Bharat Heavy Electricals Limited

Heavy Equipment Repair Plant

Tarna Shivpur Varanasi-221003
website: https://herp.bhel.com

Enquiry Number : **E-304-22-0525-61-1** Date : **20/Jan/2023**

Enquiry For Material :-

Sl No	Material Description	Material Code	Quantity	Unit
1	CERAMIC LINED INNER CONE (HY-002.B) - COMPLETE FABRICATION AND CERAMIC LINING OF INNER CONE AS PER DRG. 39860600274/01 WITH MATL AS PER DRG.	RV1019919205	19.0	NOS
2	CER. LINED VEN. VANES (HY-187.A.04) CERAMIC LINED VENTURI VANES AS PER IP DRG. 49860600188/02 WITH BASE MATL. PLATE IS:2062 Gr.B AND CERAMIC TILE MATL. ALUMINA (MIN. 85%)	RV1019919299	44.0	NOS
3	BOTH SIDE CERAMIC LINED INNER CONE (HY-002.D) - INNER CONE AS PER DRG. 16137690015/03 WITH MATL AS PER DRG.	RV1019921285	4.0	NOS
4	CERAMIC LINED INNER CONE (HY-965.A) AS PER SPECN. BA53059 REV-02	RV9753059000	5.0	NOS

Remarks

Remarks
A) SUPPLY CONDITION HY-002.B:
1. ITEM TO BE SUPPLIED AT HERP STORES.
2. PRE-DESPATCH INSPECTION WILL BE CARRIED OUT AS PER QUALITY PLAN RV-FAB-CL-1 REV-00 AT PARTY'S WORKS BY BHEL REPRESENTATIVE. (IN CASE OF SISTER UNIT INSEPCTION IS TO BE CARRIED OUT AT HERP)

(B) TECHNICAL DELIVERY CONDITION :
1. THE SCOPE OF SUPPLY WILL BE COMPLETE FABRICATION OF INNER CONE AND CERAMIC LINING AS PER DRG.
2. MATERIAL FOR INNER CONE WILL BE AS PER SPECN. IS:2062 Gr.A.
3. CERAMIC LINING SHOULD BE AS PER A 866/02.
4. DIMENSIONS AND TOLERANCES TO BE MAINTAINED AS PER DRG.
5. FOR OPEN DIMENSION, STD. HY0230261 TO BE FOLLOWED FOR UNSPECIFIED TOLERANCES.
6. DIMENSIONS REPORT IS REQUIRED.
7. 100% DP TEST SHALL BE DONE ON ALL THE WELDED JOINTS.

(C) TEST CERTIFICATE : REQUIRED FOR CERAMIC TILE MATL, D.P.TEST OF WELDED JOINTS, CHEMICAL AND MECHANICAL TC FOR SHELL MATERIAL.

(D) GUARANTEE CERTIFICATE : REQUIRED FOR WEAR LIFE OF MINIMUM 8000 RUNNING HRS. FREE REPLACEMENT IS REQUIRED IF ANY FAILURE IS REPORTED BEFORE 8000 HRS.

(E) PACKING CONDITION : ITEM IS TO BE SUPPLIED IN LOOSE CONDITION AND SECURED PROPERLY ON VEHICLE SO THAT CERAMIC TILES ARE PROTECTED DURING TRANSIT AND HANDLING.

(A) SUPPLY CONDITION FOR HY-187.A.04:
1. ITEM TO BE SUPPLIED AT BHEL HERP STORES.
2. PRE-DESPATCH INSPECTION WILL BE CARRIED OUT AS PER QUALITY PLAN RV-FAB-CL-1 REV-00 AT PARTY'S WORKS BY BHEL REPRESENTATIVE. (IN CASE OF SISTER UNIT INSEPCTION IS TO BE CARRIED OUT AT HERP)

(B) TECHNICAL DELIVERY CONDITION :
1. VENTURI VANE TO BE FABRICATED AS PER DRG.
2. CERAMIC LINING TO BE DONE AS PER SPECN. AND DRAWING.

(C) TEST CERTIFICATE : REQUIRED FOR CERAMIC TILE MATL.

(D) GUARANTEE CERTIFICATE : REQUIRED FOR WEAR LIFE OF MINIMUM 8000 RUNNING HRS. FREE REPLACEMENT IS REQUIRED IF ANY FAILURE IS REPORTED BEFORE 8000 HRS.

(E) . ITEM TO BE SUPPLIED IN PROPERLY PACKED CONDITION IN WOODEN BOXES. SPECIAL PROVISION SHOULD BE MADE TO PROTECT THE EDGES OF CERAMIC TILE (LIKE WRAPPING WITH FOAM SHEET etc.) FROM DAMAGE DURING TRANSIT AND HANDLING AT ALL STAGES.USE OF POLYTHENE IS STRICTLY PROHIBITED FOR PACKING.

REMARKS FOR HY-002.D:-

(A) SUPPLY CONDITION :
1. ITEM TO BE SUPPLIED AT BHEL HERP STORES.
2. PRE-DESPATCH INSPECTION WILL BE CARRIED OUT AS PER QUALITY PLAN RV-FAB-CL-1 REV-00 AT PARTY'S WORKS BY BHEL REPRESENTATIVE. (IN CASE OF SISTER UNIT INSEPCTION IS TO BE CARRIED OUT AT HERP)

(B) TECHNICAL DELIVERY CONDITION :
1. THE SCOPE OF WORK WILL BE COMPLETE FABRICATION AND CERAMIC LINING AS PER DRG.
2. MATERIAL FOR FABRICATION THE SHELLS WILL BE AS PER SPECN IS:2062.
3. INNER CONE SHOULD BE FABRICATED AS PER DRG. 16137690015/03.
3. THE THICKNESS OF CERAMIC TILES SHOULD BE 15 MM.
4. DIMENSION AND TOLERANCES TO BE MAINTAINED AS PER DRG.
5. DIMENSION REPORT IS REQUIRED.

(C) TEST CERTIFICATE : REQUIRED FOR CERAMIC TILE MATL.

(D) GUARANTEE CERTIFICATE : REQUIRED FOR WEAR LIFE OF MINIMUM 8000 RUNNING HRS. FREE REPLACEMENT IS REQUIRED IF ANY FAILURE IS REPORTED BEFORE 8000 HRS..

(E) PACKING INSTRUCTION : ITEM TO BE SUPPLIED IN PROPERLY PACKED CONDITION AFTER APPLYING THE RUST PREVENTIVE PAINT

INDENT REMARKS FOR ITEM CERAMIC LINED INNER CONE (HY-965.A) AS PER SPECN. BA53059 REV-02: WITH MAT CODE: RV9753059000,

(A) SUPPLY CONDITION :
1. ITEM TO BE SUPPLIED AT BHEL HERP STORES.
2. PRE-DESPATCH INSPECTION WILL BE CARRIED OUT AS PER QUALITY PLAN RV-FAB-CL-1 REV-00 AT PARTY'S WORKS BY BHEL REPRESENTATIVE. (IN CASE OF SISTER UNIT INSEPCTION IS TO BE CARRIED OUT AT HERP)

(B) TECHNICAL DELIVERY CONDITION :
1. THE SCOPE OF WORK WILL BE COMPLETE FABRICATION AND CERAMIC LINING AS PER DRG/SPECN.
2. MATERIAL FOR FABRICATION THE SHELLS WILL BE AS PER SPECN. IS:2062.
3. THE THICKNESS OF CERAMIC TILES SHOULD BE 15 MM AND CERAMIC TILE MATERIAL WILL BE MIN. 90% ALUMINA.
4. WELDED JOINTS SHALL BE CHECKED BY D.P. TEST.
5. DIMENSION AND TOLERANCES TO BE MAINTAINED AS PER DRG.
6. DIMENSION REPORT IS REQUIRED.

(C) TEST CERTIFICATE : REQUIRED FOR CERAMIC TILE MATL.

(D) GUARANTEE CERTIFICATE : REQUIRED FOR WEAR LIFE OF MINIMUM 8000 RUNNING HRS. FREE REPLACEMENT IS REQUIRED IF ANY FAILURE IS REPORTED BEFORE 8000 HRS.

(E) PACKING INSTRUCTION : ITEM TO BE SUPPLIED IN PROPERLY SECURED CONDITION AFTER APPLYING THE RUST PREVENTIVE PAINT.

REMARKS FOR ALL ITEMS

(F) DELIVERY PERIOD IS 4 MONTHS FROM THE DATE OF PO. HOWEVER EARLY DELIVERY IS ACCEPTABLE.

(G) TENDER WILL BE EVALUATED ITEM WISE i.e. L1 WILL BE DECIDED FOR EACH INDIVIDUAL ITEM AND NOT ON TOTALITY BASIS.

(H) RA MAY BE RECOMENDED FOR THIS ENQUIRY.

(I) QUANTITY IS TENTATIVE IT MAY DIFFER AT THE TIME OF PO PLACEMENT DEPENDING UPON THE ACTUAL REQUIREMENTS.

(J)FOR GENERAL TERMS & CONDITIONS PLEASE REFER GTC ATTACHED WITH THIS ENQUIRY.

PQR

Sl. No.	BHEL Terms	Supplier's ComplianceYES/NO
1	**Offers are accepted from:**	
1.a	Manufacturer's/ trader`s Offers shall be considered for the Tender Enquiry (bidder to indicate the nature of the Firm (Trader/Stokist/Manufacture).	
1.b	If bidder is manufacturer then bidder have to submit the list of necessary in-House Manufacturing and testing facilities required for manufacturing and supply of item/s as per drng./spec.	
1.c	If bidder is trader/stokist then bidder have to submit the authorization certificate. Also, source of raw material for the manufacturing of the items shall be indicated. If the supplier is dependent on more than one source, all the sources should be indicated	
2	**Experience:**	
2.a	Bidders shall submit the necessary documents proving their Experience in Supplying same or similar items to any Power Plant equipment manufacturer, government sector company/PSU in last three years from the date of Enquiry. Documentary evidances to be submitted in the form of Customer's Purchase Order copies / Matl. acceptance report and item drawings/specs.	
2.b	BHEL reserves right to verify the details from the Bidder's customers based on Documents submitted as a part of past experience.BHEL may ask for other relevant documents in line with above to review the capacity and capability of vendor with respect to enquired items.	
3	**Annual Turnover:**	
3.a	Turnover of the supplier should be as per GeM (Government e-market place) guide lines (Maximum limit to be taken). Bidders should enclose Audited Balance sheets and Profit & Loss account statement of last three consecutive years in the Part I bid.	

Note: Non Submission of the above requested documents/non compliance to the above points will result in rejection of the Offers without further Notice/Intimation to the Bidder and no correspondance will be entertained at later date.

On Bidder's office letter pad

Make in India (Model Certificate) Annexure-I

Self-Declaration

Enquiry No.	
Enquiry Date	

In line with Government public procurement order Number P-45021/2/2017-B.E-II dated 15.06.2017, and further modified order dt. 28.05.2018, 29.05-2019 and 04.06.2020

I / We hereby declare that I / We are a "Local Supplier" meeting the requirement of minimum local content (…….%) defined in the above government notification for the goods against above mentioned enquiry Number.

Details of location at which local value addition will be made is as follows:

Door No.	
Street / Address 1	
Street / Address 2	
District	
State	
Country	
PIN Code	

We also understand that the false declarations will be considered as breach of Integrity and liable for action.

For Company Name:
Seal:
Signature:

Date:
Place:

(Please fill all the yellow color field)

GENERAL COMMERCIAL TERMS & CONDITIONS OF ENQUIRY
(FOR INDIAN VENDORS)

Amendment- 21
ANNEXURE-B

ITEM DESCRIPTION:
ENQUIRY NO:

Sl No	BHEL STANDARD TERMS &CONDITIONS	Confirmation of supplier (Yes/No)
1	A) OFFER MUST BE SUBMITTED IN TWO PART BID SYSTEM NAMELY TECHNO-COMMERCIAL BID & PRICE BID FOR THE ITEM AS PER ENQUIRY IN SEPARATE SEALED COVERS: (I) TECHNO – COMMERCIAL BID & (II) PRICE BID SHOULD BE CLEARLY SUPERSCRIBED THE ENQUIRY NO. AND DUE DATE ON THE ENVELOPES. (B) UN-PRICED OFFER WITH TECHNICAL BID IS REQUIRED TO BE FURNISHED BY THE VENDOR. TECHNICAL OFFER SHOULD CLEARLY REFLECT AT LEAST OUR MATERIAL CODE, ITEM DESCRIPTION & QUANTITY. (C) THE DIFFERENCE BETWEEN "UN-PRICED OFFER" AND "PRICED OFFER" SHOULD BE ONLY THE PRICES WHEREVER APPLICABLE. THE RATES AND AMOUNT SHOULD BE CLEARLY WRITTEN IN FIGURES AND WORDS BOTH WITHOUT ANY CUTTING / OVERWRITING. (D) **IMPORTANT POINT FOR VENDOR WHO HAVE NOT SUBMITTED THE SRF (SUPPLIER REGISTRATION FORM) SO FAR**: THE VENDORS, WHO HAVE NOT SUBMITTED THE SRF SO FAR, MUST SUBMIT THE SAME ALONG WITH PART- 1 BID. THE SRF TO BE DOWNLOADED FROM WWW.BHEL.COM OR https://herp.bhel.com .	
2	BID SHOULD BE FREE FROM CORRECTION, OVERWRITING, USING CORRECTIVE FLUID, ETC. ANY INTERLINEATION , CUTTING , ERASURE OR OVERWRITING SHALL BE VALID ONLY IF THEY ARE ATTESTED UNDER FULL SIGNATURE(S) OF PERSON(S) SIGNING THE BID ELSE BID SHALL BE LIABLE FOR REJECTION .	
3	YOUR TECHNO COMMERCIAL BID SHOULD MENTION THAT PRICE BID HAS BEEN SENT IN A SEPARATE ENVELOPE GIVING ITS REFERENCE.	
4	VENDOR TO ENSURE THAT ITEM & QUANTITY MENTIONED IN THE OFFERS ARE EXACTLY SAME AS PER ENQUIRY. IF ANY DEVIATION IS THERE PARTY MUST MENTION SPECIFIC HEREWITH OTHERWISE BHEL SHALL CONSIDER THAT ITEM & QUANTITY AS REQUIRED IN ENQUIRY.	
5	PLEASE MAKE SURE THAT THERE IS NO DISCREPANCY IN BETWEEN ACCEPTED TERMS & CONDITIONS MENTIONED IN THE CHECK LIST AND QUOTATION SUBMITTED BY VENDOR AND IF FOUND SO THEN THE TERMS & CONDITIONS WHICH ARE BENEFICIAL TO BHEL WOULD ONLY BE CONSIDERED.	
6	THE TENDER RECEIVED AFTER 14:00 HRS ON THE DUE DATE WILL NOT BE CONSIDERED.	
7	PART-I CONTAINING THE TECHNO-COMMERCIAL BID WILL BE OPENED ON THE DATE AND TIME SPECIFIED IN THE ENQUIRY, IN THE PRESENCE OF THOSE TENDERERS WHO WISH TO ATTEND. PART-II i.e., PRICE BID WILL BE OPENED ONLY OF THOSE BIDDERS WHO ARE FOUND TECHNO-COMMERCIALLY SUITABLE AFTER SCRUTINY OF THEIR PART-I OFFERS.	
8	NO REVISED OFFERS WILL BE ACCEPTED UNLESS ASKED BY BHEL AFTER OPENING OF PART-1 BID IN ANY CASE.	
9	THE RATE OF GST SHOULD BE CLEARLY MENTIONED IN THE OFFER.	
10	VALIDITY OF OFFER SHOULD BE MINIMUM 90 DAYS FROM THE DATE OF TECHNO - COMMERCIAL BID OPENING OR 60 DAYS FROM THE REVERSE AUCTION DATE.	
11	BHEL RESERVES THE RIGHT TO REJECT THE OFFER, WHICH IS HAVING DEVIATIONS TO THE TERMS AND CONDITIONS GIVEN IN THE TENDER ENQUIRY.	
12	**PRICING TERMS**: PRICES ONCE QUOTED SHALL REMAIN FIRM WITHIN THE VALIDITY OR ANY EXTENSION THEREOF FOR PLACEMENT OF ORDER, TILL COMPLETE EXECUTION OF THE ORDER, WITHOUT ANY ESCALATION/INCREASE FOR ANY REASON, WHATSOEVER, UNLESS SPECIFICALLY PROVIDED FOR IN THE ENQUIRY & PO. IN CASE OF FOREIGN VENDORS, THE QUOTED PRICE SHALL BE TAKEN AS INCLUSIVE OF THIRD PARTY INSPECTION AND TESTING CHARGES AS CALLED FOR IN THE NIT.	
13	**BID EVALUATION:** UNLESS SPECIFIED IN THE TENDER, VENDOR MUST NOTE THAT BHEL WILL ARRIVE THE L1 STATUS FOR EACH ITEM ON LANDED COST BASIS. ACCORDINGLY, ORDER SHALL BE PLACED ON LOWEST BIDDER ON INDIVIDUAL ITEM BASIS ONLY, UNLESS BHEL ASK FOR TERMS OTHER THAN THIS ON EXCEPTION BASIS. IN THE COURSE OF EVALUATION, IF MORE THAN ONE BIDDER HAPPENS TO OCCUPY L-1 STATUS, EFFECTIVE L-1 WILL BE DECIDED BY SOLICITING DISCOUNTS FROM THE RESPECTIVE L-1 BIDDERS. IN CASE MORE THAN ONE BIDDERS HAPPENS TO OCCUPY THE L-1 STATUS EVEN AFTER SOLICITING DISCOUNST, THE L-1 BIDDER SHALL BE DECIDED BY A TOSS/DRAW OF LOTS, IN THE PRESENCE OF THE RESPECTIVE BIDDER(S) OR THEIR REPRESENTATIVE(S). RANKING WILL BE DONE ACCORDINGLY. BHEL'S DECISION IN SUCH SITUATION SHALL BE FINAL AND BINDING.	
14	**TERMS OF DELIVERY:** **I. FOR INDIGENOUS SUPPLIERS**: THE TERMS OF DELIVERY SHOULD BE QUOTED ON F.O.R. DESTINATION (BHEL HERP STORES VARANASI) BASIS ONLY (i.e. FREIGHT & INSURANCE ON VENDOR'S ACCOUNT ONLY). IF ANY BIDDER STILL QUOTES OTHER DELIVERY TERM IN PLACE OF BHEL HERP STORES, THEIR OFFER MAY NOT BE CONSIDERED FOR FURTHER PROCESSING. IT MUST BE SPECIFICALLY NOTED.	14
15	IF ANY INDIAN SUPPLIERS ARRANGE SUPPLY FROM FOREIGN PRINCIPLES/WORKS, TERMS OF DELIVERY SHOULD BE QUOTED ON CIF JNPT MUMBAI (INDIA) SEA PORT BASIS ONLY (i.e. FREIGHT & INSURANCE ON VENDOR'S ACCOUNT UPTO JNPT MUMBAI (INDIA) SEA PORT) OR CFR MUMBAI AIRPORT. HOWEVER FREIGHT CHARGES AS PER BHEL TRANSPORT CONTRACT FROM JNPT MUMBAI SEAPORT/MUMBAI AIRPORT TO BHEL VARANASI FOR EACH ITEM WILL BE LOADED AT THE TIME OF TOTAL LANDED COST CALCULATION.	15
16	INSURANCE CHARGES SHALL BE TO VENDOR'S ACCOUNT ONLY IF PRICE QUOTED ON BHEL HERP STORES BASIS. IN CASE PRICE QUOTED IS ON CIF JNPT MUMBAI BASIS/ CFR MUMBAI AIRPORT BASIS, INSURANCE UP TO CIF JNPT MUMBAI/ MUMBAI AIRPORT SHALL BE IN VENDOR ACCOUNT.	16
17	**PAYMENT TERMS:** **I.FOR MSEs VENDORS:** 100% AGAINST SRV WITHIN 45 DAYS THROUGH EFT (ELECTRONIC FUND TRANSFER) FROM THE DATE OF RECEIPT OF MATERIAL (DATE OF SRV) AT BHEL HERP VARANASI STORES AS PER PO. II.**FOR MEDIUM ENTERPRISES VENDORS**: 100% AGAINST SRV WITHIN 60 DAYS THROUGH EFT (ELECTRONIC FUND TRANSFER) FROM THE DATE OF RECEIPT OF MATERIAL (DATE OF SRV) AT BHEL HERP VARANASI STORES AS PER PO. **III. FOR NON- MSME:** 100% AGAINST SRV WITHIN 90 DAYS THROUGH EFT (ELECTRONIC FUND TRANSFER) FROM THE DATE OF RECEIPT OF MATERIAL (DATE OF SRV) AT BHEL HERP VARANASI STORES AS PER PO. **IV.BHEL HERP WILL MAKE PAYMENTS IN TWO PARTS: -** **PART-I:** BASIC INVOICE VALUE AND ALL OTHER CHARGES (EXCEPT GST AMOUNT) WILL BE PAID AS PER P.O. PAYMENT TERMS. **PART-II**: GST PORTION OF INVOICE VALUE WILL BE PAID ONLY AFTER FULFILLING FOLLOWING CONDITIONS: **(A)** PAYMENT OF GST AMOUNT INTO GOVT. ACCOUNT BY SUPPLIER AGAINST INVOICE RAISED TO BHEL. **(B)** FILING OF GST RETURN **(C)** DISPLAY OF GST CREDIT AGAINST BHEL GSTIN NO.09AAACB4146P2ZC IN GSTR-2B ON GSTN PORTAL. Note: 1. PAYMENT WILL BE MADE AFTER ACCEPTANCE OF MATERIAL. 2. ADVANCE PAYMENT IS NOT ACCEPTABLE BY BHEL HERP VARANASI IN ANY CASE. 3. IF ANY SUPPLIER FALLS UNDER "NON MSE" OR "NON MEDIUM" CATEGORY, THEIR PAYMENT TERM WILL BE CONSIDERED AS NON MSME SUPPLIER PAYMENT WITHOUT ANY INTIMATION.	17
18	**LOADING OF PAYMENT TERM:** IN CASE OF DEVIATION, LOADING OF INTEREST RATE @SBI MCLR RATE + 6% (AS ON PART-1 OPENING DATE) SHALL BE LOADED WHILE ARRIVING AT LANDED COST TO BHEL.	18
19	**LIQUIDATED DAMAGES (LD):** SUBJECT TO FORCE MAJEURE CONDITIONS, FAILURE TO SUPPLY WITHIN PURCHASE ORDER DELIVERY SCHEDULE WILL MAKE THE SUPPLIER LIABLE TO AN UNCONDITIONAL PENALTY OF 0.5 % PER WEEK OR PART THEREOF SUBJECT TO THE MAXIMUM OF 10% OF THE UNDELIVERED PURCHASE ORDER VALUE EXCLUDING TAXES & DUTIES. NO GRACE PERIOD SHALL BE GIVEN.	20
20	**LOADING OF LIQUIDATED DAMAGES (LD):** DEVIATION TO ABOVE STANDARD PENALTY CLAUSE, MAXIMUM LOADING OF 10% (IN CASE OF NON ACCEPTANCE OF LD CLAUSE) OR PART THEREOF (IN CASE OF PART ACCEPTANCE OF LD) SHALL BE LOADED WHILE ARRIVING LANDED COST TO BHEL. **LOADING OF DELIVERY TERM:** FURTHER IF DEVIATION IS FOUND IN THE ACCEPTED DELIVERY TERM AS WELL AS ACCEPTED PENALTY TERM, SUITABLE LOADING BASED ON TRANSPORTATION TIME TO BE TAKEN SHALL BE LOADED WHILE ARRIVING LANDED COST TO BHEL HERP STORES WHICH MAY BE AS BELOW: (i) 1% OF THE BASIC COST FOR INDIAN SUPPLIERS,	21

GENERAL COMMERCIAL TERMS & CONDITIONS OF ENQUIRY
(FOR INDIAN VENDORS)

