BHARAT HEAVY ELECTRICALS LIMITED
CORPORATE RESEARCH & DEVELOPMENT DIVISION
VIKASNAGAR, HYDERABAD - 500 093, INDIA
PHONES:23774494 (EXCHANGE)
DIRECT:23882104/23882204/
23778474/23776772
FAX : 91 40 23770698

ENQUIRY

RD:DP:MPX:F-04

To

-

-

Pin

Email :

Attn. .

Enquiry No:	Enq Date:	Due Date:	Delivery By:
351090601	09-AUG-10	25-SEP-10	15-MAR-11

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

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	STEEL STRUCTURE & CLADDING FOR UHV LAB (AS PER ENCLOSED DOCUMENTS) NOTE: 1) A PRE-BID MEETING TO BE HELD ONE WEEK BEFORE TENDER OPENING 2) REVERSE AUCTION: BHEL RESERVES THE RIGHT TO PROCURE ABOVE ITEMS THROUGH REVERSE AUCTION AMONG QUALIFIED BIDDERS	LOT	1

Please submit your offer in Two parts as per enclosed "General Terms and Conditions of enquiry, Loading Factors & Contract for the purchase of Goods/ Services" in separate sealed covers as detailed below:

1) FIRST COVER SHALL CONTAIN A) TECHNICAL & COMMERCIAL BID, B) COMPLIANCE STATEMENT, C) UN-PRICED PRICE BID, I.E. A COPY OF THE PRICE BID WITH THE PRICE(S) COLUMNS LEFT BLANK D) BIDS WITHOUT THESE ENCLOSURES SHALL NOT BE CONSIDERED.

2) WHEREVER VENDOR REGISTRATION FORM AND EFT DETAILS HAVE BEEN SUBMITTED EARLIER, THE SAME NEED NOT BE SUBMITTED AGAIN UNLESS THERE IS A CHANGE.

3) WHEREVER INDIAN AGENTS ARE REPRESENTING ON BEHALF OF THEIR PRINCIPLES, THE RELEVANT AUTHORISATION LETTER & AGREEMENT COPY TO BE ENCLOSED ALONG WITH TECHNICAL BID TO CONSIDER THE OFFER

4) Second Cover containing Price bid. If the Price bid is found to be different from the un-Priced Price bid in any way, the offer will be rejected.

5) Unsigned offers are liable for rejection.

6)PLEASE VISIT BHEL WEBSITE REGULARLY FOR ANY UPDATES AND ANY ADDITIONAL INFORMATION PRIOR TO SUBMISSION OF OFFER

Note:

1)ALL OFFERS MUST INCLUDE NAME OF CONTACT PERSON, PHONE NO, FAX NO, EMAIL ID. UNSIGNED/INCOMPLETE OFFER(S) ARE LIABLE FOR REJECTION.

2) Taxes & Duties quoted will be taken for cost evaluation & order placement and no change will be entertained later except in the case of changes made by the Government.

3) Changes in Taxes and Duties because of the changes in Turnover etc. will be to the supplier's account.

4) In case any Taxes/duties exempted, a self declaration for the same may be attached to the offer.

5) BEING A RESEARCH INSTITUTION BHEL R&D CAN AVAIL CUSTOM DUTY EXEMPTION IN TERMS OF GOVT NOTIFICATION NO 24/2007 - CUSTOMS DATED 1.3.2007 AND CENTRAL EXCISE DUTY EXEMPTION IN TERMS

BHARAT HEAVY ELECTRICALS LIMITED
CORPORATE RESEARCH & DEVELOPMENT DIVISION
VIKASNAGAR, HYDERABAD - 500 093, INDIA
PHONES:23774494 (EXCHANGE)
DIRECT:23882104/23882204/
23778474/23776772
FAX : 91 40 23770698

RD:DP:MPX:F-04

ENQUIRY

OF GOVT NOTIFICATION 16/2007 - CENTRAL EXCISE DATED 1.3.2007. HENCE SUPPLIERS ARE REQUESTED TO SUBMIT THEIR BIDS WITH OUT EXCISE DUTY."

6)THE SUPPLIER SHOULD SUBMIT EMD OF RS. 2,00,000/- (TWO LAKHS ONLY) IN THE FORM OF DEMAND DRAFT/BANKERS CHEQUE DRAWN IN FAVOUR OF BHEL R&D, VIKAS NAGAR, HYDERABAD. THE EMD SHALL NOT CARRY ANY INTEREST AND SHALL BE REFUNDED TO UNSUCCESSFUL TENDERER NORMALLY WITHIN 15 DAYS OF ACCEPTANCE AND AWARD OF THE CONTRACT TO THE SUCCESSFUL TENDERER.

7) THE SUCCESSFUL BIDDER SHALL HAVE TO REMIT 10% OF ORDER VALUE TOWARDS SECURITY DEPOSIT. THE SECURITY DEPOSIT WILL BE RETURNED ONLY ON COMPLETION OF CONTRACT AND WILL NOT CARRY ANY INTEREST.

8) THE EMD OF SUCCESSFUL TENDERER SHALL BE ADJUSTED AGANIST SECURITY DEPOSIT OF 10% OF THE CONTRACT VALUE AND BALANCE SECURITY DEPOSIT IF ANY SHALL BE DEPOSITED BY THE SUCCESSFUL TENDERER BEFORE START OF CONTRACT.

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

PLEASE FILL UP THE ENCLOSED VENDOR REGISTRATION FORM AND SEND IT ALONG WITH YOUR QUOTATION. OTHERWISE YOUR QUOTATION WILL NOT BE CONSIDERED.

Yours faithfully
for
BHARAT HEAVY ELECTRICALS LTD

Bhaskara Reddy P
Sr Dy Gen Manager

Email: pbreddy@bhelrnd.co.in

BHARAT HEAVY ELECTRICALS LIMITED
CORPORATE R&D DIVISION, VIKAS NAGAR, HYDERABAD – 500 093, AP, India
Ph: 0091-40 – 23778474, FAX: 0091-40 – 23770698

RD:MPX:F-20 **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) and Head, 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. **Late Tender**: 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" Form as it is engaged in R&D. All Indian suppliers shall clearly mention current 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 clearly. 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) though Electronic Fund transfer (RTGS/NEFT/SEFT) with bank charges, if any, to the supplier's account. 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 (Refer #14 above), interest @11% 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. **Penalty for late delivery**: 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 , 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% of total order value shall be levied at the discretion of BHEL.
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, incidentals due to the breach of contract on the part of the supplier through risk purchase.
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.

RD:MPX:F-17

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

Suppliers' compliance statement to basic conditions of enquiry

(to be submitted along with Technical & Commercial bid)

Enquiry number: **Enquiry date:**

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

	BHEL R& D's terms & Conditions	Supplier's compliance (indicate Yes/No. if 'No', state terms desired)
1) Validity of offer	Unless specifically mentioned in the enquiry, 90 days from the tender opening date	
2) Delivery requirements	Free delivery at our stores or FOR destination (or as indicated in the enquiry)	F.O.R / Delivery: within __ weeks from PO date
3) a) 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 despatch or 12 months from the date of commissioning, whichever is earlier	
3) b) Manufacturer`s Test Report	Manufacturer's Test Report / Manufacturer's Test certificate to be provided with Goods	
4) Terms of payment	Unless specifically mentioned, 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 EFT/RTGS with bank charges, if any, to supplier's account.	
5) Taxes & Duties	Unless specifically mentioned in the enquiry, we do not provide 'C' form. Supplier to specify rates of taxes/ duties element wise on the price quoted and related percentages. Please mention "NIL" if exempted and N.A if not applicable.	ED+ Cess : % Extra/ inclusive/ Nil/ NA VAT/ CST: : % Extra/ inclusive/ Nil/ NA Service Tax: : % Extra/ inclusive/ Nil/ NA
6) Penalty for late delivery	0.5% per week beyond the delivery date 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 Terms & 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)

RD:DP:MPX:F-13

BHARAT HEAVY ELECTRICALS LTD.
Corp. R&D DIVISION
VIKAS NAGAR,
HYDERABAD- 500 093 (INDIA)
Ph: 040 – 23778474, Fax: 040 – 23770698, email: mpx@bhelrnd.co.in

VENDOR REGISTRATION FORM

(Indigenous supplier)

[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 Name and address of the vendor:

_____

_____

_____

Phone Nos.:
Fax No.:
Email: 1. 2.

1.2 Local representative name & address in Hyderabad/ Secunderabad:

_____

_____

_____

_____

Phone Nos.:
Fax No.:
Email:
Contact person:
Mobile No.:

2.0. TYPE OF ORGANIZATION:

PROPRIETORSHIP	COMPANY	SISTER CONCERN (mention vendor registration number of main organization)	
PARTNERSHIP	CORPORATION	Small Scale Industry	ANY OTHER (Please specify)

In case of SSI unit, copy of registration to be enclosed.

3.0 ANNUAL TURN OVER:

#	Year	Turn-Over, Rs.
1	Current Year(budgeted)	
2	Previous year (200 - 0)	
3	Prior Year (200 - 0)	

4.0 NAME AND ADDRESS OF THE BANKER:

4.1 Bank Name
4.2 Branch name
4.3 Account number
4.4 Account Type
4.5 MICR Code:
4.6 IFSC Code(RTGS/NEFT):
4.7 Bank Phone number(s),

Blank cheque, duly cancelled, to be enclosed.

Please note that all payments shall be made through Electronic clearance services to your above account against the orders executed, if any.

5.0 REGISTRATION PARTICULARS (relevant copies to be enclosed)

5.1 IT Permanent Account No.(PAN):
5.2 State sales tax/VAT Registration No.:
5.3 Central Sales Tax Registration No.
5.4 ED Registration No.
5.5 Service Tax Registration No.:
5.6 PF Account No.:
5.7 Labour Licence No.:
5.8 ESI Account No**.:**

6.0 CONTACT PERSON: S/Sri

Designation::: Phone/ Mobile No. :

7.0 TOTAL NUMBER OF EMPLOYEES:

Graduates (Engr./Scientists/ Mgmt/Fin.)	Consultants	Workers		
		Sup./Skilled	Semiskilled	Unskilled

8.0 LIST OF PRODUCTS/ SERVICES OFFERED

#	Products/ Services	Capacity
1		
2		
3		
4		
5		
6		
7		

9.0 REFERENCE LIST :

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

#	Customer	Volume / Year
1		
2		
3		
4		
5		
6		
7		

10.0 INFRASTRUCTURE / FACILITIES:

#	Facility (with specifications)	Age/ Year procured
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

11.0 REGISTRATION WITH OTHER BHEL UNIT/UNITS:

#	Unit	Registration No.	Year
1			
2			
3			
4			

12.0 ANY OTHER INFORMATION :

DECLARATION:

The information furnished above is true and authentic.

(CEO / PROPRIETOR)

SEAL:

DATE:

Note:

1. Registered bidders, having BHEL (R&D) registration no. or have submitted this format for registration, need not furnish this information again.
2. The competent authority reserves the right to accept or reject the registration.
3. Vendors approved for registration will be informed by mail / email, as convenient. A separate communication will be sent in case of non-registration also, citing reasons thereof.
4. BHEL reserves the right to take penal action as deemed fit if any of the information provided by the vendor(s) is found to be incorrect.
5. AGM, Head (MM) may be contacted for clarification/additional information on registration.

Instructions

1. Fill all items. Please mention “N.A.” for items/ clauses not applicable.
2. Use A4 sheets for this document and the enclosures. Use of additional sheets is permitted if space provided is not adequate.
3. Attach copies of latest documents in respect of items 5.0 (Registration no.s)
4. Photographs of registered office and the chief executive/proprietor shall be furnished.

AUTHORISATION LETTER FOR E-PAYMENT/ NEFT / RTGS

(PLEASE FILL UP THE FORM COMPLETELY IN CAPITAL LETTERS ON YOUR COMPANY LETTERHEAD ONLY)

Type of Request (Tick one)	NEW	CHANGE

BHEL Vendor Code (to be filled by BHEL)	

1	Company Name	
2	Address	
3	City with PIN Code	
4	State	
5	PAN Number	
6	Name of Contact Person	
7	Phone no. with STD Code	
8	Fax No. with STD Code	
9	Email ID	
10	Website (URL)	

BANK DETAILS FOR EFT / RTGS

1	Bank Name	
2	Branch	
3	Branch Code	
4	Branch Address	
5	Branch Phone No.	
6	Account No.	
7	Account Type: SB/ Current/ other (Specify)	
8	MICR Code	
9	IFSC Code	

I, as an authorized representative / owner of the above named company, hereby state as under:

1. Enclosed here with a cancelled cheque in support of our company's bank details.
2. Authorize BHEL R&D Hyderabad, to electronically make payments to the designated bank account with bank charges, if any, to our account.
3. If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transferring Bank responsible.
4. I hereby certify that the particulars given above are true, complete and correct.
5. This authority remains in full force until BHEL receives and acknowledge written notification requesting change or cancellation.

