

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

No. Cap/OT/06

Date: 6th Nov.'06

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.	C6130/6/4474T	Oxygen Plant Capacity 80 CUB meter (as per enclosed specification)	02	18.12.06	19.12.06
2.	C6743/6/4110T	Finished Machined Steel Casting (Supporting plate) Standard No. AA19511, Drawing No. R7082.0111 Standard No. AA19511, Drawing No. R7082.0112 Standard No. AA19511, Drawing No. R7082.0113 (as per enclosed specification)	04 04 04	19.12.06	20.12.06
3.	C3991/6/4900T	Centralized Conveyor System (as per enclosed specification)	01	20.12.06	21.12.06

(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: 6th Nov.'06
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.	Oxygen Plant Capacity 80 CUB meter as per enclosed Specifications	02	30.10.2007	Rs. 1,00,000.00/- (One lac only or equivalent Foreign currency)
2.	Rough Machined Steel Casting (Bed plate) Standard No. AA19511, Drawing No. R7082.0111 04 Standard No. AA19511, Drawing No. R7082.0112 04 Standard No. AA19511, Drawing No. R7082.0113 04 as per enclosed Specifications		30.06.2007	Rs. 1,00,000.00/- (One lac only or equivalent Foreign currency)
3.	Centralized Conveyor System as per enclosed Specifications	01	10.08.2007	Rs. 1,00,000.00/- (One lac only or equivalent Foreign currency)

Please submit your Techno-Com mercial 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 SEPAR ATE 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"
 4. VENDOR REGISTRATION FORMS ENCLOSED

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>	

<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>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)



CORPORATE PURCHASE SPECIFICATION

AA 195 11

Rev. No. 09

PREFACE SHEET

CARBON STEEL CASTINGS - FUSION WELDING QUALITY

FOR INTERNAL USE ONLY
REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS

Comparable Standards:

1. AMERICAN : ASTM A 216 - 1993
Gr: WCC

Suggested/Probable Suppliers and Grades:

Use plant's vendor list.

User Plant References:

1. BHOPAL : PS 10 202
2. HEER, HARDWAR : 0550.41, GR: 15Ω; 20Ω; 25Ω & 30Ω
CSW - C 20 \$ CSW - C 25.
3. HYDERABAD : ASTM A 216, Gr: WCA
: CSN 422641.1
: CSN 422643.1
: CSN 422650.2
: IS : 2986
: γ 87 - 30, Type L
4. TRICHY : ASTM A 216, Gr: WCB
: ASTM A 216, Gr: WCC

Revisions :

CI 30.8.30 of MOM of MRC - FCF+HTM

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (FCF+HTM)

Rev. No. 09

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt: 01.10.2005

Dt :

Year :

HYDERABAD

Corp. R&D

MARCH, 1978



CORPORATE PURCHASING SPECIFICATION

AA 195 11

Rev. No. 09

PAGE 1 OF 6

CARBON STEEL CASTINGS-FUSION WELDING QUALITY

1.0 GENERAL

This specification governs the quality requirements of Carbon Steel Castings-Fusion Welding Quality.

2.0 APPLICATION

For pressure containing parts for high temperature service and of quality suitable for assembly with other castings or wrought steel parts by fusion welding.

3.0 CONDITION OF DELIVERY

Normalised / Normalised & tempered

Rough machining of the castings shall be carried out, unless otherwise specified in BHEL order/drawing.

Castings shall not be painted

4.0 COMPLIANCE WITH NATIONAL STANDARDS

There is no Indian standard covering this material. However, assistance has been derived from ASTM A 216-1993, Gr: WCC, in preparing this specification.

5.0 DIMENSIONS AND TOLERANCES

The castings shall be true to the pattern/drawing.

Holes for machining up to and including 50 mm in diameter are to be cast solid, unless otherwise stated in BHEL order/drawing.

Unless otherwise specified in BHEL order/drawing, untoleranced dimensions for the castings shall be as per tolerance class 4 of BHEL standard AA 023 04 02.

Revisions :

CI 30.8.30 of MOM of MRC-FCF+HTM

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (FCF+HTM)

Rev. No. 09

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt: 01.10.2005

Dt :

Year :

HYDERABAD

Corp. R&D

MARCH, 1978



6.0 MANUFACTURE

The steel for the castings shall be made by basic electric furnace process or such other process as may be agreed to between BHEL and the manufacturer.

The steel shall be fully killed.

7.0 HEAT TREATMENT

Heat treatment shall be carried out at suitable temperatures to give the properties specified.