Amendment- 21
ANNEXURE-B

21	**DELIVERY PERIOD:** VENDOR SHOULD STRICTLY QUOTE THE DELIVERY PERIOD AS MENTIONED IN NIT.	22
22	IF ANY VENDOR DOES NOT SUPPLY THE ITEM WITHIN THE PURCHASE ORDER DELIVERY PERIOD, BHEL MAY/MAY NOT ACCEPT THE SUPPLY AT ITS SOLE DISCRETION.	23
23	**BANK GUARANTEE:** THE COST OF BHEL FREE ISSUE MATERIALS PER SET/PER ASSEMBLY AND TOTAL COST OF FIM FOR THE ENQUIRY ARE MENTIONED IN NIT. IN THIS REGARD: **1.** PARTY WILL HAVE TO SUBMIT EQUAL AMOUNT OF SECURITY DEPOSIT (IN THE FORM OF 25% BG/FDR/DD/CHEQUE/BANK TRANSFER AND 75% INDEMNITY BOND) TOWARDS THE COST OF BHEL MATERIALS TO BE ISSUED TO THEM BEFORE THE ISSUE OF BHEL MATERIALS TO THEM. AT ANY POINT OF TIME, PROPORTIONATE SECURITY DEPOSIT OF TOTAL/CUMMULATIVE MATERIAL VALUE SHOULD BE MAINTENED. 2. BHEL MAY ASK THE SUPPLIER FOR SUBMISSION OF FULL SECURITY DEPOSIT AMOUNT OR PART DEPENDING UPON THE AVAILABILITY OF FREE ISSUE MATERAILS AT OUR END. 3. PARTY MUST HAVE TO SUBMIT THE SAME WITHIN 02 WEEK TIME FROM THE DATE OF WRITTEN INTIMATION BY BHEL WITHOUT FAIL OTHERWISE IT WOULD TREATED AS FAILURE OF HONOURING PO TERMS AND ACCORDINGLY BHEL MAY CANCEL THE PURCHASE ORDER AND INITIATE ALTERNATE PROCUREMENT ACTION AT SUPPLIER RISK & COST. 4. IN CASE OF ABSENCE OF DESIRED SECURITY DEPOSIT AT BHEL END AND ALSO NON RESPONSE OF POINT NO. 03 AS ABOVE, I. BHEL MAY HOLD THE PENDING PAYMENTS OF SUPPLIER AVAILABLE AT BHEL END WITHOUT ANY INTIMATION. II. IF NO PAYMENT IS PENDING AT BHEL END, ACTION FOR ALTERNATE PROCUREMENT ACTION MAY BE INITIATED.	37
24	TRANSPORTATION CHARGES FOR SENDING BHEL FREE ISSUE MATERIALS TO THE PARTY WORKS WILL BE BORNE BY BHEL ONLY.	36
25	IF BHEL ISSUES FREE ISSUE MATERIALS TO THE SUPPLIER, IT MUST BE RETURNED WITHIN THE TIME LIMIT AS PRESCRIBED IN GST LAW (PRESENTLY 01 (ONE) YEAR FROM THE DATE OF FREE ISSUE DATE) TO COMPLY THE GST RULES. IF ANY VENDOR DOES NOT RETURN THE BHEL FREE ISSUE MATERIALS AS MENTIONED ABOVE, THE FINANCIAL IMPLICATION ON ACCOUNT OF THIS, IF ANY, SHALL BE RECOVERED FROM THE PARTY BILLS.	35
26	**REVERSE AUCTION**: BHEL SHALL BE RESORTING TO REVERSE AUCTION (RA) (GUIDELINES AS AVAILABLE ON WWW.BHEL.COM) FOR THIS TENDER. RA SHALL BE CONDUCTED AMONG ALL THE TECHNO-COMMERCIALLY QUALIFIED BIDDERS. PRICE BIDS OF ALL TECHNO-COMMERCIALLY QUALIFIED BIDDERS SHALL BE OPENED AND SAME SHALL BE CONSIDERED AS INITIAL BIDS OF BIDDERS IN RA. IN CASE ANY BIDDER(S) DO (ES) NOT PARTICIPATE IN ONLINE REVERSE AUCTION, THEIR SEALED ENVELOPE PRICE BID ALONG WITH APPLICABLE LOADING, IF ANY, SHALL BE CONSIDERED FOR RANKING.	24
27	IF ANY OF THE VENDORS DO NOT ACCEPT THE ABOVE POINT MENTIONED AT SL. NO. 26, THEIR OFFER MAY BE LIABLE FOR REJECTION WITHOUT INTIMATION.	25
28	**RISK PURCHASE**: IN CASE OF DELAY IN SUPPLIES/ DEFECTIVE SUPPLIES/NON EXECUTION OF PURCHASE ORDER ETC. (FOR DETAILS, REFER GUIDELINES FOR RISK PURCHASE), BHEL MAY CANCEL THE ORDER IN FULL OR PART THEREOF/ MAY ALSO MAKE THE PURCHASE OF SUCH MATERIALS FROM ELSEWHERE/ALTERNATIVE SOURCES AT THE RISK & COST OF SUPPLIER.BHEL MAY ALSO MANUFACTURE THE ITEM IN-HOUSE IN PART OR FULL DEPENDING UPON THE URGENCY OF THE ITEM. GUIDELINES FOR **RISK PURCHASE** IS AVAILABLE ON BHEL WEBSITE "https://herp.bhel.com" at "Notice". RESPECTIVE BIDDERS / SUPPLIERS MAY REFER THIS GUIDELINE BEFORE SUBMITTING THEIR OFFER AGAINST BHEL, HERP TENDER ENQUIRIES. IN CASE RISK PURCHASE IS APPLIED, BHEL SHALL TAKE ACTION AGAINST THE NON-PERFORMING AND/OR DEFAULTING SUPPLIERS/ CONTRACTORS IN LINE WITH THIS GUIDELINE ONLY.	26
29	BHEL MAY SHORT CLOSE/CANCEL AN ORDER AT ANY TIME DURING THE CURRENCY OF THE CONTRACT/PO IRRESPECTIVE OF THE PO DELIVERY DATE, IF (I) THE WORK PROGRESS OF THE VENDOR IS POOR, OR (II) THE DELIVERY REQUIREMENT OF THE ITEM IS VERY CRITICAL & NOT BEING MET BY THE VENDOR ON WHICH ORDER HAS BEEN PLACED, OR (III) THERE IS NO RESPONSE FOR IMPROVEMENT IN DELIVERY AS PER BHEL REQUIREMENT,	27
30	THE OFFERS OF THE BIDDERS WHO ARE ON THE BANNED LIST AND ALSO THE OFFER OF THE BIDDERS, WHO ENGAGE THE SERVICES OF THE BANNED FIRMS, SHALL BE REJECTED. THE LIST OF BANNED FIRMS IS AVAILABLE ON BHEL WEB SITE www.bhel.com	28
31	**RESERVATION RIGHTS OF BHEL**: – BHEL RESERVES THE RIGHT TO REJECT ANY OR ALL QUOTATIONS WITHOUT ASSIGNING ANY REASONS THEREOF. BHEL ALSO RESERVES THE RIGHT TO INCREASE OR DECREASE THE TENDERED QUANTITIES. VENDORS SHOULD BE PREPARED TO ACCEPT ORDER FOR REDUCED QUANTITIES WITHOUT ANY EXTRA CHARGES. VENDOR SHOULD ALSO BE PREPARED FOR GIVING DISCOUNT IN CASE OF INCREASE IN QUANTITY.	29
32	**NON-DISCLOSURE AGREEMENT**: ALL DRAWINGS AND STANDARDS ARE PROPRIETARY OF BHEL. IT MUST NOT BE USED IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY. ALL SUPPLIERS SHALL FURNISH NDAS (NON-DISCLOSURE AGREEMENT) AGAINST USE OF DOCUMENTS FURNISHED BY BHEL TOWARDS UN-AUTHORIZED USE EXCEPT FOR THE PURPOSE IT HAS BEEN FURNISHED.	30
33	**A. SETTLEMENT OF DISPUTES & ARBITRATION:** I.ALL QUESTIONS/INTERPRETATIONS REGARDING SUBJECT MATTER OF THE CONTRACT SHALL BE DECIDED BY THE BHEL ON THE REQUEST OF THE VENDOR AND THE DECISION OF THE BHEL SHALL BE FINAL. II.IN CASE OF DISPUTE, STEPS SHALL BE TAKEN BY THE PARTIES TO THE CONTRACT TO SETTLE THE SAME THROUGH NEGOTIATIONS. III.IN CASE, DISPUTE IS NOT SETTLED IN NEGOTIATIONS, IT SHALL BE REFERRED TO CONCILIATOR APPOINTED BY THE COMPETENT AUTHORITY OF THE BHEL. *THE CONCILIATION PROCEEDINGS WITH RESPECT TO A DISPUTE AS DEFINED IN THE BHEL CONCILIATION SCHEME, 2018 AND SUBSEQUENT REVISIONS CAN BE INITIATED UNDER THE SCHEME AT ANY STAGE WHETHER BEFORE, DURING OR EVEN AFTER THE COMMENCEMENT OF ARBITRATION PROCEEDINGS OR LITIGATION BEFORE COURTS. THIS CONCILLIATION SCHEME IS AVAILABLE ON OUR WEBSITES* https://herp.bhel.com *AND* ***www.bhel.com*** . IV.IN CASE DISPUTE IS NOT SETTLED IN CONCILIATION PROCEEDINGS, THE SAME SHALL BE REFERRED TO ARBITRATION AS PER CORPORATE GUIDELINES OF THE BHEL AND THE ARBITRATION PROCEEDING SHALL BE CONDUCTED AS PER PROVISIONS OF THE ARBITRATION AND CONCILIATION ACT, 1996 READ WITH CORPORATE GUIDELINE AS AMENDED FROM TIME TO TIME. V.THE VENDOR SHALL CONTINUE TO PERFORM THE CONTRACT, PENDING SETTLEMENT OF DISPUTE(S). **B.JURISDICTION:** ALL DISPUTES OR DIFFERENCES ARISING OUT OF OR IN CONNECTIONS WITH THE CONTRACT SHALL BE SUBJECT TO THE EXCLUSIVE JURISDICTION OF THE COURT AT VARANASI (U.P.) ONLY.	31
34	**SPECIAL NOTE FOR BIDDERS**: THE QUOTATION SHOULD BE FROM PRINCIPAL / ORIGINAL EQUIPMENT MANUFACTURER ONLY. THE OFFER OF THOSE OEM, AUTHORISING THEIR TRADER / DEALER / DISTRIBUTOR TO QUOTE AND TAKE ORDER IS LIABLE FOR DISQUALIFICATION. SINCE BHEL PREFER TO DEAL DIRECTLY WITH OEM AND NOT THROUGH DEALER / TRADER / DISTRIBUTOR OF OEM, THEREFORE, OEM MUST DIRECTLY QUOTE, TAKE ORDER AND DELIVER THE MATERIAL UNDER THEIR GUARANTEE / WARRANTEE.	32
35	I. FOLLOWING DOCUMENTS SHOULD BE ENCLOSED AND ADDRESSED TO DGM (FINANCE) AND SAME SHALL BE DISPATCHED TO MM DEPTT. BHEL, HERP, TARNA, SHIVPUR, VARANASI-221003 FOR PAYMENT PURPOSE: a) 05 (FIVE) COPIES OF GST INVOICES b) COPY OF GR/RR. c) TEST CERTIFICATE AND GUARANTEE/WARRANTEE CERTIFICATE AND PDI REPORT, IF APPLICABLE. (ONE COPY). II. FURTHER TO ABOVE, 02 (TWO) COMPLETE SETS OF DOCUMENTS (COPIES OF ABOVE MENTIONED DOCUMENTS AT SL. NO. I FOR INDIAN SUPPLIERS (UNDER THIS CLAUSE) SHALL BE SENT FOR PURCHASE AND QUALITY DEPARTMENTS. ORIGINAL COPIES OF TC, GC, PDI REPORTS & OTHER QUALITY PAPERS SHALL BE ATTACHED IN THE SET OF DOCUMENTS FOR QUALITY DEPARTMENTS. III. THE VENDOR SHOULD PROVIDE BILLS & OTHER DOCUMENTS COMPLETE IN ALL RESPECT AS PER PURCHASE ORDER ALONGWITH DESPATCH OF MATERIALS**.** BHEL SHALL SEEK CLARIFICATION(S) (IF ANY) RELATED TO PAYMENT DOCUMENTS IN ONE GO. THE VENDOR SHOULD PROVIDE ALL SUCH CLARIFICATION(S) IMMEDIETLY.ANY DELAY IN PROCESSING OF PAYMENT, DUE TO NON RECEIPT OF CLARIFICATION(S) SOUGHT BY BHEL, SHALL BE ATTRIBUTABLE COMPLETELY TO VENDOR. IV. DIGITALLY SIGNED INVOICE IS ALSO ACCEPTABLE FOR PROCESSING OF PAYMENT.	33
36	THE VENDOR SHALL ENSURE THAT THEIR BANK DETAILS ARE UPDATED WITH US FOR TIMELY PAYMENT THROUGH EFT (ELECTRONICS FUND TRANSFER).	53
37	**GUIDELINES FOR SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS/ CONTRACTORS:** THE REVISED GUIDELINES FOR SUSPENSION OF BUSSINESS DEALINGS ARE AVAILABLE ON BHEL WEBSITE AT "www.bhel.com" on "SUPPLIER REGISTRATION PAGE". RESPECTIVE BIDDERS / SUPPLIERS MAY REFER THIS BEFORE QUOTING AS PER THEIR REQUIREMENT. ACTION AGAINST THE DEFAULTED SUPPLIERS/ CONTRACTORS' SHALL BE TAKEN AS PER THESE GUIDELINES ONLY.	34

38	VENDOR MUST FOLLOW THE SEQUENTIAL DELIVERY SCHEDULE i.e. ITEMS TO BE SUPPLIED IN SUCH A MANNER THAT THE PURCHASE ORDER HAVING OLDER DELIVERY SCHEDULE SHOULD BE SUPPLIED EARLIER AND PURCHASE ORDER HAVING LATTER DELIVERY SCHEDULE TO BE SUPPLIED LATTER. IF ANY VENDOR DOES NOT FOLLOW THE SEQUENTIAL DELIVERY SCHEDULE ESPECIALLY FOR SAME ITEM, BHEL MAY ACCOUNT FOR THE ITEM IN SEQUENTIAL MANNER OR MAY RECOVER THE FINANCIAL IMPLICATION.	
39	ALL ABOVE ACCEPTED TERMS & CONDITIONS SHALL BE PART OF PURCHASE ORDER WITH OR WITHOUT MENTIONING IN THE PO/CONTRACT BASED ON YOUR ACCEPTANCE AND OFFER SUBMITTED.	
40	**IMPORTANT INSTRUCTION:** I.VENDORS ARE REQUESTED TO QUOTE THEIR RATE WITH DESCRIPTION MENTIONED IN THE ENQUIRY CONSIDERING ALL TECHNICAL TERMS & CONDITIONS OF THE ENQUIRY. ALSO RATES QUOTED SHOULD BE EXACLTY AS PER SL. NO. OF HARD COPY OF THE ENQUIRY (IF ENQUIRY HAS BEEN FLOATED THROUGH CONVENTIONAL MODE) OR AS PER SL. NO. APPEARING IN THE e-Procurement PORTAL (IF ENQUIRY HAS BEEN FLOATED THROUGH e-Procurement) ONLY. IT MUST BE FOLLOWED UP TO AVOID CONFUSION AT LATER STAGES. ALSO RATES TO BE SUBMITTED BOTH IN NUMERICS AS WELL AS IN WORD. IN CASE OF DISCREPENCY, RATES SUBMITTED IN WORDS SHALL BE CONSIDERED FOR FURTHER PROCESSING. II.DOCUMENTS SUBMITTED WITH THE OFFER SHOULD BE SIGNED AND STAMPED IN EACH PAGE BY AUTHORIZED REPRESENTATIVE OF THE BIDDER. II.IN CASE OF PDI, VENDOR SHALL RAISE ONLINE INSPECTION CALL IN ONLINE INSPECTION PORTAL/INTIMATE BHEL IN WRITTIING (WHERE INSPECTION IS IN BHEL HERP SCOPE) AT LEAST 01 WEEK IN ADVANCE OR AS MUTUALLY AGREED PERIOD ABOUT THE DATE AND PLACE AT WHICH GOODS WILL BE READY FOR INSPECTION. IV.PURCHASER OR HIS AUTHORIZED REPRESENTATIVE SHALL BE ENTITLED TO CARRY OUT SURVEILLANCE INSPECTION OF MATERIAL AND WORKMANSHIP AT SELLER'S PREMISES OR AT HIS SUB-CONTRACTOR'S PREMISES AT ALL REASONABLE TIMES DURING EXECUTION OF THE CONTRACT. SUCH INSPECTION, EXAMINATION AND TESTING, IF MADE, SHALL NOT ABSOLVE THE SELLER FROM HIS OBLIGATIONS UNDER THE CONTRACT. V.SUCH PRE-DISPATCH INSPECTION, EXAMINATION AND TESTING, IF MADE, AT VENDOR'S WORKS SHALL NOT ABSOLVE THE SELLER FROM HIS OBLIGATIONS TO MANUFACTURE/MACHINING THE GOODS UNDER THE CONTRACT. IF DEFCETS ARE FOUND AT LATER STAGE, IT IS THE SOLE RESPONSIBILITY OF THE VENDOR TO REPLACE/RECTIFY THE SAME.	
41	**IMPORTANT CLAUSE FOR GST**: INPUT TAX CREDIT OF GST CAN BE AVAILED BY BHEL ONLY WHEN THE MATERIAL HAS BEEN PHYSICALLY RECEIVED AND GST INVOICE IS IN POSSESSION OF BHEL. THEREFORE, SUPPLIERS SHOULD ENSURE THE FOLLOWING IN RESPECT OF POS ISSUED BY BHEL: I. GST INVOICE SHOULD CONTAIN ADDRESS, GST NO. AND PAN NO. OF BHEL AS WELL AS OF SUPPLIER. APPLICABLE HSN CODE OF THE MATERIAL SHOULD BE INDICATED IN THE GST INVOICE. II. FIVE COPIES OF GST INVOICE AND LORRY RECEIPT MAY BE DESPATCHED ALONGWITH SHIPMENT OF THE GOODS IN ORDER TO AVOID ANY DELAY IN AVAILING INPUT CREDIT BY BHEL. III. DECLARE SUCH INVOICE IN HIS GSTR-1 RETURN FOR THE MONTH OF DESPATCH OF MATERIAL. IV. PAYMENT OF GST TO STATUTORY AUTHORITIES WITHIN PRESCRIBED TIME. V. IN CASE OF DISCREPANCY IN THE DATA UPLOADED BY THE BIDDER IN THE GSTN PORTAL VIS-A-VIS THE TAX INVOICE OR IN CASE OF ANY SHORTAGES OR REJECTION IN THE SUPPLY, THEN BHEL WILL NOT BE ABLE TO AVAIL THE TAX CREDIT. BIDDER HAS TO RECTIFY THE DATA DISCREPANCY IN THE GSTN PORTAL OR ISSUE CREDIT NOTE OR DEBIT NOTE (DETAILS ALSO TO BE UPLOADED IN GSTN PORTAL) FOR THE SHORTAGES OR REJECTIONS IN THE SUPPLIES OR ADDITIONAL CLAIMS FOR PROCESSING OF SUCH INVOICES. VI. GST TDS DEDUCTED AS PER GST ACT, IS UPLOADED IN GSTN PORTAL ALONG GSTR7. BIDDERS CAN DIRECTLY DOWNLOAD THE GST TDS CERTIFICATE FROM THE GSTN PORTAL. IN CASE GST CREDIT IS DELAYED /DENIED TO BHEL DUE TO NON OR DELAYED RECEIPT OF GOODS AND OR TAX INVOICE OR EXPIRY OF TIMELINE PRESCRIBED IN GST LAW FOR AVAILING SUCH ITC OR ANY OTHER REASON NOT ATTRIBUTABLE TO BHEL, GST AMOUNT SHALL BE RECOVERABLE FROM VENDOR ALONG WITH INTEREST /PENALTY LEVIABLE ON BHEL. IN CASE SUPPLIERS DELAYS DECLARING SUCH INVOICE IN HIS RETURN AND GST CREDIT AVAILED BY BHEL IS DENIED OR REVERSED SUBSEQUENTLY AS PER GST LAW, GST AMOUNT PAID BY BHEL TOWARDS SUCH ITC REVERSAL SHALL BE RECOVERABLE FROM SUPPLIER ALONGWITH INTEREST LEVIED/LEVIABLE ON BHEL. IN CASE OF RAISING ANY SUPPLEMENTARY TAX INVOICE (DEBIT/ CREDIT NOTE), THE SUPPLIER SHALL ISSUE THE SAME CONTAINING ALL THE DETAILS AS REFERRED TO IN SECTION 34 READ WITH SECTION 31 OF GST ACT & RULES REFERRED THERE UNDER .	
42	**STATUTORY VARIATION CLAUSE :** ANY INCREASE IN THE RATE OF GST SHALL BE PAYABLE ONLY FOR DELIVERIES COMPLETED WITHIN THE SCHEDULED DELIVERY PERIOD, IN OTHER WORDS INCREASE IN THE RATE OF GST SHALL NOT BE PAYABLE FOR VALUE OF CONSIGNMENT DELIVERED AFTER THE SCHEDULED PURCHASE ORDER DELIVERY PERIOD.2.NEW TAXES AND DUTIES , IF IMPOSED SUBSEQUENT TO DUE DATE OF OFFER SUBMISSION, BY STATUTORY AUTHORITY DURING CONTRACT PERIOD (INCLUDING EXTENSION IF THE SAME IS NOT ATTRIBUTABLE TO BIDDER) SHALL BE REIMBURSED BY BHEL ON PRODUCTION OF RELEVANT SUPPORTING DOCUMENTS TO THE SATISFACTION OF BHEL . HOWEVER, BIDDER SHALL TAKE PRIOR APPROVAL OF BHEL BEFORE DEPOSITING NEW TAXES AND DUTIES.	
43	**IMPORTANT INSTRUCTION FOR MSEs SUPPLIERS:** I. "MSE SUPPLIERS CAN AVAIL THE INTENDED BENEFITS ONLY IF THEY SUBMIT ALONG WITH OFFER, ATTESTED COPIES OF EITHER EM-II CERTIFICATE HAVING DEEMED VALIDITY (FIVE YEARS FROM THE DATE OF ISSUE OF ACKNOWLEDGEMENT IN EM-II) OR VALID NSIC CERTIFICATE OR EM-II CERTIFICATE ALONG WITH CA CERTIFICATE (FORMAT ENCLOSED AS PER ANNEXURE-1 WHERE DEEMED VALIDITY OF EM-II CERTIFICATE OF FIVE YEARS HAS EXPIRED) APPLICABLE FOR THE RELEVANT F/Y (LATEST AUDITED).DATE TO BE RECKONED FOR DETERMINING THE DEEMED VALIDITY WILL BE THE DATE OF BID OPENING (PART -1 IN CASE OF TWO PART BID). NON SUBMISSION OF SUCH DOCUMENTS WILL LEAD TO CONSIDERATION OF THEIR BID AT PAR WITH OTHER BIDDERS. NO BENEFIT SHALL BE APPLICABLE FOR THIS ENQUIRY IF ANY DEFICIENCY IN THE ABOVE REQUIRED DOCUMENTS ARE NOT SUBMITTED BEFORE PRICE BID OPENING. IF THE TENDER IS TO BE SUBMITTED THROUGH e-procurement PORTAL, THEN THE ABOVE REQUIRED DOCUMENTS ARE TO BE UPLOADED ON THE PORTAL. DOCUMENTS SHOULD BE NOTARIZED OR ATTESTED BY A GAZETTED OFFICE. II.IN CASE OF ANY CHANGE IN THE MSE STATUS OF THE BIDDER, IT SHALL BE RESPONSIBILITY OF THE BIDDER TO NOTIFY THE CHANGE AS A PART OF THE BID DOCUMENT. IF AT A LATER DATE IT COMES TO NOTICE OF BHEL, THAT THE CHANGE IN THE STATUS HAS NOT BEEN INTIMATED BY THE BIDDER AND THE ORDER IS OBTAINED UNDER THE PREMISE OF AN MSE, THEN BHEL WOULD CANCEL THE PENDING ORDER AGAINST THIS TENDER AND TAKE NECESSARY ACTION SUSPENSION OF THE BUSSINESS DEALING WITH THE BIDDER AS PER PROCUREMENT POLICY OF BHEL. III.25 % OF THE TENDERED QUANTITY IS EARMARKED FOR MSE SUPPLIERS IN THIS TENDER. IV.OUT OF THIS 25% TENDERED QUANTITY RESERVED FOR MSE SUPPLIERS, 6.25% SHALL BE EARMARKED FOR PROCUREMENT FROM MSEs OWNED BY SC/ST ENTREPRENEURS. V.OUT OF THIS 25% TENDERED QUANTITY RESERVED FOR MSE SUPPLIERS, 3% SHALL BE EARMARKED FOR PROCUREMENT FROM MSEs OWNED BY WOMEN. VI.IN CASE MSE VENDOR PARTICIPATING IN THE TENDER QUOTES WITHIN THE PRICE BAND OF "L1+15%", THEY WILL BE ALLOWED TO SUPPLY THE 25% PORTION OF THE REQUIREMENT SUBJECT TO ACCEPTANCE OF L1 PRICE (ON LANDED COST BASIS) BY MSE VENDOR. IN CASE OF MORE THAN ONE SUCH MSE VENDOR WITHIN THE "L1+15% PRICE BAND" THE SUPPLY SHALL BE SHARED PROPORTIONATELY (TO 25% TENDERED QUANTITY). VII.IF THE L1 VENDOR HAPPENS TO BE A MSE VENDOR AGAINST ANY ITEM CODE, THEN 100% OF THE TENDERED QTY (FOR RESPECITVE ITEM CODE) SHALL BE PROPOSED TO ORDER ON THE L1 (MSE) VENDOR, EVEN THOUGH THERE MAY BE OTHER MSE VENDORS WITHIN THE "L1+15% PRICE BAND". VIII.IN CASE AFTER OPENING OF PRICE BID, IT IS SEEN THAT NO MSE HAS BECOME L1, THEN DEPENDING ON THE NATURE OF THE ITEM, IF IT IS NOT POSSIBLE TO SPLIT THE TENDERED ITEMS/QUANTITIES ON ACCOUNT OF REASONS LIKE CUSTOMER CONTRACT REQUIREMENTS OF SUPPLYING ONE MAKE FOR A GIVEN PROJECT OR TECHNICAL REASONS LIKE TENDERED ITEMS BEING A SYSTEM etc. THEN BHEL WOULD NOT COUNTER OFFER THE L1 PRICES EVEN THOUGH THERE MAY BE MSE BIDDERS WITHIN THE "L1+15% PRICE BAND" OF L1.	
44	THE **STARTUPS** AS DEFINED IN THE GAZETTE OF INDIA NOTIFICATION NO.: G.S.R. 127 (E) DATED 19/02/2019 WILL BE EXEMPTED FROM FULFILLING THE CRITERIA, IF MENTIONED, IN THE PQR (PRE-QUALIFYING REQUIREMENT) REGARDING PRIOR TURNOVER AND PRIOR EXPERIENCE. HOWEVER, THERE MAY BE CIRCUMSTANCES (LIKE PROCUREMENTS OF ITEMS RELATED TO PUBLIC SAFETY, HEALTH, CRITICAL SECURITY OPERATIONS AND EQUIPMENTS ETC.) WHERE BHEL MAY PREFER THE VENDORS TO HAVE PRIOR EXPERIENCE RATHER THAN GIVING ORDER TO NEW ENTITIES. FOR SUCH PROCUREMENTS, BHEL MAY NOT RELAX THE CRITERIA OF PRIOR EXPERIENCE/TURNOVER FOR THE STARTUPS.	
45	**PURCHASE PREFERENCE FOR INDIAN VENDORS:** FOR THIS PROCUREMENT, THE LOCAL CONTENT TO CATEGORIZE A SUPPLIER AS A CLASS I LOCAL SUPPLIER / CLASS II LOCAL SUPPLIER /NON LOCAL – SUPPLIER AND PURCHASE PREFERENCE TO CLASS I LOCAL SUPPLIER, IS AS DEFINED IN PUBLIC PROCUREMENT (PREFERNCE TO MAKE IN INDIA), ORDER 2017 DATED 04.06.2020 ISSUED BY DPIIT. IN CASE OF SUBSEQUENT ORDERS ISSUED BY THE NODAL MINISTRY, CHANGING THE DEFINITION OF LOCAL CONTENT FOR THE ITEMS OF THE NIT, THE SAME SHALL BE APPLICABLE EVEN IF ISSUED AFTER ISSUE OF THIS NIT, BUT BEFORE OPENING OF PART –II BIDS AGAINST THIS NIT. **MODEL CLAUSE FOR TENDER.** I. ANY BIDDER FROM A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA WILL BE ELIGIBLE TO BID IN THIS TENDER ONLY IF THE BIDDER IS REGISTERED WITH THE COMPETENT AUTHORITY.	