Date:

Authorised Signatory
Designation :

COMPANY SEAL

RD:MPX:F-18

BHARAT HEAVY ELECTRICALS LIMITED

CORPORATE R&D Division

Vikasnagar, Hyderabad, Andhra Pradesh, India – 500093

IMPORTED

Suppliers' compliance statement to basic conditions of enquiry

(to be submitted along with Technical & Commercial bid)

Enquiry number: **Enquiry dt:**

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

Condition	BHEL R& D's terms	Supplier's compliance (indicate Yes/No. if 'No', state terms desired)
1. Validity of offer	90 days from the tender opening date (or as per enquiry)	
2. Delivery requirements	FCA – Nearest International Airport (or as indicated in the enquiry)	F.C.A International Airport. Delivery: within __ weeks from PO date
3. a) 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	
3) b) Manufacturer`s Test Report	Manufacturer's Test Report / Manufacturer's Test certificate to be provided with Goods	
4. Terms of payment	Sight draft. All bank charges inside India will be to BHEL R&D account and outside India will be to the supplier's account. Documents through State Bank of India, Trade Finance Central processing Cell (TFCPC), Opp. Anand Theatre, Secunderabad, Andhra Pradesh, India-500003. SWIFT Code: SBININBB602, Phone: 91-40-27816795, FAX: 91-40-27720459	
5. Agency commission	Pl specify Indian agency commission charges, if any, in percentage of quotation. The same shall be paid to the agency in Indian Currency only.	
6. Erection/ Commission	As per enquiry	
7. Documentation	As per enquiry	
8. Insurance	BHEL will arrange Insurance based on intimation to our Insurance agency. Address of the agency will be mentioned in the Purchase Order.	
9. Penalty for late delivery	0.5% per week beyond the delivery date 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)

RD:DP:MPX:F-14

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

1.6 CONTACT PERSON(S)
FOR PRODUCT OFFERED
NAME(S)
OFFICIAL CPACITY
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 REGISTRTION
(Attach brouchers and catalogues)

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 AUTHORIZATION LETTER

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 SUPPIER (Authorized signatory)

NAME
DESIGNATION
DATE
…….OFFICIAL SEAL

Note: 1. BHEL Reserves the right to take penal action as deemed fit if any of the information provided by the vendor is found to be incorrect.
2. Please attach separate sheets, if space found is inadequate

BHEL R&D
RD:DP:MPX:F-22

LOADING FACTORS

NOTE : IN CASE OF DEVIATION TO BHEL TENDER SPECIFIED TERMS, LOADING FACTOR INDICATED IN FOLLOWING TABLE WILL BE APPLIED TO QUOTED PRICE WHILE EVALUATING THE LOWEST QUOTE ( )

A. FOR INDIGENOUS PURCHASES

SLNO	SCOPE	COMMERCIAL TERMS	BHEL STANDARD TERM	AS OFFERED	LOADING FACTOR FOR NON COMPLIANCE TO BHEL STANDARD TERMS
A.1	SUPPLY OF EQUIPMENT	PAYMENT TERMS	100% PAYMENT, WITH IN 30 DAYS FROM THE DATE OF RECEIPT AND ACCEPTANCE OF MATERIAL	**SAME**	**NIL**
				PAYMENT AGAINT PROFORMA INVOIVE / DESPATCH DOCUMENT **OR** CASH ON DELIVERY (COD) / CASH AGAINST PROOF OF DESPATCH	11% PER ANNUM INTEREST ON THE TOTAL PO VALUE FOR ONE MONTH
				ADVANCE PAYMENT WITH BANK GUARANTEE	11% PER ANNUM INTEREST ON THE TOTAL VALUE FOR OFFERED DELIVERY PERIOD (Rounded off to nearest month) + 1 MONTH
				PART ADVANCE PAYMENT WITH SUPPORTING BANK GUARANTEE AND BALANCE WITH IN 30 DAYS	11% PER ANNUM INTEREST ON ADVANCE FOR OFFERED DELIVERY PERIOD (Rounded off to nearest month) + 1 MONTH
				PART ADVANCE PAYMENT WITH SUPPORTING BANK GUARANTEE AND BALANCE ON RECEIPT OF MATERIAL	11% PER ANNUM INTEREST ON ADVANCE FOR OFFERED DELIVERY PERIOD (Rounded off to nearest month) + 1 MONTH AND 11% PER ANNUM INTEREST ON BALANCE AMOUNT FOR ONE MONTH
A.2	SUPPLY OF EQUIPMENT INCLUDING E&C	PAYMENT TERMS (THE SUPPLIER MUST SUBMITT A PERFORMANCE BANK GUARANTEE (PBG) FOR 10% OF THE BASIC VALUE OF THE ORDER VALID FOR WARRANTY PERIOD.)	90% PAYMENT, WITH IN 30 DAYS FROM THE DATE OF RECEIPTAND ACCEPTANCE OF MATERIAL . BALANCE 10% WITH IN 30 DAYS OF COMPLETION OF E&C AND ON SUBMISSION OF PERFORMANCE BANK GUARANTEE (PBG) FOR 10% OF BASIC PO VALUE.	**SAME**	**NIL**
				100% PAYMENT WITH IN 30DAYS AFTER COMPLETION OF SUPPLIES AND ERECTION AND COMMISIONING	NIL (PBG WILL NOT BE INSISTED FROM THE SUPPLIER)
				90% PAYMENT AGAINT PROFORMA INVOICE/ DESPATCH DOCUMENT **OR** CASH ON DELIVERY (COD) / CASH AGAINST DESPATCH AND BALANCE 10% WITH IN 30 DAYS OF E&C	11% PER ANNUM INTEREST ON 90% OF THE VALUE OF PO FOR ONE MONTH
				90% PAYMENT AGAINT PROFORMA / DESPATCH DOCUMENT **OR** CASH ON DESPATCH (COD) / CASH AGAINST DESPATCH AND BALANCE 10% AFTER COMPLETION OF E&C	11% PER ANNUM INTEREST ON TOTAL PO VALUE FOR ONE MONTH
				90% ADVANCE PAYMENT WITH BANK GUARANTEE AND BALANCE 10% WITH IN 30 DAYS OF E&C	11% PER ANNUM INTEREST ON 90% OF THE TOTAL VALUE FOR DELIVERY PERIOD(ROUNDED OF TO THE NEAREST MONTH) + 1 MONTH
				PART ADVANCE (x%) PAYMENT WITH SUPPORTING BANK GUARANTEE AND (90 - x) % PAYMENT ON RECEIPT OF MATERIAL AND 10% PAYMENT WITH IN 30 DAYS AFTER E&C	11% PER ANNUM INTEREST ON THE ADVANCE AMOUNT FOR THE DELIVERY PERIOD(ROUNDED OF TO THE NEAREST MONTH)+ 1 MONTH AND 11% PER ANNUM INTEREST ON (90-X)% PAYMENT FOR ONE MONTH
				PART ADVANCE (x%) PAYMENT WITH BANK GUARANTEE AND (90 - x) % PAYMENT ON RECEIPT OF MATERIAL AND 10% PAYMENT AFTER E&C	11% PER ANNUM INTEREST ON THE ADVANCE AMOUNT FOR THE DELIVERY PERIOD(ROUNDED OF TO THE NEAREST MONTH)+ 1 MONTH AND 11% PER ANNUM INTEREST ON BALANCE AMOUNT

SLNO	SCOPE	COMMERCIAL TERMS	BHEL STANDARD TERM	AS OFFERED	LOADING FACTOR FOR NON COMPLIANCE TO BHEL STANDARD TERMS
B. FOR FOREIGN PURCHASES (IMPORTED)					
B.1	SUPPLY OF EQUIPMENT	**PAYMENT TERMS.**	AGAINST SIGHT DRAFT ON PRESENTATION OF DESPATCH DOCUMENTS VIZ INVOICE, AWB ETC TO OUR BANKERS (ALL BANK CHARGES INSIDE INDIA TO BHEL ACCOUNT AND OUTSIDE INDIA WILL BE TO THE SUPPLIER'S ACCOUNT)	SAME	NIL
				100% PAYMENT AFTER RECEIPT AND ACCEPTANCE OF MATERIAL AT BHEL R&D BY WIRE TRANSFER. (DESPATCH DOCUMENTS WILL BE SENT TO BHEL R&D DIRECTLY ALONG WITH BANK DETAILS)	NIL
				LC PAYMENT	11% PER ANNUM INTEREST ON THE BASIC VALUE FOR ONE MONTH
				ADVANCE BY WIRE TRANSFER WITH BANK GUARANTEE	11% PER ANNUM INTEREST ON THE BASIC VALUE FOR DELIVERY PERIOD + 1 MONTH
				PART ADVANCE (x%) PAYMENT WITH SUPPORTING BANK GUARANTEE AND BALANCE PAYMENT AFTER RECEIPT OF MATL	11% PER ANNUM INTEREST ON THE ADVANCE AMOUNT FOR THE DELIVERY PERIOD+ 1 MONTH AND 11% PER ANNUM INTEREST ON BALANCE AMOUNT FOR ONE MONTH
B.2	SUPPLY OF EQUIPMENT INCLUDING E&C	**PAYMENT TERMS (THE SUPPLIER MUST SUBMITT A PERFORMANCE BANK GUARANTEE (PBG) FOR 10% OF THE BASIC VALUE OF THE ORDER VALID FOR WARRANTY PERIOD.)**	90% PAYMENT WILL BE MADE WITH IN 30 DAYS FROM THE DATE OF RECEIPT OF MATERIAL ON ACCEPTANCE AND BALANCE 10% WITH IN 30 DAYS OF COMPLETION OF E&C AND ON SUBMISSIONOF PERFORMANCE BANK GUARANTEE FOR 10% OF BASIC VALUE	SAME	NIL
				LC PAYMENT FOR 90% OF THE ORDER VALUE + 10% AFTER E&C WITH IN 30 DAYS	11% PER ANNUM INTEREST ON 90% OF BASIC VALUE FOR ONE MONTH
				90% OF BASIC VALUE AS ADVANCE BY WIRE TRANSFER WITH BANK GUARANTEE AND BALANCE 10% AFTER E&C BY WIRE TRANSFER WITH IN 30 DAYS	11% PER ANNUM INTEREST ON 90% OF THE BASIC VALUE FOR DELIVERY PERIOD + 1 MONTH
				x% OF TOTAL VALUE AS ADVANCE PAYMENT WITH BANK GUARANTEE AND BALANCE (I.E. 90-X)AFTER RECEIPT OF MATL BY WIRE TRANSFER AND 10% AFTER COMPLETION OF E&C	11% PER ANNUM INTEREST ON THE ADVANCE AMOUNT FOR THE DELIVERY PERIOD+ 1 MONTH AND 11% PER ANNUM INTEREST ON BALANCE AMOUNT OF 90% OF ORDER VALUE (I.E. 90-X%)
C. PERFORMANCE BANK GUARANTEE, PBG (COMMON FOR INDIGENOUS AND IMPORTS)					
C.1		**PERFORMANCE BANK GUARANTEE**	PBG FOR 10% OF THE BASIC PO VALUE SHALL BE FURNISHED IN BHEL PRESCRIBED FORMAT.	IF NOT AGREED	10% OF THE BASIC MATERIAL COST
D. PENALTY (COMMON FOR INDEGENOUS & IMPORTS)					
D.1		**LD CLAUSE**	IN THE EVENT OF DELAY IN AGREED CONTRACTUAL DELIVERY, PENALTY OF 0.5% (HALF PERCENT) PER WEEK BUT LIMITED TO A MAX OF 10% VALUE OF UNDELIVERED PORTION OF BASIC MATERIAL COST WILL BE APPLICABLE	AGREED	NIL
				IF NOT AGREED	10% OF THE BASIC MATL COST
				IF AGREED FOR 5%	5% OF THE BASIC MATERIAL COST
				OTHER THAN THE ABOVE	10% MINUS THE AGREED MAX PERCENTAGE OF THE BASIC MATERIAL COST WILL BE LOADED.

