

- | | |
|---|--|
| <p>1. State Bank of India CAG Branch, 10-th Floor, Vijaya Building, Barakhamba Road, New-Delhi-110001</p> | <p>10. HDFC Bank Ltd 5th Floor, HT House, K G Marg, New-Delhi-110001</p> |
| <p>2. Canara Bank 74, Janpath, New-Delhi-110001</p> | <p>11. CITI Bank N A Jeevan Vihar Building, Sansad Marg, New-Delhi-110001</p> |
| <p>3. Punjab National Bank 74, Janpath, New-delhi-110001</p> | <p>12. Standard Chartered Bank H2 Block, Connaught place, New-Delhi-110001</p> |
| <p>4. Bank of Baroda Corporate Banking Branch, 11th Floor, BOB Building, Sansad Marg, New-Delhi-110001</p> | <p>13. ICIC Bank Ltd. ICIC Tower, Bisham Pitamah Marg, Pragati Vihar, New Delhi 110003</p> |
| <p>5. Deutsche Bank Tolstoy Marg, New-Delhi-110001</p> | <p>14. IDBI Bank Ltd. 19, K G Marg, Surya Kiran Building, New-Delhi-110001</p> |
| <p>6. State Bank of Hyderabad Surya Kiran Building, K. G. Marg, New-Delhi-110001</p> | <p>15. HSBC Ltd. ECE House, 28 KG Marg, New-Delhi-110001</p> |
| <p>7. State Bank of Mysore Antriksh Bhawan, K. G. Marg, New-Delhi-110001</p> | |
| <p>8. State Bank of Mysore Industrial Finance Branch, Ramanashree Arcade, MG Road, Bangalore-560001</p> | |
| <p>9. State Bank of Travancore Travancore House, IF Branch, K G Marg, New-Delhi-110001</p> | |



ANNEXURE-IV

WAM-28

Proforma for Bank Guarantee

In consideration of the Bharat Heavy Electrical Limited Siri fort N. Delhi through Division HEEP Hardwar (hereinafter called the Company') having agreed to exempt ----- (hereinafter called 'the said Contractor' which term includes 'Suppliers' for the purpose of this Bond) from the demand under the terms and conditions of an Agreement date. ----- Made between ----- and ----- -- for (hereinafter called 'the said Agreement') of Security Deposit for the due fulfillment by the said Contractor of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs. ----- (Rupees-----only).

1. We, ----- (Indicate the name of the Bank) (hereinafter referred to as 'the Bank') at the request of----- (Contractor (s) do hereby undertake to pay to the Company an amount not exceeding Rs. ----- against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reason of any breach by the said Contractor (s) of any of the terms and conditions contained in the said Agreement.
2. We, ----- do hereby undertake to pay the amounts due and (indicate the name of the Bank) payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s), of any of the terms of conditions contained in the said Agreement or by reason of the contractor(s), failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.---- .
3. We undertake to pay to the Company any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.

4. We, ----- further agree that the Guarantee herein contained (indicate the name of the Bank) shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till ----- Office / Department / Division of Bharat Heavy Electrical Limited certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor(s) and accordingly discharged this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the ----- we shall be discharged from all the liability under this guarantee thereafter.
5. We, -----, further agree with the Company that the (indicate the name of the Bank) Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the power exercisable by the company against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the company or any indulgence by the company to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.
6. This guarantee will not be discharged due to the change in the constitution of the Bank or the contractor(s).
7. We,----- lastly undertake not to revoke this guarantee during its (indicate the name of Bank) currency except with the previous consent of the Company in writing.

Date the -----day of -----
For -----

(Indicate the name of the Bank)