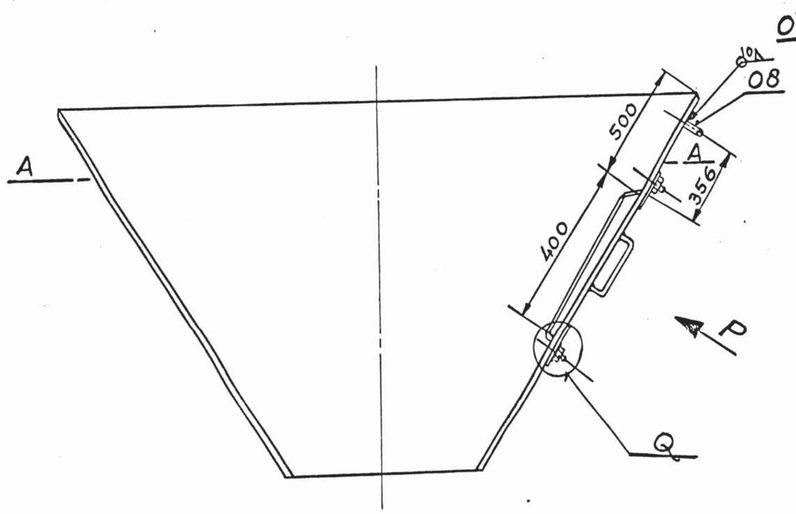
	II. "BIDDER" (INCLUDING THE TERM 'TENDERER', 'CONSULTANT' OR 'SERVICE PROVIDER' IN CERTAIN CONTEXTS) MEANS ANY PERSON OR FIRM OR COMPANY, INCLUDING ANY MEMBER OF A CONSORTIUM OR JOINT VENTURE (THAT IS AN ASSOCIATION OF SEVERAL PERSONS, OR FIRMS OR COMPANIES), EVERY ARTIFICIAL JURIDICAL PERSON NOT FALLING IN ANY OF THE DESCRIPTIONS OF BIDDERS STATED HEREINBEFORE, INCLUDING ANY AGENCY BRANCH OR OFFICE CONTROLLED BY SUCH PERSON, PARTICIPATING IN A PROCUREMENT PROCESS. III. "BIDDER FROM A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA" FOR THE PURPOSE OF THIS ORDER MEANS: - a) AN ENTITY INCORPORATED, ESTABLISHED OR REGISTERED IN SUCH A COUNTRY: OR b) A SUBSIDIARY OF AN ENTITY INCORPORATED, ESTABLISHED OR REGISTERED IN SUCH A COUNTRY; OR c) AN ENTITY SUBSTANTIALLY CONTROLLED THROUGH ENTITIES INCORPORATED, ESTABLISHED OR REGISTERED IN SUCH A COUNTRY; OR d) AN ENTITY WHOSE BENEFICIAL OWNER IS SITUATED IN SUCH A COUNTRY; OR e) AN INDIAN (OR OTHER) AGENT OF SUCH AN ENTITY; OR f) A NATURAL PERSON WHO IS A CITIZEN OF SUCH A COUNTRY; OR g) A CONSORTIUM OR JOINT VENTURE WHERE ANY MEMBER OF THE CONSORTIUM OR JOINT VENTURE FALLS UNDER ANY OF THE ABOVE IV. THE BENEFICIAL OWNER FOR THE PURPOSE OF (III) ABOVE WILL BE AS UNDER: 1. IN CASE OF A COMPANY OR LIMITED LIABILITY PARTNERSHIP, THE BENEFICIAL OWNER IS THE NATURAL PERSON (S) WHO, WHETHER ACTING ALONE OR TOGETHER, OR THROUGH ONE OR MORE JURIDICAL PERSON, HAS A CONTROLLING OWNERSHIP INTEREST OR WHO EXERCISES CONTROL THROUGH OTHER MEANS. EXPLANATION – a. "CONTROLLING OWNERSHIP INTEREST" MEANS OWNERSHIP OF OR ENTITLEMENT TO MORE THAN TWENTY-FIVE PER CENT. OF SHARES OR CAPITAL OR PROFITS OF THE COMPANY b. "CONTROL" SHALL INCLUDE THE RIGHT TO APPOINT MAJORITY OF THE DIRECTORS OR TO CONTROL THE MANAGEMENT OR POLICY DECISIONS INCLUDING BY VIRTUE OF THEIR SHAREHOLDING OR MANAGEMENT RIGHTS OR SHAREHOLDER'S AGREEMENTS OF VOTING AGREEMENTS; 2. IN CASE OF A PARTNERSHIP FIRM, THE BENEFICIAL OWNER IS THE NATURAL PERSON (S) WHO, WHETHER ACTING ALONE OR TOGETHER, OR THROUGH ONE OR MORE JURIDICAL OF CAPITAL OR PROFITS OF THE PARTNERSHIP; 3. IN CASE OF AN UNINCORPORATED ASSOCIATION OR BODY OF INDIVIDUALS, THE BENEFICIAL OWNER IS THE NATURAL PERSON (S), WHO, WHETHER ACTING ALONE OR TOGETHER, OR THROUGH ONE OR MORE JURIDICAL PERSON, HAS OWNERSHIP OF OR ENTITLEMENT TO MORE THAN FIFTEEN PERCENT OF THE PROPERTY OF CAPITAL OF PROFITS OF SUCH ASSOCIATION OR BODY OF INDIVIDUALS; 4. WHERE NO NATURAL PERSON IS IDENTIFIED UNDER (1) OR (2) OR (3) ABOVE, THE BENEFICIAL OWNER IS THE RELEVANT NATURAL PERSON WHO HOLDS THE POSITION OF SENIOR MANAGING OFFICIAL; 5. IN CASE OF TRUST, THE IDENTIFICATION OF BENEFICIAL OWNER (S) SHALL INCLUDE IDENTIFICATION OF THE AUTHOR OF THE TRUST, THE TRUSTEE, THE BENEFICIARIES WITH FIFTEEN PERCENT OR MORE INTEREST IN THE TRUST AND ANY OTHER NATURAL PERSON EXERCISING ULTIMATE EFFECTIVE CONTROL OVER THE TRUST THROUGH A CHAIN OF CONTROL OR OWNERSHIP. V. AN AGENT IS A PERSON EMPLOYED TO DO ANY ACT FOR ANOTHER, OR TO REPRESENT ANOTHER IN DEALINGS WITH THIRD PERSON. **CERTIFICATE:** IN ORDER TO AVAIL THE BENEFITS, VENDORS TO SUBMIT (ALONG WITH OFFER) THE SELF-CERTIFICATION THAT THE ITEM OFFERED MEETS THE CONTENT REQUIREMENT FOR CLASS-I/ CLASS-II LOCAL SUPPLIER AS THE CASE MAY BE, INDICATING THE PERCENTAGE OF LOCAL CONTENT. AND SHALL GIVE DETAILS OF LOCATION AT WHICH THE LOCAL VALUE ADDITION IS MADE (refer attached Make in India (Model Certificate no I).	
46	**FORCE MAJEURE** : NOTWITHSTANDING ANYTHING CONTAINED IN THE CONTRACT, NEITHER THE VENDOR NOR THE BHEL SHALL BE HELD RESPONSIBLE FOR TOTAL OR PARTIAL NON-EXECUTION OF ANY OF THE CONTRACTUAL OBLIGATIONS, SHOULD THE OBLIGATION BECOME UNREASONABLY ONEROUS OR IMPOSSIBLE DUE TO OCCURRENCE OF A 'FORCE MAJEURE' WHICH DIRECTLY AFFECTS THE OBLIGATIONS TO BE PERFORMED BY THE BHEL OR THE VENDOR ; SUCH EVENTS INCLUDE WAR, MILITARY OPERATIONS OF ANY NATURE, BLOCKAGES, REVOLUTIONS, INSURRECTIONS, RIOTS, CIVIL COMMOTIONS, INSURGENCY, SABOTAGE, ACTS OF PUBLIC ENEMY, FIRES, EXPLOSION, EPIDEMICS, QUARANTINE RESTRICTIONS, FLOODS, EARTHQUAKE, OR ACTS OF GOD, RESTRICTIONS BY GOVT. AUTHORITIES; OVER WHICH THE VENDOR OR THE BHEL HAS NO CONTROL. THE PARTY CLAIMING TO BE AFFECTED BY FORCE MAJEURE SHALL NOTIFY THE OTHER PARTY IN WRITING WITHOUT DELAY, WITHIN TWO WEEKS ON THE INTERVENTION AND ON THE CESSATION OF SUCH CIRCUMSTANCE. EXTENSION OF TIME SOUGHT BY THE VENDOR ALONG WITH SUPPORTING EVIDENCE AND SO GRANTED BY THE BHEL FOR THE SUPPLY/ WORK AFFECTED, IF ANY, SHALL NOT BE CONSTRUED AS WAIVER IN RESPECT OF REMAINING DELIVERIES. RESCHEDULING OF DELIVERIES ON ACCOUNT OF FORCE MAJEURE CONDITIONS, IF SO AGREED BY THE BHEL, WILL NOT ENTAIL THE VENDOR TO CLAIM ANY INCREASE IN THE PRICE ON WHATSOEVER ACCOUNT. NOTWITHSTANDING ABOVE PROVISIONS, BHEL SHALL RESERVE THE RIGHT TO CANCEL THE ORDER/ CONTRACT, WHOLLY OR PARTLY, IN ORDER TO MEET THE OVERALL PROJECT SCHEDULE AND MAKE ALTERNATIVE ARRANGEMENTS. IF DEEMED NECESSARY, BHEL MAY TAKEOVER PARTLY PROCESSED MATERIAL AT A MUTUALLY AGREED PRICE.	
47	**FRAUD PREVENTION POLICY :** THE BIDDER ALONG WITH ITS ASSOCIATE/ COLLABORATORS/ SUB-CONTRACTORS/ SUB-VENDORS/ CONSULTANTS/ SERVICE PROVIDERS SHALL STRICTLY ADHERE TO BHEL FRAUD PREVENTION POLICY DISPLAYED ON BHEL WEBSITE WWW.BHEL.COM AND SHALL IMMEDIATELY BRING TO THE NOTICE OF BHEL MANAGEMENT ABOUT ANY FRAUD OR SUSPECTED FRAUD AS SOON AS IT COMES TO THEIR NOTICE.	
48	**SHORT SHIPMENTS/ WARRANTY/GUARANTEE REPLACEMENTS**: IN CASE OF ANY SHORT SHIPMENT DURING INITIAL SUPPLY WHICH IS SUBSEQUENTLY DISPATCHED BY THE VENDOR OR ANY GUARANTEE / WARRANTY REPLACEMENTS SHALL BE DISPATCHED ON "FOR-BHEL STORES/DESIGNATED DESTINATION" BASIS FOR INDIGENOUS ITEMS. TAXES, IF ANY PAID BY INDIGENOUS VENDOR FOR GUARANTEE /WARRANTEE REPLACEMENT, REPAIR ACTIVITY EXCLUDING SHORT SUPPLY SHALL BE TO VENDOR'S ACCOUNT ONLY. THE VENDOR HAS TO RAISE A CREDIT NOTE FOR SHORT SUPPLIED QUANTITY AS PER GST PROVISIONS.	
49	**E WAY BILL**: THE SUPPLIER HAS TO ARRANGE FOR E WAY BILL AS APPLICABLE FOR ANY MOVEMENT OF GOODS ALONG WITH OTHER PRESCRIBED DOCUMENTS AS PER GST LAW. THE SUPPLIER HAS ALSO TO COMPLY WITH ANY AMENDMENT AS PRESCRIBED FROM TIME TO TIME UNDER E WAY BILL RULE. ANY FINANCIAL IMPLICATION ARISES ON BHEL DUE TO NONCOMPLIANCE OF E WAY BILL RULE WILL BE PASSED ON TO THE SUPPLIER.	
50	THE BIDDER DECLARES THAT THEY WILL NOT ENTER INTO ANY ILLEGAL OR UNDICLOSED AGREEMENT OR UNDERSTANDING, WHETHER FORMAL OR INFORMAL WITH OTHER BIDDER (S). THIS APPLIES IN PARTICULAR TO PRICES, SPECIFICATIONS, CERTIFICATIONS, SUBSIDIARY CONTRACTS, SUBMISSION OR NON- SUBMISSION OF BIDS OR ANY OTHER ACTIONS TO RESTRICT COMPETITIVENES OR TO INTRODUE CARTELIZATION IN THE BIDDING PROCESS. IN CASE, THE BIDDER IS FOUND HAVING INDULGED IN ABOVE ACTIVITIES, SUITABLE ACTION SHALL BE TAKEN BY BHEL AS PER EXTANT POLICIES / GUIDELINES.	
51	THE BIDDER SHALL REGISTER THEMSELVES ON GEM PORTAL AND SHALL QUOTE THEIR GEM SELLER ID IN THEIR OFFER. GEM SELLER ID IS MANDATORY FOR PLACEMENT OF PURCHASE ORDER EXCEPT IN CASES WHERE FREE ISSUE MATERIAL IS TO BE ISSUED BY BHEL .	
52	**REJECTION/REPLACEMENT:** THE SELLER SHALL ARRANGE REPLACEMENT / REPAIR UNDER ITS OBLIGATION UNDER THE CONTRACT. SELLER SHALL BE GIVEN GROUND RENT FREE PERIOD OF 90 DAYS FROM THE DATE OF REJECTION TO LIFT REJECTED MATERIAL. BEYOND 90 DAYS, A GROUND RENT OF 0.25% OF VALUE OF REJECTED MATERIAL PER WEEK WILL BE LEVIED FOR A MAXIMUM PERIOD OF 4 WEEKS. BEYOND THIS PERIOD SUPPLIER FORFEITS THEIR RIGHT TO THE MATERIALS.	
53	**CONFLICT OF INTEREST AMONG BIDDERS/AGENTS:** A BIDDER SHALL NOT HAVE CONFLICT OF INTEREST WITH OTHER BIDDERS. SUCH CONFLICT OF INTEREST CAN LEAD TO ANTI-COMPETITIVE PRACTICES TO THE DETRIMENT OF PROCURING ENTITY'S INTERESTS. THE BIDDER FOUND TO HAVE A CONFLICT OF INTEREST SHALL BE DISQUALIFIED. A BIDDER MAY BE CONSIDERED TO HAVE A CONFLICT OF INTEREST WITH ONE OR MORE PARTIES IN THIS BIDDING PROCESS, IF a) THEY HAVE CONTROLLING PARTNER (S) IN COMMON; OR b) THEY RECEIVE OR HAVE RECEIVED ANY DIRECT OR INDIRECT SUBSIDY FINANCIAL STAKE FROM ANY OF THEM; OR c) THEY HAVE THE SAME LEGAL REPRESENTATIVE/AGENT FOR PURPOSES OF THIS BID; OR d) THEY HAVE RELATIONSHIP WITH EACH OTHER, DIRECTLY OR THROUGH COMMON THIRD PARTIES, THAT PUTS THEM IN A POSITION TO HAVE ACCESS TO INFORMATION ABOUT OR INFLUENCE ON THE BID OF ANOTHER BIDDER; OR e) BIDDER PARTICIPATES IN MORE THAN ONE BID IN THIS BIDDING PROCESS. PARTICIPATION BY A BIDDER IN MORE THAN ONE BID WILL RESULT IN THE DISQUALIFICATION OF ALL BIDS IN WHICH THE PARTIES ARE INVOLVED. HOWEVER, THIS DOES NOT LIMIT THE INCLUSION OF THE COMPONENTS/ SUB-ASSEMBLY ASSEMBLIES FROM ONE BIDDING MANUFACTURER IN MORE THAN ONE BID; OR f) IN CASES OF AGENTS QUOTING IN OFFSHORE PROCUREMENTS, ON BEHALF OF THEIR PRINCIPAL MANUFACTURERS, ONE AGENT CANNOT REPRESENT TWO MANUFACTURERS OR QUOTE ON THEIR BEHALF IN A PARTICULAR TENDER ENQUIRY. ONE MANUFACTURER CAN ALSO AUTHORISE ONLY ONE AGENT/DEALER. THERE CAN BE ONLY ONE BID FROM THE FOLLOWING: 1. THE PRINCIPAL MANUFACTURER DIRECTLY OR THROUGH ONE INDIAN AGENT ON HIS BEHALF; AND 2. INDIAN/FOREIGN AGENT ON BEHALF OF ONLY ONE PRINCIPAL; OR g) A BIDDER OR ANY OF ITS AFFILIATES PARTICIPATED AS A CONSULTANT IN THE PREPARATION OF THE DESIGN OR TECHNICAL SPECIFICATIONS OF THE CONTRACT THAT IS THE SUBJECT OF THE BID; OR	

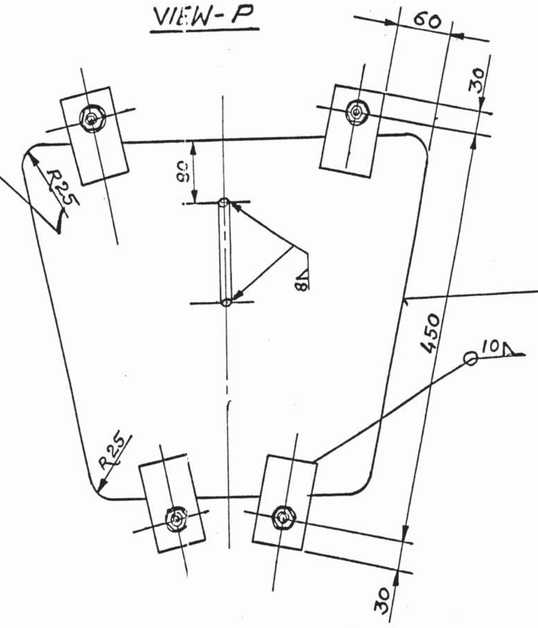
	H) IN CASE OF A HOLDING COMPANY HAVING MORE THAN ONE INDEPENDENTLY MANUFACTURING UNITS, OR MORE THAN ONE UNIT HAVING COMMON BUSINESS OWNERSHIP/MANAGEMENT, ONLY ONE UNIT SHOULD QUOTE. SIMILAR RESTRICTIONS WOULD APPLY TO CLOSELY RELATED SISTER COMPANIES. BIDDERS MUST PROACTIVELY DECLARE SUCH SISTER/ COMMON BUSINESS/ MANAGEMENT UNITS IN SAME/ SIMILAR LINE OF BUSINESS.	
54	VENDOR MUST VISIT OUR WEBSITE https://herp.bhel.com REGULARILY FOR ENQUIRY/PO/CLARIFICATIONS/FOR ANY LATEST UPDATES.	

NOTE:

1. FOR FOREIGN SUPPLIERS: **CLAUSE NO. 09, 23,24,25,48,50,51, 56 & 58** ARE NOT APPLICABLE FOR 'FOREIGN SUPPLIERS'. IT IS APPLICABLE FOR ONLY INDIAN SUPPLIERS.
2. PLEASE FILL IN THIS FORMAT AND SEND COMPULSORILY ALONG WITH QUOTATION WITH VENDOR'S SEAL, SIGNATURE AND DATE.

SIGNATURE ALONG WITH SEAL AND DATE:





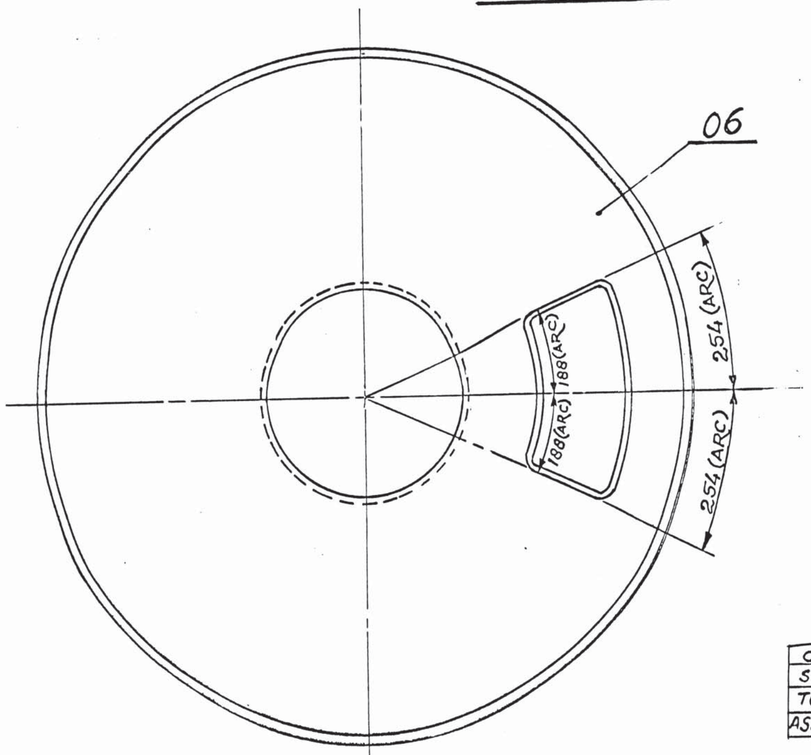
WPS	TYPE OF WELD	TYPE OF ELECTRODE	WELD LENGTH
WE 006/A1	10 Δ	E 6013	1.3 m.
WE 006/A1	5 Δ	E 6013	0.5 m.

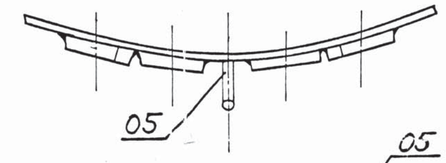
Flame cut COVER Plate from inner cone with minimum kerf.

NOTE:-

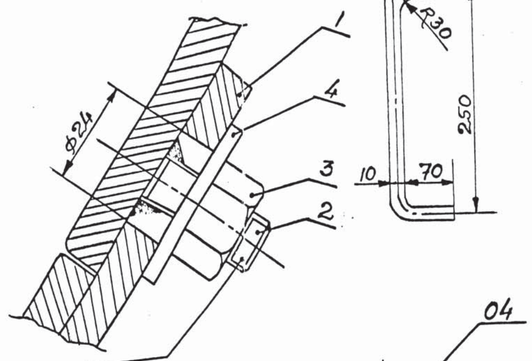
1. Refer view P. Flame cut inner cone for manhole use cut out portion as door. Add handle (Item-5) Clips (Item-1) to door.
2. Location of cut out (View-P) to be suitable chosen between two rollers for easy access.

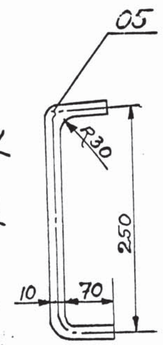
SECTION-AA



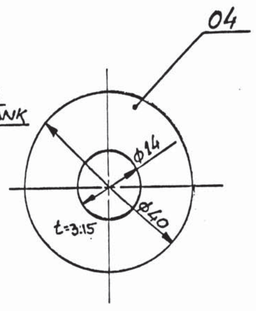


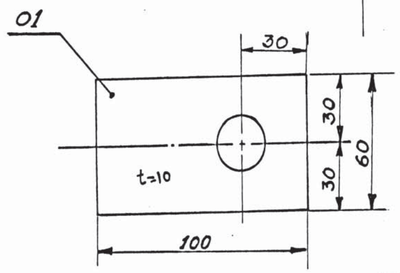
DETAIL-Q

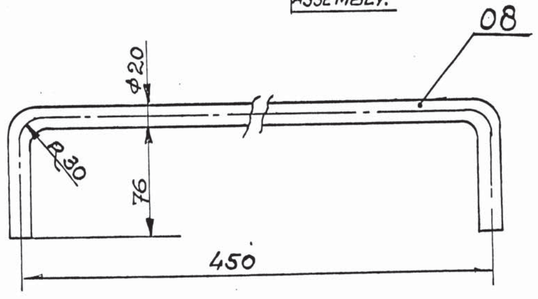




CUT AND REMOVE THE HEAD OF THE SCREW M12X30 AND WELD THE SHANK TO INNER CONE AS SHOWN WHILE ASSEMBLY.







DESCRIPTION	ITEM NO.	DRG. NO.	MATL. CODE / MATL. SPECN.	WEIGHT (Kg) / QTY.
HANDLE RO.20X596	08	4-61-376-00133	HY1010299107 / HY-10197	1.5 / 1
DOOR (CUTOUT FROM INNER CONE)	07	-	AA 1011819074 / AA 10119	14.5 / 1
INNER CONE PL.10X2600X4115	06	2-61-376-00037	AA 1018190 74 / AA 10119	584.00 / 1
HANDLE (RO.ϕ10X365)	05	4-61-362-90014	HY1010299069 / HY 10199	0.13 / 1
WASHER S.H.3.15XOD40XID14	04	4-61-362-90013	AA 10111111 33 / AA 10111	0.10 / 4
HEX. NUT M12	03		AA 71511115040 / AA 7151115	0.02 / 4
SCREW M12X30	02		AA 7121123363 / AA7121123	0.04 / 4
CLIP PL 10X60X100	01	4-61-362-90012	AA 1011819074 / AA 10119	0.45 / 4

HY-2

BHARAT HEAVY ELECTRICALS LIMITED.
HERP. SHIVPUR, VARANASI.

DEPT	CODE	SCALE	WEIGHT (KG)	REF. TO. ASSY. DRG.
		N.T.S.	588.07	

	NAME	SIGN	DATE
DRAWN	D. BASAK		
CHECKED			
APPROVED			

TITLE
INNER CONE WITH ACCESS DOOR

1-61-376-90015 03.

SHEET NO. 1 NO. OF SHEETS 1

COMPUTER FILE NAME 26100037.DWG

INVENTORY NO | SIGN. AND DATE | REF. DRG. NO.