Steel Structure and Cladding for UHV Laboratory

Work Scope & Specifications Document

(After study of this document for further Technical clarifications please contact either Mr. U N RAO, AGM (TCH&HGT), Ph No: 040-27807075, Mobile: 0 99853 06556, e-mail id: unrao@bhelrnd.co.in or Mr. S. K. Chandra, AGM (Projects), Ph No. 040-23882185, 0 99853 06542. e-mail id: Chandra@bhelrnd.co.in)

Corporate Research & Development Division
Bharat Heavy Electricals Ltd.,
Vikasnagar, HYDERABAD – 500093

Structures and Cladding for UHV Laboratory

Introduction:

This document elaborates the requirements of metallic structures and the cladding for proposed UHV Laboratory at BHEL R&D, Hyderabad. This tall laboratory is an optimal combination of Concrete construction and metal structures. Civil and structural work for this hybrid construction is sourced separately to complete the construction in shortest possible project schedule. This document has been designed to facilitate vendors to understand the requirement of structural work and claddings and respond to tender enquiry accurately.

The document details i) Scope of Supply and ii) Erection and fitting of Structures iii) leak proof cladding and interfacing of cladding with civil and structural works iv) Tender schedules and v) Qualification requirements for tender.

1. Scope of Supply:

1.1. Design and Supply: Manufacture/ Fabrication and Supply of all structural items as per the specifications, sizes emanating from the Structural design drawings as given in Annexure–I. In Annexure- I, General view of the building viewed from different directions are given in Drawings marked as TDR Drawing 1,2 and 3. TDR Drawings marked 4 to 11 show the steel structural portion forming the scope of this tender. It is to be noted that the shaded portions as indicated in the drawings are **not** in the scope of this tender and therefore not to be considered by the prospective vendors. Some sectional views of the building are given in TDR Drawings marked 12 to 15 to facilitate better understanding of the building and requirements.

1.2. All the items should comply with the Technical requirements elaborated in Annexure–II. The BOQ's (Bill of Quantities) of various items are given in Annexure–III giving reference to respective drawing to facilitate better estimation of material requirements.

2. Erection and fitting of Structures:

2.1. Erection, Assembly and fitting of the Structure and structural elements at site (BHEL R&D) as per design requirements, accommodating site variations in dimensions, following a well laid down and approved "structural erection procedure". The work should be in compliance with all appropriate requirements as given in Annexure– II.

2.2. The BOQ's (Bill of Quantities) of various items are given in Annexure–III giving reference to respective drawing to facilitate better estimation of material requirements.

3. **Leak proof cladding and interfacing with civil and structural works**:

3.1. Cladding of the structure (Roof, Walls, intersections and interfaces) as specified in Annexure–II shall be detailed and executed by the vendor for a leak proof installation. Importance to be given to aspects of Basic technical requirement of the building, good aesthetics and long term protection from weather conditions for the Structure. The cladding shall include adequate provisions for ventilation and natural / day light illumination. The type of cladding required at various portions of the building is given in TDR Drawings 16 to 17.

3.1.1. The vendor can also suggest alternative types of Cladding additionally which are cost effective without sacrificing the functional requirement and aesthetics. The financial offer (price bid part) should be accordingly be made to reflect the alternatives separately. BHEL however is free to consider or ignore such alternative types of cladding.

3.2. Conceptual BOQ's (Bill of Quantities) of various items are given in Annexure–III giving reference to respective drawing to facilitate better estimation of material requirements. Details not covered shall be the responsibility of the vendor for quality execution and completion of the work.

4. **Tender schedules:** The prospective vendor shall follow and submit his offer in following schedules (Offers submitted other than in this form shall be rejected summarily):
   4.1. Schedule-A: Manufacture/ Fabrication and supply of all structural items.
   4.2. Schedule-B: Supply of Cladding Materials and associated accessories.
   4.3. Schedule-C: Erection, Assembly and Fitting of Structures and Claddings.
   4.4. Schedule-D: Warrantee to repair / replace faulty material for 12 months and
   4.5. Schedule-E: Cost of maintenance for the structures & claddings/ annum for next three years and consent for undertaking such work, if awarded.

5. **Qualification requirements**:

5.1. The vendor shall be a **registered fabricator** for heavy structural works. He shall have an annual conversion capacity of minimum 250 Tons (vendor shall submit proof of supply and erection of structural work carried out by them in recent past exceeding this requirement). Offers from agents/ facilitators would not be entertained.

5.2. The vendor shall have a **registered workshop** and regular well experienced employees for design, fabrication, supervision etc with all essential fabrication facilities in-house. List of fabrication facilities and welder's certifications shall be submitted along with technical cum un-priced price bid (first part of the bid).

5.3. The vendor shall be capable of converting conceptual architectural drawings (defining load lines) in to shop drawings. Sample fabrication drawings for one section of the structure shall be submitted by the vendor along with technical cum un-priced price bid (first part of the bid) as qualification requirement.

5.4. The vendor shall demonstrate ability to source the necessary plant and equipment required to execute the work, typically;

- necessary lifting gear including lifting bracketry, proprietary lifting beams / systems, return blocks, hook block, chains, nylon stops, shackles and all associated inspection and checking systems and documentation.
- Required mobile, crawler and tower craneage together with supporting backup such as breakdown response, fitters, suitably qualified drivers / technicians / operatotrs etc.,
- Safety provisions including Personnel Protective Equipment, perimeter edge protection and necessary certification.

5.5. The vendor shall provide pictorial and documentary evidence of completed projects undertaken together with supporting references from clients fully endorsing the work.

5.6. Tender shall be prepared and submitted as per schedules given in Clause-4 above.

5.7. The vendor shall commit to delivery schedule given in Annexure – IV.

5.8. Consent for Reverse Auction.

6. General:

6.1. Overall lowest (L1) Cost to BHEL shall be the guiding factor to decide awardal of the contract.

6.2. Payment terms other than BHEL standard terms shall be loaded as per loading criteria .

6.3. BHEL Reserves the right to arrange Reverse Auction (RA) and the vendor shall give his written consent along with technical offer.

ANNEXURE – I

Views of Structure and Drawings

(Attached Separately)

ANNEXURE – II

Technical Specifications and Requirements

Annexure-2

Structures and Cladding for UHV Laboratory

Technical specifications and important requirements for fabrication, supply, erection, surface finishing of **steel structures** and **Cladding** for roofs, walls and exposed surfaces of UHV laboratory at BHEL R&D, Hyderabad.

The vendor shall ensure that the technical specifications detailed herein are carefully read and understood in conjunction with (and related to) bill of quantities (BOQ). The vendor shall offer complete and consolidated quotes including requirements specified herein and other parts of this document and those implied to before and after the supply of steel structures / cladding.

The structures shall comply with latest version of codes and standards listed here:

- IS-816 (1969): Code of practice for use of metal arc welding for general construction
- IS: 800 Code of Practice for General Construction in Steel
- IS: 806 Code of Practice for use of Steel Tubes in General Building Construction
- IS: 808 Dimensions of Hot Rolled Steel Beam, channel and angle sections
- IS:813 Scheme of Symbols for Welding
- IS:816 Code of Practice of use of Metal Arc Welding for General construction in Mild Steel.
- IS:818 Code of Practice for Safety and Health requirements in electric and Gas Welding and Cutting operations
- IS:4923 Hollow Steel sections for structural use.
- IS:5369 General Requirements for plain washers and lock washers
- IS:6227 Code, of practice for use of metal arc welding in tubular structures
- SP :38(S&T)-1987 Handbook of Typified Designs for Structures with Steel Roof Trusses
- IS226-1975 Specification for structural steel (standard quality)
- IS2062-1984 Specification for weld able structural steel
- IS1161-1979 Specification for steel tubes for structural purpose
- IS 875-1987(Parts 1,2,3and 5) code of practice for structural safety of buildings : Loading standards
- SP6(1)-1964 IS Handbook for Structural Engineers
- IS807-1976 Code of Practice for design, manufacture, erection and testing (structural portion) of cranes and hoists.
- IS 12843-1989 Tolerances for erection of steel structures

Technical Requirements:

Steel Structures: This section covers important requirements of engineering, fabrication, surface finishing, transportation to site, assembly in position for steel structures and other associated works including tests and validations.

1. **Design**: The vendor shall agree to prepare and submit detailed engineering and shop (component level) drawings to BHEL R&D for approval with in **fifteen days** from date of purchase order.
2. **Design inputs**: Architect drawings (load lines) are provided with this tender specification. The architect drawings provided cover main structures like East side, West side, central hall and dome. The drawings provided are **indicative** and without details for connections, lifting, handling etc.
3. **Design clarifications:** The drawings provided are self explanatory; in case of any doubts it shall be responsibility of the vendor to seek all relevant design information/clarification from BHEL and shall verify the same during construction/ fabrication stage prior to supply. Ensuring assembly and accuracy shall be vendors responsibility. In case alternate sections are suggested for use by the vendor his proposal for use shall be submitted to BHEL with relevant design calculations/ proof. Any reduction in overall weights on account of such change shall reduce the value of the purchase order on pro-rata basis (PO Value / Total weight in kg). However any increase in structural weight on account of **use of alternate sections** shall be absorbed by the vendor.
4. **Drawing approval and fabrication**: Submitted drawings if necessary be corrected/ modified before initiation of work to **accommodate site requirements**. Drawing modification/ costs for revisions shall be covered in offer/ quote and no separate claims would be entertained on this account. Fabrication shall be carried out in accordance with approved drawings only.
5. **Presentation/Documentation:** Clear and legible document duly approved by vendor's structural engineer/ consultant shall be provided by the vendor on standard size of paper (A0-A4). Shop drawing shall include:
   - **5.1.** Detailed Marking Plans
   - **5.2.** Details of member connections and connection to other structures /component / building
   - **5.3.** Detailed dimension for fabrication and tolerances for installation
   - **5.4.** Welding and bolting procedures for shop and the site
   - **5.5.** Cambers required/ provided and fabrication tolerances
   - **5.6.** Assembly and erection sequence and special slinging requirement if any
   - **5.7.** Bills of material and
   - **5.8.** Itemized Quality plans (QP)
6. **Overall Design:** The vendor shall ensure and shall be responsible for:
   - **6.1.** Dimensional accuracy
   - **6.2.** Correctness of engineering design and design of connections
   - **6.3.** Fit of parts
   - **6.4.** Details

6.5. Errors and omissions
6.6. Material and workmanship
6.7. Methodology of fabrication and erection
6.8. Safety at shop and at site
6.9. Performance of the supplied structures

7. **Commencement of Work:** Before commencement of work the vendor shall prepare and submit:
   7.1. A detailed activity/ item wise time schedule for procurement and approval of material, fabrication, transportation, stocking at site, erection etc together with arrangement of resources for site fabrication work / erection activity.
   7.2. A detailed list of Plant and Machinery, manpower proposed for use by the vendor shall be supplied to BHEL by the vendor before commencement of work. Safety requirement for the men and machine shall be vendor's responsibility and shall be insured by the vendor on his own cost. BHEL shall **not be responsible** for any loss on such account.

8. **Materials:** The scope of purchase includes supply of steel structures and cladding, these materials shall comply to following details:

   8.1. Primary members (primary structural framing shall include the transverse rigid frames, columns, corner columns, end wall wind columns and frames at Door openings) fabricated from plates and sections with minimum yield strength of **250** MPa or to suit design by continuous welding.
   8.2. Secondary members (secondary structural framing shall include the purlins, girts, eave struts, wind bracing, flange bracing, base angles, clips,flashings and other miscellaneous structural parts. Suitable wind bracings sag rods to be reckoned while designing the structure) for Purlins and Grits shall conform to the physical specification of IS Standards having a minimum yield strength of **250** MPa.
   8.3. ROOF & WALL BRACINGS: Roof and wall bracings shall have minimum yield strength of 250 MPa and shall conform to the specifications IS 2062 / IS226
   8.4. All hot rolled sections shall conform to the physical specifications IS 2062 / IS226. All other miscellaneous secondary members shall have minimum yield strength of 250 MPa.
   8.5. Defect (loose mill scales, slag inclusions, lamination, pitted, flacky, rusted) free, sound, fresh steel sections, plates and hardware shall only be employed and procured by the vendor. Procurement details and test certificates shall be periodically submitted to BHEL for co-relating quantities used. Materials used from stocked items by the vendor shall be identified and informed to BHEL prior to use, submitting procurement details and test certificates. BHEL reserves right to verify test parameters, rejecting utilisation in case of unsatisfactory results. The cost of verification shall be borne by the vendor.
   8.6. Handling and storage: Section and fabricated items shall be stored in dry, covered space. The material shall be protected against soiling by construction environment at factory or site.