Any flame or arc cutting which may have to be done, shall be carried out before heat treatment.

Test pieces shall also be heat treated along with the castings they represent.

8.0 FINISH

All castings shall be properly fettled and dressed and all surfaces shall be thoroughly cleaned.

Machined surfaces shall have the surface finish as indicated in the drawing

9.0 FREEDOM FROM DEFECTS

Castings shall be free from defects such as porosity, blow holes, sand inclusion, shrinkage, cavities, hard spots, cold shuts, cracks, etc., which may adversely affect machining and utility of castings.

When it is necessary to remove risers by flame cutting, care shall be taken to make the cut at a sufficient distance from the body of the casting so as to prevent any defect being introduced into the casting due to local heating.

10.0 CHEMICAL COMPOSITION

The melt analysis of steel and the permissible variation in the composition of the castings from the melt analysis shall be as specified below:

Element	Melt analysis, Percent, max	Permissible Variation, percent
*Carbon	0.25	0.02
Silicon	0.60	0.05
*Manganese	1.20	0.06
Sulphur	0.045	0.008
Phosphorus	0.040	0.008



Note: 1. In the interest of uniform welding, the concentration of the unspecified alloying elements shall not exceed the limits specified below. Whenever specified in the enquiry/order, the test results of these elements shall also be included in the test certificate. However, the manufacture shall ensure that these elements are within the limits specified.

Element	Percent, Max.
Copper	0.30
Nickel	0.50
Chromium	0.50
Molybdenum	0.20
Vanadium	0.03

1. Total content of these unspecified elements 1.00

2. For each reduction of 0.01% below the specified maximum carbon content, an increase of 0.04% Mn above the maximum specified will be permitted up to a maximum of 1.40%.

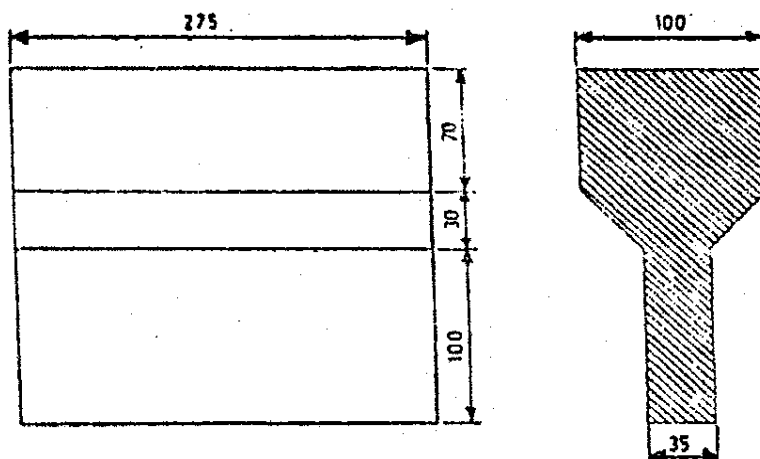
11.0 TEST SAMPLES

Manufacturers shall carryout mechanical testing as per following sampling plan.

- 11.1 Unless otherwise specified for castings weighting up to 500 kg. piece weight one keel block, separately cast per melt per heat treatment batch shall be supplied according to the sketch given below:
- 11.2 Unless otherwise specified castings weighing more than 500 kg shall be provided with integrally cast keel block.
- 11.3 Retests shall be carried out as per IS : 8800
- 11.4 Keel blocks with proper identification and representative of the castings shall be supplied along with the consignment for testing at BHEL works.



DETAIL OF KEEL BLOCK



ALL DIMENSIONS IN mm

12.0 MECHANICAL PROPERTIES:

The test pieces, after being heat treated as per clause C1.7.0 above, shall show the following properties:

12.1 Tensile

The test pieces shall show the following properties when tested in accordance with ASTM A 370

Tensile strength	:	485 - 655 N/mm ²
Yield strength	:	275 N/mm ² , min.
Elongation on 50mm gauge length	:	22 percent, min.
Reduction in area	:	35 percent, min.

12.2 Hardness (Brinell): for information only:

150 - 205 HB.

13.0 NON-DESTRUCTIVE TESTS:

The following tests shall be conducted:

- 1) Ultrasonic examination to BHEL standard AA 085 01 04 / AA 085 01 05
- 2) Liquid penetrate examination to BHEL standard AA 085 0131.
- 3) Magnetic particle examination to BHEL standard AA 085 01 33 and norms of acceptance as per BHEL standard AA 085 01 34.