(ALL DIMENSIONS ARE IN mm)

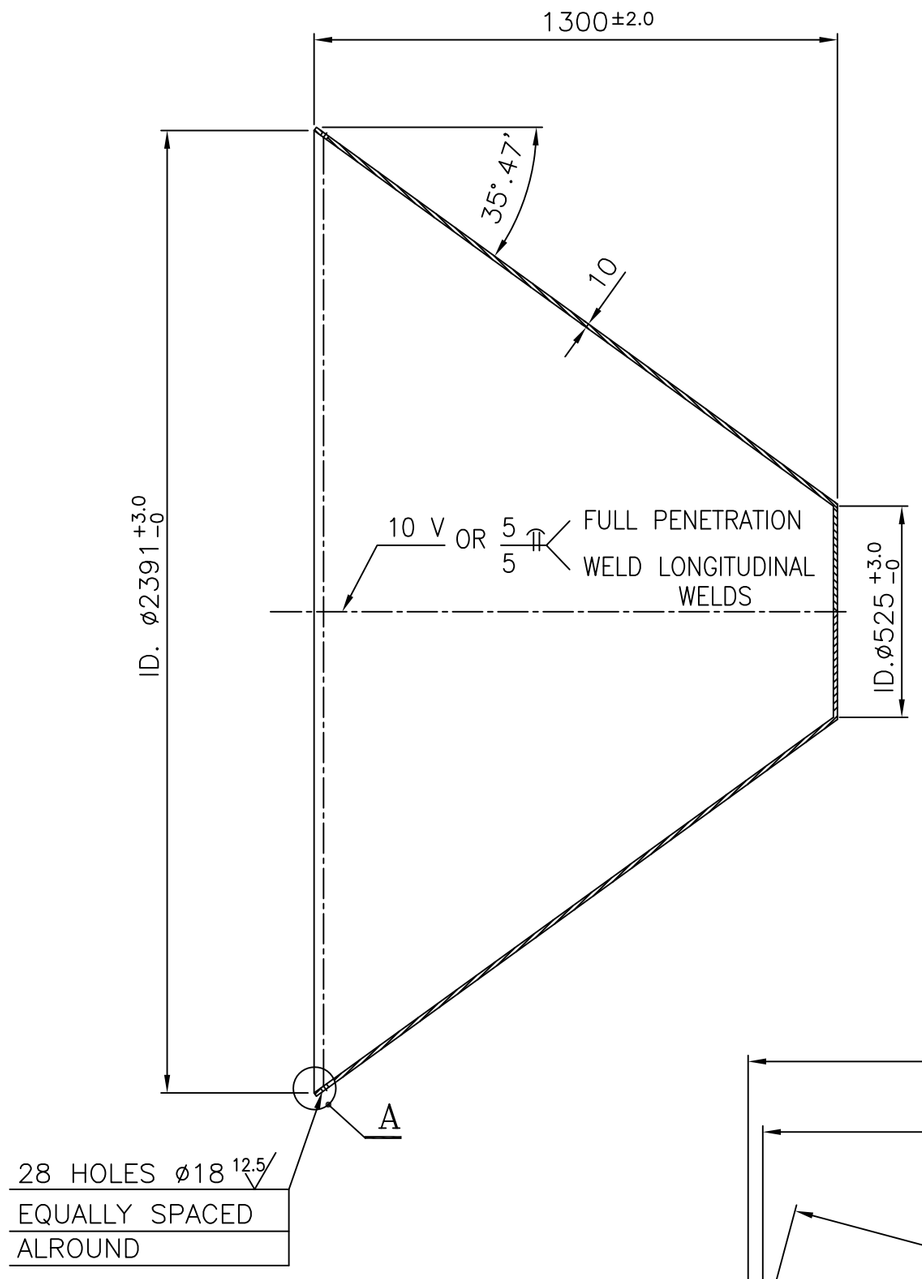
POORNIMA CAD

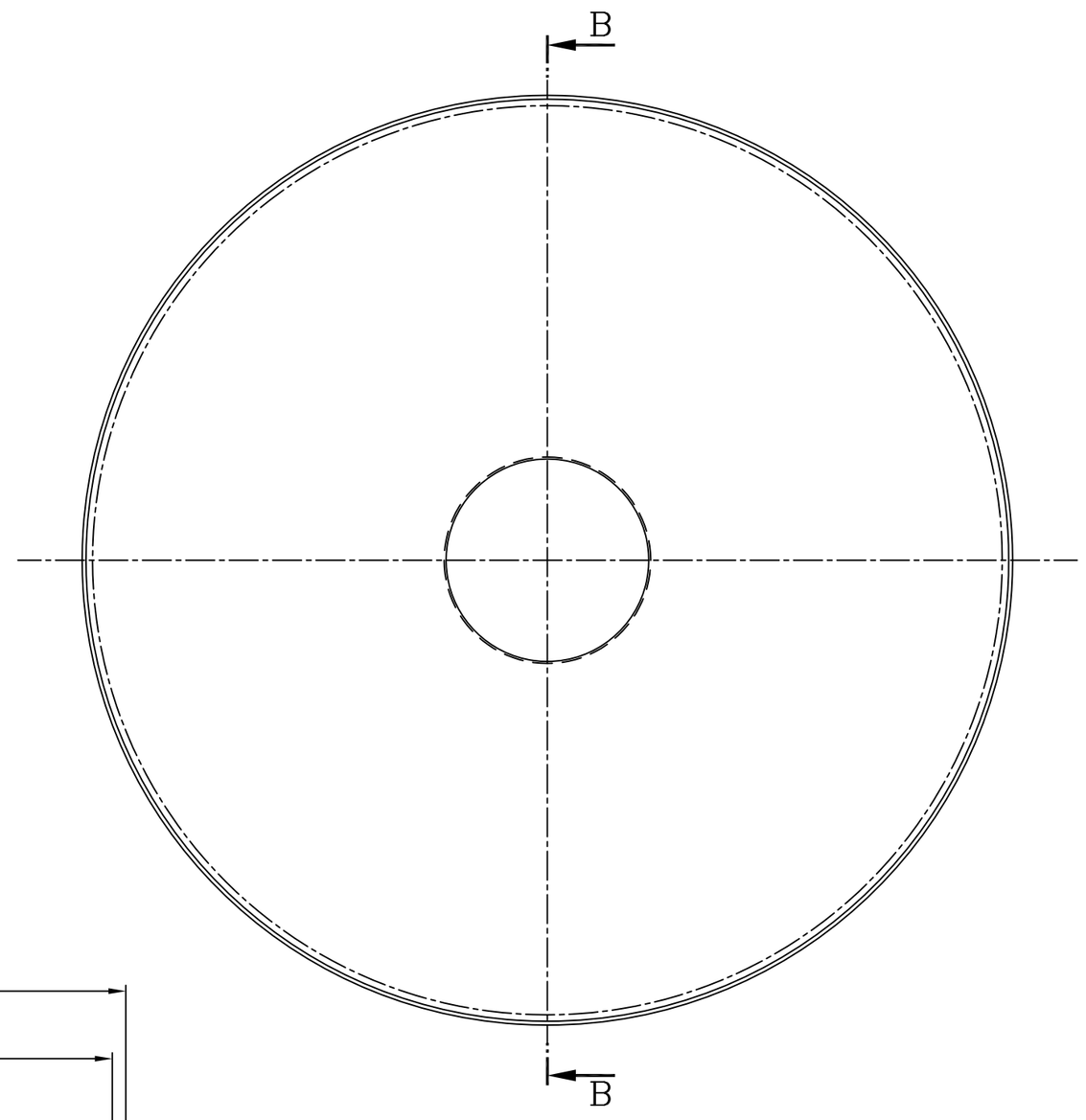
DRG. NO. 2-61-376-00037

WPS	TYPE OF WELD	ELECTRODE SPECIFCN	LENGTH OF WELD
WE 006	10V	E44 RNX	1.6 M

12.5

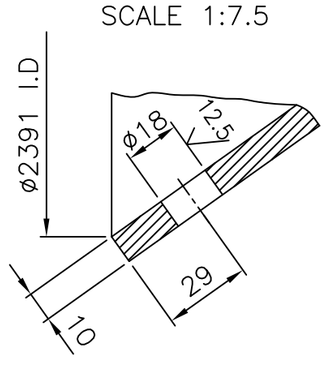
SECTION B-B



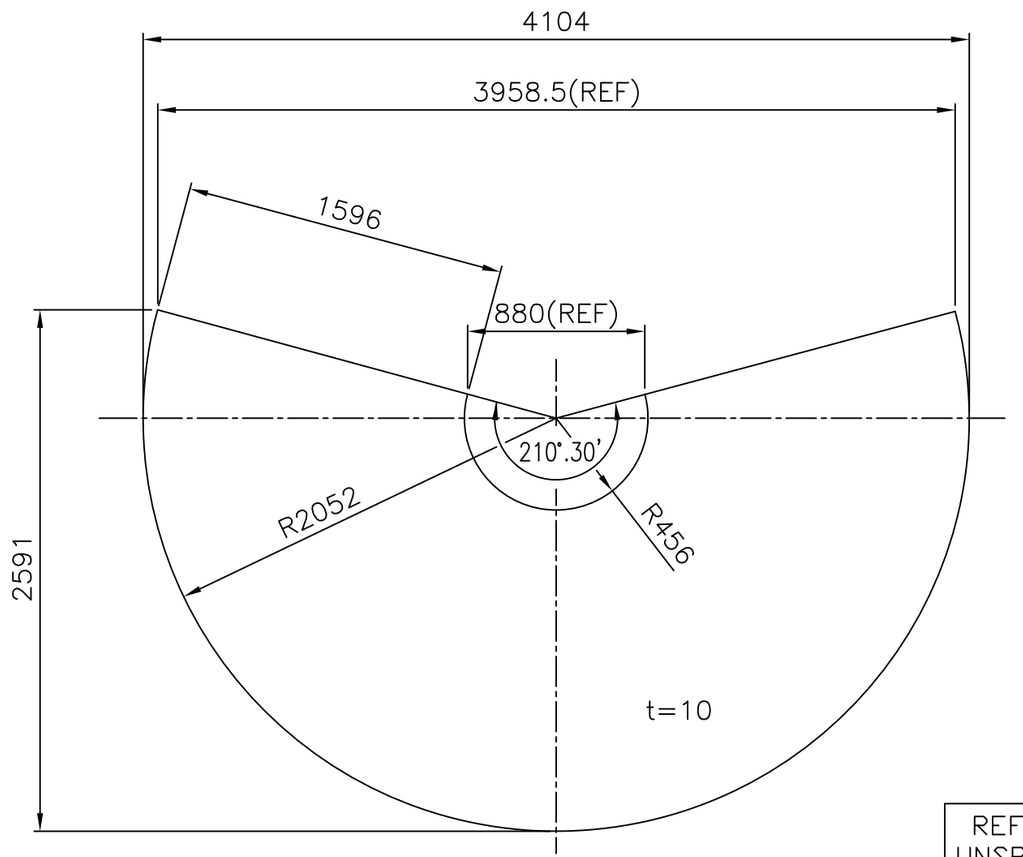


DETAIL-A

SCALE 1:7.5



SCALE 1:30



NOTES:-

1. ~~HOLES TO BE DRILLED TOGETHER WITH MATING PART~~
2. WELD MUST BE AIR TIGHT
3. ALL INSIDE AND OUTSIDE WELDED SEAMS MUST BE SMOOTH
4. NOTE-1 IS NOT APPLICABLE FOR SPARES SUPPLY.

ITEM NO.	DESCRIPTION	DRAWING NO.	MATL CODE / MATL SPECN	UNIT WT / QTY
01	PL 10x2600x4115		AA1011819074 / AA10119	584 /

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: XRP 803 BOWL MILL

REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.			12.8.83	NA
CHD.			12.8.83	
APPD.			12.8.83	

REV.	DATE	ALTERED / CHECKED / APPROVED	ZONE
06	22.1.06	SUSHANT / PKP / V.KUMAR	NOTE-4 ADDED FOR SPARES SUPPLY.
05	12.5.98	ALTERED / CHECKED / APPROVED	DRG REDRAWN IN CARPORATING ALL THE PREVIOUS REVISIONS.

DEPT.	GRADE OF TOL.DIM.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
B.M.D	C/M/F	1:15 1:30 1:7.5	584	NA	NA	NA
CODE 446						

TITLE: INNER CONE (CONE SECTION)

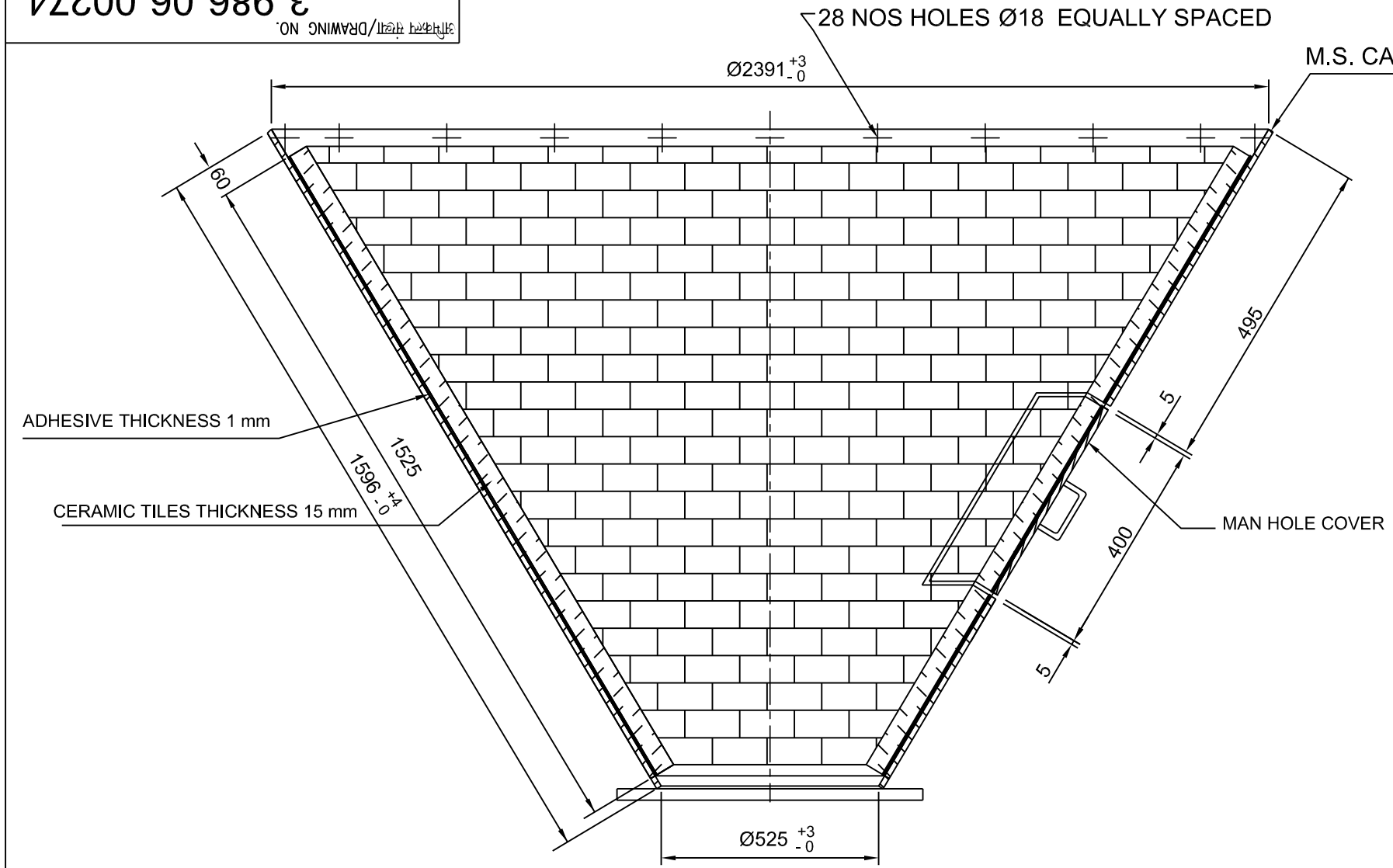
DRAWING NO. 2-61-376-00037 REV. 06

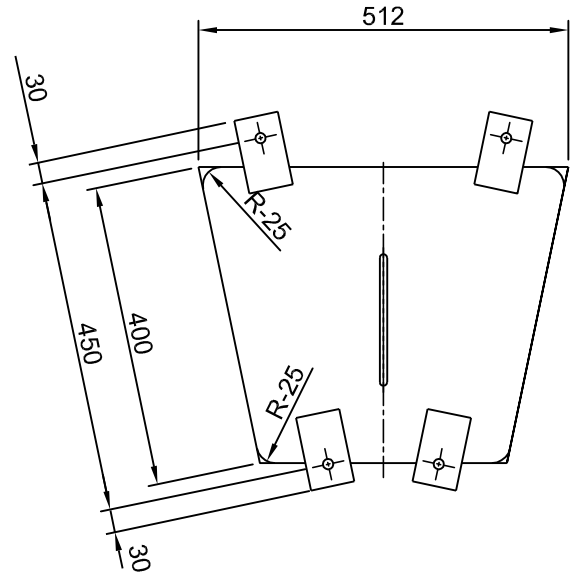
SHEET NO. 1 NO OF SHEETS 1

प्रथम कोण प्रक्षेपण/FIRST ANGLE PROJECTION

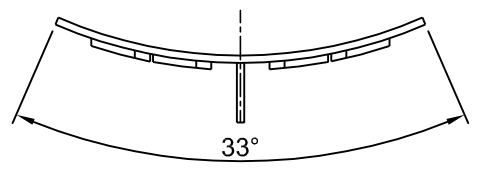
सभी विमाएं मिलीमीटर में हैं।/ALL DIMENSIONS ARE IN mm.

अभिकल्प संख्या/DRAWING NO. 3-986-06-00274





MAN HOLE COVER DETAILS



DRAWING APPROVED.
-VIRENDRA KUMAR
DY. MANAGER-P&D
BHEL HERP VARNASI
DTD. 15.12.2007
(HERP REF. NO. HY-002.B)

NOTES :-

01 MATERIAL M.S. CONFORMS TO IS:2062 Gr.-A
02 CASING TO BE CLEANED & PAINTED WITH RED-OXIDE
03 TOLERANCE ON THICKNESS OF CASING AS PER IS:1852 CLAUSE 7.3
04 D.P. TEST TO BE CARRIED OUT AS PER E & D -331

DIMENSIONS TO BE CONTROLLED WITHIN
LIMITS AS SHOWN
MACHINING TOLERANCE ±0.25 mm
UNLESS
OTHERWISE SHOWN
NON-MACHINING TOLERANCE ±0.5 mm

संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY / जांचकर्ता CHD

संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY / जांचकर्ता CHD
01	15.05.06	

REF. NO.-1822

उत्पाद का प्रकार या ग्राहक/परियोजना का नाम
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT
HERP VARANASI

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, जगदीशपुर, सुल्तानपुर
BHARAT HEAVY ELECTRICALS LIMITED, JAGDISHPUR, SULTANPUR

	नाम/NAME	हस्ताक्षर/SIGN	दिनांक/DATE
निर्माणकर्ता DRN.	C.S.JOSHI	Sd/=	10.03.06
जांचेकर्ता CHD	S.YADAV	Sd/=	10.03.06
स्वीकृतीदाता APPD	S.CHANDRA	Sd/=	10.03.06

वेरिएन्ट संख्या No. of Var.

विभाग DEPTT.	अभियांत्रिकी ENGG.	पैमाना/SCALE	भार कि.ग्रा. WEIGHT (KG)	असेम्बली अभिकल्प का संदर्भ REFER TO ASSLY. DRG.	नग क्रमांक ITEM NO.	नगों की संख्या NO. OF ITEMS
कोड/CODE	400	N.T.S.	--			

शीर्षक/TITLE
CERAMIC LINED INNER CONE

कार्ड कोड CARD CODE

अभिकल्प संख्या/DRAWING NO. 3-986-06-00274

REV. 01

पृष्ठ संख्या/Sheets No. | पृष्ठों की संख्या/No. of Sheets

संदर्भित अभिकल्प संख्या REFERENCE DRG. NO.

हस्ताक्षर और दिनांक/SIGN & DATE

सामग्री सूची संख्या INVENTORY NO.

A3 साइज़/A3 SIZE

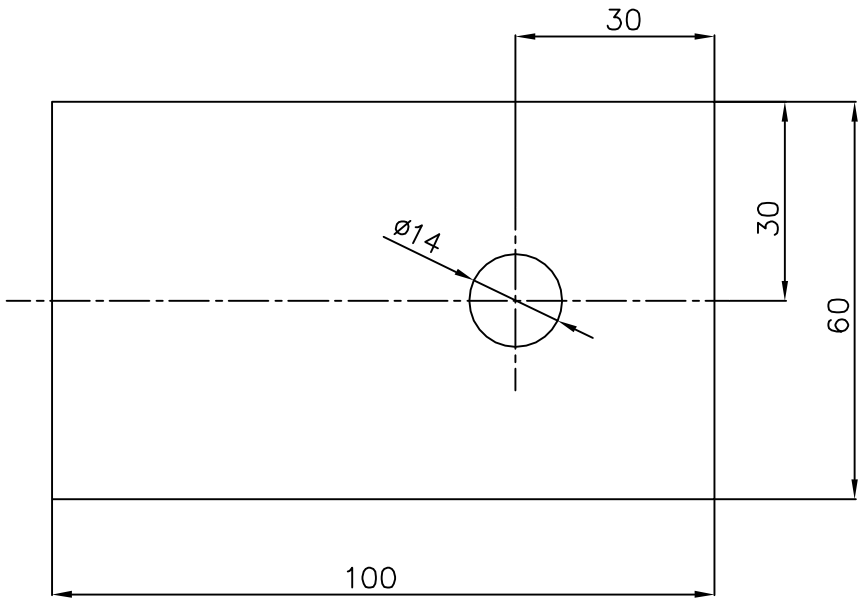
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN mm.

REV.	DATE		REV.	DATE		REV.	DATE	
01	12.4.85	ALTERED PAVAN KUMAR	02	6.5.00	ALTERED PAVAN KUMAR			ALTERED
		CHECKED Y.S.B.LAXMAN RAO			CHECKED SGHATGE			CHECKED
		APPROVED B.THYAGARAJAN			APPROVED K.M.RAO			APPROVED

AA10119 WAS IS2062 MAT CODE WAS AA1011914010

DRAWING RETRACED.



THICHNESS=10 mm

DESCRIPTION & DRG.NO.	VAR NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATL. CODE	NET.WT.	GROSS WT
CLIP		PL 10X60X100	AA1011819074	0.45	
			AA10119		1
			MATL. SPECN.	QTY.	

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN	DATE
DRN.	Yadagiri		06.05.00
CKD.	B.Pavan kumar		06.05.00
APPD.	Satish Ghatge		06.05.00

NO.OF VAR. /

DEPT. PULV.ENGG

CODE 446

SCALE 1 : 1

WEIGHT(K.G.) 0.45

REF.TO ASSY.DRG. 2-61-362-00112

ITEM NO. 03

NO.OF ITEM /

TITLE CLIP (INNER CONE)

DRAWING NO. 4-61-362-90012

REV. 02

SHT.NO. 01

NO.OF SHT. 01

REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.

INVENTORY NO. | SIGN. & DATE | REF. DRG. NO. | COMPUTER NO. 46190012.DWG |

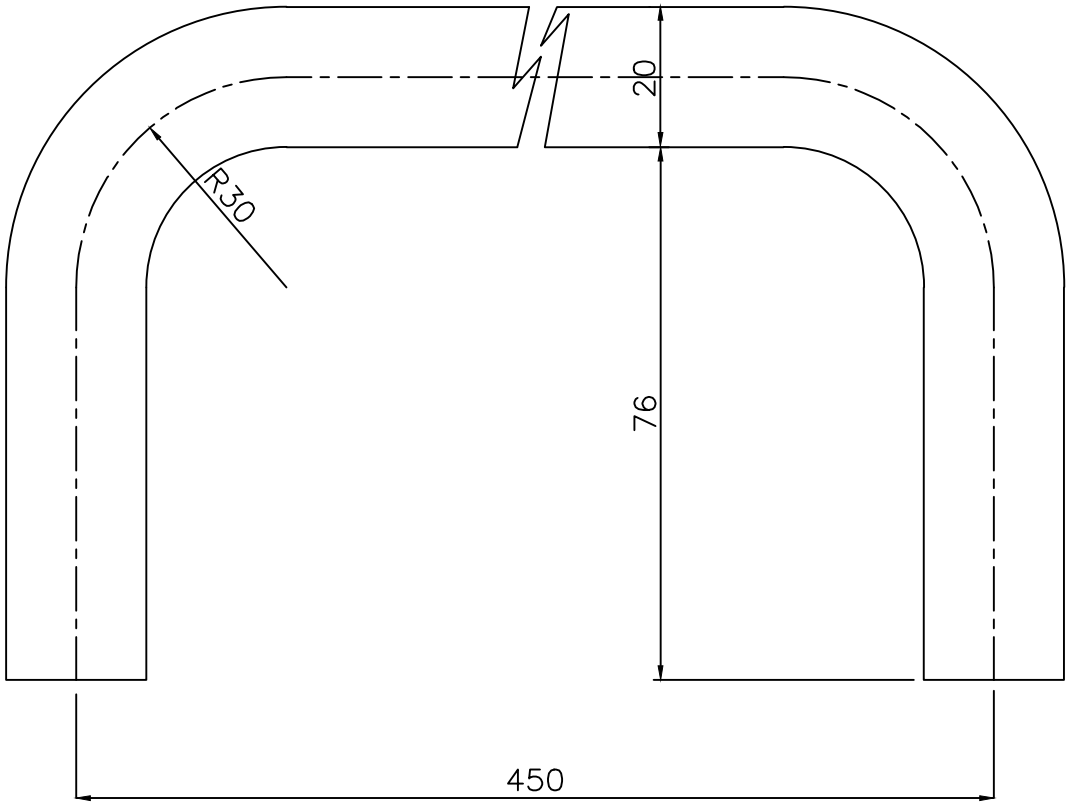
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN mm.

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED
01	26.9.98	ALTERED CHECKED APPROVED	02	29.06.13	ALTERED SHARIFF CHECKED AMAN APPROVED S.GHATGE			ALTERED CHECKED APPROVED

DRG. REDRAWN

RAW MATL SIZE WAS ø20 X 596
WT CORRECTED ACCORDINGLY



DEVELOPED LENGTH : 576 MM

ROD		ø20 X 580	HY1010299107	1.42 / 1.43
			HY10199	1
DESCRIPTION & DRG.NO.	VAR NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATL. CODE	NET.WT. / GROSS WT
			MATL. SPECN.	QTY.

TYPE OF PRODUCT OR
NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN	DATE
DRN.	N.D.S.		26.9.98
CKD.	S.G		26.9.98
APPD.	K.M.R		26.9.98

NO.OF VAR. —

DEPT.	SCALE	WEIGHT(K.G.)	REF.TO ASSY.DRG.	ITEM NO.	NO.OF ITEM
BMD	1:1	1.42		—	—
CODE 446					

TITLE

HANDLE

DRAWING NO. 4-61-376-00133

REV. 02

SHT.NO. 1 NO.OF SHT. 1

REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.

SIGN. & DATE

REF. DRG. NO.

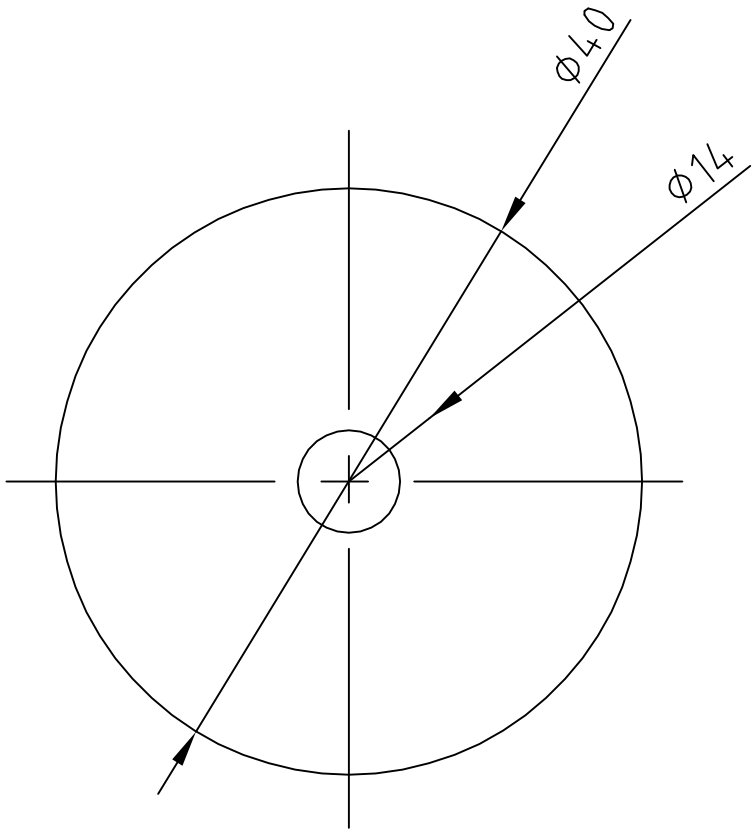
COMPUTER NO. 46100133

INVENTORY NO.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN mm.

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED



		PL. 3.15 X OD.40 X ID 14	AA1011711199	0.10	
			AA10111		
DESCRIPTION & DRG.NO.	VAR NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATL. CODE	NET.WT.	GROSS WT
			MATL. SPECN.	QTY.	

TYPE OF PRODUCT OR
NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN	DATE
DRN.	E.M.ASHOK		10.3.2000
CKD.	S.GHATGE		10.4.2000
APPD.	K.M.RAO		11.4.2000

NO.OF VAR.