9. Fabrication: All fabrication work shall be carried out as per QP and in accordance with standards (IS: 800-2007) at vendor's workshop or at site as approved by BHEL.

9.1. Sizing and straightening: Mild steel rolled sections, plates shall be cut clean using plasma/ gas maintaining margins and cutting allowances. The flash and metal droplets resulting from cuts shall be removed by grinding. The sections shall be straightened or bent, using proper hydraulic/pneumatic tools, as desired. Vendor shall refrain from using impact loading (sledging/hammering) during these operations. Heating of section during bending, rolling, straightening is permitted.

9.2. Drilling/Punching/Holing: Punching is preferred operation for the holes and slots. The supplier is permitted to mill the slots and drill the holes. Holes and punches shall be made at right angles and cut clean without any torn or jagged edges. The edges shall be appropriately chamfered. **Gas cut holes and slots are not permitted.**

9.3. Fabrication tolerances: Unless otherwise shown on drawings, the fabrication tolerances shall generally be as detailed hereunder.

9.4. STRAIGHTNESS: The dimensional and weight tolerance for rolled shapes shall be in accordance with IS: 1852 for indigenous steel . The acceptable limits for straightness (sweep and camber) for rolled or fabricated members shall be:

9.4.1. Struts and columns: L/1000 or 10mm whichever is smaller. For all other members not primarily in compression such as purlins, beams, bracings & web members of trusses and latticed girders: L/500 or 15mm whichever is less.(Where L is the length of finished member, or such lesser length as the Engineer in charge may specify)

9.4.2. TWISTS:A limit of twist (prior to erection) in:

9.4.2.1. Box girders and heavy columns: L/1500
9.4.2.2. Other members L/1000

9.4.3. CAMBER: Tolerance in specified for camber of structural members shall be ±3mm.

9.4.4. LENGTH: Tolerance in specified length shall be as follows:

Type of member	Tolerance
A column finished for contact bearing	± 1 mm
Other members (e.g. beams) under 10 m	+ 0 and -3mm
Other members (e.g. beams) 10 m long and over	+ 0 and -5mm

9.4.5. Column Fabrication Tolerances: The work point at about the elevation of the crane girders seat shall not be vary more than ±1/8th inch from the straight line struck between top and bottom points. The AWS straightness tolerances will control between the work points. The girder seat plates are to be located from the work centre line with a tolerance of ±1/32 inch or equivalent ASIC/MBMA manual.

9.4.6. SQUARE-NESS AT END OF MEMBERS:

9.4.6.1. Beam to beam and beam to column connections where the abutting parts are to be jointed by butt welds, permissible deviation from the square-ness of the end is:
Beams up to 600mm in depth: 1.5mm
Beams over 600mm in depth: 1.5mm every 600 mm depth up to a max of 3mm

9.4.6.2. Where abutting parts are to be jointed by bolting through cleats or end plates, the connections require closer tolerance.

Beams up to 600mm in depth: 1.0mm
Beams over 600mm in depth: max of 1.5mm

9.4.7. BUTT JOINTS: For full bearing, two abutting ends of columns shall first be aligned to within 1 in 1000 of their combined length and then the following conditions shall be met:

(a) Over at least 80% of the bearing surface the clearance between the surfaces does not exceed 0.10mm.

(b) Over the reminder of the surfaces the clearance between the surfaces does not exceed 0.30mm.

Where web stiffeners are designed for full bearing on either the top flange or bottom flange or both, at least half the stiffener shall be in positive contact with the flange. The reminder of the contact face could have a max. gap of 0.25mm.

9.4.8. DEPTH OF MEMBER: Acceptable deviation from the specified overall depth is:

For depths of 900 mm and under: 3mm

For depths over 900 mm and under 1800mm: ± 5mm

For depths of 1800 mm and over: +8 mm: - 5mm

9.4.9. FLANGE PLATES: Limit for combined warp-age and tilt on the flanges of a built up member is 1/200 of the total width of flange or 1.5 mm whichever is smaller measured with respect to centre line of flange.

9.4.10. Lateral deviation between centre line of web plate and centre line of flange plate at contact surfaces, in the case of built up sections shall not exceed 3 mm.

9.5. Welding: Metal inert gas (MIG) welding process shall be used for majority of welding operations. The site assembly work where it is difficult to use MIG, manual arc welding shall be resorted to.

9.5.1. The electrodes for manual arc welding shall be suitable for use in the position and type of work, as laid down in the specified standard and as recommended by electrode manufacturers. Electrodes classification group 1 or 2 as given in IS: 814 shall be used for welding steel conforming to IS: 2062. Electrodes shall conform to IS: 1442 for steels conforming to IS: 8500.

9.5.2. Joints in materials above 20mm thick, and, all important connections shall be made with low hydrogen electrodes with sound and unbroken electrode flux covering.

9.5.3. Covered electrodes for manual arc-welding shall be stored (as recommended by electrode manufacturer) in an oven prior to use and only an hour's quota shall be issued to each welder from the oven. Electrodes larger than 5mm diameter shall not be used for root-runs in butt-weld.

9.5.4. All welds shall be made only by trained, licensed and qualified welders as prescribed in the relevant applicable standards. All welds shall be free from defects like blow holes, slag inclusions, lack of penetration, undercutting, cracks etc. All welds shall be cleaned of slag or flux and show uniform sections, smoothness of weld metal, feather edges without overlap and freedom from porosity.

9.5.5. Fusion faces and surfaces adjacent to the joint for a distance of at least 50mm on either side shall be absolutely free from grease, paint loose scales, moisture or any other substance which might interfere with welding or adversely affect the quality of the weld. Joint surfaces shall be smooth, uniform and free from fins, tears, laminations etc. Preparation of fusion faces shall be done in accordance with the approved fabrication drawings by shearing, chipping, machining or machine flame cutting (shearing shall not be used for thickness over 8mm).

9.5.6. In the fabrication of cover-plated beams and built up members all shop splices in each component part shall be made before such component part is welded to other parts of the member. Wherever weld re-enforcement interferes with proper fit-up between components to be assembled for welding, these welds shall be ground flush prior to assembly.

9.5.7. Members to be joined by fillet welding shall be brought and held as close together as possible and in no event shall be separated by more than 3mm. If the separation is 1.5mm or greater, the fillet weld size shall be increased by the amount of separation. This shall only apply in the case of continuous welds. The fit-up of joints at contact surfaces which are not completely sealed by welds shall be close enough to exclude water after painting.

9.5.8. The separation between fraying surfaces of lap joints and butt joints with backing plate shall not exceed 1.5mm. Abutting parts to be butt welded shall be carefully aligned and the correct root gap maintained throughout the welding operation. Misalignments greater than 25 percent of the thickness of the thinner plate or 3mm whichever is smaller shall be

corrected and in making the correction the parts shall not be drawn into a slope sharper than 2 degree (1in 27.5).

9.5.9. Welding procedures recommended by appropriate welding standards and to provide satisfactory welds shall be followed. A welding procedure shall be prepared by the Vendor and submitted to the Engineer in charge for approval before start of welding.

9.5.10. Approval of the welding procedure by the BHEL shall not relieve the Vendor of his responsibility for correct and sound welding, without undue distortion in the finished structure.

9.5.11. Voltage and current (and polarity if direct current is used) shall be set according to the recommendations of the Manufacturer of the electrode being used, and suitable to thickness of material, joint etc. The work shall be positioned for flat welding wherever practicable and overhead weld shall be avoided.

9.5.12. No Welding shall be done when the surface of the members is wet, not during periods of high wind unless the welding operator and the work are properly protected. In joints connected by fillet welds, the minimum size of single run fillet welds or first runs and minimum full sizes of fillet welds shall conform to the requirements of IS:816 and IS:823, Fillet welds larger than 8mm shall be made with two or more passes.

9.5.13. All 'full penetration butt welds' made by manual arc-welding, except when produced with the aid of backing material or welded in flat position, from both sides in square-edge material, not over 8mm thick with root opening not less than one-half the thickness of the thinner part joined, shall have the root of the initial layer gouged out on the back side before welding is started from that side, and shall be so welded as to secure sound metal and complete fusion throughout the entire cross section.

9.5.14. Butt welds shall be terminated at the ends of a joint in a manner that will ensure their soundness where abutting parts are 20mm or more in thickness, run-on and run-off plates with similar edge preparation end having a width not less than the thickness of the thicker part joined shall be used. These extension pieces shall be removed upon completion of the weld and the ends of the weld made smooth and flush with the abutting parts. Where the abutting parts are thinner than 20 mm the extension pieces may be omitted but the ends of the butt welds shall then be chipped or gouged out to sound metal and side welded to fill up the ends to the required reinforcement.

9.5.15. Each layer of a multiple layer weld except root and surface runs may be moderately peeled with light blows from a blunt tool. Care shall be exercised to prevent scaling or flaking of weld and base metal from over- peeling. Minimum pre heat temperature for metal thickness up to 50 mm shall be100ºC. If so desired by BHEL, mock up welding shall be carried out at the vendor's cost to establish the efficacy of the proposed programme, with any modification suggested by the Engineer in Charge in limiting distortion or/and residual stress to acceptable levels. Such modifications will not relieve the vendor of any of his responsibilities.

9.5.16. The ends of butt joints shall be welded so as to provide full throat thickness. This may be done by the use of extension pieces, cross-runs or other approved means. The weld face shall, at all places, be deposited projecting the surface of the parent metal. Where a flush surface is required, the surplus metal shall be dressed off. Splices and butt joints of compression members, depending on contact for stress transmission, shall be accurately machined over the whole section. In column bases, the ends of shafts together with the attached gussets, angles, channels etc., after bolting and/or welding together as the case may be, shall be accurately machined so that the parts connected butt over the entire surface of contact. Care shall be taken, so that connecting angles or channels are fixed with such accuracy that they are not reduced in thickness by machining by more than 0.80mm.

9.5.17. The minimum leg length of a fillet weld as deposited shall be not less than the specified size. In no case shall a concave weld be deposited, unless specifically permitted. Where permitted, the leg length shall be increased above that specified length, so that the resultant throat thickness is as great as would have been obtained by the deposition of a flat-faced weld of the specified leg length.

9.5.18. After making each run of welding, all slag shall be thoroughly removed and the surface cleaned. The weld metal, as deposited (including tack welds), shall be free from cracks, slag inclusions, porosity, cavities and other deposition faults. The weld metal shall be properly fused with the parent metal without under cutting or overlapping at the toes of the weld. The surface of the weld shall have a uniform consistent contour and regular appearance. In case the tests uncover defective work, such tests shall be at the Vendor's cost and the Contactor shall correct such defects at his own cost and prove the soundness of rectified work.

9.5.19. The correction of defective welds shall be carried out as directed by the Engineer in charge without damaging the parent metal. When a crack in the weld is removed, magnetic particle inspection or any other equally positive means as prescribed by the Engineer in charge shall be used to ensure that the whole of the crack and material up to 25mm beyond each end of the crack has been removed. Cost of all such tests and operations incidental to correction shall be to the Vendor's account.

9.6. Surface treatment: The material used shall be shot blasted prior to sizing and welding. On completion of fabrication the weld areas shall be shot blasted again prior to application of primer (35-40 micron). The finished members shall be painted for a composite thickness of 75 micron using Nerolac / Berger / Asian make enamel / epoxy paint as shall be selected in two or more steps. The section shall not be handled during the process of drying of primer/ paint.

9.7. Inspection: As supplies shall be sequenced inter stage inspection shall be carried out and completed as scheduled on a continuous basis. The readiness shall be communicated and inspections arranged without loss of time.