| TECHNICAL SPECIFICATION FOR 45 KW MEDIUM FREQUENCY INDUCTION BRAZING MACHINE TECHNICAL SPECIFICATION NO. EMT- 6709 REV. 00 | | | | | |
|---|--|--|---------|-----------|---------|
| SL. NO | DESCRIPTION OF BHEL REQUIREMENT | REQUIRED | OFFERED | DEVIATION | REMARKS |
| 1.0 | PURPOSE : | | | | |
| | 45 KW Medium Frequency Induction Brazing Machine will be used for brazing of the joints as per Annexure -I and Annexure - II. | | | | |
| 2.0 | SCOPE OF SUPPLY : | | | | |
| | The scope of supply includes design, manufacturing, supply, erection, commissioning and proving of the performance of the machine at BHEL Haridwar works. | | | | |
| 3.0 | JOB DESCRIPTION AND TECHNICAL REQUIREMENT OF JOB : | | | | |
| 3.1 | Job Description : Brazing of water box bottom part as per Annexure -I and brazing of copper flat of rotor coil of large size Turbogenerator as per Annexure -II. | | | | |
| 4.0 | TECHNICAL SPECIFICATION OF 45 KW MEDIUM FREQUENCY INDUCTION BRAZING MACHINE : | | | | |
| 4.1 | Main Parameters : Continuous output power : 45 KW Frequency Range : 10 to 30 KHz Medium frequency induction brazing machine should consist of following major items like Frequency Converter, Co-axial Transformer, Brazing Inductor, Chilling Unit, Mobile Trolley. Controller, Radiation Pyrometer etc. | Vendor to confirm | | | |
| 4.2 | FREQUENCY CONVERTER : | | | | |
| 4.2.1 | Frequency converter will vary the frequency range between 10 to 30 KHz automatically as per job requirement | Vendor to confirm | | | |
| 4.2.2 | Front display board should indicate the following parameters of the machine - DC voltage and current, output power, frequency, temperature of brazing joint though radiation pyrometer etc. . | Vendor to confirm and submit the details | | | |

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|-------|--|---|--|--|--|
| 4.2.3 | Frequency converter should be cooled by forced cooling water NOTE : Normal drinking water supply available at the shop floor, will be used for this purpose. Suitable partition / barrier must be provided between the water cooled items and non water cooled items in the cubicle of frequency converter so that in the event of water leakage, remaining items are not affected or damaged. | Vendor to confirm and submit the details | | | |
| 4.3 | CO-AXIAL TRANSFORMER ; | | | | |
| 4.3.1 | Light weight, cylindrical configuration , water cooled Co-axial Transformer easy to manoeuvre on and around the brazing joint, is to be supplied. Co-axial Transformer will be connected to frequency converter by 5 meter long and light weight flexible cable. Size and weight of Co-axial transformer and arrangement for holding / hanging Co-axial Transformer, is to be indicated in the offer. | Vendor to confirm and submit the details | | | |
| 4.3.2 | Normal drinking water available at shop floor will be used for cooling the Co-axial Transformer, | Vendor to confirm | | | |
| 4.3.3 | Suitable mobile stand with good quality spring balancer is to be supplied for hanging the Co-axial Transformer | Vendor to confirm and submit the details | | | |
| 4.3.4 | For fixing the brazing inductor on the mouth of Co-axial Transformer, <u>screw type of joint will not acceptable.</u> | Vendor to confirm and submit the details | | | |
| 4.4 | BRAZING INDUCTOR : Water cooled brazing inductor suitable for the joint as per Annexure I and Annexure II, are to be supplied. | Vendor to submit the sketch of brazing inductor | | | |
| 4.4.1 | Brazing inductor must be leak proof and quick fitting arrangement for fixing the same at the mouth of Co-axial Transformer. In this regard Sl. no. 4.3.4 is also to be referred. | Vendor to confirm and submit the details | | | |
| 4.5 | CHILLING UNIT : | | | | |
| 4.5.1 | Chilling unit will consist of effective and reputed make chiller, high performance circulating pump, leak proof and quick end fitting coupling for incoming and outgoing water connection between the chiller and frequency converter. Make and specification of chiller and pump, is to be furnished in the offer. | Vendor to confirm and submit the details | | | |
| 4.5.2 | Suitable end fitting complete with leak proof stop cock and nozzle is to be supplied on chiller for first filling and make up water. Similarly overflow connection is to be provided along with the level indicator. One connection end along with fitting is to be provided for draining out the water from storage tank. | Vendor to confirm and submit the details | | | |

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|-------|---|------------------------------|--|--|--|
| 4.5.3 | The complete chilling unit along with all joints and fittings must be sealed hermetically | Vendor to confirm | | | |
| 4.5.4 | Overall dimensions of chilling unit is to be furnished in the offer | Vendor to submit the details | | | |