DEPT.	SCALE	WEIGHT(K.G.)	REF.TO ASSY.DRG.	ITEM NO.	NO.OF ITEM
BMD	2:1	5.00	0-61-076-00112		
CODE 446					

TITLE WASHER (INNER CONE)

DRAWING NO. 4-61-376-90013

REV. 00

SHT.NO. | NO.OF SHT.

REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.

COMPUTER NO. 4619013

REF. DRG. NO.

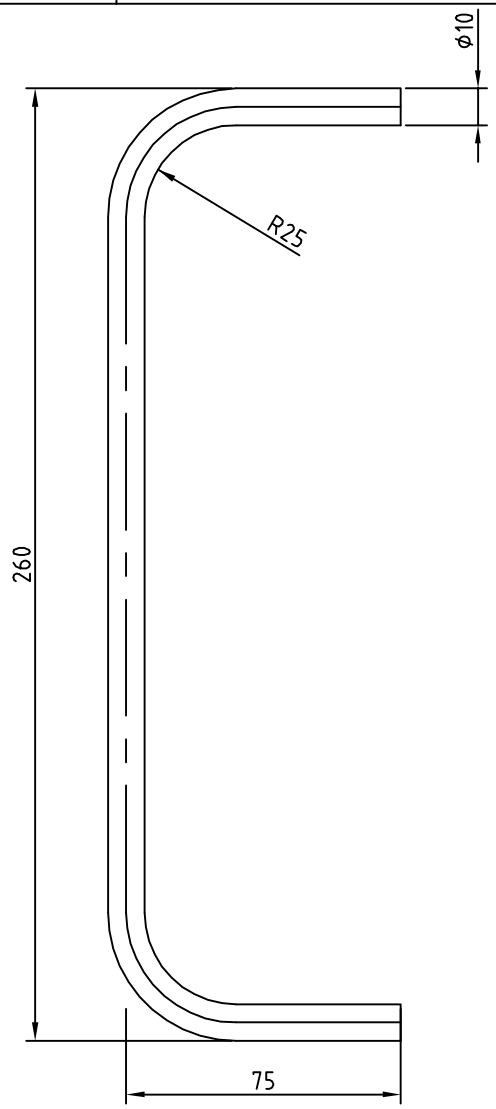
SIGN. & DATE

INVENTORY NO.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN mm.

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED



COMPUTER NO. 4619001-4

REF. DRG. NO.

SIGN. & DATE

INVENTORY NO.

	ROD ϕ10 X 365	HY1010299069	0.13	
		HY10199	6	
DESCRIPTION & DRG.NO.	VAR NO. / RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATL. CODE	NET.WT.	GROSS WT
		MATL. SPECN.	QTY.	

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN	DATE	NO.OF VAR.
DRN.	E.M.ASHOK		10.3.2000	
CKD.	S.GHATGE		10.4.2000	
APPD.	K.M.RAO		11.4.2000	

REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.

DEPT.	SCALE	WEIGHT(K.G.)	REF.TO ASSY.DRG.	ITEM NO.	NO.OF ITEM
BMD	1:4	5.00	0-61-076-00022		
CODE 446					

TITLE

HANDLE (INNER CONE)

DRAWING NO. 4-61-376-90014

REV. 00

SHT.NO. | NO.OF SHT.

A4 SIZE

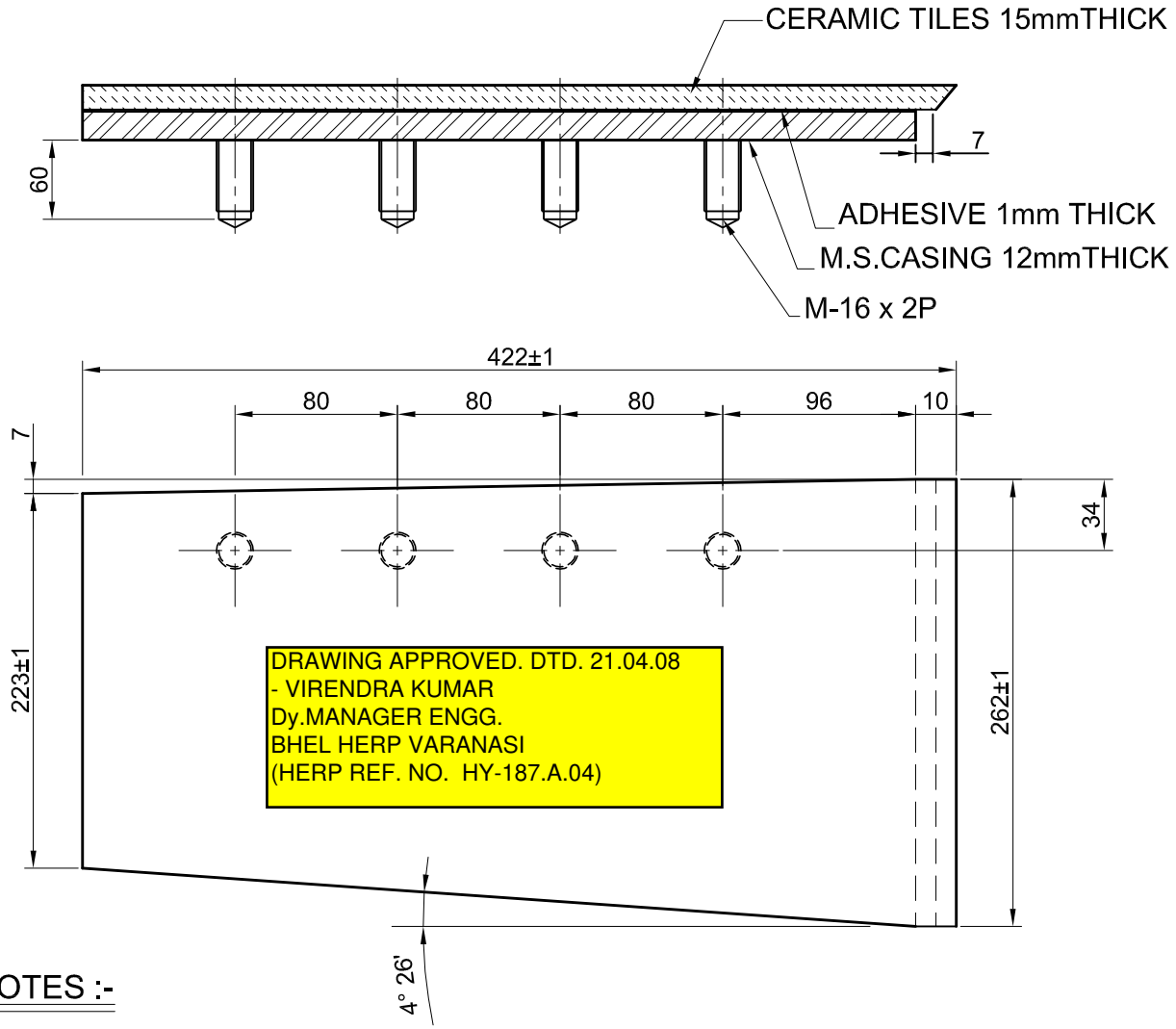
प्रथम कोण प्रक्षेपण/FIRST ANGLE PROJECTION सभी विमाएं मिलीमीटर में हैं।/ALL DIMENSIONS ARE IN mm.

DIMENSIONS TO BE CONTROLLED WITHIN LIMITS AS SHOWN
MACHINING TOLERANCE ±0.25 mm UNLESS OTHERWISE SHOWN
NON-MACHINING TOLERANCE ±0.5 mm

संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY / जाचैंकर्ता CHD	संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY / जाचैंकर्ता CHD	संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY / जाचैंकर्ता CHD
01	28.05.04	Sd/- / Sd/-	02	16.04.08				

REF NO.-1675

REF NO.-1996



NOTES :-

01 MATERIAL M.S. TO CONFORM TO IS:2062 Gr.-A
02 M. S. PLATE TO BE CLEANED & PAINTED WITH RED OXIDE EXCLUDING TOP SIDE & BOLTS.
03 TOLERANCE ON THICKNESS OF PLATE AS PER IS:1852 CLAUSE 7.3
04 D.P. TEST TO BE CARRIED OUT AS PER E&D:331

CUSTOMER NAME:- HERP VARANASI

संदर्भित अभिकल्प संख्या REFERENCE DRG. NO 3-61-380-00435

हस्ताक्षर और दिनांक/SIGN & DATE

सामग्री सूची संख्या INVENTORY NO.

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, जगदीशपुर, सुल्तानपुर
BHARAT HEAVY ELECTRICALS LIMITED, JAGDISHPUR, SULTANPUR

	नाम/NAME	हस्ताक्षर/SIGN	दिनांक/DATE
निर्माणकर्ता DRN.	C.S.JOSHI	Sd /=	21.05.04
जाचैंकर्ता CHD	S.M.S/ A.M.	Sd /=	21.05.04
स्वीकृतीदाता APPD	T. L. PAI	Sd /=	21.05.04

वेरिएन्ट संख्या No. of Var.

विभाग अभियांत्रिकी DEPTT. ENGG.		पैमाना /SCALE	भार कि.ग्रा. WEIGHT (KG)	असेम्बली अभिकल्प का संदर्भ	नग क्रमांक	नगों की संख्या
कोड/CODE 400		N.T.S.	-	REFER TO ASSLY. DRG.	ITEM NO.	NO. OF ITEMS

शीर्षक/TITLE	कार्ड कोड CARD CODE	अभिकल्प संख्या/DRAWING NO.	REV.
CERAMIC LINED VENTURY VANE		4-986-06-00188	02
		पृष्ठ संख्या/Sheets No. 01	पृष्ठों की संख्या/No. of Sheets 01

A4 साइज /A4 SIZE

BOWL MILL

SPECIFICATION FOR CERAMIC LINER
[INNER CONE. CONE SECTION]

SPECIFICATION
A-866/02
SHEET No 01 OF 02

MATERIAL CODE :

BOWL MILL : 803 SERIES

No. OFF PER MILL : ONE SET

COMP CODE : 61-380
[INNER CONE CONE SECTION]

DESCRIPTION :-

CERAMIC LINER OF 15 mm. THICK SUITABLE FOR CLASSIFIER INNER CONE AS SHOWN IN THE ENCLOSED SKETCH. THESE LINERS WILL BE FIXED ON A MILD STEEL INNER CONE. THESE LINERS WILL BE COMING INTO CONTACT WITH AIR + PULVERISED COAL WITH ASHCONTANT UP TO 50 % AIR + COAL VELOCITY WILL BE AROUND 30 METRE/SECOND AND THE TEMP. AROUND 90°C.

MATERIAL. CERAMIC WITH 85% ALUMINA. DYNAWEAR OF M/S COMB. ENGG. OR CERAVAM OF B&W OR EQUIVALENT

NOTES :-

1. NECESSARY FIXING ARRANGEMENT. PROCEDURE AND FIXING MATERIAL SHALL BE SUPPLIED BY THE SUPPLIERS
2. SIZING OF INDIVIDUAL LINERS AS PER SUPPLIER'S STANDARD PRACTICE.
3. MAXIMUM LINEAR DIMENSION SHOULD BE RESTRICTED TO 200 MM.
4. SEPARATE LINER SHOULD BE PROVIDED FOR THE OPENING DOOR.

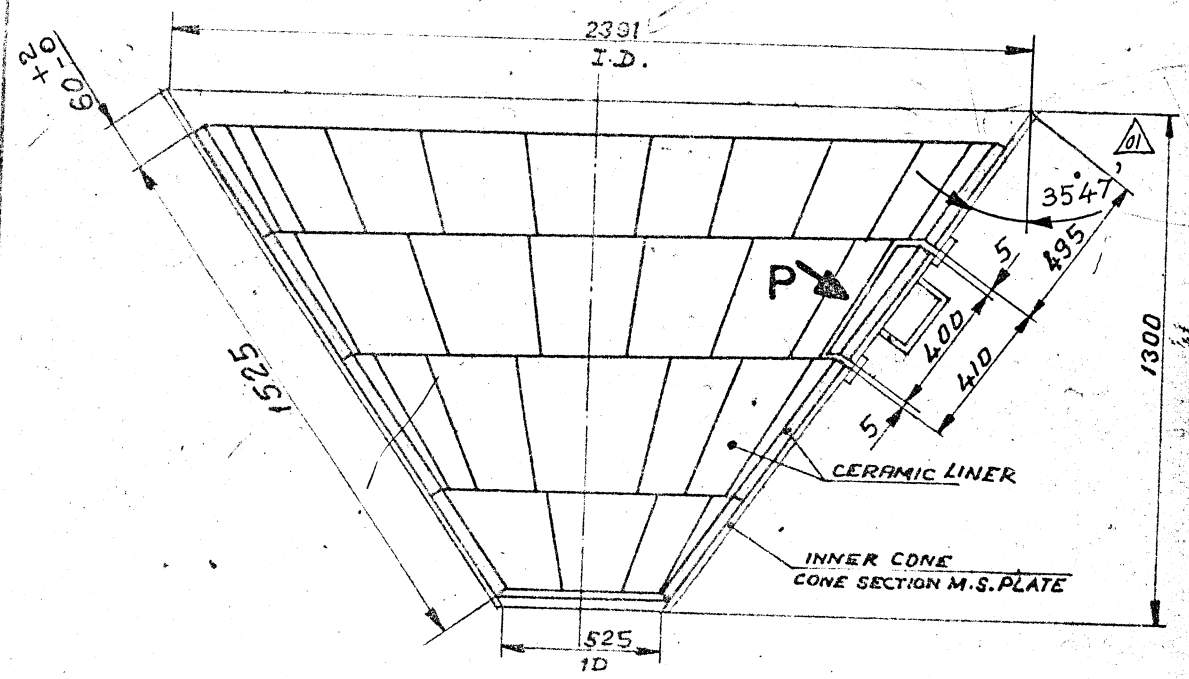
PREPARED: R. Sankara Pandi	REV 01	DATE 28-5-86	ALTERED. CHECKED.	1. IN NOTES NO 3 LINEAR DIMENSION ADDED.
CHECKED:				
APPROVED:				

— MASTER COPY —

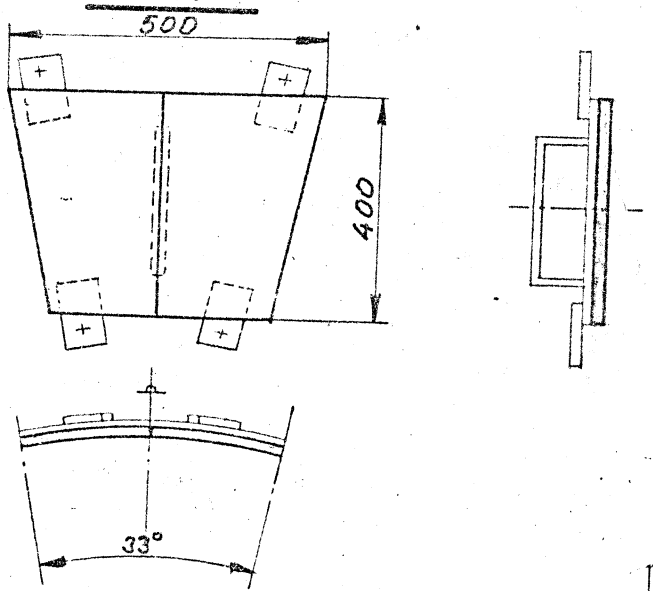
SPECIFICATION FOR CERAMIC LINERS 803 XRP

SPECIFICATION No A-866/02

SHEET NO. 02 OF 02



VIEW-P



NOTE

GAP BETWEEN INNER CONE LINER TO DOOR LINER SHOULD BE WITHIN(+) 2 TO(+)5

REV.	DATE	ALTERED. & CHECKED.
01	28-5-86	CONE ANGLE ADDED.
02	29-11-89	DIMN $\pm^{2}_{0}$ WAS 60

PREPARED : R. Sankarapandi

CHECKED : K. Madhusudhana Rao

APPROVED :

MILL DESIGNS

— MASTER COPY —

HOT ROLLED CARBON STEEL SHEET (410 N/mm² Tensile)

1.0 GENERAL:

This specification governs the quality requirements of Hot Rolled Carbon Steel Sheet of thickness of 2.5 mm to 4.0 mm (both inclusive).

2.0 APPLICATION:

Suitable for cold forming / drawing / fabrication by welding.

3.0 CONDITION OF DELIVERY:

Sheets shall be supplied in hot rolled, decaled and oiled condition. Imported sheets shall be supplied in straight lengths. The edges shall be flattened and sheared. Mill edges are not acceptable. Sheets shall be free from waviness and shall have a uniformly dull (matt) finish.

Oil used for rust prevention should be free from pungent smell. The following oils are suggested:

a) SERVO RP 125 of M/s. IOC.
b) RUSTOP 387/388 of M/s. HPC
c) Bharat TCPF of M/s. Bharat Petroleum
d) Any other TRP conforming to IS: 1154

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following National standards and also meet the requirements of this specification.

IS: 5986 – 2011, Gr.: 255: Hot rolled steel flat products for structural forming and flanging purposes - Specification.

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes:

Hot rolled carbon steel sheets shall be supplied to the dimensions in BHEL order.

5.2 Tolerances:

The tolerances on sheets shall comply with the following:

5.2.1 Thickness (IS: 1852):

Thickness, mm	Tolerance, mm
2.50	± 0.20
3.15	± 0.22
4.0	± 0.25

5.2.2 Width, Length, Flatness, Edge chamber and Out of square tolerance for cut lengths:

As per IS:5986

6.0 MANUFACTURE:

Process of manufacture is left to the discretion of the manufacturer except Bessemer process.

Material shall be manufactured from semi killed or killed steel.

7.0 FREEDON FROM DEFECTS:

The sheets shall be free from harmful defects, twists, buckle, rust, scale and waviness and shall be reasonably smooth, flat and square.

8.0 CHEMICAL COMPOSITION:

The melt analysis of steel and the permissible variation in the composition of the material from the melt analysis shall be as follows:

Element	Melt analysis, percent, max.	Permissible variation, percent, max.
Carbon	0.15	0.03
Manganese	1.20	0.05
Sulphur	0.040	0.005
Phosphorus	0.040	0.005

Carbon equivalent (C.E.): 0.42 max.

9.0 TEST SAMPLES:

9.1 Tensile Test:

One sample shall be taken per thickness per consignment from each melt.

As far as possible test pieces shall be cut transverse to the direction of rolling and shall be of full thickness of the sheet rolled.

9.2 Bend Test:

One sample shall be taken per thickness per consignment from each melt.

Bend test pieces shall be cut so that the axis of the bend is parallel to the direction of rolling viz. transverse.

Note: When more than one thickness is rolled from the same melt, one additional test piece for each thickness shall be taken.

10.0 MECHANICAL PROPERTIES:

10.1 Bend:

When tested in accordance with IS: 1599, the test pieces shall be capable of being bent cold through 180° close. The outer convex surface of the test piece shall be free from cracks.

10.2 Tensile:

When tested as per IS : 1608, the test pieces shall show the following properties:

Tensile strength	: 410 – 520 N/mm^2
Yield strength	: 255 N/mm^2, min.
Elongation:	
For sheets up to & Incl. 3 mm, thick	: 15 %, minimum on 80 mm gauge length
For sheets above 3 mm, thick	: 24 %, minimum in 5.65 $\sqrt{S_o}$ gauge length

11.0 TEST CERTIFICATES:

Unless otherwise specified, three copies of test certificates shall be supplied.

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

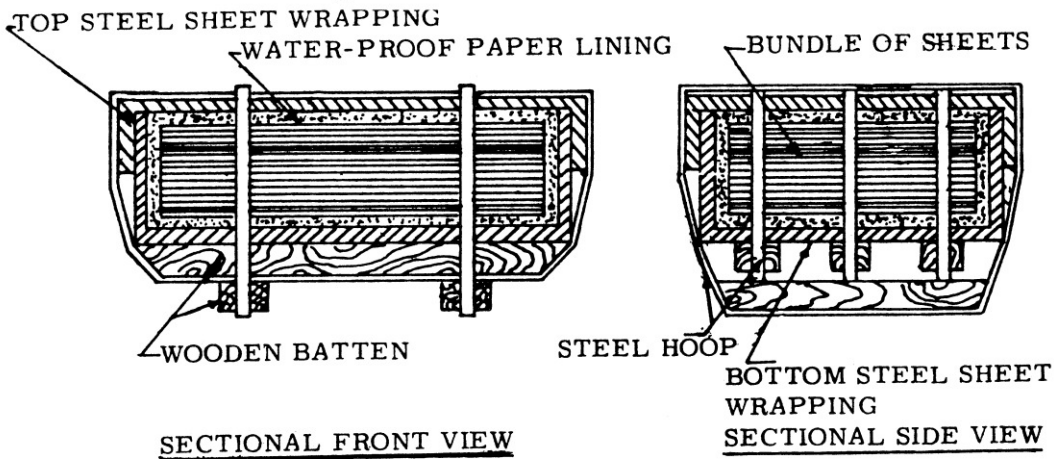
The test certificate shall bear the following information:
AA10111, Rev 06: HOT ROLLED CARBON STEEL SHEET (410 N/mm^2 Tensile)
BHEL Order No,
Supplier's name,
Identification No
Melt No,
Process of manufacture
Details of pickling, descaling and oiling
Results of dimensional inspection
Results of Chemical analysis and Mechanical tests,

Note: Material procured, supplied and certified as AA10111 / IS: 5986, Gr.:255 and comply with the requirements of this specification is acceptable.

12.0 PACKING AND MARKING:

Steel sheets shall be supplied in bundles and shall be suitably packed in bundles to prevent corrosion and damage during transit.

The recommended packing for imported material shall be as shown below.



Note:

a) Water proof paper lining shall be preferably Volatile Corrosion Inhibitor (V.C.I.) Coated Paper with additional polythene (100 micron) enveloped.
b) Approximate weight of each bundle shall be 2 to 3 tonnes. Bundle weighing 2 metric tonnes is however preferred.

A metal label shall be securely attached to each bundle and shall bear the following information:

AA10111: HOT ROLLED CARBON STEEL SHEET (410 N/mm^2 Tensile)
BHEL Order No,
Supplier's Name & Identification No,
Size & Thickness of sheets
Weight

13.0 REFERRED STANDARDS (Latest publications including amendments):

1) IS: 1154 2) IS: 1599 3) IS: 1608 4) IS: 1852

STRUCTURAL STEEL - WELDABLE QUALITY
(PLATES, SECTIONS, STRIPS, FLATS AND BARS)

ORDERING DESCRIPTION

1.0 GENERAL:

The material shall conform to IS 2062 – 2011, E250-Gr.BR (with mandatory Impact Test) or DIN EN 10025-2:2005, Gr. S275JR and comply with following additional requirements.

2.0 APPLICATION:

For general engineering purposes, suitable for welding.

3.0 CONDITION OF DELIVERY:

3.1 Bars & Sections shall be supplied in Hot rolled in straight lengths without twists and bends.

3.2 The material shall be supplied as per IS: 2062 – 2011, E250 Gr.BR (with mandatory Impact Test) or as per DIN EN 10025-2:2005 Gr. 275JR.

3.3 Any other additional requirement as per BHEL Purchase order.

4.0 DIMENSIONS AND TOLERANCES:

4.1 Sizes:

Material shall be supplied to the dimensions specified in BHEL Order.

4.2 Tolerances:

The tolerances on hot rolled material shall comply with IS: 1852 or any other equivalent national standard.

4.3 Straightness for hot rolled bars:

Unless otherwise specified, the permissible deviation in straightness shall not exceed 5 mm in any 1000 mm length.

5.0 TEST SAMPLES:

The selection of test pieces for all tests like Chemical, Mechanical etc. shall be as per IS: 2062, E250-Gr.BR or DIN EN 10025-2, Gr. S275JR.

CORPORATE PURCHASING SPECIFICATION

6.0 ULTRASONIC EXAMINATION:

Plates shall be ultrasonically examined in accordance with BHEL standard AA0850120 (or ASTM-A435) as detailed below and shall comply with the acceptance standards specified therein.

6.1 For plates above 40 mm thick:

Shall be ultrasonically examined unless when otherwise specified in order.

7.0 TEST CERTIFICATES:

Unless otherwise specified, three copies of test certificates shall be supplied.

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

The test certificate shall bear the following information:

AA10119 - Rev.No.15/ IS: 2062-Gr: BR (with mandatory Impact test) or DIN EN 10025-2, Gr. S275JR,

BHEL order No.

Melt No, Size & Quantity, Batch No with heat treatment details, Results of Chemical analysis,

Mechanical tests & NDT, Supplier's name, Identification No, TC No, Signature of Competent Authority, etc.

8.0 PACKING AND MARKING:

Plates shall be transported suitably to avoid damage during transit.

Each plate shall be marked with Melt No. Material grade and specification, BHEL Order No, Supplier's Name Identification No, Size & weight, on any one corner and encircled with paint preferably of white colour.

9.0 REJECTION AND REPLACEMENT

If the material does not comply with the requirements of this specification during receipt inspection at BHEL or if any defect is found during further processing of material, BHEL reserves the right to reject the whole consignment and the supplier shall replace the material free of cost. The rejected material shall be taken back by the supplier after fulfilling the commercial terms and conditions.

10.0 REFERRED STANDARDS (Latest publications including amendments):

1) IS: 1852 2) ASTM - A435 3) AA0850120

26/6/14

CS-721

भा एच ई एल BHEL	REAFFIRMATION -NOTIFICATION	AA 085 01 20	Rev. No. 01

AA 085 01 20 : STRAIGHT BEAM ULTRASONIC EXAMINATION OF STEEL PLATES FOR PRESSURE VESSELS

This standard is "Reaffirmed 2002"

Please see Instructions on the reverse.

Ref :	Approved	Issued	Date	Cum.Sr.No.
Cl. 15.8.13 of MOM of WG-NDT	WG-NDT	CORP. R&D	15.01.2002	R 3096

AA 085 01 20:STRAIGHT BEAM ULTRASONIC EXAMINATION OF STEEL PLATES FOR PRESSURE VESSELS

1.0 PAGE 1 OF 3; Cl 1.2: Existing sentence is modified as follows:
"This standard is generally based on ASTM A 435."

2.0 Cl 3.0 APPARATUS:
Clause 3.0 is replaced as given below:

"3.0 EQUIPMENT CHARACTERISTICS:

3.1 Frequency range:
The ultrasonic equipment shall be suitable for operating at frequencies within the range of 0.5 to 6 MHz.

3.2 Sensitivity:
The sensitivity of the equipment shall be tested to ensure that the number of full screen back wall echoes is not less than that given below, when the appropriate probe is placed on the metallised surface of plastic insert of the Indian Standard reference block (IS:4904)/IIW block.

..... contd.

Ref:	Amd. No.	Approved	Issued	Date	Cum. Sr. No.
Cl:10.2.6 of MOM	01	WG-NDT	CORP. R&D	15.1.96	A 1823

Frequency, MHz	Min.No. of full screen back wall echoes
1	5
2	4
4 to 6	2

3.3 Resolution:
The resolution of the equipment and probe combined shall be such as to show separately indications of the three grooves in the IIW-VI block."