9.7.1. The inspection shall be as per approved Quality Plan (QP) and shall be arranged by vendor. The reports shall be made available, within 48 hours, to BHEL for records. Costs of involving third party during inspection shall be to the account of the vendor.

9.7.2. All rejected material shall be promptly removed from the shop/site and replaced with new material for the BHEL's approval / inspection. The fact that certain material has been accepted at the Vendor's shop shall not invalidate final rejection at site by the Engineer in charge, if it fails to be in proper conditioner has fabrication in accuracies which prevents proper assembly. No materials shall be painted or dispatched to site without inspection and approval by BHEL unless; such inspection is waived in writing by BHEL.

9.7.3. Shop / site inspection by BHEL or authorized representative, or submission of test certificates and acceptance thereof by the Engineer, shall not relieve the Vendor from the responsibility of furnishing material conforming to the requirements of these specifications. Nor shall it invalidate any claim, which BHEL may make because of defective or unsatisfactory material and/or workmanship.

9.7.4. The Vendor shall provide all the testing and inspection services and facilities for shop work except where otherwise specified. For fabrication work carried out in the field, the same standard of supervision and quality control shall be maintained as in shop fabricated work. Inspection and testing shall be conducted in a manner satisfactory to BHEL.

9.8. TESTING: If mill test reports are not available for any steel materials, the same shall be tested by the vendor to the satisfaction of BHEL to demonstrate conformity with the relevant specification.

9.8.1. DYE PENETRATION TEST: Where welds are required to be examined by dye penetration inspection method, such tests shall be carried out in accordance with IS:3658.

9.8.2. TEST FAILURE: At any stage, in the event of any material or work failing to meet an inspection of test requirement, which is not overseen by the Engineer in charge, the Vendor shall notify the Engineer in charge immediately. The vendor must obtain permission from Engineer in charge before repair is undertaken. The quality control procedures to be followed to ensure satisfactory repair shall be subject to approval by the Engineer in charge. The Engineer in charge has the right to specify additional inspection or testing as he deems necessary, and the additional cost of such testing shall be borne by the Vendor. The Vendor shall maintain records of all inspection and testing which shall be made available to the Engineer in charge on demand.

9.9. SHOP MATCHING: Some steel work, particularly columns along with tie beams, bracings etc. may have to be shop assembled to ensure satisfactory fabrication, if BHEL so desires, then, BHEL may instruct such assembly at shop

for verification. The Vendor shall comply with such instructions without claiming any extra cost.

9.10. **SHOP ASSEMBLY**: Steel work shall be temporarily shop assembled, if necessary, so that the accuracy of fit may be checked before dispatch. The parts shall be shop assembled with a sufficient number of parallel drifts to bring and keep the parts in place.

9.11. **SITE ASSEMBLY:** All parts assembled for bolting shall be in close contact over the whole surface. The component parts shall be so assembled that they are neither twisted nor otherwise damaged, specified cambers, if any, shall be provided. All parts of bolted and welded members shall be held firmly in position by means of jigs or clamps while bolting or welding. No drifting of holes shall be permitted, except to draw the parts together and no drift used shall be larger than the nominal diameter of the bolt. Drifting done during assembling shall not distort the metal or enlarge the holes. Trial assemblies shall be carried out at the fabrication stage to ensure accuracy of workmanship, and these checks shall be witnessed by the Engineer in charge/Authorized inspecting agency. Such trial assembly shall be at the cost of the vendor.

9.12. **FIELD BOLTS**: Requirements stipulated under bolting shall apply for field bolts also. Field bolts nuts and washers shall be furnished by the vendor in excess of the nominal numbers required. He shall supply the full number of bolts, nuts and washers and other necessary fittings required completing the work, together with the additional bolts, nuts and washers totaling to 10% of the requirement subject to minimum of 10 Nos.

9.13. At the time of assembly, the surfaces in contact shall be free of paint or any other applied finish, oil, dirt, loose rust, loose scale, burrs and other defects which would prevent solid seating or the parts or would interfere with the development of friction between them.

9.14. If any other surface condition, including a machined surface, is specified, it shall be the responsibility of the Vendor to work within the slip factor specified for the particular case.

9.15. Each bolt and nut shall be assembled with washers of appropriate shape, quality and number in cases where plane parallel surfaces are involved, such washers shall be placed under the bolt head or the nut, whichever is to be rotated during the tightening operation. The rotated nut or bolt head shall be tightened against a surface normal to the bolt axis, and the appropriate tapered washer shall be used when the surfaces are not parallel. The angle between the bolt axis and the surface under the non-rotating component (i.e. the bolt head or the nut) shall be 90+3 degree. For angles outside these limits, a tapered washer shall be placed under the non-rotating component. Tapered washers shall be correctly positioned.

9.16. No gasket or other flexible material shall be placed between the holes. The holes in parts to be joined shall be sufficiently well aligned to permit bolts to be freely placed in position. Driving of bolts is not permitted. The nuts shall be placed so that the identification marks are clearly visible after tightening. Nut and bolts shall always be tightened in a staggered pattern and where there are more

than four bolts in anyone joint, they shall be tightened from the centre of the joint outwards.

9.17. If after final tightening, a nut or bolt is slackened off for any reason, the bolt, nut and washer or washers shall be discarded and not used again.

10. ERECTION: Erection of structural steel fabricated components shall be done generally in accordance with provisions of IS 800.-2007

10.1. Before starting of erection work, the vendor shall ensure the fulfillment of the following activities:-

10.1.1. The vendor shall submit, detailed particulars of his proposed methods of erection of the super structured steel work, together with complete calculations required relating to strength and deflection. If the erection scheme necessitates the attachment of the action to the permanent steel work, the vendor shall submit, for approval of BHEL, the methods he proposes for making good the permanent steelwork after removing the temporary work. The vendor shall also submit the fabrication drawings including detailed calculations of temporary nose, counter weight of staging, braces etc. required for safe erection, for approval of BHEL.

10.1.2. The vendor shall provide all construction and transport equipment, tools, tackle and consumables, materials, labour and supervision required for the erection of the structural steel work.

10.1.3. Handling, assembling, bolting, welding and satisfactory installation of all fabricated structural steel materials in proper location, according to approved erection drawings and/or as directed by the Engineer in charge.

10.1.4. Setting out, aligning, plumbing, leveling, bolting, welding and securely fixing the fabricated steel structures in accordance with the erection scheme or as directed by the Engineer in charge.

10.2. ERECTION TOLERANCES: Erection tolerances shall be as per Table-33 of IS 800-2007

10.3. QUALITY CONTROL & TESTING REQUIREMENTS: The vendor shall submit the following:

10.3.1. Quality plan for approval for fabrication as well as erection.

10.3.2. Proposed overall schedule for documentation of shop drawings, plan / procedures and records, submission of procedure of fabrication.

10.3.3. The vendor shall himself inspect all materials and shop work to satisfy the specified tolerance limits and quality norms before the same are inspected by Engineer in charge.

10.3.4. The vendor shall through appropriate planning and continuous measurements in the workshop and the erection at site ensure that the tolerances specified in this specification are strictly adhered to.

10.3.5. Fabricating agency shall have in house facilities for all testing of welds.

10.4. VISUAL EXAMINATION: The vendor shall conduct visual examination and measurement of the external dimensions of welds for all joints. Before

examining the welded joints, areas close to it on both sides of the weld for a width not less than 20 mm shall be cleaned of slag and other impurities. Examination shall be done by a magnifying glass which has a magnification power of ten (10) and measuring instrument which has an accuracy of ± 0.10 mm or by weld gauges. Welded joints shall be examined from both sides. The vendor shall examine the following during the visual checks:

10.4.1. Correctness and shape of the welded joints
10.4.2. Incomplete penetration of weld metal
10.4.3. Influx
10.4.4. Burns
10.4.5. Un welded craters
10.4.6. Undercuts
10.4.7. Cracks in welded spots and heat affected zones
10.4.8. Porosity in welds and spot welds.
10.4.9. Compression in welded joints as a result of electrode impact while carrying out contact welding.
10.4.10. Displacement of welded element.
10.4.11 The vendor shall, document all data as per sound practices.

10.4.12 WALL & ROOF CLADDING:

10.4.12.1 ROOF SHEETING : 50mmth Puf insulated galvalume sheeting(Roof of the Cylindrical portion)…….. Appendix -1.
10.4.12.2 ROOF SHEETING: 50mmth crimped galvalume sheeting with glass wool (Top portion of parabola)…… Appendix - 2 .
10.4.12.3 ROOF SHEETING: Single layer bare galvalume sheeting (North side of parabola)..… ……Appendix - 3 .
10.4.12.4 Side wall Cladding: 30mmth Puf insulated galvalume sheeting (Cylindrical portion walls and other walls)…Appendix - 4.

10.4.13 SHEETING FASTENERS: Standard fasteners shall be self tapping zinc plated metal screws with EPDM bonded zinc plated washers. All screws shall be color coated to match roof and wall sheeting.

10.4.14 SEALER: This is to be applied at all side laps and end laps of roof panels and around self flashing windows. Sealer shall be pressure sensitive elastomeric Butyl tapes. The sealer shall be non-asphaltic, non-shrinking and non toxic and shall be superior adhesive metals, plastics and painted at temperatures from 51°C to +104°C.

10.4.15 CLOSURES: Solid or closed cell closures matching the profiles of the panel shall be installed along the eaves, rake and other locations specified on drawings.

10.4.16 FLASHING AND TRIM: Flashing and / or trim shall be furnished at the rake, corners, eaves, and framed openings and wherever necessary to provide weather tightness and finished appearance. Color shall be matching with the color of wall. Material shall be conforming to the physical specifications of sheeting.

10.4.17 SKY LIGHTS : Skylight is translucent corrugated sheets matching the profile of roof and side cladding. The translucent sheets are made from 2mm thick Polycarbonate sheets and shall provide an economic form of general-purpose day lighting. Skylights shall be provided for 5% of the roof area. Colour of the panel shall be white with smooth surface finish with a light transmitting capacity of 60% + 5%.

10.4.18 Turbo blowers: Turbo blowers of adequate size and capacity shall be included in design for each of three sections.

10.4.19 GUTTERS AND DOWN SPOUTS: Gutters and downspouts shall be adequately designed to ensure proper roof drainage system. Material shall be same as that of sheeting.

10.4.20 CONNECTIONS :

10.4.21 SITE CONNECTIONS

10.4.21.1 All primary bolted connections shall be provided with galvanized high strength bolts, washers, nuts conforming to specifications of grade 8.8 or above OF IS 1367

10.4.21.2 All secondary bolted connections shall be furnished with bolts, nuts, washers conforming to the specifications of grade 4.6 of IS 1367 or ASTM-A307.

10.4.22 SHOP CONNECTIONS: All shop connections shall be welded with appropriate arc welding process and welding shall be in accordance with IS 816,IS-819 ,IS1024,IS-1261, IS1323,IS-9595, AWSD 1.1. as appropriate. The Webs should be welded on to the flanges at both the faces at top and bottom for columns, beams. Weld material should have strength more than the parent metal.

Poly Urethane Foam (PUF) Insulated Sheeting Specifications

Appendix -1

Providing & fixing self supporting Metecno make Glamet 50 mm thick Sandwich PUF panels [roofing purpose] or equivalent approved make and shade manufactured on continuous line comprising with colour coated Galvalume profiled sheet both sides with 0.5 mm external & 0.4mm TCT internal facing with Crest height of 38 mm & distance between two crest as 333.33 mm (or as per manufacturers specification) to improve strength and aesthetics.

The colour coated sheets will have substrate of Galvalume 150 AZ and yield strength 280 MPa (min)

Coating shall be of polyester type on both the external & internal steel wall facings of 25 micron finish. The void between the sheets will be CFC free **polyurethane foam** of density **40 kg/Cu M** and thermal conductivity of 0.024 W/m K. The thickness of panel shall form 50 mm outer excluding the profile. The length of the panel shall be to suit the site length requirement. The side lapping and overlapping joints of the self supporting panels should be vapour tight. The rate should include cost of all necessary iron mongery, hardware.

The PUF panels supplied shall have guard film protection on all exposed surfaces.

Appendix -2

Providing & fixing self supporting Metecno make 50 mm thick Crimped roofing with glass wool of 30Kg density or equivalent approved make and shade manufactured on continuous line comprising with colour coated galvalume profiled sheet both sides with 0.5 mm external & 0.4mm TCT internal facing with Crest height of 38 mm & distance between two crest as 333.33 mm (or as per manufacturers specification) to improve strength and aesthetics.