Norms of acceptance shall be as specified in BHEL order/drawing

**14.0 REPAIR OF CASTINGS**

The manufacturer without the prior permission of BHEL shall not carry out repair of castings.

15.0 SCOPE OF THIRD PARTY INSPECTION:

Wherever, separate quality plan is not attached, the scope of third party inspection shall be as follows:

1. Review of supplier's declared chemical composition.
2. Selection of test samples for mechanical tests and witness of mechanical tests.
3. Witness of Non-destructive tests as applicable.
4. Review of HT charts.
5. Dimensional inspection.

16.0 TEST CERTIFICATES

Three copies of test certificates shall be supplied unless otherwise stated in BHEL order, preferably in the test certificate format annexed to this specification (Annexure -1).

In addition, the supplier shall ensure to enclose one copy of the test certificate along with their dispatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information:

- i) Dimensional inspection.
- ii) Detail of heat treatment
- iii) Chemical composition & unspecified alloying elements whenever called for
- iv) Results of mechanical tests
- v) Results of NDT tests.

17.0 PACKING AND MARKING

Castings shall be suitably packed to prevent corrosion and damage during transit. Machined surfaces shall be properly protected with anticorrosive compounds. Each package or casting (when supplied separately) shall be legibly marked with the following information.

AA 195 11: C.S. Castings - F.W. Quality
BHEL Order No.
Consignment/Identification No.
Melt No.
Weight
Supplier's Name

18.0 REFERRED STANDARDS (Latest Publications Including Amendments):

- | | | | |
|-----------------|-----------------|-----------------|-----------------|
| 1. AA 023 04 02 | 2. AA 085 01 04 | 3. AA 085 01 05 | 4. AA 085 01 31 |
| 5. AA 085 01 34 | 6. ASTM A 216 | 7. ASTM A 370 | 8. IS : 8800 |



ANNEXURE 1 - RECOMMENDED TEST CERTIFICATE FORMAT FOR CASTINGS

SUPPLIER'S NAME AND ADDRESS												
1. Customer :						6. Cast No. & Date :						
2. TO No. & Date :						7. Batch No. :						
3. PO No. :						8. Heat Code :						
4. Process of Melting :						9. Spec. No. :						
5. Deoxidisation Process						10. Test Bar Size						
II. CASTING COVERED BY T.C.												
Sl. No.	Drawing No. & Item No.					Description			Quantity & Weight			
12. CHEMICAL COMPOSITION (PERCENT)												
Element	C	Si	Mn	S	P							
As per Min.												
Spec. Max.												
Actual Values.												
13. HEAT TREATMENT (To be accompanied by Recorder Chart, wherever called for)												
Condition	Temp. °C				Soaking Time, Hrs.				Cooling Medium			
14. MECHANICAL PROPERTIES												
	T.S. N/mm ²	Y.S. 0.5/0.2% Proof N/mm ²	% E on GL 5.65 SO	% R.A. Mn	Hardness BHN Min. 3 Values	Impact Value, Joules	Bend					
As per Min.												
Spec. Max.												
Actual Values.												
15. Surface Finish (When called for in the order/dwg)												
16. DIMENSIONAL INSPECTION												
17. NON-DESTRUCTIVE TESTS												
Nature of Test	Acceptance Level	Instrument used	Range	Results	Any other details							
Ultrasonic												
Radiographic												
Dye Penetrant/ Magnetic Particle												
18. OTHER TESTS, IF ANY (MICRO- Scopie, Hydraulic, Etc.)												
19. IDENTIFICATION ON CASTING AS PER CPS.												
<p>We hereby certify that the items mentioned above have been tested and inspected in our presence and are found to be in accordance with the drawings, specifications and purchase order.</p> <p>Signature & Seal of the Inspecting Officer (Purchase Representative)</p> <p>Date :</p> <p>Signature and Seal of the Chief of Quality Control Chief Metallurgist of the Supplier.</p> <p>Date :</p> <p>INSTRUCTION:</p> <p>a) If steel is produced by LD or Oxygen process, Nitrogen content should be furnished and shall not exceed 0.009%</p> <p>b) Test Certificates are to be furnished as per Purchase Order and Specifications, in A4 Size transparent paper.</p> <p>c) All the entries including signature should be in black ink.</p> <p>d) If testing is done by outside agencies, the original TCs shall be furnished.</p> <p>e) The actual Test Certificate may run into more than one A4 size paper, if needed, to facilitate filling up of details.</p>												