3.4 Transducer;
The transducer shall be 20-30mm dia or 25.4mm square. The test shall be performed by one of the following methods:
a)Direct contact b)Immersion c)Liquid column coupling."

3.0 PAGE 2 OF 3; Cl 5.4: Last line is modified as below:
"couplant such as oil or water shall be used."

4.0 Cl 6.1: Add the following sentence at the end of existing para:
"Total loss of back reflection means loss of back reflection upto 5% of screen height."

5.0 Cl 6.2 & 6.3: Clause 6.2 is deleted.
Clause 6.3 is renumbered as 6.2.

Please see instructions on the reverse.

Ref:	Amd. No.	Approved	Issued	Date	Cum. Sr. No.
Cl:10.2.6 of MOM	01	WG-NDT	CORP. R&D	15.1.96	A 1823

STRAIGHT BEAM ULTRASONIC EXAMINATION OF STEEL PLATES FOR PRESSURE VESSELS

1.0 SCOPE:

1.1 This standard covers the examination procedures and acceptance standards for straight beam, pulse echo, ultrasonic, examination of rolled carbon and alloy steel plates, 12.5 mm and above in thickness, of fully killed, pressure vessel quality. It was developed to assure delivery of steel plates free of gross internal discontnuities such as pipe, ruptures or laminations and is to be used whenever the corporate purchasing specification states that the plates are to be subjected to ultrasonic examination.

1.2 This standard is generally based on ASTM A 435 - 1982 (Reapproved 1987).

2.0 PERSONNEL REQUIREMENT:

Personnel performing non-destructive examination and evaluation shall be qualified to the recommended practice SNT-TC-1A or any other recognised practice.

3.0 APPARATUS:

3.1 The manufacturer shall furnish suitable ultrasonic equipment and qualified personnel necessary for performing the test. The equipment shall be of the pulse echo straight beam type. The transducer shall be 20 to 30 mm diameter or 25.4 mm square. The test shall be performed by one of the following methods, direct contact, immersion or liquid column coupling.

4.0 TEST CONDITIONS:

4.1 The examination shall be conducted in an area free from operations that interfere with proper functioning of the equipment.

4.2 The plate surface shall be sufficiently clean and smooth to maintain a reference back reflection from the opposite side of the plate at least 50% of full scale during scanning.

4.3 The surface of plates inspected by this method may be expected to contain a residue of oil or rust or both. Any specified identification which is removed when grinding to achieve proper surface smoothness shall be restored.

5.0 PROCEDURE:

5.1 Ultrasonic examination shall be made on either major surface of the plate. Acceptance of defects in close proximity may require inspection

from the second major surface. Plates ordered in the quenched and tempered condition shall be tested following heat treatment.

5.2 A nominal test frequency of 2 to 4 MHz is recommended. Thickness, grain size or microstructure of the material and the nature of the equipment or method may require a higher or lower test frequency. However, frequencies, less than 1 MHz may be used only on agreement with BHEL. A Clear, easily interpreted trace pattern should be produced during the examination.

5.3 Conduct the examination with a test frequency and instrument adjustment that will produce a minimum 50 to a maximum 75% of full scale reference back reflection from the opposite side of a sound area of the plate.

5.4 Scanning shall be continuous along perpendicular grid lines on nominal 230 mm centres, or at the manufacturer's option, shall be continuous along parallel paths, transverse to the major plate axis, on nominal 100 mm centres, or shall be continuous along parallel paths parallel to the major plate axis, on 75 mm or smaller centres. A suitable couplant such as water, soluble oil, or glycerine shall be used.

5.5 Scanning lines shall be measured from the center or one corner of the plate. An additional path shall be scanned within 50 mm of all edges of the plate on the scanning surface.

5.6 Where grid scanning is performed and complete loss of back reflection accompanied by continuous indications is detected along a grid line, the entire surface area of the square adjacent to this indication shall be scanned continuously. Where parallel path scanning is performed and complete loss of back reflection accompanied by continuous indications is detected, the entire surface area of 230 x 230 mm square centred on this indication shall be scanned continuously. The true boundaries where this condition exists shall be established in either method by the following technique: Move the transducer away from the centre of the discontinuity until the heights of the back reflection and discontinuity indications are equal. Mark the plate at a point equivalent to the centre of the transducer. Repeat the operation to establish the boundary.

6.0 ACCEPTANCE STANDARD:

6.1 Any discontinuity indication causing a total loss of back reflection which cannot be contained within a circle, the diameter of which is 75 mm or one half of the plate thickness, whichever is greater is unacceptable.

6.2 BHEL representative may witness the test.

6.3 Acceptable adjacent discontinuity indications shall be separated from each other by a distance equal to or larger than the larger of the adjacent discontinuity indications unless the adjacent defects can be contained in a circle of diameter equal to the acceptance standard for a single defect.

7.0 **MARKING:**

7.1 Plates accepted in accordance with this specification shall be identified by stamping UT: AA 085 01 20 or in some other manner adjacent to marking required by the relevant corporate purchasing specification.

8.0 **SUPPLEMENTARY REQUIREMENTS:**

8.1 Any supplementary requirements according to ASTM A 435, if required, will be specified in the purchase order.

ACCEPTANCE STANDARDS FOR LIQUID PENETRANT EXAMINATION OF WELDS

1.0 SCOPE:

1.1 This standard covers the "Acceptance Standards For Liquid Penetrant Eamination Of Wleds' .

1.2 The procedure for liquid penetrant examination shall be as per Corporate Standard AA 085 01 31: Procedure For Liquid Penetrant Examination.

1.3 This standard is based on ASME Section 8, Division 1, Appendix 8.

2. DEFINITION OF IHDICATIONS:

Relevant indications are those which result from mechanical discontinuities. Indications with major dimensions greater than 1.6 mm only shall be considered relevant.

2.1 Linear indications are those indications in which the length is more than three times the width.

2.2 Rounded indications are those indications which are circular or elliptical with the length equal to or less than 3 times the width.

2.3 Any questionable or doubtful indications shall be retested to verify whether or not they are relevant.

2.4 Localised surface imperfections, such as may occur from machining marks, surface conditions or incomplete bond between base metal and cladding may produce similar indications which are not relevent to the detection of unacceptable discontinuities.

3. ACCEPTANCE STANDARDS:

All surfaces to be examined shall be free from:

a) relevent linear indications.

b) relevent rounded indications greater than 4.8 mm.

c) four or more rounded defects in line separated by 1.6 mm or less (edge to edge) except where the specification for the material establishes different requirements for acceptance so far as defects are concerned.

PROCEDURE FOR LIQUID PENETRANT EXAMINATION

1.0 **SCOPE:**

1.1 This standard details the procedure for liquid penetrant examination of non-porous ferrous and non-ferrous and non-metallic materials such as ceramics, plastics, glass, etc.

1.2 Typical surface discontinuities detectable by this method are cracks, seams, laps, cold shuts, porosity, laminations, etc.

1.3 This standard conforms substantially with ASTM E 165 ~~—1980 (Reapproved 1988)~~ and ASME code section V, Article 6. (01)

2.0 **PERSONNEL REQUIREMENT:**

Personnel performig non-destructive examination and evaluation shall be qualified to the recommended practice SNT-TC-1A or any other recognised practice.

3.0 **DESCRIPTION:**

In principle a liquid penetrant is applied to the surface to be examined and allowed to enter discontinuities, excess penetrant removed, the part dried and a developer applied. The developer functions both as a blotter to absorb penetrant that has been trapped in discontinuities and as a contrasting back ground to enhance the visibility of penetrant indications.

4.0 **APPROVED METHODS & MATERIALS:**

4.1 Either a colour contrast or fluorescent penetrant method may be used. Any one of the following penetrants shall be used:

(a) Solvent Removable
(b) Post Emulsifying
(c) Water Washable

4.2 For nickel base alloys and/or for stainless steel materials used in nuclear components the penetrant materials, cleaner, penetrant developer, etc., used shall not contain sulphur or halogen above 1% by weight.

4.3 Selection of liquid penetrant material shall be from the same family (brand). Inter-mixing of family of liquid penetrant materials is not allowed.

5.0 **PROCEDURE:**

5.1 **Surface Preparation:**

5.1.1 Surface preparation by grinding or machining or other method may be employed where surface irregularities may mask indications of unacceptable discontinuities.

5.1.2 The surface to be examined and all adjacent areas within at least 25 mm shall be dry and free from any dirt, lint, scale, rust, welding flux, weld spatter, grease, oil or other extraneous matter that could obscure surface openings or otherwise interfere with examination.

5.1.3 The surface to be examined shall be cleaned with detergents, organic solvents, descaling solutions or paint removers. Degreasing and ultrasonic cleaning may be employed to increase cleaning efficiency. Cleaning method employed is an important part of the examination procedure. Cleaning solvents shall meet the requirements of Cl.4.2

Caution: Blasting with shot or dull sand, rotofinishing, buffing, wire brusing the soft material or machining with dull tools shall not be used as they may peen the discontinuities at the surface.

5.2 **Drying:**

Drying, after cleaning the surface to be examined, shall be accomplished by normal evaporation or with forced hot air, as appropriate. A minimum period of time shall be established to ensure that the cleaning solution has evaporated prior to application of the penetrant.

5.3 **Application Of Penetrants:**

5.3.1 The penetrant shall be applied by dipping, brushing or spraying. If the penetrant is applied by spraying using compressed air type apparatus, filters shall be placed at the air inlet to preclude contamination of penetrant by oil, water or dirt sediment that may have collected in the lines. Spraying should only be performed in a booth equipped with exhaust system.

5.3.2 The length of penetration time is critical and depends upon the material being inspected, the process through which it has passed and the type of discontinuities expected. The recommended penetration time is given in Table 1.

5.3.3 The temperature of the penetrant and the surface of the part to be examined shall not be below 10°C(50°F) nor above 50°C(125°F) throughout the examination period. Local heating or cooling is permitted provided the temperatures remain in the range of 10 to 50°C during the examination. Where it is not practical to comply with these temperature limitations, other temperatures and times shall be used provided the procedures are qualified as described in Annexure-I.

5.4 **Removal Of Excess Penetrant:**

After the penetration time specified in the procedure has elapsed, any penetrant remaining on the surface shall be removed, taking care to minimise removal of penetrant from discontinuities.

5.4.1 **Postemulsifying Penetrants:**

The emulsifier shall be applied by spraying or dipping. The emulsifying time shall not exceed 5 minutes. After emulsification, the mixture shall be removed by water spray.

5.4.2 **Solvent Removable Penetrants:**

Excess penetrant shall be removed by wiping with a cloth or absorbent paper repeating the operation until most tracesof penetrants have been removed. The remaining traces shall be removed by wiping the surface lightly with cloth or absorbent paper moistened with solvent.

Caution: Care shall be taken to avoid excess solvent as this may remove penetrants from discontinuities. Flushing the surface with solvent following the application of the penetrant and prior to developing is prohibited.

5.4.3 **Water Washable Penetrants:**

Excess water washable penetrant shall be removed with a water spray. The water pressure shall not exceed 0.35 N/mm² (50 Psi) and the water temperature shall not exceed 43.3°C (110°F).

5.5 **Drying:**

Surface shall be dried before the application of developer.

5.5.1 a) If postemulsifying or water washable method is used, the surface shall be dried by blotting with clean materials or by using circulating warm air, provided the temperature of the surface is not raised above 50°C (125°F).

b) For solvent removable method, the surface may be dried by normal evaporation, blotting, wiping or forced air.

5.6 **Application Of Developer:**

The developer shall be applied as soon as possible after the removal of the excess penetrant. Two types of developer, dry or wet,shall be used with fluorescent penetrant. With colour contrast penetrants, only wet developer shall be used.

5.6.1 **Application Of Dry Developer:**

Dry developer shall be applied by a soft brush, a hand operated powder bulb or a powder gun or other means provided the powder is dusted evenly over the entire surface being examined.

5.6.2 **Application Of Wet Developer**

Prior to applying suspension type wet developer to the surface, the developer must be thoroughly agitated to ensure adequate dispersion of suspended particles.

(a) **Aqueous Developer Application:**

Aqueous developer may be applied to either a wet or dry surface. It shall be applied by dipping, spraying or other means provided a thin coating is obtained over the entire surface being examined. Drying time may be decreased by using warm air, provided the surface temperature of the part is not raised above 50°C.

(b) **Non-aqueous Developer Application:**

Non-aqueous developer shall be applied only on a dry surface. It shall be applied by spraying, except where safety or restricted access preclude it. Under such conditions developer may be applied by brushing. Drying shall be by normal evaporation.

6.0 **EXAMINATION:**

Observe the surface during the application of the developer to detect nature of any indications which tend to bleed out profusely. Final examination shall be done between 7 minutes at the earliest and 30 minutes at the latest after application of the developer. The nature of discontinuities corresponding to the indications shall be defined depending upon the method of setting, appearance, direction, shape and dimensions of the same. If the bleed out does not alter the examination results, longer periods are permitted. If the surface to be examined is large enough to preclude complete examination within the prescribed time the surface shall be examined in increments.

6.1 **Colour Contrast Penetrants (Visible Dye Penetrants):**

6.1.1 With colour contrast penetrants the developer forms a reasonably uniform coating. Surface discontinuities are indicated by bleeding out of the penetrant which is normally of a deep red colour. Indication with a light pink colour may indicate excessive cleaning. Inadequate cleaning may leave an excessive background making interpretation difficult.

6.1.2 Adequate illumination is required to ensure no loss of the sensitivity in the examination. Examination shall be done under natural or suitable light (illumination level shall be in the order of 500 LUX).

6.2 **Fluorescent Penetrants:**

Examination of the surface shall be carried out with a high intensity black light in a darkened area or booth. Black light shall have a wave length of 3650 A°. The bulbs shall be allowed to warm up for not less than 5 minutes prior to use in the examination. The black light intensity shall be at least of 800 uW/cm^2 on the surface of the part being examined and the light source being kept at a distance of at least 375 mm from the surface being examined. The operator should allow his eyes to become accustomed to the darkness of the inspection booth for at least 5 minutes before inspecting the parts. He should avoid looking directly into the black light and also avoid going from the darkness to

the light and back again without allowing sufficient time for his eyes to adjust to the darkness. The intensity shall be measured at least once every 8 hours and whenever the work station is changed.

7.0 EVALUATION OF INDICATIONS & INTERPRETATION:

7.1 As the developer dries to a smooth, even white coating, indications will appear at the locations of discontinuities. Depth of surface discontinuities may be correlated with the richness of colour and speed of bleeding out. However, localised surface imperfections such as may occur from machining marks or surface conditions may produce similar indications which are non-relevant.

7.2 Usually, a crack or similar opening will show a line and light cracks or partially welded lap will show a broken line. Gross porosity may produce large indications covering an entire area. Very fine porosity is indicated by random dots.

7.3 Any non-relevant indication shall be regarded as a defect until the indication is either eliminated by surface conditioning or it is Proved non-relevant by other NDT methods.

7.4 Linear indications are those indications in which the length is more than three times the width. Rounded indications are indications which are circular or elliptical with the length less than three times the width.

7.5 All indications shall be evaluated in terms of the acceptance standards of the referencing documents.

8.0 ACCEPTANCE STANDARDS:

8.1 For castings - Refer Corporate Standard AA 085 01 32.

8.2 For Austenitic Forgings - Refer Corporate Standard AA 085 01 30.

8.3 For Welds - Refer Corporate Standard AA 085 01 29.

9.0 POST EXAMINATION CLEANING:

Surfaces examined shall be cleaned after evaluation of the test with dry cotton rag with or without water rinse.

TABLE - 1 (Clause 5.3.2)

Suggested Penetration Time For Post-emulsified And Solvent Removable Penetrants

Material	Form	Type of discontinuity	*Penetration time (min.)
Aluminium	Castings	Porosity	5
		Cold shut	5
	Extrusions & Forgings	Laps	10
		Lack of fusion	5
	Welds	Porosity	5
	All forms	Cracks	10

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TABLE - 1 (Clause 5.3.2) Contd.

Material	Form	Type of discontinuity	*Penetration time (min.)
Magnesium	Castings	Porosity	5
		Cold shut	5
	Extrusions & Forgings	Laps	10
		Lack of fusion	10
	Welds	Porosity	10
	All forms	Cracks	10
Steel	Castings	Porosity	10
		Cold shut	10
	Extrusions & Forgings	Laps	10
		Lack of fusion	20
	Welds	Porosity	20
	All forms	Cracks	20
Brass & Bronze	Castings	Porosity	5
		Cold shut	5
	Extrusions & Forgings	Laps	10
		Lack of fusion	10
	Brazed parts	Porosity	10
	All forms	Cracks	10
Plastics	All forms	Cracks	5
Glass	All forms	Cracks	5
Carbide tipped tools	All forms	Lack of fusion	5
		Porosity	5
		Crack	20
Titanium & high temperature alloys	All forms		20 to 30
Ceramic	All forms	Cracks	5
		Porosity	5

* For lower temperatures, penetration time should be increased.

ANNEXURE - 1 (Clause 5.3.3)

PROCEDURE FOR NON-STANDARD TEMPERATURES

A.1 **General:**

When it is not practical to conduct a liquid penetrant examination within the temperature range of 15.6 to 51.6°C (60 to 125°F), the examination procedure at the proposed lower or higher temperature range requires qualification. This shall require the use of a quench cracked aluminium block, which is designated as 'Liquid Penetrant Comparator Block'.

A.2 **Liquid Penetrant Comparator Block:**

The liquid penetrant comparator block shall be made of aluminum, ASTM B209, Type 2024 or SB-211. Type 2024, 10 mm (3/8 in.) thick, and shall have approximate face dimensions of 50 mm x 75 mm (2 in. x 3 in.). At the centre of each face, an area approximately 25 mm in diameter shall be marked with a 510°C (950°F) temperature indicating crayon or paint. The marked area shall be heated with a blow torch, a Bunsen burner or similar device to a temperature between 510°C (950°F) and 524°C (975°F). The specimen shall then be immediately quenched in cold water which produces a network of the fine cracks on each face. The block shall then be dried by heating to approximately 149°C (300°F). After cooling, the block shall be cut into two halves. One half of the specimen shall be designated block 'A' and the other block 'B' for identification in subsequent processing. Figure 1 illustrates the comparator blocks "A" and "B". As an alternate to cutting the block in half to make blocks "A" and "B", separate blocks 50 mm x 75 mm (2 in. x 3 in.) can be made using the heating and quenching technique as described above. Two comparator blocks with closely matched crack patterns may be used. The blocks shall be marked "A" and "B".

A.3 **Comparator Application:**

(a) If it is desired to qualify a liquid penetrant examination procedure at a temperature of less than 15.6°C (60°F) the proposed procedure shall be applied to block "B" after the block and all materials have been cooled and held at the proposed examination temperature until the comparison is completed. A standard procedure which has previously been demonstrated as suitable for use shall be applied to block "A" in the 15.6 to 51.6°C (60 to 125°F) temperature range. The indications of cracks shall be compared between blocks "A" and "B". If the indications obtained under the proposed condition on block "B" are essentially the same as obtained on block "A" during examination at 15.6 to 51.6°C (60 to 125°F), the proposed procedure shall be considered qualified for use.

(b) If the proposed temperature for the examination is above 51.6°C (125°F), block "B" shall be held at this temperature throughout the examination. The indication of cracks shall be compared as described in T-647.3(a) while block "B" is at the proposed temperature and block "A" is at the 15.6 to 51.6°C (60 to 125°F) temperature range.

(c) A procedure qualified at a temperature lower than 15.6°C (60°F) shall be qualified from that temperature to 15.6°C (60°F).

(d) To qualify a Procedure for temperatures above 51.6°C (125°F), the upper and lower temperature limits shall be established and the procedure qualified at these temperatures.

(e) As an alternate to the requirements of (a) and (b) when using color contrast penetrants, it is permissible to use a single comparator block for the standard and non-standard temperatures and to make the comparison by photography.

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CORPORATE STANDARD

(f) When the single comparator block and photographic technique is used, the processing details (as applicable) described in (a) and (b) above shall apply. The block shall be thoroughly cleaned between the two processing steps. Photographs shall be taken after processing at the nonstandard temperature and then after processing at the standard temperature. The indication of cracks shall be compared between the two photographs. The same criteria for qualification as (a) above shall apply.

(g) Identical photographic techniques shall be used to make the comparison photographs.

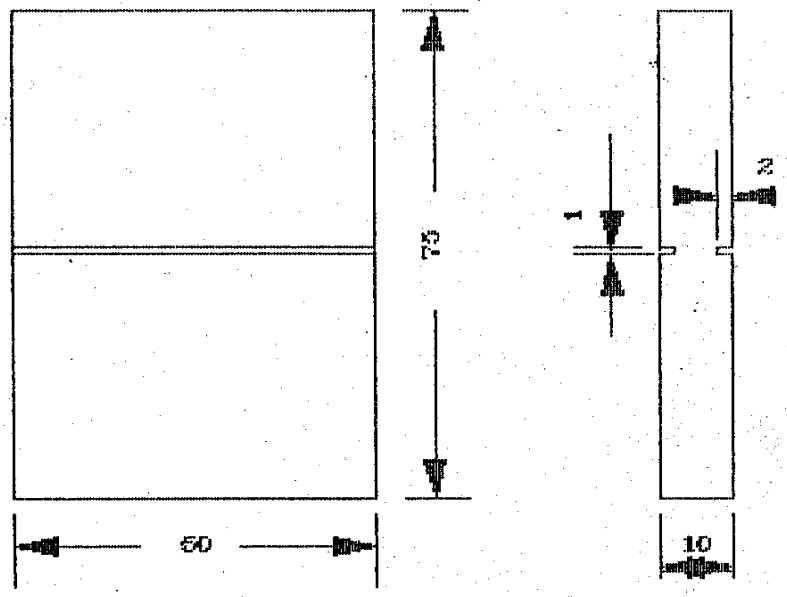


FIGURE: 1-LIQUID PENETRANT COMPARATOR BLOCK

	CORPORATE STANDARD	**AA 712 1123**
		Rev. No. 08
		PAGE 1 OF 3

SCREWS, HEXAGON HEAD, PRODUCT GRADE 'A' COARSE PITCH, STEEL, PROPERTY CLASS 8.8 (M6 - M24)

1.0 DESIGNATION:

A product Gr. A hexagon head, steel screws of thread M8, length 50 mm, coarse pitch and conforming to property class 8.8 shall be designated as:

1.1 On drawings:

i) Material specification column : AA 712 11 23
ii) Description column : SCRU HEX A M8X50 - 8.8

1.2 On indents:

Screws Hex A M8 X 50 - 8.8 ; AA7121123

1.3 For issuing enquiries and on purchase orders:

While issuing enquiries and purchase orders\, delete BHEL standard number from the above description and add the information given under clause 2.0

2.0 COMPLIANCE WITH STANDARDS:

2.1 Dimensions, tolerances & general Requirements:

As per IS: 1364, Part 2 - 2002

2.2 Mechanical Properties:

To conform to property class 8.8 as specified in Table - 3 of IS: 1367, Part 3
Permissible hardness 238 - 350 HB for sizes M6 - M10.

2.3 Threads:

Pitch-coarse to IS: 4218, Part 2
Tolerance quality - Medium
Tolerance class - 6g

2.4 Identification Marking:

As per clause 9 of IS: 1367, Part 3

2.5 Surface Discontinuity: As per IS: 1367, Part 9

2.6 Finish: As specified in BHEL order

4/3/18

CS-837

Revisions :			**APPROVED:** INTERPLANT MATERIAL RATIONALSIZATION COMMITTEE (MRC-F)		
Rev. No. 08	**Amd.No.**		**Prepared**	**Issued**	**Dt. of 1st Issue**
Dt:14-11-15	**Dt :**	**Year :**	**HARDWAR**	**Corp. R&D**	**January, 1977**

CORPORATE STANDARD

3.0 NOTE:

3.1 Length and diameter combination (refer Table 1 on page 3 of 3) between the bold lines should only be used.

3.2 For screw threads, general (Metric) refer to BHEL standard AA 023 18 00.

3.3 For tolerance grade, position and class refer to BHEL standard AA 023 02 01.

3.4 Screws to this standard would be unplated, divisions wishing to have plated bolts would have to get them plated.

3.5 Weights given in this standard are for general reference only and are not for commercial transactions.

3.6 When fasteners are to be tested with in BHEL, the sampling and acceptance plan shall be as per IS:1367, Part 17

4.0 CROSS REFERRED STANDARDS (Latest publications including amendment):

1) IS: 1367, Part3, 9&17
2) IS: 4218, Part 2
3) AA 023 02 01
4) AA 023 18 00
5) AA 023 18 50

EXPLANATORY NOTE:

This standard was issued in Jan.1977 and was based on IS: 1364-1967. Subsequently many changes have been agreed upon at International level and as a result ISO 4014-88 was issued. Accordingly IS: 1364 has also been revised in line with ISO 4014 and issued in 2002 as part 1 2, 3, 4 & 5.

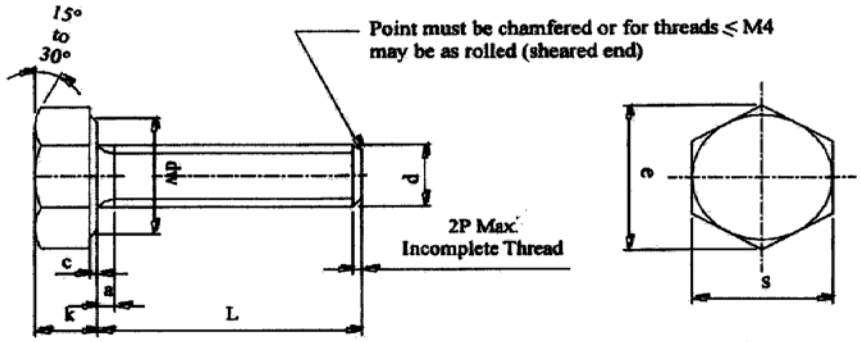
This revision in AA7121123 has been taken up to incorporate the changes in IS: 1364, Part 2- 2002.

The following major changes have been made in the revision:

- Clause 2.2, the year reference of IS: 1367, Part 3 "2002" has been removed.
- The column for Nom. length (L) 14, 75 & 85 has been excluded from the Table-1.
- Page-3, Table-1 and Fig.-1, has been modified and made more visible.

CS-855 4/3/11

cs-835 4/3/16



NOTE:

1. Corporate sub-codes are given in the Table-1.
2. For thread run out refer AA0231850.
3. Weights have been shown in kg. per 1000 Nos.
4. Sizes beyond chain dotted lines are for Prod.Gr.B

Table -1

All dimensions in 'mm.'