The colour coated sheets will have substrate of Galvalume 150 AZ and yield strength 280 Mpa (min)

Coating shall be of polyester type on both the external & internal steel wall facings of 25 micron finish. The void between the sheets will be filled with **glass wool** of density **30 kg/Cu M** .The length of the panel shall be to suit the site length requirement. The side lapping and overlapping joints of the self supporting panels should be vapour tight. The rate should include cost of all necessary iron mongery, hardware.

The panels supplied shall have guard film protection on all exposed surfaces.

Appendix -3

Providing & fixing of Single skin Galvalume sheet of approved make and shade manufactured on continuous line comprising with colour coated Galvalume profiled sheet with 0.5 mm thickness with Crest height of 38 mm & distance between two crest as 333.33 mm (or as per manufacturers specification) to improve strength and aesthetics.

The colour coated sheets will have substrate of Galvalume 150 AZ and yield strength of 550 MPa.

Coating shall be of polyester type on both the external & internal steel wall facings of 25 micron finish fixed with self drilling screws, EPDM washer etc complete. The length of the panel shall be to suit the site length requirement. The rate should be complete including cost of all necessary iron mongery, hardware etc.

Appendix - 4

Providing & fixing self supporting Metecno make Monowall 30 mm thick Sandwich PUF panels [Wall cladding purpose] or equivalent approved make and shade manufactured on continious line comprising with colour coated galvalume profiled sheet comprising 0.5 mm TCT/ 0.5 mm TCT to improve strength and aesthetics. The color coated sheets will have substrate of Galvalume 150 AZ & yield strength 280 Mpa [min.].

Coating shall be of polye- ster type on both the external & internal steel wall facings of 25 micron finish.

The void between the sheets will be CFC free **polyurethane foam** of density 40 kg/Cu M and thermal conductivity of 0.024 W/m K. The thickness of panel shall form 30 mm outer to outer excluding the profile. The length of the panel shall be to suit the site length requirement. The self supporting panels shall have tongue and groove joints OR any other suitable method for jointing the sheets. the panel joints should be finally sealed with silicon sealant of approved make to make it vapour tight. The rate should include cost of all necessary iron mongery, hardware.

The PUF panels supplied shall have guard film protection on all exposed surfaces.

Appendix – 5

The structure is to be provided with adequate number of Turbo Ventilators of best quality and size 500 mm to 660 mm over the roof as required for good ventilation.

Appendix - 6

Adequate number of sky illumination pockets and Skylights

ANNEXURE – III

Bill of Quantities for proposed Structure

BILL OF QUANTITIES : BHEL UHV LAB

		kgs	Ref.
A	**STRUCTURALS:**		
	1. East & West Side Vertical Walls (Structural)	**8686.3**	**PageAIII-2**
	2. Structure covering North & South		
	i. Parabolic Dome Portion	**29348.6**	**Page AIII-3**
	ii. Cylindrical Dome Portion	**37983.4**	**Page AIII-4**
	3. Structural Columns for 5T and 15 T EOT Cranes	**16414.5**	**Page AIII-5**
	4. Purlins for external & Internal Cladding	**19540**	**Page AIII-6**
	5. Miscellaneous	**2600**	**Page AIII-5**
	Total of Structurals	**114573**	
B	**CLADDING:**		
		Area in Sq.m	
	Cladding Type as per Appendix 1 in Annexure II	**550**	**Page AIII-6**
	Cladding Type as per Appendix 2 in Annexure II	**180**	**Page AIII-6**
	Cladding Type as per Appendix 3 in Annexure II	**3889**	**Page AIII-6**
	Cladding Type as per Appendix 4 in Annexure II	**1340**	**Page AIII-6**
	Total Area to be Cladded	**5959**	
C	**ACCESSARIES:**		
	1. Turbine Air Ventillators	**Numbers as arrived at based on size of the structure**	
	2. Skylights	**As required and arrived at to result in good daylight**	

BILL OF QUANTITIES - Structurals (BHEL UHV LAB)

1	EAST SIDE ELEVATION	NO	GRID	PIECE LENGTH	TOTAL LENGT	UNIT WT.	TOTAL WEIGHT	REMARK	
	REF DWG : TDR DRG No: 04								
	c - ISMC 125 F/F	2	3-4,10-11	1.732	3.464	25.40	87.99	HORIZONTAL TIES	
		2	3-4,10-12	0.974	1.948	25.40	49.48	HORIZONTAL TIES	
		6	4-6,8-10	2.259	13.554	25.40	344.27	HORIZONTAL TIES	
		2	4-6,8-11	1.297	2.594	25.40	65.89	HORIZONTAL TIES	
		10	6-7,7-8	4.000	40.000	25.40	1016.00	HORIZONTAL TIES	
		22			**61.56**	**25.40**	**1563.62**		**1563.62**
	f - PIP761.0H(NB 65 H)	2	3-4,10-11	2.997	5.994	7.93	47.53	DIAGONAL BRACINGS	
		2	3-4,10-11	2.606	5.212	7.93	41.33	DIAGONAL BRACINGS	
		2	3-4,10-11	2.519	5.038	7.93	39.95	DIAGONAL BRACINGS	
		2	3-4,10-11	2.069	4.138	7.93	32.81	DIAGONAL BRACINGS	
		12	4-6,8-10	2.982	35.784	7.93	283.77	DIAGONAL BRACINGS	
		2	4-6,8-10	1.920	3.84	7.93	30.45	DIAGONAL BRACINGS	
		2	4-6,8-10	2.656	5.312	7.93	42.12	DIAGONAL BRACINGS	
		4	6-7,7-8	4.441	17.764	7.93	140.87	DIAGONAL BRACINGS	
		4	6-7,7-8	4.397	17.588	7.93	139.47	DIAGONAL BRACINGS	
		4	6-7,7-8	4.397	17.588	7.93	139.47	DIAGONAL BRACINGS	
		4	6-7,7-8	4.236	16.944	7.93	134.37	DIAGONAL BRACINGS	
		4	6-7,7-8	4.236	16.944	7.93	134.37	DIAGONAL BRACINGS	
		2	6-7,7-8	2.692	5.384	7.93	42.70	DIAGONAL BRACINGS	
		46			**157.53**	7.93	**1249.21**		**1249.21**
	J -ISMB 250	1	7	10.110	10.11	37.3	377.10	FACIA FRAME COLUMNS	
		2	3--4	5.623	11.246	37.3	419.48	FACIA FRAME COLUMNS	
		2	4--6	8.415	16.83	37.3	627.76	FACIA FRAME COLUMNS	
		5			**38.186**	**37.3**	**1424.34**		**1424.34**
	BASE PLATES	**5**		450X300X20		7850	1563.62 **105.975**	BASE PLATE UNDER COLUMNS	**105.98**
2	**WEST SIDE ELEVATION**	**NO**	**GRID**	**(m)**	**(m)**	**(Kg/m)**	**(Kg)**	**REMARK**	
	REF DWG : TDR DRG No: 04								
	c - ISMC 125 F/F	2	3-4,10-11	1.732	3.464	25.40	87.99	HORIZONTAL TIES	
		2	3-4,10-12	0.974	1.948	25.40	49.48	HORIZONTAL TIES	
		6	4-6,8-10	2.259	13.554	25.40	344.27	HORIZONTAL TIES	
		2	4-6,8-11	1.297	2.594	25.40	65.89	HORIZONTAL TIES	
		10	6-7,7-8	4.000	40.000	25.40	1016.00	HORIZONTAL TIES	
		22			**61.56**	**25.40**	**1563.62**		**1563.62**
	f - PIP761.0H(NB 65 H)	2	3-4,10-11	2.997	5.994	7.93	47.53	DIAGONAL BRACINGS	
		2	3-4,10-11	2.606	5.212	7.93	41.33	DIAGONAL BRACINGS	
		2	3-4,10-11	2.519	5.038	7.93	39.95	DIAGONAL BRACINGS	
		2	3-4,10-11	2.069	4.138	7.93	32.81	DIAGONAL BRACINGS	
		12	4-6,8-10	2.982	35.784	7.93	283.77	DIAGONAL BRACINGS	
		2	4-6,8-10	1.920	3.84	7.93	30.45	DIAGONAL BRACINGS	
		2	4-6,8-10	2.656	5.312	7.93	42.12	DIAGONAL BRACINGS	
		4	6-7,7-8	4.441	17.764	7.93	140.87	DIAGONAL BRACINGS	
		4	6-7,7-8	4.397	17.588	7.93	139.47	DIAGONAL BRACINGS	
		4	6-7,7-8	4.397	17.588	7.93	139.47	DIAGONAL BRACINGS	
		4	6-7,7-8	4.236	16.944	7.93	134.37	DIAGONAL BRACINGS	
		4	6-7,7-8	4.236	16.944	7.93	134.37	DIAGONAL BRACINGS	
		2	6-7,7-8	2.692	5.384	7.93	42.70	DIAGONAL BRACINGS	
		46			**157.53**	7.93	**1249.21**		**1249.21**
	J -ISMB 250	1	7	10.110	10.11	37.3	377.10	FACIA FRAME COLUMNS	
		2	3--4	5.623	11.246	37.3	419.48	FACIA FRAME COLUMNS	
		2	4--6	8.415	16.83	37.3	627.76	FACIA FRAME COLUMNS	
		5			**38.186**	**37.3**	**1424.34**		**1424.34**
	BASE PLATES	**5**		450X300X20		7850	**105.975**	BASE PLATE UNDER COLUMNS	**105.98**

Page AIII - 2

BILL OF QUANTITIES - Structurals (BHEL UHV LAB)

3	STRUCTURE COVERING NORTH & SOUTH	NO	GRID	(m)	(m)	(Kg/m)	(Kg)	REMARK	
A	PARABOLIC DOME (REF DWG : TDR DRG No: 05)								
	pa - PIP 244.5H (NB-225H)	6	,C,D,M,N,(	49.32	295.92	34.700	10268.42	PARABOLA COLUMNS	
		6			**295.92**	**34.7**	**10268.42**		**10268.42**
	pb - PIP 219.1H (NB-200H)	2	E,L	33.274	66.548	31.00	2062.99	PARABOLA COLUMNS	
		2	F,K	46.32	92.64	31.00	2871.84		
		4			**159.188**	**31.00**	**4934.83**		**4934.83**
	d - PIP 889.0H (NB 80H	40	B-C,N-O	3.500	140	9.9	1386.00	HORIZONTAL TIES	
		40	C-D,M-N	4.000	160	9.9	1584.00	HORIZONTAL TIES	
		4	E-F,K-L	2.513	10.052	9.9	99.51	HORIZONTAL TIES	
		4	E-F,K-L	2.309	9.236	9.9	91.44	HORIZONTAL TIES	
		4	E-F,K-L	2.040	8.16	9.9	80.78	HORIZONTAL TIES	
		8	B-C,N-O	2.679	21.432	9.9	212.18	BOTT DIAGNAL BRACNGS	
		8	C-D,M-N	2.849	22.792	9.9	225.64	BOTT DIAGNAL BRACNGS	
		16	B-C,N-O	2.68	42.88	9.9	424.51	TOP DIAGNAL BRACNGS	
		16	C-D,M-N	2.68	42.88	9.9	424.51	TOP DIAGNAL BRACNGS	
		140			**317.432**	9.9	**3142.58**		**3142.58**
	r - PIP1016.0L(NB 90L)	**4**	B-C,N-O	3.500	14	8.7	121.80	HORIZONTAL TIES	
		4	C-D,M-N	4.000	16	8.7	139.20	HORIZONTAL TIES	
		8			**30**	8.7	**261.00**		**261.00**
	dc - PIP152.4L(NB 135L	**2**	B-C,N-O	3.500	7	16.4	114.80	RIDGE TIE	
		2	C-D,M-N	4.000	8	16.4	131.20	RIDGE TIE	
		4			**15**	16.4	**246.00**		**246.00**
	f - PIP761.0H(NB 65 H)	28	D-E,L-M	1.850	51.800	7.93	410.774	HORIZONTAL TIES	
		4	D-E,L-M	1.660	6.640	7.93	52.655	HORIZONTAL TIES	
		4	D-E,L-M	1.103	4.412	7.93	34.987	HORIZONTAL TIES	
		4	D-E,L-M	0.576	2.304	7.93	18.271	HORIZONTAL TIES	
		4	E-F,K-L	1.706	6.824	7.93	54.114	HORIZONTAL TIES	
		4	E-F,K-L	1.310	5.24	7.93	41.553	HORIZONTAL TIES	
		4	E-F,K-L	0.856	3.424	7.93	27.152	HORIZONTAL TIES	
		52			**80.644**	7.93	**639.51**		**639.51**
		160	B-C,N-O	2.693	430.88	7.93	3416.88	DIAGONAL BRACINGS	
		160	C-D,M-N	2.869	459.04	7.93	3640.19	DIAGONAL BRACINGS	
		64	D-E,L-M	2.746	175.744	7.93	1393.65	DIAGONAL BRACINGS	
		4	D-E,L-M	2.370	9.48	7.93	75.18	DIAGONAL BRACINGS	
		4	D-E,L-M	2.019	8.076	7.93	64.04	DIAGONAL BRACINGS	
		4	D-E,L-M	1.838	7.352	7.93	58.30	DIAGONAL BRACINGS	
		4	D-E,L-M	1.579	6.316	7.93	50.09	DIAGONAL BRACINGS	
		8	E-F,K-L	3.337	26.696	7.93	211.70	DIAGONAL BRACINGS	
		8	E-F,K-L	3.242	25.936	7.93	205.67	DIAGONAL BRACINGS	
		8	E-F,K-L	3.080	24.64	7.93	195.40	DIAGONAL BRACINGS	
		8	E-F,K-L	2.645	21.16	7.93	167.80	DIAGONAL BRACINGS	
		8	E-F,K-L	2.637	21.096	7.93	167.29	DIAGONAL BRACINGS	
		8	E-F,K-L	2.357	18.856	7.93	149.53	DIAGONAL BRACINGS	
		4	E-F,K-L	1.91	7.64	7.93	60.59	DIAGONAL BRACINGS	
		452			**1242.91**	7.93	**9856.29**		**9856.29**