| | | | | | |
|-------|--|--|--|--|--|
| 4.6 | MOBILE TROLLEY : | | | | |
| 4.6.1 | Separate mobile trolley for frequency converter (Sl. no. 4.2) and chilling unit (Sl. no. 4.5) is to be supplied. Each mobile trolley will be complete with minimum 4 nos. good quality nylon wheels and suitable handle to steer the frequency converter and chilling unit, at shop floor as and when required. Size of the trolley is to be indicated in the offer. | Vendor to confirm and submit the details | | | |
| 4.6.2 | Suitable lifting rod with eye / other arrangement is to be provided on the top base of the trolley to shift and transport the frequency converter (Sl. no. 4.2) and chilling unit without water (Sl. no. 4.5) inside the work shop, with the help of overhead crane. | Vendor to confirm and submit the details | | | |
| 4.7 | CONTROL : | | | | |
| 4.7.1 | One main controller with programmable temperature control for setting of time during heating mode, soaking mode, total time for brazing, power required for the brazing operation etc., is to be supplied on the front panel of the cubicle of frequency converter. Make, model and details of the controller is to be furnished in the offer. | Vendor to confirm and submit the details | | | |
| 4.7.2 | RADIATION PYROMETER : Make, Model and Specification details of radiation pyrometer is to be furnished in the offer, for the indication of temperature of brazing joint during entire brazing cycle. Suitable arrangement is to be provided for fixing the radiation pyrometer on outer body of Co-axial Transformer (Sl. no. 4.3). | Vendor to confirm and submit the details | | | |
| 4.7.3 | Switch On button is to be provided on the arrangement clamped on the Co-axial Transformer (4.3) for making the power circuit ON and OFF | Vendor to confirm | | | |
| 4.7.4 | FOOT PEDAL SWITCH : Additionally one number foot pedal switch is to be provided for switching ON and OFF the power circuit for brazing operation, in case the controller is not used. NOTE : Price of the foot pedal switch is to be quoted separately. | Vendor to confirm and submit the details | | | |
| 5.0 | GENERAL ARRANGEMENT DRAWING OF THE CUBICLE OF FREQUENCY CONVERTER, CHILLING UNIT, MOBILE STAND FOR HANGING THE CO-AXIAL TRANSFORMER : | | | | |

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| 5.1 | General arrangement drawing of the offered Medium Frequency Induction Brazing machine including the schematic sketch / technical leaflet / photograph of main equipment, chilling unit, mobile stands for hanging the Co-axial transformer, total plan area, overall size and weight of the equipment, total power requirement etc. are to be furnished. | Vendor to submit the details | | | |
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| 6.0 | OPERATIONAL & MAINTENANCE MANUAL OF MEDIUM FREQUENCY INDUCTION BRAZING MACHINE AND CHILLING UNIT : | | | | |
| 6.1 | 5 sets of operational & maintenance manual in English language, will be supplied with the machine. Out of these 5 sets, one set of manual is to be supplied on CD | Vendor to confirm | | | |
| 6.2 | NOTE : In addition to other information, O&M Manual should contain the following also : | Vendor to confirm | | | |
| 6.2.1 | Erection Manual | Vendor to confirm | | | |
| 6.2.2 | Detail Operation Manual | Vendor to confirm | | | |
| 6.2.3 | Detail Maintenance Manual | Vendor to confirm | | | |
| 6.2.4 | Electrical wiring diagram indicating the layout of the cables, plugs, junction box, terminal strips etc | Vendor to confirm | | | |
| 6.2.5 | Ladder Diagram / Statement list | Vendor to confirm | | | |
| 6.2.6 | Cross reference list | Vendor to confirm | | | |
| 6.2.7 | I / O / F list | Vendor to confirm | | | |
| 6.2.8 | Alarm list and fault diagnostic manual | Vendor to confirm | | | |
| 6.2.9 | Programming manual of PLC | Vendor to confirm | | | |
| 6.2.10 | Complete back up of PLC program / control program on CD | Vendor to confirm | | | |
| 6.2.11 | Operation & maintenance manual of all auxiliary systems / equipment | Vendor to confirm | | | |
| 6.2.12 | Electrical wiring circuit of all auxiliary system / equipment | Vendor to confirm | | | |
| 6.2.13 | Safety instruction for the operation of the Medium Frequency Induction Brazing Machine and its auxiliaries | Vendor to confirm | | | |
| 6.2.14 | Detailed equipment Parts List along with OEM address should be supplied. | Vendor to confirm | | | |
| 7.0 | POWER SUPPLY AND ENVIRONMENT CONDITION : | | | | |
| 7.1 | BHEL will provide input power supply 3 phase, 3 wire, 415 + / - 15% volt, 50 + / - 3% Hz to main control cubicle / panel of Medium Frequency Brazing Machine at single point and remaining wiring for the control cubicle to other auxiliaries / equipment, will be in the scope of the vendor. There will be no neutral wire and earthing will be provided through shop structure column. | Vendor to confirm | | | |
| 7.2 | Uninterrupted Power Supply (UPS) device of at least for 15 minutes duration of reputed make to be supplied. In case of foreign vendor, UPS shall be offered by their Indian agent in Indian Rupees. | Vendor to confirm and submit the details | | | |