Thread Sizes d	Head					Washer			Un threaded length a Max.		10	12	16	20	25	30	35	40	45	50	55	60	65	70	80	90	100	110	120
	Flats s Max.	Flats s Min.	Crns. e Min.	Thickness k Max.	Thickness k Min.	Dia. d Min.	Thickness c Max.	Thickness c Min.																					
M6	10	9.78	11.05	4.15	3.85	8.9	0.5	0.15	3	Sub-Code	010	029	045	053	061	070	088												
										Weight	4.40	4.75	5.45	6.25	7.36	8.47	9.58									See Note - 4			
M8	13	12.73	14.38	5.45	5.15	11.6	0.6	0.15	4	Sub-Code		096	100	118	126	134	142	150		169		177	185						
										Weight		9.96	11.2	12.5	14.3	16.3	18.2	20.2		24.2		28.1	30.1						
M10	16	15.73	17.77	6.58	6.22	14.6	0.6	0.15	4.5	Sub-Code			207	215	223	231	240	258	266	274	282	290	304	312		320	339		
										Weight			21.4	23.4	25.9	28.9	32.0	35.1	38.2	41.2	44.3	47.4	50.5	53.6		65.9	72.0		
M12	18	17.73	20.03	7.68	7.32	16.6	0.6	0.15	5.30	Sub-Code				347	355	363	371	380	398	401	410	428	436	444	460		479		
										Weight				33.7	37.0	41.0	45.4	49.9	54.3	58.7	63.2	67.6	72.1	76.5	85.4		103.1		
M16	24	23.67	26.75	10.18	9.82	22.5	0.8	0.2	6.0	Sub-Code					487	495	509	517	525	533	541	550	568	576	592	606			
										Weight					71.7	78.4	85.07	92.2	100.1	108	115.8	123.7	131.6	139.5	155.3	171			
M20	30	29.67	33.53	12.72	12.28	28.2	0.8	0.2	7.5	Sub-Code																			
										Weight																			
M24	36	35.38	39.98	15.21	14.78	33.6	0.8	0.2	9	Sub-Code																			
										Weight																			

CORPORATE STANDARD

AA7121123

Rev. No. 08

PAGE No.3 OF 3

NUTS, HEXAGON, PRODUCT GRADE 'A' COARSE PITCH, STEEL PROPERTY CLASS 8 (M1.6 - M16)

1.0 DESIGNATION

A product Gr.A, hexagon, Steel, nut thread M10, coarse pitch and conforming to property class 8 shall be designated as:

1.1 On drawings

i) Material specification column : AA7151115

ii) Description column : NUT HEX A M10 – 8

1.2 On indents

Nut Hex A M10 – 8; AA7151115

1.3 For issuing enquiries and on purchase orders

While issuing enquiries and purchase orders, delete BHEL standard number form the above description and add the information given under clause 2.0

2.0 COMPLIANCE WITH STANDARDS

2.1 Dimensions, Tolerances & General Requirements

As per IS: 1364, Part 3-2002, Reaffirmed 2007

2.2 Mechanical Properties

To conform to property class 8 as specified in Table-5 & 6 of IS: 1367, Part 6, Permissible Hardness 188 to 330 HB for sizes M3 to M10

2.3 Threads

Pitch - Coarse to IS: 4218, Part 2

Tolerance quality - Medium

Tolerance class - 6H

2.4 Identification Marking

As stated in clause 9 of IS: 1367, Part 6

2.5 Surface Discontinuity

As per IS: 1367, Part 9

2.6 Finish

As specified in BHEL order.

CORPORATE STANDARD

3.0 NOTE

3.1 For nuts, hexagon, product Gr.A, coarse pitch, brass (M1.6 - M16) refer to BHEL standard AA7151113

3.2 For screw threads, general (Metric) refer to BHEL standard AA0231800

3.3 For tolerance grade, position and class refer to BHEL standard AA0230201

3.4 Nuts to this standard would be unplated, divisions wishing to have plated nuts would have to get them plated.

3.5 Weights given in this standard are for general reference only and are not for commercial transactions.

3.6 When fasteners are to be tested with in BHEL, the sampling and acceptance plan shall be as per IS: 1367, Part 17

4.0 REFERRED STANDARDS (Latest Publications including Amendments)

1) IS: 1367, Part 6, 9 & 17
2) IS: 4218, Part 2
3) AA0230201
4) AA0231800
5) AA7151113

EXPLANATORY NOTE

The following major changes have been made in the present revision

- Clause 2.1: "Reaffirmation 2007" has been added at end of the clause.
- Clause 2.2: The "Part 6-1994" has been modified as "Part 6"
- Clause 3.6: "Sampling Plan" has been modified in accordance with IS: 1367, Part 17
- Clause 4 has been modified accordingly.
- On Page-3: Table-1: The dimension of "Wrenching height" m' has been corrected from 2.32 to 2.3 for thread size M4 in accordance with IS: 1364, Part 3-2002, Reaffirmed 2007
- On Page-3: Table-1 & Fig.-1 have been modified and made more visible.

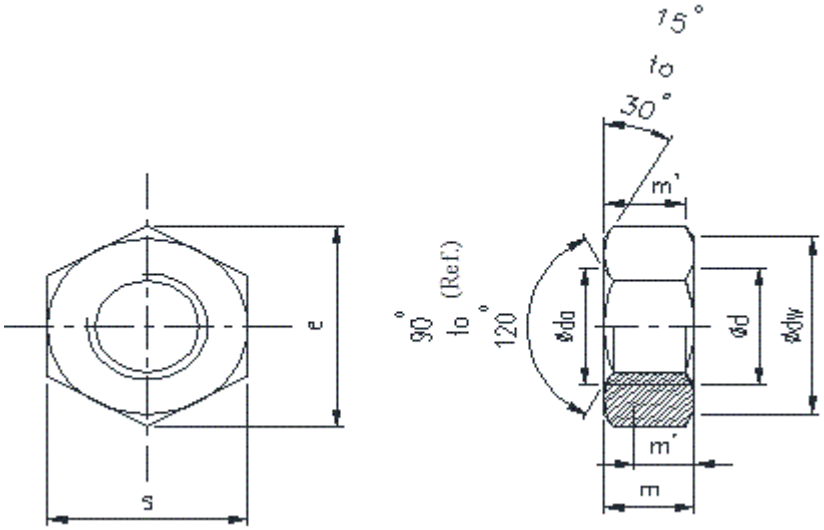


Table – 1

All dimensions in mm

Thread Size	Flats		Corners	Thickness		Wrenching Height				Sub-Code	Weight
d	s		e	m		m'	dw	da			
Nom.	Max.	Min.	Min.	Max.	Min.	Min.	Min.	Min.	Max.		
M1.6	3.2	3.02	3.41	1.3	1.05	0.8	2.4	1.6	1.84	091	
M2	4.0	3.82	4.32	1.6	1.35	1.1	3.1	2.0	2.3	105	
M2.5	5.0	4.82	5.45	2.0	1.75	1.4	4.1	2.5	2.9	113	
M3	5.5	5.32	6.01	2.40	2.15	1.7	4.6	3.0	3.45	067	0.39
M4	7.0	6.78	7.66	3.2	2.90	2.3	5.90	4.0	4.6	075	0.82
M5	8.0	7.78	8.79	4.7	4.40	3.5	6.90	5.0	5.75	083	1.24
M6	10.0	9.78	11.05	5.20	4.90	3.9	8.90	6.0	6.75	016	2.52
M8	13.0	12.73	14.38	6.8	6.44	5.2	11.6	8.0	8.75	024	5.40
M10	16.0	15.73	17.77	8.4	8.04	6.4	14.6	10.0	10.8	032	11.69
M12	18.0	17.73	20.03	10.8	10.37	8.30	16.6	12.0	13.0	040	17.69
M16	24.0	23.67	26.75	14.8	14.1	11.3	22.5	16.0	17.3	059	33.58

PRODUCT STANDARD
PULVERISERS
HYDERABAD

Product STD NO.	BA53059
Rev No **02**	
Page 1 of 4	

SPECIFICATION FOR INNER CONE WITH CERAMIC LINERS.

MATEIRAL CODE: BA9753059000 **MILL TYPE**: XRP 883
PGMA: 61388

DESCRIPTION:

Inner cone with ceramic liners of 15 mm thick fixed on both inside and outside as per the sketch enclosed.

These liners will be fixed on a mild steel inner cone of 10mm/12mm thickness.
These liners will be coming into contact with air + pulverized coal with ash content of 40% max., air + coal velocity will be around 30 M/Sec. and temp. around 90°C.

MATERIAL: **CHEMICAL COMPOSITION**

Al_2O_3 – 51.1%, Zr O_2- 33.6%, Si O_2- 13.1%, Others-2.2%
OR
Minimum-90% Alumina.
Hardness-2000 Vickers, Density-3.73 gm/cc

NOTE:

1. Necessary fixing arrangement procedure and fixing material shall be supplied by the supplier.
2. Sizing of individual liners as per supplier's standard practice.
3. The size of individual liner is less than that of the opening.
4. Separate liner should be provided for the opening door.
5. Gap between inner cone liner to door liner should be within +2 to +5.
6. Three circular areas of Ø 80 at 120° spacing to be left without lining for the purpose of welding Ø 60.3 OD pipe supports between inner cone and separator body. These areas to be at height location of 708mm from the small end on the cone and inspection door to be located at the mid space of two pipe supports. Inspection door shall be lined from both the sides.

Revisions:	Prepared:	Approved:	Date:
Refer to record of revisions:	S Ghatge	JG Kulkarni	6.12.04

7. Lifting lugs shall be provided from outside at suitable location.

QUALITY PLAN:

The Supplies shall be as per approved Quality Plan. The vendor to submit drawings and QP's for approval along with the offer.

GUARANTEE:

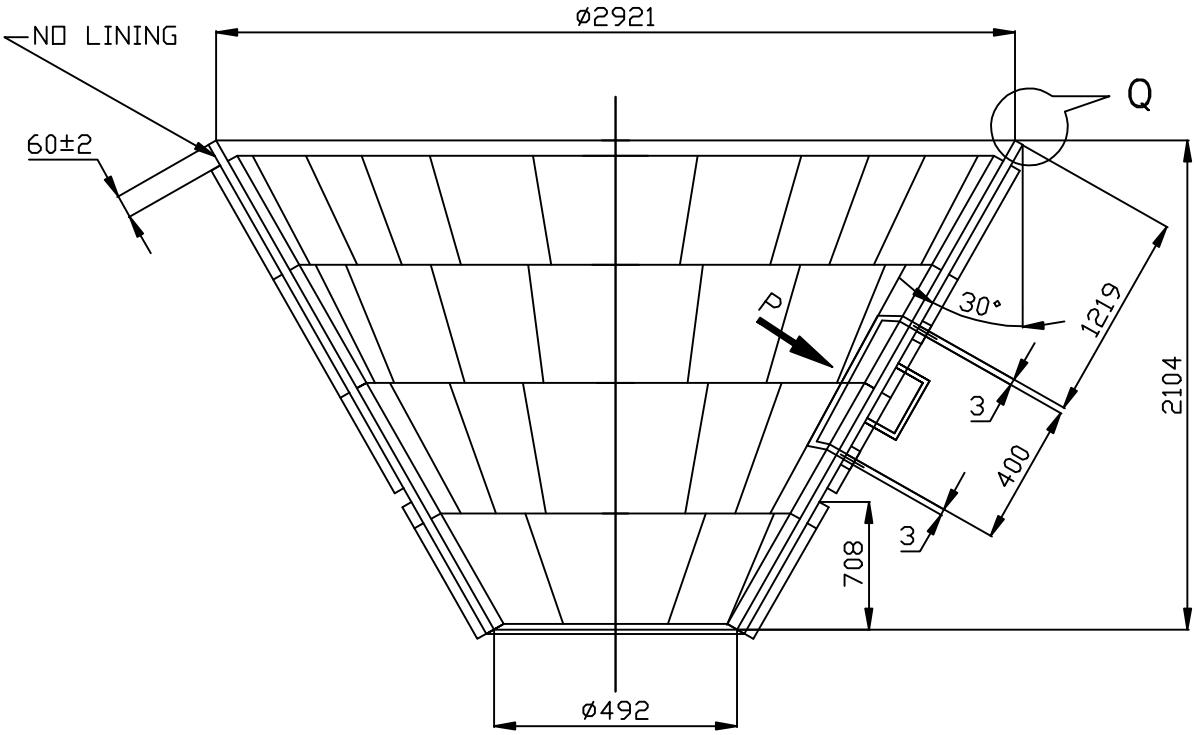
Vendor shall guarantee a minimum wear life expectancy of 25000 hrs. for the ceramic lined Inner Cone.

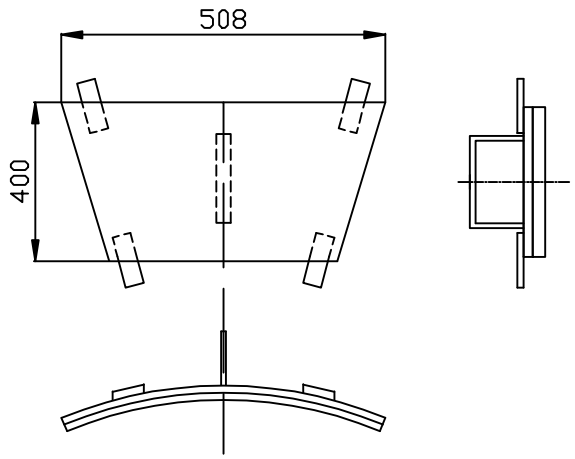
PACKING:

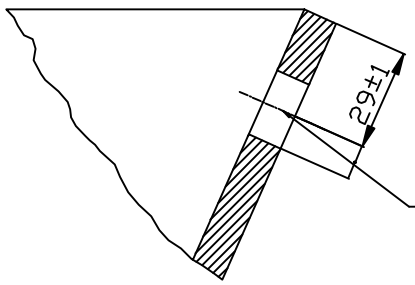
Proper support and packing to be provided such that the tiles don't get damaged and inner cone remains stable during transit and handling.

PRODUCT STANDARD
PULVERIZERS
HYDERABAD

SPEC.No. BA53059
Rev. No. 02







ø20–30 HOLES
EQUISPACED ON PCD 2892

VIEW–P

VIEW–Q

COMP.FILE NAME: 989–1.DWG
Ref. Doc.:

Rev.No.	Revisions :	Prepared :	Approved :	Date :
	Refer to record of revisions	S.GHATGE	J.G.KULKARNI	06.12.04

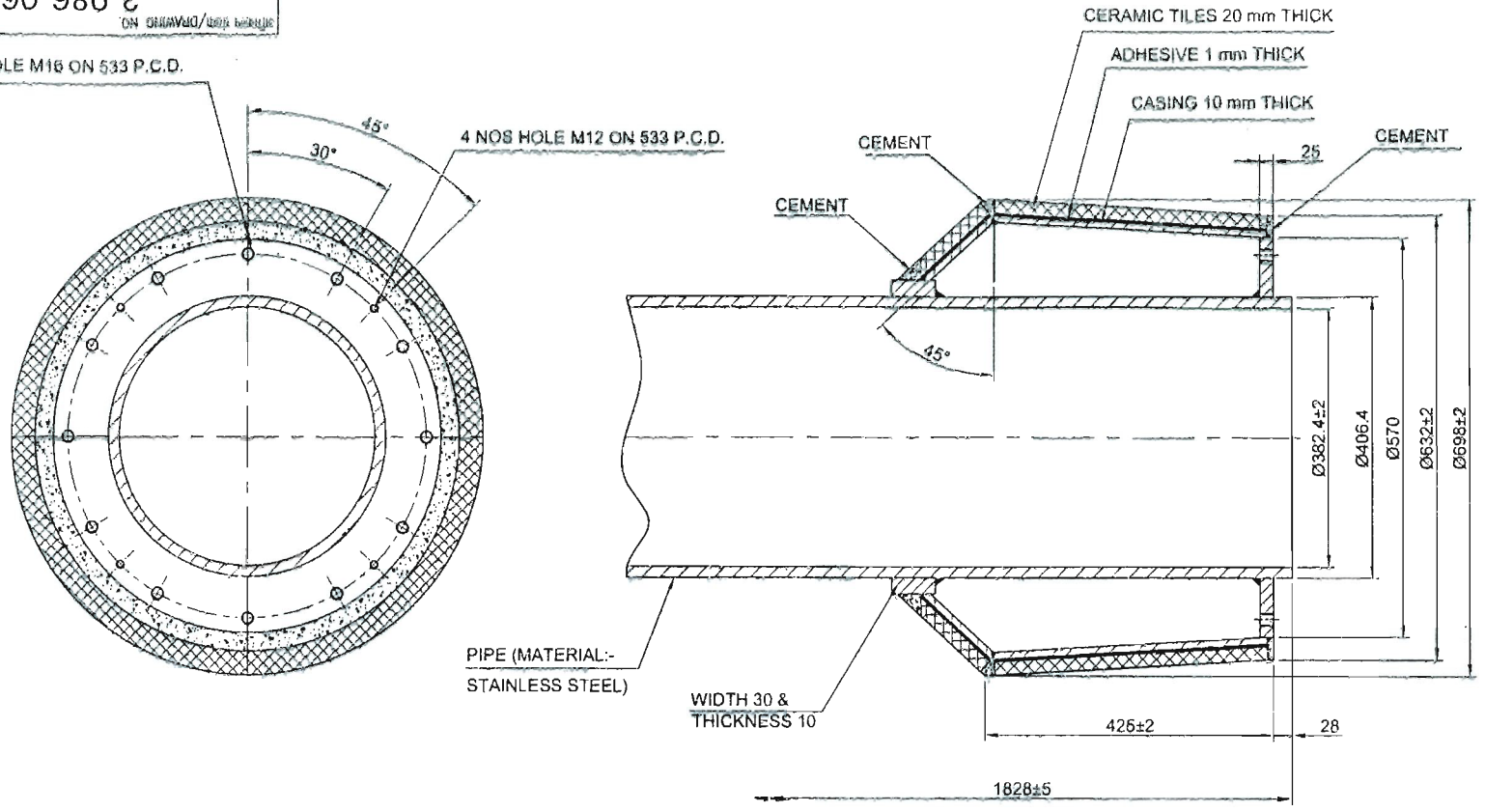
RECORD OF REVISIONS

REV. NO	DATE	REVISION DETAILS	REVISED	APPROVED
01	12-9-05	ϕ492-I.D. OF MS CONE ADDED IN PAGE 3 OF 4	AMAN	S GHATGE
02	10-11-05	90% ALUMINA WAS 85% ALUMINA	AMAN	S GHATGE

प्रथम कोण प्रक्षेपण/FIRST ANGLE PROJECTION

सभी विमाएं मिलीमीटर में हैं।/ALL DIMENSIONS ARE IN mm.

3-986-06-00470
ON DRAWING NO.



DRAWING APPROVED.
DTD. 06.05.14
-PK PRAJAPATI
Sr. ENGR-P&D
BHEL HERP VARANASI
HERP REF. NO. HY-187.X

DIMENSIONS TO BE CONTROLLED WITHIN LIMITS AS SHOWN
MACHINING TOLERANCE ±0.25 mm
UNLESS OTHERWISE SHOWN
NON-MACHINING TOLERANCE ±0.5 mm

संदर्भ ऑफिस ड्राइंग सं. REFERENCE DRG NO. HY-187. X

हस्ताक्षर और दिनांक/SIGN & DATE

मानक सूची संख्या INVENTORY NO.

NOTES :-

01 MATERIAL M.S. CONFORM TO IS:2062 Gr.-A EXCEPT PIPE MATERIAL.
02 TOLERANCE ON THICKNESS OF CASING AS PER IS:1852 CLAUSE 7.3 .
03 D.P. TEST ON WELDED JOINT TO BE CARRIED OUT AS PER E&D:331 .
04 ALL SEGMENTS TO BE FULL WELDED .
05 M. S. CASING TO BE CLEANED & PAINTED WITH RED-OXIDE .

CONTROLLED COPY

संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY जांचकर्ता CHD	संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY जांचकर्ता CHD
			01	27.07.10	

Ø698±2 WAS Ø700±5 AND DIM. 425±2 WAS 416±2.

REF. NO. 2156

उत्पाद का प्रकार या ग्राहक/परियोजना का नाम
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

BHEL HERP VARANASI

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, जगदीशपुर, सुल्तानपुर
BHARAT HEAVY ELECTRICALS LIMITED, JAGDISHPUR, SULTANPUR

	नाम/NAME	हस्ताक्षर/SIGN	दिनांक/DATE
ड्राफ्ट्समैन DRN.	C.S.JOSHI	Sd/-	23.09.09
जांचकर्ता CHD	S. YADAV	Sd/-	23.09.09
स्वीकृतकर्ता APPD.	A.K.SHARMA	Sd/-	23.09.09

विभाग DEPTT.	अभियांत्रिकी ENGG.	पैमाना/SCALE	भार कि.ग्रा. WEIGHT (KG)	असेम्बली अभिकल्प का संदर्भ REFER TO ASSLY. DRG.	नग क्रमांक ITEM NO.	नगों की संख्या NO. OF ITEMS
कोड/CODE 400		N.T.S.	--			

शीर्षक/TITLE
CERAMIC LINED VENTURI OUTLET

कार्ड कोड CARD CODE

अभिकल्प संख्या/DRAWING NO. 3-986-06-00470

REV. 01

पृष्ठ संख्या/Sheets No. 01 पृष्ठों की संख्या/No. of Sheets 01

वीक्षण संख्या No. of Ver.

A3 साइज़/A3 SIZE

CARBON STEEL BARS
(Gr. 15 C8)

1.0 GENERAL:

This specification governs the quality of hot rolled/forged Carbon Steel bars of grade 15 C8.

2.0 APPLICATION :

For the manufacture of machined parts for general engineering purposes. Bars of dia 100 mm and above may be used for the manufacture of forged components also.

3.0 CONDITION OF DELIVERY :

3.1 Bars upto dia / size 100 mm (inclusive) shall be supplied in hot rolled condition.

3.2 Bars above 100 mm dia / size can be supplied in hot rolled or forged condition.

3.3 Bars upto 40 mm dia / size can be supplied in as rolled condition if the mechanical properties specified in this specification are achieved.

3.4 All the bars above 40 mm dia / size shall be supplied in Normalised condition.

3.5 The bars shall be supplied with ends square and true. The bars shall be supplied in straight lengths.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

This specification complies with

(1) IS: 1570 (Part II) – 1979] Schedules for Wrought Steels
Gr: 15 C 8] Part II Carbon Steels (unalloyed Steels)

(2) IS: 1875 – 1992 – Carbon steel bars for forgings.

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes: The bars shall be supplied to the dimensions specified on the order. Unless otherwise specified, Hot rolled bars / rounds shall be supplied in random lengths of 3 to 5 metres. However, the minimum length for Square bars shall be 4 metres.

Forged bars shall be supplied in the length of 1.5 to 3.0 meters.

5.2 Tolerances:

5.2.1 Hot rolled bars / flats: The dimensional tolerances shall be in accordance with Grade I of IS:3739.

5.2.2 Forged Bars: + 8 mm on diameter/side width.
- 0

5.2.3 Straightness: Unless otherwise agreed to, the permissible deviation in straightness shall not exceed 5 mm in any 1000 mm length.

5.2.4 The tolerance as per any other international standard are also acceptable with prior written approval of BHEL.

6.0 MANUFACTURE:

The steel shall be manufactured by the electric furnace, basic oxygen, duplex process or by a combination of these processes. The bars shall be manufactured from Killed steel.

Sufficient reduction and discard shall be made from each ingot to ensure freedom from piping, segregation and other harmful defects.

7.0 FREEDOM FROM DEFECTS:

The bars shall be sound and free from internal and surface defects like cracks, surface flaws and laminations.

8.0 HEAT TREATMENT :

The bars shall be normalised at a temperature of 880-910°C. The normalizing operation is optional for bars upto dia / size of 40 mm (inclusive).

9.0 CHEMICAL COMPOSITION:

9.1 The melt analysis of the material shall be as follows:

Element		C	Mn	Si	S	P
Ladle Analysis	% Min.	0.10	0.60	0.15	-	-
	% Max.	0.20	0.90	0.35	0.030	0.040
Permissible variation in product analysis		± 0.02	± 0.05	± 0.03	+0.005	+0.005

Note: 1. When the steel is aluminium killed or killed with both aluminium and silicon, the requirement of minimum silicon content is not applicable.

9.2 The following elements shall be tested and reported in the test certificate. The limits are specified below.

Ni = 0.30% max. ; Cr = 0.30% max. ; Cu = 0.25% max.
Mo = 0.15% max. ; B = 0.0003% max. ; V = 0.05% max.
Sn = 0.05%

Note: (1) (Cr + Ni + Mo ≤ 0.50%)
(2) (Cu% + 10 x Sn% ≤ 0.5%)
(3) Carbon Equivalent = 0.42% max.

10.0 SELECTION OF TEST SAMPLES:

10.1 One sample of each heat shall be analysed for chemical composition.

10.2 One sample from each melt / heat treatment batch / size shall be taken for mechanical testing. Location of the test sample shall be in line with IS 1875.

11.0 MECHANICAL PROPERTIES:

11.1 Tensile : When tested in according with IS : 1608, the test pieces shall show the following properties :

Tensile Strength : 410 N/mm², minimum
Yield strength : 220 N/mm², minimum
Elongation on
5.65 √So guage length : 25 percent min.

11.2 Hardness: 10% of the bars or minimum 10 bars (whichever is more) shall be tested for hardness in accordance with IS 1500 or any other reputed national standard. The hardness shall not be less than 110 BHN.

12.0 ULTRASONIC TEST :

Each bar above 100 mm dia / side width shall be ultrasonically tested in accordance with AA 085 01 18 to ensure freedom from internal defects. The norms of acceptance shall be as per category 2 of the same.

13.0 TEST CERTIFICATES:

Three copies of the test certificate bearing the following information shall be furnished.

BHEL Order No :

BHEL Specification No : HY 10199 Rev. 03

Supplier's Name:

Cast No :

Results of Chemical analysis and Mechanical tests.

Results of ultrasonic test (if applicable)

14.0 PACKING AND MARKING:

Bars shall be supplied in securely packed bundles and shall be suitably protected from corrosion and damage during transit. Bars over 50 mm diameter shall be stamped at one end with cast number, HY10199, and BHEL P.O. for easy identification.

Bars of 50 mm diameter and below shall be bundled and a metal lable shall be securely attached to each bundle bearing the following details:

HY 10199 Rev. 03 : Hot rolled Carbon Steel bars, Gr:15 C8

BHEL Order No:

Consignment or Indentification No:

Cast No:

Size and Weight:

Supplier's name:

LIST OF APPLICABLE STANDARDS ON LIMITS, FITS AND TOLERANCES

1.0 SCOPE:

The standard covers the list of applicable standards on Limits, Fits and Tolerances. These standards are applicable unless or otherwise specified.

2.0 LIST OF APPLICABLE STANDARDS:

SL. NO.	STANDARD NO.		TITLE
1.	AA0230201	-	Limits and Fits (Tolerance grade, Position and Class).
2.	AA0230202	-	Limits and sizes for commercial bolts and nuts.
3.	AA0230204	-	Guide for selection of Fits.
4.	AA0230206	-	Standard limits for Shafts (upto 500 mm).
5.	AA0230207	-	Standard limits for Shafts (above 500 mm and upto 3150 mm).
6.	AA0230208	-	Allowable deviations for dimensions without specified tolerances (linear and angular).
7.	AA0230402	-	Permissible deviations for untoleranced dimensions of castings.
8.	AA0230403	-	Tolerancing system ISO Metric Screw Threads
9.	AA0621101	-	Tolerances and Machining allowances for Flame cutting.
10.	AA0621104	-	General tolerances for welding constructions for length and angles.
11.	AA0621105	-	General tolerances for welded structures – form and position.