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BILL OF QUANTITIES - Structurals (BHEL UHV LAB)

3B	**CYLINDRICAL DOME**	**NO**	**GRID**	**(m)**	**(m)**	**(Kg/m)**	**(Kg)**	**REMARK**	
	(REF DWG : TDR DRG No: 05)								
	cd - PIP 273.0H (NB-250)	12	D-M	20.500	246	38.9	9569.40	MAIN COLUMMNS	**9569.40**
	r - PIP1016.0L(NB 90L)	36	E-G,J-L	4.68	168.48	8.70	1465.78	HORIZONTAL TIES	
		36	G-H,I-J	5.01	180.36	8.70	1569.13	HORIZONTAL TIES	
		18	H-I	5.93	106.74	8.70	928.64	HORIZONTAL TIES	
		90			**455.58**	8.70	**3963.55**		**3963.55**
	f - PIP761.0H(NB 65 H)	80	E-G,J-L	5.252	420.16	7.93	3331.87	DIAGONAL BRACINGS	
		80	G-H,I-J	5.226	418.08	7.93	3315.37	DIAGONAL BRACINGS	
		40	H-I	6.262	250.48	7.93	1986.31	DIAGONAL BRACINGS	
					1088.72	**7.93**	**8633.55**		**8633.55**
	da - PIP114.3L(NB100L	4	E-G,J-L	4.68	18.72	9.75	182.52	HORIZONTAL TIES	
		4	G-H,I-J	5.01	20.04	9.75	195.39	HORIZONTAL TIES	
		2	H-I	5.93	11.86	9.75	115.64	HORIZONTAL TIES	
		10			**50.62**	**9.75**	**493.55**		**493.55**
3C	**TIE BEAM TRUSS AT 20M LEVEL**	**NO**	**GRID**	**(m)**	**(m)**	**(Kg/m)**	**(Kg)**		
	(REF DWG : TDR DRG No: 14)								
	f - PIP761.0H(NB 65 H)	**8**	----------	2.15	17.2	**7.93**	136.40	VERTICAL POST	
		8	----------	0.541	4.328	**7.93**	34.32	TOP TRANSVERSE TIE	
		4	----------	12.826	51.304	**7.93**	406.84	TOP HOZONTAL RAFTER	
		20				**7.93**	**577.56**		**577.56**
	f1 - PIP603.0L1	**24**	----------	4.667	112.008	**4.08**	456.99	DIAGONAL MEMBERS	**456.99**
	d1 - PIP 889.0L(NB 80 L	**2**		12.826	25.652	**8.70**	223.17	BOTTOM HORIZONTAL TIE	**223.17**
3D	**TIE BEAM AT PARABOLA RIDGE LEVEL**	**NO**	**GRID**	**(m)**	**(m)**	**(Kg/m)**	**(Kg)**	**REMARK**	
	(REF DWG : TDR DRG No: 12)								
	dc - PIP152.4L (NB135L	**4**	ACCOUNTED ABOVE						
	dq - PIP114.3M(NB100M	**2**	------	8.23	16.46	**12.20**	200.81	BOTT HORIZONTAL MEMB	
	d - PIP 889.0H (NB 80H	**10**		2.00	20	**9.30**	186.00	VERTICAL POSTS	
		12	------	2.45	29.4	**9.30**	273.42	CROSS MEMBERS	
	f - PIP761.0H(NB 65 H)	**16**	------	2.80	44.8	**7.93**	355.26	DIAGONAL BRACINGS	
							1015.50		**1015.50**
3E	**DOME ROOF TRUSS**	**NO**	**GRID**	**(m)**	**(m)**	**(Kg/m)**	**(Kg)**	**REMARK**	
	(REF DWG : TDR DRG No: 07)								
	da - PIP114.3M(NB100M	**14**	------	25.343	354.802	**12.20**	4328.58	TOP AND BOTT CHORDS	
	f 3 - PIP761.0L(NB 65 L)	112	------	1.879	210.448	**5.71**	1201.66	VERTICAL POSTS	
		98		2.310	226.38	**5.71**	1292.63	DIAGONAL POSTS	
	(REF DWG : TDR DRG No: 08)								
	f - PIP761.0H(NB 65 H)	14	------		70.97	**7.93**	562.79	OTTOM TRANSEVERSE TIE	
	f 1 - PIP603.0L1(NB 50 L	56			196.71	**4.08**	802.58	OTTOM TRANSEVERSE TIE	
	f 2 - PIP483.0L(NB 40 L)	42	------		54.68	**3.23**	176.62	OTTOM TRANSEVERSE TIE	
	f - PIP761.0H(NB 65 H)	56			226.16	**7.93**	1793.45	TOP DIAG BRACINGS	
	f 1 - PIP603.0L1(NB 50 L	84	------		259.13	**4.08**	1057.25	TOP DIAG BRACINGS	
	f 2 - PIP483.0L(NB 40 L)	56			88.61	**3.23**	286.21	TOP DIAG BRACINGS	
							11501.77		**11501.77**
3F	**BASE PLATES**	**Nos**		**Size**		**Kg/cu.m**	**(Kg)**	**REMARK**	
	1. Base Plates	**12**	------	00X500X32		7850	753.6	PLATES UNDER NB-250 COL (CYLINDRICAL STRUCTURE)	
	2. Base Plates	**20**	------	50X450X25		7850	794.8125	PLATES UNDER NB-225 COL (PARABOLIC STRUCTURE)	
							1548.4125		**1548.41**

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BILL OF QUANTITIES - Structurals (BHEL UHV LAB)

4A	**EOT CRANE COLUMNS - 5 TONNE**	**NO**	**GRID**	**(m)**	**(m)**	**(Kg/m)**	**(Kg)**	**REMARK**	
	REF DWG : TDR DRG No: 09								
	composite column-1 2-ISMC 225 @850 c/c (5-no's)								
	MC-225	10	------	6.272	62.72	25.9	1624.45	COLUMN MEMBERS	
	ISA 65X50X6	70		1.000	70	4.9	343.00	DIAGONAL LACING	
	ISA 65X50X6	60		0.830	49.8	4.9	244.02	HORIZONTAL LACING	
	800x250x8	20	------			7850	251.20	END PLATES	
	250X400X20	5				7850	78.50	CAP PLATE	
	350X450X25	10				7850	309.09	COLUMN BASE PLATE	
	ISMB250	5	------	0.850	4.25	37.3	158.53	TOP CROSS GIRDER	
							3008.79		**3008.79**
	DETAILS OF LONGITUDANAL TIES AND CROSS BRACINGS (REF DWG : TDR DRG No: 09)								
	ISMB150	2		25.671	51.342	14.90	31.40	HORIZONTAL TIE	
	ISMC75	10			43.700	6.80	157.00	DIAGONAL BRACING	
	ISLC100	2		6.252	12.504	3.00	31.40	DIAGONAL BRACING	
	20Φ MS PLAIN BAR	25		0.851	21.275	2.46	52.34	LACINGS	
							272.14		**272.14**
4B	**EOT CRANE COLUMNS - 15 TONS**	**NO**	**GRID**	**(m)**	**(m)**	**(Kg/m)**	**(Kg)**	**REMARK**	
	REF DWG : TDR DRG No: 10								
	composite column-1 2-ISMB 250 @900 c/c (3-no's)								
	MB-250	6	------	13.000	78	37.3	2909.40	COLUMN MEMBERS	
	ISA 65X65X6	90		1.195	107.55	5.8	623.79	DIAG. LACINGS	
	ISA 65X65X6	72	------	1.043	75.096	5.8	435.56	LACINGS	
	ISMC 300	6	------	1.080	6.48	36.3	235.22	COL TOP END TIES	
	1060x250x8	6				7850	998.52	BOTT END PLATES	
	350X450X20	6				7850	148.37	COLUMN BASE PLATES	
							5350.86		**5350.86**
	DETAILS OF LONGITUDANAL TIES AND CROSS BRACINGS (REF DWG : TDR DRG No: 10)								
	2-ISMC175 (TB1)	8		3.700	29.600	19.6	580.16	HORIZONTAL TIE	
	2-ISLC100 (TB2)	16		5.580	89.280	7.9	705.31	DIAGONAL BRACING	
	ISA 50X50X5	36		1.100	39.6	3.00	118.80	LACINGS	
	20Φ MS PLAIN BAR	L.S	---				40.00	LACINGS	
							1444.27		**1444.27**
	REF DWG : TDR DRG No: 10								
	composite column-2 2-ISMB 250 @900 c/c (2-no's)								
	MC-225	8		13.000	104	25.9	2693.60	COLUMN MEMBERS	
	ISA 65X65X6	120		1.195	143.4	5.8	831.72	DIAG. LACINGS	
	ISA 65X65X6	96		1.043	100.128	5.8	580.74	LACINGS	
	1060x250x8	8				7850	133.14	END PLATES	
	ISMB250	2		0.950	1.9	37.3	70.87	TOP CROSS GIRDER	
	ISMC100	2		0.550	1.1	9.56	10.52	TOP CROSS GIRDER	
	350X450X20	8				7850	197.82	COLUMN BASE PLATES	
							4518.40		**4518.40**
	DETAILS OF LONGITUDANAL TIES AND CROSS BRACINGS (REF DWG : TDR DRG No: 10)								
	2-ISMC175 (TB1)	4		5.470	21.880	19.6	428.85	HORIZONTAL TIE	
	2-ISMC100 (TB3)	8		6.800	54.400	9.56	520.06	DIAGONAL BRACING	
	ISA 50X50X5	36		1.252	45.072	3.00	135.22	LACINGS	
	20Φ MS PLAIN BARS	L.S	---				40.00	LACINGS	
							1124.13		**1124.13**
	TIE BEAM-2 AT FRAME ENDS IN TRANSEVERSE DIRECTION (REF DWG : TDR DRG No: 10)								
	ISA100X75X8	4		11.200	44.8	10.1	452.48	FRAME TIE BEAM	
	ISA50X50X6	11		2.3	25.3	4.3	108.79	VERTICAL LACINGS	
	ISA50X50X6	8		2.6	20.8	4.3	89.44	LACINGS	
	450X200X16	4		4		7850	45.22	LACINGS	
							695.93		**695.93**
5	**MISCELLENIOUS MATERIALS**						**(Kg)**		
	INSERT PLATES					L.S	**600.00**		
	ANCHOR BOLTS						**1000.00**		
	BRACKETS ,STIFFNRS, END PLATES ,CAP PLTS						**1000.00**		
							2600.00		**2600.00**