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| 7.2.1 | When switching off the Medium frequency Induction Brazing Machine or when sudden power interruption, UPS device will give message to the operating system. All open files then are closed automatically. During this period, the UPS will be supplying power to the control. UPS will also protect the control against power spikes and power fluctuation | Vendor to confirm | | | |
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| 7.3 | Environment Condition : | | | | |
| | Machine and other auxiliaries should be suitable for tropical condition with ambient temperature from 0 to 50 degree Centigrade and relative humidity maximum 96 % | Vendor to confirm | | | |
| 7.4 | Noise Level : | | | | |
| 7.4.1 | Maximum noise level of equipment / air compressor / any accessory, should be below 85 dB(A) at normal operation, one meter away from the machine with correction factor for background noise. Refer Sl. No. 8.0 also. | Vendor to confirm | | | |
| 7.4.2 | Vendor will demonstrate the noise level as per international standard like DIN 45635-16, if asked for. | Vendor to confirm | | | |
| 7.5 | Voltage Stabilizer : | | | | |
| | Suitable servo-controlled voltage stabilizer of NEEL / SUVIK / SERVOMAX / AUTOMATIC ELECTRIC (all these are Indian make) and of appropriate rating shall be supplied and connected to the equipment. The Oil / Air Cooled Servo Controlled Voltage Stabilizer (of above make) should be supplied for the complete operation of the Medium frequency Induction Brazing Machine, its auxiliaries & controls, PLC etc. for unbalanced load and power supply conditions as stated in Sl. No. 7.1. Catalogue of the same will be submitted along with the offer. In case of foreign vendor, Voltage Stabilizer should be supplied by their Indian agent in Indian Rupees. | Vendor to confirm | | | |
| 7.6 | Ultra Isolation Transformer : | | | | |
| | Ultra Isolation Transformer (of reputed Indian make like NEEL / SUVIK / SERVOMAX / AUTOMATIC ELECTRIC) suitable for complete Medium Frequency Induction Brazing machine, its auxiliaries and control, PLC etc for unbalanced load & power supply condition as stated in Sl. No.7.1. Catalogue of the same will be submitted along with the offer. In case of foreign vendor, Ultra Isolation Transformer should be supplied by their Indian agent in Indian Rupees. | Vendor to confirm | | | |
| 8.0 | AIR COMPRESSOR : | | | | |
| | As per the requirement of pneumatic system provided in the Medium Frequency Induction Brazing machine, suitable capacity and reputed Indian make air compressor with drier , is to be offered. Maximum noise level of air compressor should be below 85 dB(A), one meter away from the air compressor. Refer Sl. No. 7.4.1 also. | Vendor to confirm and submit the details | | | |

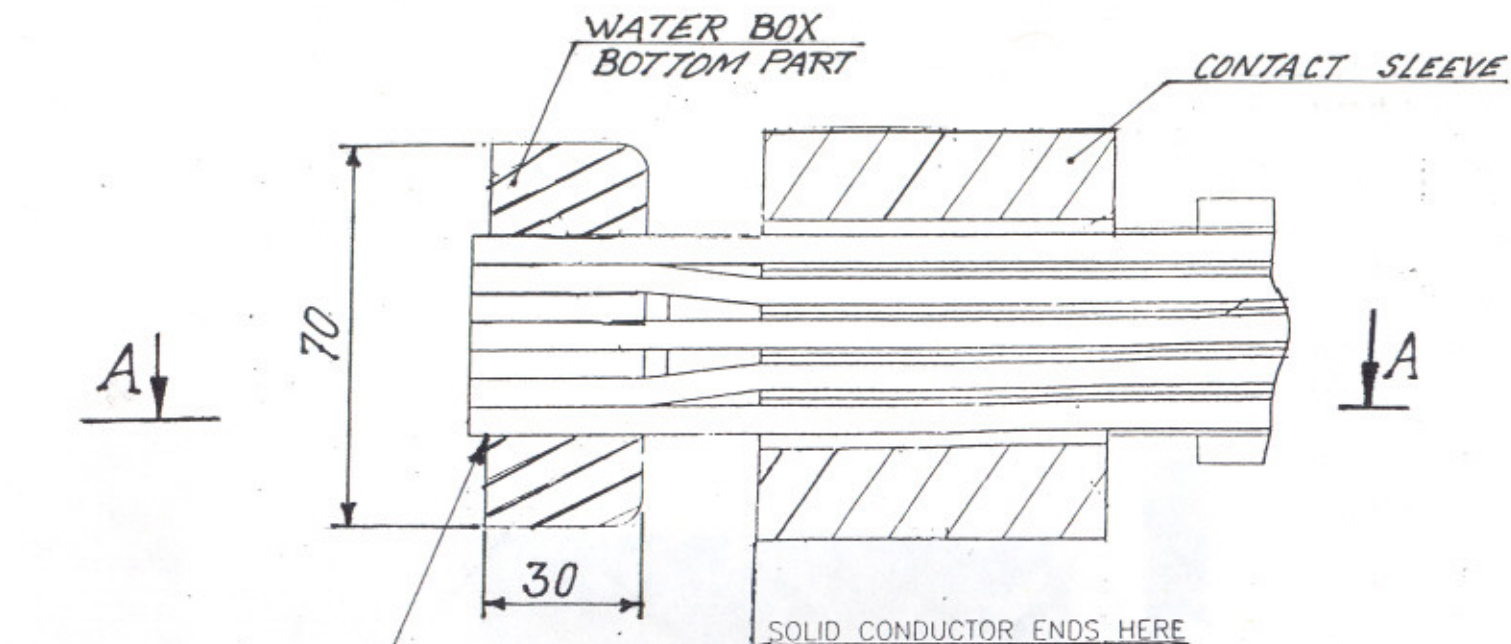
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| 9.0 | OTHER ESSENTIAL ITEMS : | | | | |
| | Full description along with the quantity and price of the items not covered at Sl. No. 4.0 to 8.0 above but are essential for operation & control, installation, commissioning of the Medium Frequency Induction Brazing Machine and its auxiliaries, shall be offered. | Vendor to confirm and submit the details | | | |
| 10.0 | TELE-DIAGNOSTIC SERVICE PACAKAGE (OPTIONAL): | | | | |
| 10.1 | Tele- diagnostic service pacakage consisting of modem and other hardware with all necessary software packages for remote diagnostic of control system shall be provided. With this facility, control system can be looked at and operated from remote PC of the vendor, so that errors can be recognized and changes / corrections can be made from the vendor's end. Separate price is to be indicated in commercial offer, as an optional item. | Vendor to confirm and submit the details | | | |
| 11.0 | SPARES (OPTIONAL) : | | | | |
| | Set of spares required for 2 years trouble free operation of the Medium Frequency Induction Brazing Machine and other accessories including one no. Co-axial Transformer | Vendor to confirm | | | |
| 11.1 | Mechanical | Vendor to submit the details | | | |
| 11.2 | Electrical | Vendor to submit the details | | | |
| 11.3 | Electronics | Vendor to submit the details | | | |
| 11.4 | Control system | Vendor to submit the details | | | |
| 11.5 | CPU Unit | Vendor to submit the details | | | |
| 11.6 | Pneumatic | Vendor to submit the details | | | |
| 11.7 | Detailed item wise-price list of the spares along with name and address of suppliers for all bought out items to be offered against each of the above categories along with quantity recommended. | Vendor to submit the details | | | |
| 11.8 | Vendor will furnish offer validity of two years for the spares after erection and commissioning of the Medium Frequency Induction Brazing Machine and other accessories | Vendor to confirm | | | |