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BILL OF QUANTITIES - CLADDING (BHEL UHV LAB)

Ref DRG: TDR DRG No 16 & 17

S.No	Description	Cladding Type	Area in Sq M
1	Outer Side of East & West faces	As per Appendix 3 in Annexure II	257
2	Outside surface of Parabola portion	As per Appendix 4 in Annexure II	597
	Curved (both sides)	As per Appendix 2 in Annexure II	180
3	Outside (top) Surface of circular Dome	As per Appendix 1 in Annexure II	550
4	Outside surface of Cylidrical Portion	As per Appendix 4 in Annexure II	743
		As per Appendix 3 in Annexure II	223
5	Inner Side of East & West faces	As per Appendix 3 in Annexure II	544
6	Inside surface of Parabola portion Curved (both sides)	As per Appendix 3 in Annexure II	1050
7	Inside Surface of circular Dome	As per Appendix 3 in Annexure II	550
8	Inside surface of Cylindrical Portion	As per Appendix 3 in Annexure II	1265

	Total Length, m	**Weight / m**	**Total Weight**
Purlins for above Cladding Area	3585 (C150-2 tk)	5.45	19540 kg

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ANNEXURE – IV

Time Schedule

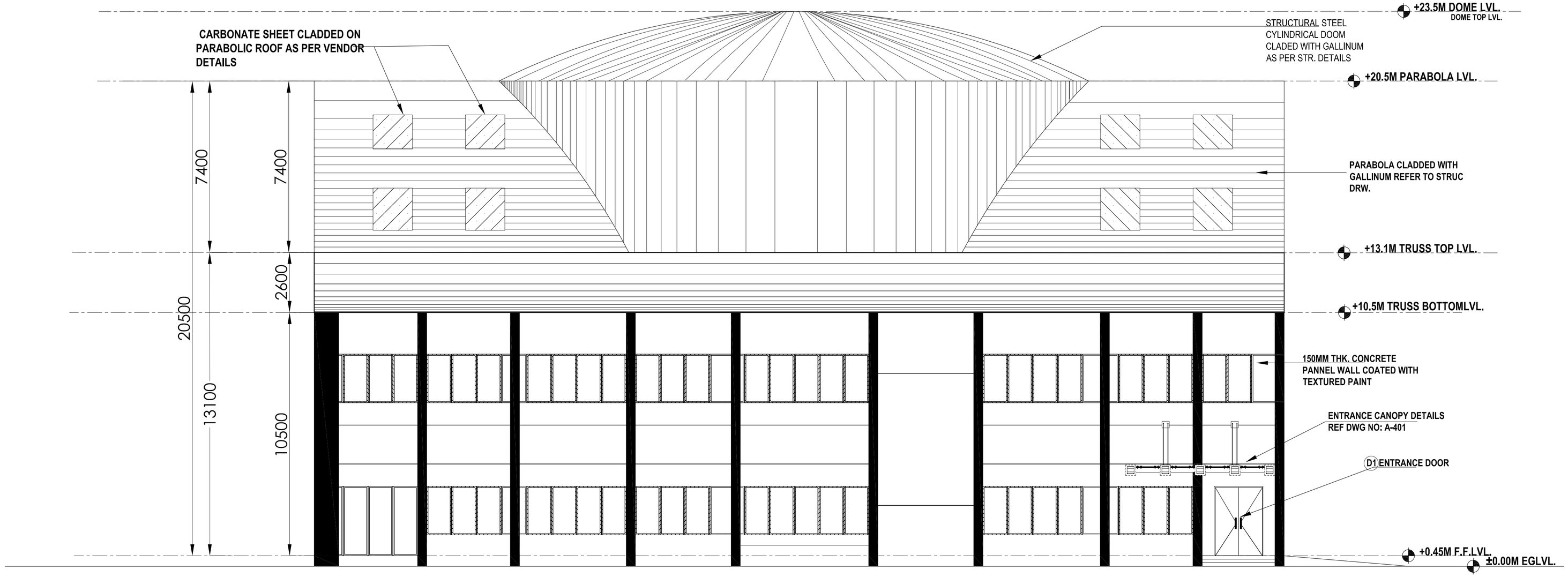
Time Schedule

Annexure IV

Structure and Cladding for UHV Laboratory - Required Schedule

	Activity	Month 1				Month 2				Month 3				Month 4				Month 5				Month 6			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Preparation of Fabrication drawings .																								
2	Procurement of Raw material.																								
3	Approval of Fabrication drawings																								
4	Fabrication of All types of structures																								
5	Assembly and errection of Steel structures.																								
6	Painting to finished structures.																								
7	Roof sheeting ,Wall cladding and final painting																								
8	Miscellaneous and Finishing Works																								

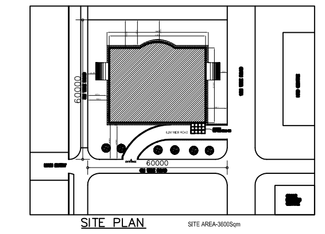
TDR DRG No. 01



NORTH SIDE ELEVATION

NOTES

1. ALL DIMENSIONS IN MM ONLY
2. DO NOT SCALE DRAWING.
3. FOLLOW WRITTEN DIMENSIONS.
4. ALL DIMENSIONS ARE UNFINISHED DIMENSIONS.



SCHEDULE OF OPENINGS

D1	GLAZED DOUBLE SWING DOOR WITH PIVOTS AND FLOOR SPRING AND A HANDLE 2100 X3000MM
D2	12MM GLASS POWEDER CAOTED FISHER CHANNEL FRAME WITH FLOOR SPRING 110 MAGNET 1200MM X2100MM
D3	GLAZED SINGLE SWING DOOR 1200MM X2100MM
D4	FIRE PROOF DOOR 1200MM X2100MM
D5	FIRE PROOF DOOR 3000MM X2100MM
D6	SLIDING DOOR 7500MM X8000MM
D7	SKIN DOOR FOR TOILETS 900MM X2100MM
D8	VENNER DOOR FOR A.H.U. ROOM 900MM X2100MM

	AEROCON BRICK WALL
	75MM RUNNERS ARE WELDED TO COLUMNS AND THEN CLADDED WITH M.S. SHEETING

SIGNATURE

CLIENT

B.H.E.L. R&D

CONSULTANT

designer's guild
a 105, mount banjara, road no.12,
banjara hills, hyderabad 500 034.
+ 91 40 30585657
satsri.dg@gmail.com

DRAWING VALIDITY

DRAWN BY	SCALE	NORTH
VANI.G	1:100	N
CHECKED BY	DATE	
SATHYA	02-02-10	

PROJECT TITLE

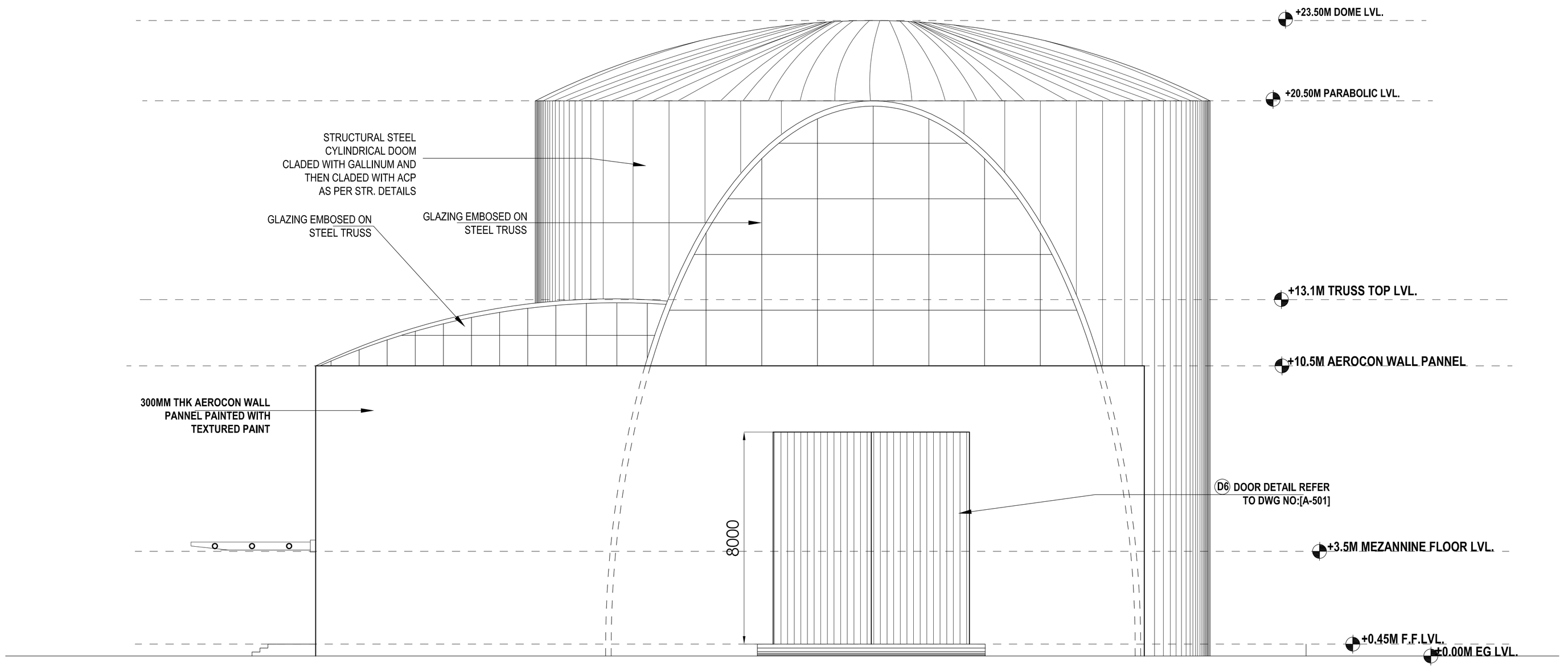
PROPOSED HV LAB AT BHEL R&D, BALANAGAR, HYDERABAD.

DRAWING TITLE

NORTH SIDE ELEVATION

PROJECT NO. DRAWN:	REV. NO.	DWG. NO.
	R0	A-201

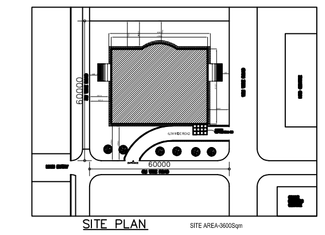
TDR DRG No. 02



WEST SIDE ELEVATION

NOTES

1. ALL DIMENSIONS IN MM ONLY
2. DO NOT SCALE DRAWING.
3. FOLLOW WRITTEN DIMENSIONS.
4. ALL DIMENSIONS ARE UNFINISHED DIMENSIONS.



SCHEDULE OF OPENINGS

D1	GLAZED DOUBLE SWING DOOR WITH PIVOTS AND FLOOR SPRING AND A HANDLE 2100 X3000MM
D2	12MM GLASS POWEDER CAOTED FISHER CHANNEL FRAME WITH FLOOR SPRING 110 MAGNET 1200MM X2100MM
D3	GLAZED SINGLE SWING DOOR 1200MM X2100MM
D4	FIRE PROOF DOOR 1200MM X2100MM
D5	FIRE PROOF DOOR 3000MM X2100MM
D6	SLIDING DOOR 7500MM X8000MM
D7	SKIN DOOR FOR TOILETS 900MM X2100MM
D8	VENNER DOOR FOR A.H.U. ROOM 900MM X2100MM

	AEROCON BRICK WALL
	75MM RUNNERS ARE WELDED TO COLUMNS AND THEN CLADDED WITH M.S. SHEETING

SIGNATURE

CLIENT

B.H.E.L. R&D

CONSULTANT

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a 105, mount banjara, road no.12,
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+ 91 40 30585657
satsri.dg@gmail.com

DRAWING VALIDITY

DRAWN BY	SCALE	NORTH
VANI.G	1:100	N
CHECKED BY	DATE	
SATHYA	02-02-10	

PROJECT TITLE

PROPOSED HV LAB AT BHEL R&D, BALANAGAR, HYDERABAD.

DRAWING TITLE

EAST SIDE ELEVATION

PROJECT NO. DRAWN:	REV. NO.	DWG. NO.
	R3	A-202