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| 12.0 | PAINTING : | | | | |
| 12.1 | Medium Frequency Induction Brazing Machine, control panel and other auxiliaries / accessories will be painted by RAL 7038 Grey paint or mutually agreed. | Vendor to confirm | | | |
| 12.2 | NOTE : Vendor will repair the paint with original paint in case the same is damaged in transit / erection, before commissioning the Medium Frequency Induction Brazing Machine and other auxiliaries. | Vendor to confirm | | | |
| 13.0 | PRE-ACCEPTANCE OF MEDIUM FREQUENCY INDUCTION BRAZING MACHINE, CHILLING UNIT OTHER AUXILIARIES AT VENDOR'S WORKS : | | | | |
| 13.1 | Pre-acceptance of Medium Frequency Induction Brazing Machine with test pieces mutually agreed, will be witnessed by BHEL engineers deputed for training (Sl. No. 14) at vendor's works. | Vendor to confirm | | | |
| 13.2 | NOTE : Test pieces required for brazing operation during pre-acceptance test at vendor's works, will be arranged by the vendor. | Vendor to confirm | | | |
| 14.0 | TRAINING : | | | | |
| 14.1 | Training of three BHEL engineers for 2 weeks / mutually agreed period, | Vendor to confirm | | | |
| 14.1.1 | Operation of Medium Frequency Induction Brazing Machine and accessories | Vendor to confirm | | | |
| 14.1.2 | Mechanical / Pneumatic maintenance of the Medium Frequency Induction Brazing Machine and other auxiliaries | Vendor to confirm | | | |
| 14.1.3 | Electrical, Electronics and CNC maintenance of Medium Frequency Induction Brazing Machine and other auxiliaries | Vendor to confirm | | | |
| 14.2 | Vendor shall quote for the charge of training if any, per man & per day basis | Vendor to confirm | | | |
| 15.0 | ERECTION & COMMISSIONING OF THE MEDIUM FREQUENCY INDUCTION BRAZING MACHINE AND OTHER ACCESSORIES : | | | | |
| 15.1 | Vendor shall take full responsibility for carrying out the erection, start up, testing of the Medium Frequency Induction brazing machine, its control & all types of other supplied equipments / accessories etc. Service requirement like power, air and water shall be provided by BHEL at only one point, to be indicated by the vendor in their layout drawings. Other requirement like crane (capacity of EOT Crane in the shop is 2 Ton only) and helping personnel will be provided by BHEL. Details of these requirements should be informed / discussed by the vendor and agreed with BHEL in advance. In case higher capacity crane is required, representative of vendor shall hire mobile crane from local sources. Compressed air pressure available in BHEL shop, is in the order 3.0 kg / square centimeter. | Vendor to confirm | | | |

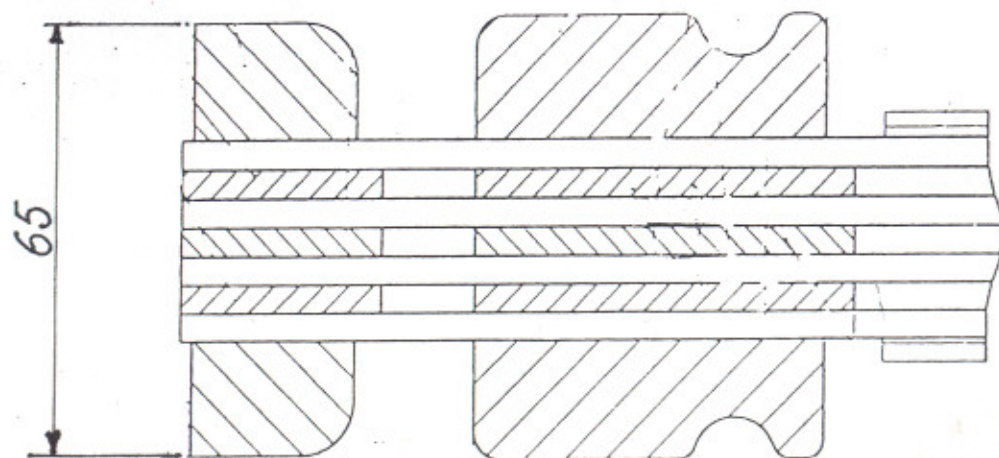
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| 15.2 | Erection & Commisioning of Voltage Stabilizer, Isolation Transformer, Air Compressor and other accessoeries with all electrical & mechanical connections, shall be responsibility of the vendor. | Vendor to confirm | | | |
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| 16.0 | JOB PROVING AND FINAL ACCEPTANCE OF THE 45 KW MEDIUM FREQUENCY INDUCTION BRAZING MACHINE AT BHEL WORKS : | | | | |
| 16.1 | Complete and successful brazing operation of minimum 4 nos. brazing joint as per attached Annexure I and Annexure II, shall be done by the vendor. | Vendor to confirm | | | |
| 16.2 | Final acceptance of Medium Frequency Induction Brazing Machine shall be made at BHEL Hardwar works after completion of following activities | Vendor to confirm | | | |
| | i) Demonstration of all features of Medium Frequency Induction Brazing Machine, Chilling Unit, its control system & other accessories to the satisfaction of BHEL | Vendor to confirm | | | |
| | ii) Successful brazing operation of the job | Vendor to confirm | | | |
| | iii) Training of BHEL operators in operation of complete Medium frequency Induction Brazing machine, Chilling Unit, its control system and all the accessories etc. by the vendor's experts during the period of commissioning and proving at BHEL works | Vendor to confirm | | | |
| | NOTE : Separate price if any, is to be indicated in the commercial bid of the offer, for proving of the Medium frequency Induction Brazing Machine at BHEL works. | Vendor to confirm | | | |
| 17.0 | GUARANTEE : | | | | |
| | Guarantee for complete Medium Frequency Induction Brazing machine, Chilling Unit, Control, software and all supplied accessories / equipments for 24 months from the date of final acceptance of the machine. Any spare required during guarantee period shall have to be arranged by the vendor free of cost and duty leived have to be borne by the vendor | Vendor to confirm | | | |
| 18.0 | QUALITY PLAN : | | | | |
| | Vendor shall submit Quality Plan within two months after issue of Purchase Order. | Vendor to confirm | | | |
| 19.0 | PACKING : | | | | |
| | Sea worthy (in case of foreign vendor) and rigid packing for all items of complete Medium Frequency Induction Brazing Machine, Chilling Unit, its Control Panel, all accessories and other supplied items to avoid any damage / loss in transit. All small and loose items like spares etc., should be suitably packed in wooden boxes. | Vendor to confirm | | | |
| 20.0 | GENERAL INFORMATION : | | | | |
| | All the information and drawing attached with tender document are exclusive property of BHEL Hardwar. Under any circumstances these information as stated above, must not be passed on to any third party without prior permission of BHEL and must not be used directly or indirectly detrimental to the interest of BHEL. | Vendor to confirm | | | |

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| 21.0 | QUALIFYING CONDITIONS : | | | | |
| | <p>Offer of only those vendors will be considered who have supplied and installed at least one number 45 KW or above medium frequency induction brazing machine for brazing copper to copper functionally similar for the brazing operation as described in Sl. no. 1.0 of this Technical Specification, in last five years and it is working satisfactorily for at least one year after commissioning the machine.</p> <p>Supporting documents like copy of purchase order / original performance certificate from the customer, is to be submitted along with the former.</p> <p>Vendors may note that reference / performance certificate of supplying induction heating equipment for the processes like annealing, tempering, hardening , drying, curing and bonding etc. <u>other than Induction Brazing of coper to copper will be ignored.</u></p> | Vendor to submit the details | | | |
| | i) Name of the company / customer, where 45 KW and above Medium Frequency Induction Brazing Machine(s) is (are) installed | Vendor to submit the details | | | |
| | ii) Complete postal address of the company / customer | Vendor to submit the details | | | |
| | iii) Year of commissioning | Vendor to submit the details | | | |
| | iv) Application for which the machine is installed | Vendor to submit the details | | | |
| | v) Name and designation of the contact person of the company / customer | Vendor to submit the details | | | |



TO BE BRAZED USING
BRAZING WIRE BY FACE FEEDING.

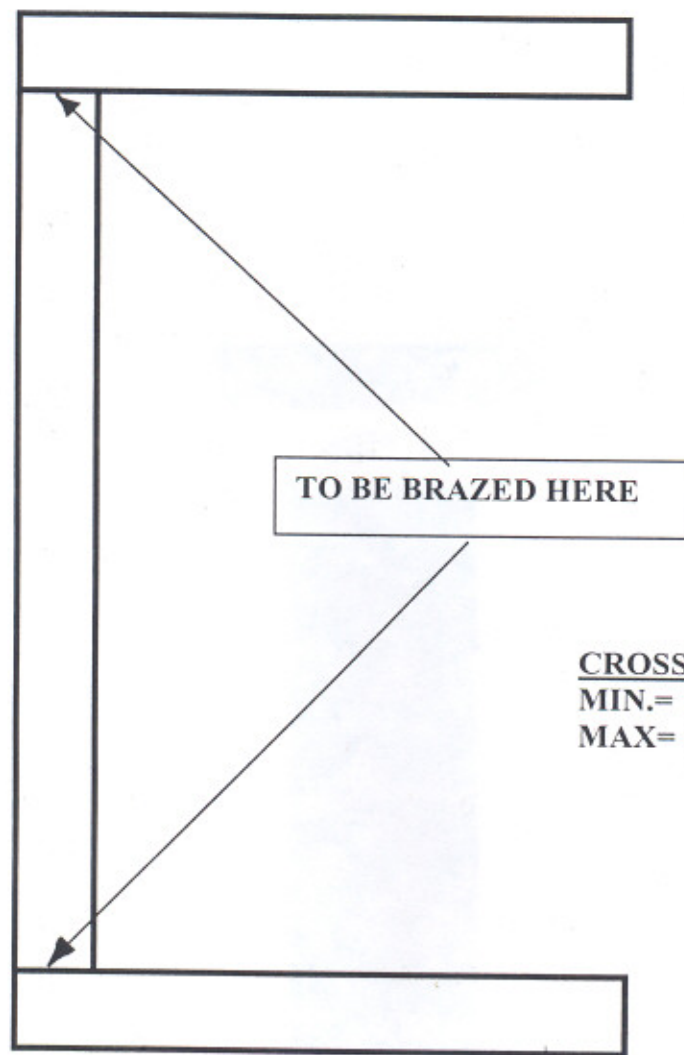


SECTION A-A

NOTE :-

1. CONTACT SLEEVE IS TO BE BRAZED WITH 100KW INDUCTION BRAZING MACHINE.
2. WATER BOX BOTTOM PART IS TO BE BRAZED WITH 45 KW INDUCTION BRAZING MACHINE.
3. BRAZING OF CONTACT SLEEVE AND WATER BOX BOTTOM PART, WILL BE CARRIED OUT IN ONE SETTING.

ANNEXURE-II



CROSS-SECTION :
MIN.= 3 MM X30 MM
MAX= 50 MMX20 MM

QUALITY PLAN FOR CAPITAL MACHINE TOOLS

| BHEL QC-178 | | | NAME OF SUPPLIER-----NAME OF EQUIPMENT----- - Q.P NO.-----REV NO.-----INDENT NO----- SPECIFICATION NO.-----REV NO.----- | | | | | | SHEET-----OF----- * P-PERFORMANCE 1.BHEL REP W-WITNESSED BY 2.VENDOR V-VERIFIED BY 3.SUB - VENDOR FINALLY TO BE REVIEWED BY BHEL HARDWAR | | | |
|----------------|-----------------------------------|--|--|---|--|--------------------------------|------------------|-------------------|---|----|----|---------|
| SL. NO. | MAJOR COMPONENTS / SUB ASSEMBLIES | DETAILS OF COMPONENTS GOING IN THE ASSLY 'COL-2' | CLASSIFICATION MATERIAL GRADES | TYPE OF CHECKS (SEE DETAILS AT ANNEX-I) | QUANTUM OF TEST REFERENCE DOCUMENT FOR TESTING | REFERENCE DOCUMENT FOR TESTING | ACCEPTENCE NORMS | FORMAT OF RECORDS | AGENCY FOR TESTING (TO BE PROPOSED BY VENDOR)* | | | REMARKS |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| | | | | | | | | | | | | |

Prepared by:
 (Signature and seal of the Head of
 Quality Management Of Supplier's works)
NOTE: Annexure-I is enclosed herewith

Approved by:
BHEL Hardwar
 (Signature & Seal of Approving Authority)

TYPE OF CHECK FOR COL. NO. 5

| Code | Description | Code | Description |
|------|--------------------------------------|------|---|
| 1. | Visual | 17. | No Load / Free running Test |
| 2. | Dimensional | 18. | Load / Over Load Test |
| 3. | Fitment and alignment | 19. | Measurement of speed / RPM |
| 4. | Physical Test (Sample) | 20. | Surface Finishing |
| 5. | Chemical Test (Sample) | 21. | Manufacturing Test Certificate for Bought |
| 6. | Ultrasonic Test (UT) | | Out Items (BOIs) |
| 7. | Magnetic Particle Test (MPI) | 22. | Internal Inspection Report by Contractor |
| 8. | Radiography Test (RT) | 23. | Hardness Test |
| 9. | Dye Penetration Test (DPT) | 24. | Acoustical Test |
| 10. | Welder's Qualification Test | 25. | High Voltage (HV) Test |
| 11. | Heat Treatment | 26. | Megger Test |
| 12. | Pressure Test Leakage Test Balancing | 27. | Circuit / Continuity Check |
| 13. | Leakage | 28. | Simulation Checking |
| 14. | balancing | 29. | Any other relevant tests to Assure the |
| 15. | Vibration Test | | performance of the Equipment |
| 16. | Performance | 30. | Proof Testing at BHEL Hardwar |