NOTE:

1) AA 023 02 08

Medium class of deviation is applicable, if the same is not mentioned on the drgs./specs.

2) AA 023 04 02

Tolerance class 5 is applicable, if the same is not mentioned on the drgs./specs.

3) AA 062 11 04

Accuracy class A is applicable if the same is not mentioned on the drgs.

4) AA 062 11 05

Accuracy class E is applicable, if the same is not applicable on drgs.

NDE PROCEDURE FOR RADIOGRAPHIC EXAMINATION OF WELDS

1.0 SCOPE:

This standard covers the procedure and acceptance standard to be employed for the radiographic examination of welds and shall be followed whenever called for as a part of design requirement or code requirement.

1.1 This standard is based on ASME: Sec. V Article - 2, ASME: Sec. VIII Division 1 & 2.

2.0 PERSONNEL QUALIFICATION:

The personnel conducting the examination shall be qualified according to NDE Written Procedure QMI: 008.

3.0 SELECTION OF RADIATION ENERGIES:

3.1 **For X-Ray :** Less than 19 mm of steel
For Ir-192 : Minimum 19 mm of steel
For Co-60 : Minimum 38 mm of steel

The minimum recommended thicknesses may be reduced when radiaiton energy employed for any Radiographic Technique shall be achieve the density and IQI image requirements.

4.0 FILMS:

Radiographs shall be made using Industrial Radiographic films. Following films or its equivalent shall be used.

1. Agfa Gaevert - D7 / D4
2. Kodak Industrex - AA - 400 / MX - 125

5.0 WELD WITH REINFORCEMENT:

The thickness on which the IQI (Image Quality Indicator) is based on the nominal single wall thickness plus the actual weld reinforcement not to exceed the maximum permitted as shown below. Backing rings or strips are not to be considered as part of the thickness in IQI selection.

5.1 For welds as per ASME Sec VIII Division –I

Material Nominal Thickness	MAXIMUM REINFORCEMENT	
	Circumferential Joint Pipe and Tubing	Others
Less than 2.40mm (3/32)	2.40mm (3/32)	0.8mm (1/32)
2.40 to 4.8mm incl. (3/32 to 3/16)	3.20mm (1/8)	1.6mm (1/16)
Over 4.8 to 12.7mm incl.(3/16 to ½)	4mm (5/32)	2.40mm (3/32)
Over 12.7 to 25.4mm incl.(½ to 1)	4.80mm (3/16)	2.40mm (3/32)
Over 25.4 to 51mm incl. (1 to 2)	6mm (¼)	3.20mm (1/8)
Over 51 to 76.2mm incl. (2 to 3)	6mm (¼)	4mm (5/32)
Over 76.2 to 101.6mm incl. (3 to 4)	6mm (¼)	5.6mm (7/32)
Over 101.6 to 127mm incl. (4 to 5)	6mm (¼)	6mm (¼)
Over 127 mm (5)	7.9mm (5/16)	7.9mm (5/16)

5.2 For welds as per ASME Sec VIII Division – II

Material Nominal Thickness	MAXIMUM REINFORCEMENT	
	Circumferential Joint Pipe and Tubing	Others
Less than 2.40mm (3/32)	2.40mm (3/32)	0.8mm (1/32)
2.40 to 4.8mm incl. (3/32 to 3/16)	2.40mm (3/32)	1.6mm (1/16)
Over 4.8 to 12.7mm incl.(3/16 to ½)	3.2mm (1/8)	2.40mm (3/32)
Over 12.7 to 25.4mm incl.(½ to 1)	4.00mm (5/32)	2.40mm (3/32)
Over 25.4 to 50.8mm incl. (1 to 2)	4mm (5/32)	3.20mm (1/8)
Over 50.8 to 76mm incl. (2 to 3)	4mm (5/32)	4mm (5/32)
Over 76 to 101.6mm incl. (3 to 4)	5.6mm (7/32)	5.6mm (7/32)
Over 101.6 to 127mm incl. (4 to 5)	6mm (¼)	6mm (¼)
Over 127 mm (5)	7.9mm (5/16)	7.9mm (5/16)

- Inch sizes are adopted (with in brackets).

5.3 Weld Surface Preparation:

The weld ripples or weld surface irregularities on both the inside (where accessible) and outside shall be removed by any suitable process to such a degree that the resulting radiographic image due to any surface irregularities can not mask or be confused with the image of any discontinuity. The finished surface of all butt welded joints may be flush with the base material or may have reasonably uniform crowns.

6.0 IMAGE QUALITY INDICATORS (IQI):

Image quality indicators (IQI) shall be either the hole type or the wire type and meet the requirements of SE 1025 (For Hole Type) and SE 747 (For Wire Type). Its thickness and dia shall be as per appendix I & II respectively**.** Image Quality Indicators shall be selected from either the same alloy material group or grade as identified in SE 1025 and

SE 747 or from an alloy material group or grade with less radiation absorption than the material being radiographed.

6.1 IQI Selection:

Radiography shall be performed with a technique of sufficient sensitivity to display the hole IQI image and the 2T hole, or the essential wire of a wire IQI. The radiographs shall also display the IQI identifying numbers and letters. If the designated hole IQI image and 2T hole, or essential wire, do not show on any film in a multiple film technique, but do show in composite film viewing, interpretation shall be permitted only by composite film viewing. The designated hole IQI or essential wire shall be specified in table-I. A thinner or thicker hole type IQI may be substituted for any section thickness listed in table-II. Provided an equivalent IQI sensitivity is maintained. Equivalent IQIs shall be selected from Appendix I for hole type and Appendix II for wire type

6.2 Placement of IQIs:

Source-Side IQIs: IQIs shall be placed on the source side of the part being examined. The IQIs (Hole type) may be placed adjacent to or on the weld. The IQIs (Wire type) shall be placed on the weld so that the length of the wires is perpendicular to the length of the weld. The identification numbers and, when used, the lead letter "F" shall not be in the area of interest, except when geometric configuration makes it impractical.

Film–side IQIs: Where inaccessibility prevents hand placing the IQIs on the source side, the IQIs shall be placed on the film side in contact with the part being examined, a lead letter "F" shall be placed adjacent to or on the IQIs, but shall not mask the essential hole where hole IQIs are used.

6.3 Number of IQIs:

When one or more film holders are used for an exposure, at least one IQI image shall appear on each radiograph. For cylindrical components where the source is placed on the axis of the component for a single exposure, atleast three IQIs spaced approximately 120 deg. apart are required.

6.4 Shims Under Hole IQI's:

A shim of material radiographically similar to the weld metal shall be placed between the part and the IQI, if needed, so that the radiographic density through out the area of interest is no more than minus 15% from (lighter than) the radiographic density through the IQI. The shim dimensions shall exceed the IQI dimensions such that the outline of at least three sides of the IQI image shall be visible in the radiograph.

7.0 IDENTIFICATION OF RADIOGRAPHS:

A system shall be used to produce permanent identification on the radiograph traceable to the contract, component, weld or weld seam, or part number as appropriate. In addition the manufacturers symbol or name and the date of the radiograph shall be plainly and permanently included in the radiograph. This identification system does not necessarily require that the information appear as radiographic images. In any case this information shall not obscure the area of interest. The letter 'R' shall be used to designate a radiograph of a repair area and may include 1,2, ---- etc for the number of repairs.

7.1 Location Markers:

Location markers (See fig. 2) which are to appear as radiographic images on the film shall be placed on the part not on the cassette. Their location, shall be placed on the part, not on the exposure holder/cassette. Their locations shall be permanently marked on the surface of the part being radiographed when permitted, or on a map, in a manner permitting the area of interest on a radiograph to be accurately traceable to its location on the part, for the required retention period of the radiograph. Evidence shall also be provided on the radiograph that the required coverage of the region being examined has been obtained.

7.2 Sharpness of Radiographic Image:

7.3 Source to Object Distance (S.O.D):

The minimum distance 'd' from the weld being radiographed to the source of radiation is determined from:

d = Ft / Ug, where

F= effective source size

Ug= geometric unsharpness

t=thickness of the weld

7.4 Geometric Unsharpness Limitation:

The geometric unsharpness of the radiograph shall not exceed the following:

Material thickness	Ug Maximum
Under 51mm (2")	0.51mm (0.020")
51 through 76.2mm (2 to 3")	0.76mm (0.030")
Over 76.2 through 101.6mm (3 to 4")	1.02mm (0.040")
Greater than 101.6mm (4")	1.78mm (0.070")

8.0 RADIOGRAPHIC DENSITY:

The transmitted film density through the radiographic image of the body of the appropriate hole IQI or adjacent to the designated wire of a wire IQI and the area of interest shall be 1.8 minimum for single film viewing for radiographs made with X-ray and 2 minimum for radiographs made with gamma ray source. For composite viewing of multiple film exposures, each film of the composite set shall have a minimum density of 1.3. The maximum density shall be 4.0 for either single or composite viewing. A tolerance of 0.05 in density is allowed for variations between densitometer readings

If the density of the radiograph any where through the area of interest varies by more than minus 15% or plus 30% from the density through the body of the hole IQI or adjacent to the designated wire of a wire IQI with in the minimum / maximum allowable density specified above then an additional IQI shall be used for each exceptional area or areas and the radiograph retaken.

8.1 Monitoring density limitations of Radiographs:

Either a densitometer or step wedge comparison film shall be used for judging film density requirements. The density of step wedge comparison films and densitometer calibration shall be verified by comparison with a calibrated step wedge film traceable to a national standard. The step wedge calibration films may be used within one year upon opening.

9.0 INTENSIFYING SCREENS:

Lead screens shall be used in all gamma ray radiography. For x-ray, Lead Screens shall be used wherever they improve the quality of the radiograph. Copper screens of suitable thickness may be used in conjunction with Cobalt - 60 isotope to improve sensitivity.

9.1 Radiographic technique:

A single wall exposure technique shall be used for radiography when ever practical. When it is not practical to use a single wall technique, a double wall technique shall be used. An adequate number of exposures shall be made to demonstrate that the required coverage has been obtained.

a) Single wall technique:

In the single wall technique the radiation passes through only one wall of the weld material, which is viewed for acceptance on the radiograph.

b) Double wall technique:

When it is not practical to use a single wall technique, one of the following double wall techniques shall be used.

I) For welds a technique may be used in which the radiation passes through two walls and only the weld material on the film sidewall is viewed for acceptance on the radiograph. When complete coverage is required for circumferential weld materials a minimum of three exposures taken 120° to each other shall be made.

II) For welds in components 3.5 inch (89mm) or less in nominal outside diameter a technique may be used in which the radiation passes through two walls and the weld materials in both walls is viewed for acceptance on the same radiograph. For double wall viewing only a source side IQI shall be used. Care should be exercised to ensure that the required geometric un-sharpness is not exceeded. With the geometric unsharpness requirement can not be met, then single wall viewing shall be used.

III) For welds, the radioation beam may be offset from the plane of the weld at an angle sufficient to separate the images of the source side and film side portions of the weld so that there is no overlap of the areas to be interpreted. When complete coverage is required, a minimum of two exposures taken 90° to each other shall be made for each joint.

IV) As an alternative, the weld may be radiographed with the radiation beam positioned so that the images of both walls are super imposed. When complete coverage is required a minimum of three exposures taken at either 60° or 120° to each other shall be made for each joint.

Additional exposures shall be made if the required radiographic coverage can not be obtained using the minimum number of exposures indicated above.

10.0 BACK SCATTER RADIATION:

Suitable lead backing shall be used to avoid back scatter. A lead symbol 'B' with minimum dimensions 13 mm (½") in height and 1.6 mm (1/16") in thickness shall be attached to the back of each film holder during each exposure to determine if back scatter radiation is exposing the film.

10.1 Excessive Scatter:

If there is any question about the adequacy of protection from back scatter radiation, 3.2 mm (1/8") thick letter "B" should be attached to the back of the cassette or film holder, and a radiograph made in the normal manner. If the image of this symbol appears on the radiograph that as a lighter density than background, it is an indication protection against Back Scattered radiation is insufficient and the radiograph shall be considered unacceptable and that additional precaution must be taken. A dark image of the 'B' on a lighter background is not a cause for rejection.

11.0 CHEMICAL PROCESSING AND QUALITY OF RADIOGRAPH:

The chemical processing of the film shall conform to the best standard of photographic chemical processing or recommendations of the manufacturers. Processing time,

temperatures of various baths, degree of agitation and qualities shall be as recommended by the manufacturer of the films and / or chemicals.

All radiographs shall be free from excessive mechanical, chemical or other processing defects such as fogging, streaking watermarks, strains, dirtiness, tears and scratches that could interfere with proper interpretation of the radiograph

11.1 Procedure:

Radiography shall be carried out as per approved Technique for radiography examination of welds as shown in Appendix III

12.0 ACCEPTANCE STANDARD:

12.1 For welds as per ASME Sec VIII, Division – I

Welds that are shown by radiography to have any of the following type of discontinuities shall be unacceptable.

12.1.1 For 100% Radiography:

a) Any indication of crack or zone of incomplete fusion or incomplete penetration.

b) Any other elongated indication which has a length greater than

i) 6 mm (1/4 in.) for T up to 19mm (3/4 in.)
ii) 1/3 T for T from 19 to 57mm (3/4 in. to 2 ¼ in.)
iii) 19mm (3/4 in.) for T over 57mm (2 ¼ in.)

(Where T is the thickness of the weld excluding any allowable reinforcement or for a butt weld joining two members having different thicknesses at weld, T is the thinner of these two thicknesses. If a full penetration weld includes a fillet weld, the thickness & the throat of the fillet shall be included in T)

c) Any group of aligned indications in line that have an aggregate length greater than T in a length of 12 T except when the distance between successive indication exceed 6L, where L is the longest indication in the group.

d) Rounded Indication in excess that of shown in porosity chart, ASME: Sec VIII Div.I

12.1.2 For Spot Radiography:

a) Any type of crack or zone of incomplete fusion or incomplete penetration.
b) Any other elongated indication which has a length greater than 2/3 T, where T is the thickness of the weld excluding any allowable reinforcement or for a butt weld joining two members having different thicknesses at weld, T is the thinner of these two thicknesses.

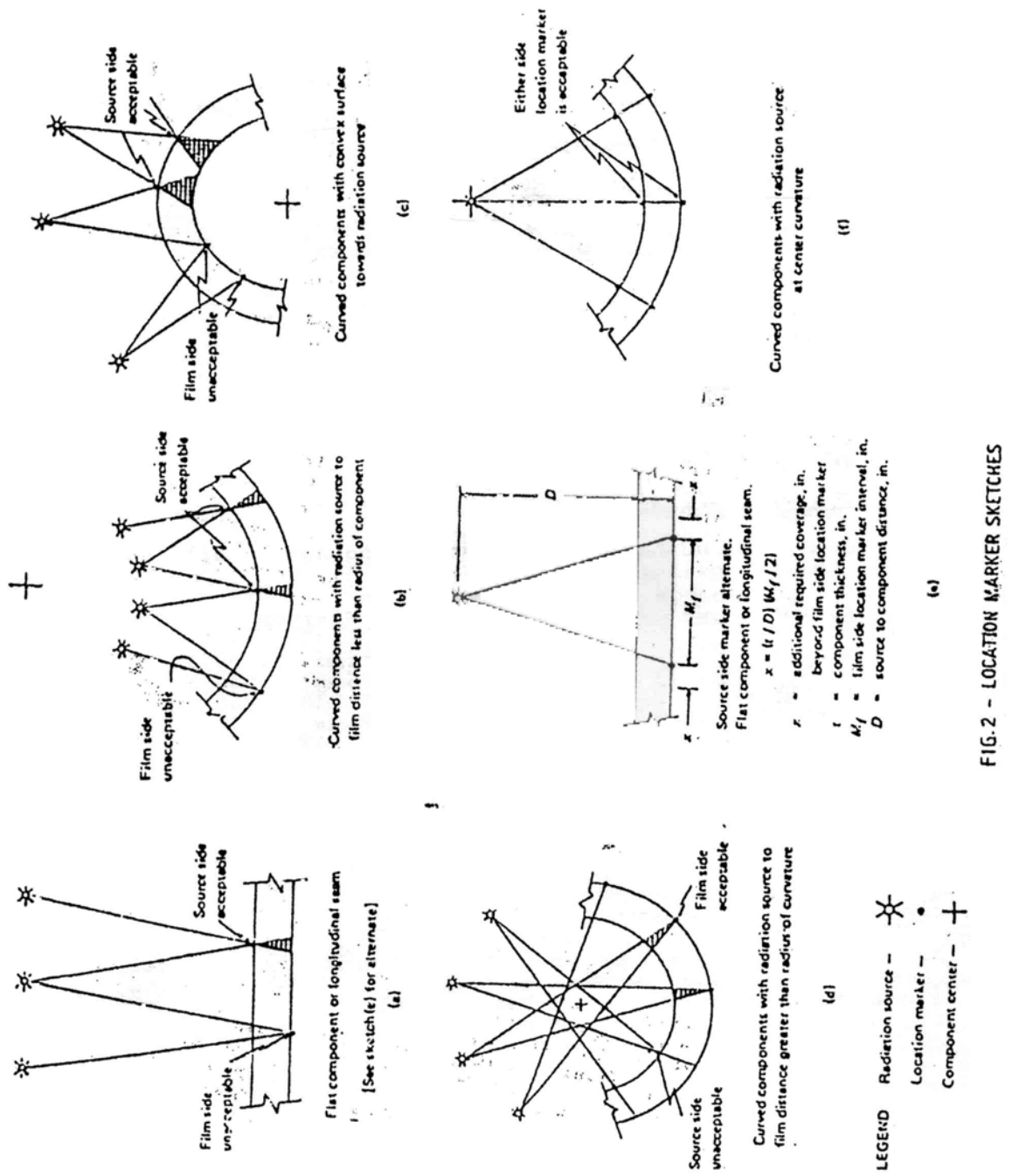


FIG. 2 - LOCATION MARKER SKETCHES

c) If several indications with in the above limitations exist in line, the weld shall be judged acceptable if the sum of the longest dimension of all such indications is not more than T in a length of 6 T (or proportionately for radiographs shorter than 6 T) and if the longest indications considered are separated by atleast 3L of acceptable weld metal where L is the length of the longest indication. The maximum length of acceptable indication shall be ¾ in. (19 mm). Any such indications shorter than ¼ in. (6 mm) shall be acceptable for any plate thickness.

d) Rounded indications are not a factor in the acceptability of welds, not to be fully radiographed.

12.1.3 For welds as per ASME Sec. VIII Division – II

Sections of welds that are shown by radiography to have any of the following type of defects are unacceptable.

a) Any indication of crack or zone of incomplete fusion or incomplete penetration.
b) Any elongated inclusion, such as a slag which has length greater than

i) 6 mm (1/4 in.) for T up to 19mm (3/4 in.)
ii) 1/3 T for T from 19 to 57mm (3/4 in. to 2 ¼ in.)
iii) 19mm (3/4 in.) for T over 57mm (2 ¼ in.)

(Where T is the thickness of the weld excluding any allowable reinforcement or for a butt weld joining two members having different thicknesses at weld, T is the thinner of these two thicknesses. If a full penetration weld includes a fillet wild, the thickness & the throat of the fillet shall be included in T)

c) Any group of aligned indications in line that have an aggregate length greater than T in a length of 12 T except when the distance between successive indication exceed 6L, where L is the longest indication in the group.

d) Rounded Indication in excess that of shown in porosity chart, ASME: Sec VIII Div.II

13.0 REPORTS AND RECORDS:

A report describing the radiographic technique (Annexure III) and the procedure followed along with a detailed analysis of the result of the radiographic examination shall be prepared in the form INSP-085 and shall be signed by minimum of Level II personnel qualified as per NDE written procedure QMI 008.

13.1 A complete set of radiographs and reports for each job shall be retained by BHEL until the data report has been signed by the AI and all the NDE reports and radiographs are to be retained till MDR is signed by AI as per ASME Sec. VIII, Div-I and for 5 years, in case of ASME Sec. VIII, Div.-II.

TABLE I

MATERIAL THICKNESS AND IQI DESIGNATIONS

Nominal Single-wall Material Thickness Range	IQI			
	Source Side		Film Side	
	Hole Type Designa-tion	Wire Type Essential Wire	Hole Type Designation	Wire Type Essential Wire
Up to 6.4mm (0.25”) incl.	12	5	10	4
Over 6.4mm through 9.5mm (0.25 to 0.375”)	15	6	12	5
Over 9.5mm through 12.7mm (0.375 to 0.50”)	17	7	15	6
Over 12.7mm through 19mm (0.50 to 0.75”)	20	8	17	7
Over 19mm through 25.4mm (0.75 to 1.00”)	25	9	20	8
Over 25.4mm through 38.1mm (1.00 to 1.50”)	30	10	25	9
Over 38.1mm through 50.8mm (1.50 to 2.00”)	35	11	30	10
Over 50.8mm through 63.5mm (2.00 to 2.50”)	40	12	35	11
Over 63.5mm through 101.6mm (2.50 to 4.00”)	50	13	40	12
Over 101.6mm through 152.4mm (4.00 to 6.00”)	60	14	50	13
Over 152.4mm through 203.2mm (6.00 to 8.00”)	80	16	60	14
Over 203.2mm through 254mm (8.00 to 10.00”)	100	17	80	16
Over 254mm through 304.8mm (10.00 to 12.00”)	120	18	100	17
Over 304.8mm through 406.4mm (12.00 to 16.00”)	160	20	120	18
Over 406.4mm through 508mm (16.00 to 20.00”)	200	21	160	20

TABLE - II

EQUIVALENT HOLE TYPE IQI SENSITIVITY

Hole type designation 2T hole	Equivalent hole type designations	
	1T hole	4T hole
10	15	5
12	17	7
15	20	10
17	25	12
20	30	15
25	35	17
30	40	20
35	50	25
40	60	30
50	70	35
60	80	40
80	120	60
100	140	70
120	160	80
160	240	120
200	280	140

APPENDIX - I

HOLE TYPE IQI DESIGNATION, THICKNESS AND HOLE DIAMETERS

IQI Desig-nation	IQI Thickness		1T Hole Diameter		2T Hole Diameter		4T Hole Diameter	
	Mm	in	mm	in	mm	in	Mm	In
5	0.13	0.005	0.25	0.010	0.51	0.020	1.02	0.040
7	0.19	0.0075	0.25	0.010	0.51	0.020	1.02	0.040
10	0.25	0.010	0.25	0.010	0.51	0.020	1.02	0.040
12	0.32	0.0125	0.32	0.012	0.64	0.025	1.27	0.050
15	0.38	0.015	0.38	0.015	0.76	0.030	1.52	0.060
17	0.44	0.0175	0.44	0.0175	0.89	0.035	1.78	0.070
20	0.51	0.020	0.51	0.020	1.02	0.040	2.03	0.080
25	0.64	0.025	0.64	0.025	1.27	0.050	2.54	0.100
30	0.76	0.030	0.76	0.030	1.52	0.060	3.05	0.120
35	0.89	0.035	0.89	0.035	1.78	0.070	3.56	0.140
40	1.02	0.040	1.02	0.040	2.03	0.080	4.06	0.160
45	1.14	0.045	1.14	0.045	2.29	0.090	4.57	0.180
50	1.27	0.050	1.27	0.050	2.54	0.100	5.08	0.200
60	1.52	0.060	1.52	0.060	3.05	0.120	6.10	0.240
70	1.78	0.070	1.78	0.070	3.56	0.140	7.11	0.280
80	2.03	0.080	2.03	0.080	4.06	0.160	8.13	0.320
100	2.54	0.100	2.54	0.100	5.08	0.200	10.16	0.400
120	3.05	0.120	3.05	0.120	6.10	0.240	12.19	0.480
140	3.56	0.140	3.56	0.140	7.11	0.280	14.22	0.560
160	4.06	0.160	4.06	0.160	8.13	0.320	16.26	0.640
200	5.08	0.200	5.08	0.200	10.16	0.400	--	--
240	6.10	0.240	6.10	0.240	12.19	0.480	--	--
280	7.11	0.280	7.11	0.280	14.22	0.560	--	--

APPENDIX - II

WIRE IQI DESIGNATION AND WIRE DIAMETERS

Set	Wire Diameter		Wire identity
	mm	inch	
A	0.08	0.0032	1
	0.10	0.004	2
	0.13	0.005	3
	0.16	0.0063	4
	0.20	0.008	5
	0.25	0.010	6
B	0.25	0.010	6
	0.33	0.013	7
	0.41	0.016	8
	0.51	0.020	9
	0.64	0.025	10
	0.81	0.032	11
C	0.81	0.032	11
	1.02	0.040	12
	1.27	0.050	13
	1.60	0.063	14
	2.03	0.080	15
	2.54	0.100	16
D	2.54	0.100	16
	3.20	0.126	17
	4.06	0.160	18
	5.08	0.200	19
	6.35	0.250	20
	8.13	0.320	21

* Inch sizes are adopted.

BHEL HYDRABAD	TECHNIQUE CHART	TECHNIQUE NO

TECHNIQUE FOR RADIOGRAPHIC EXAMINATION

A) NAME OF THE JOB:		
B) JOINT DETAILS:		
C) NO OF EXPOSURES:		
D) SOURCE:		
E) FOCAL SPOT/SOURCE SIZE:		
F) MATERIAL	THICKNESS:)	REINFORCEMENT:
G)SOURCE TO OBJECT DISTANCE:		
H) DISTANCE FROM SOURCE SIDE OF OBJECT TO FILM:		
I) FILM:	DENSITY:	SENSITIVITY REQUIRED:
	SCREEN:	SCREEN THICK :
J) NO. OF FILMS IN EACH FILM HOLDER:		
K) SINGLE/DOUBLE WALL EXPOSURE :		
L) SINGLE/DOUBLE WALL VIEWING:		

SHOOTING SKETCH

PREPARED BY: Level-II Date	APPROVED BY: Level-III Date

HYDERABAD	RADIOGRAPHY TEST REPORT	NDT CENTER: REPORT NO: DATE:

Customer Order	Work Order	Drawing No	PROCEDURE NO & REV
Name Of The Part:		Part No:	

Material	Source :	Film Type:	
Thickness :	Size/Focal Spot :	Screen Front/Back:	
Weld Process	Energy/Voltage	S.O.D	I.Q.I

Type Of Joint:	Welder No	Activity/Current	Exposure Time	Sensitivity	Density Of Radiograph

Indent No: Technique No:

Film Location Plan

SAMPLE

No	Radiograph No	Observation	evaluation& disposition	Defect Location

Operator	Approved By	External Inspector
Level: Date:	level: Date:	Date:

BHEL HERP VARANASI
QUALITY PLAN

CERAMIC LINED ITEMS

SL.NO.	COMPONENT	CHARACTERISTIC CHECKED	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS & ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
							P	W	V	
1.0	i.Raw Material : Plates	i.Chemical & Mechanical properties	Chemical, Tensile and Bend test	1 sample per heat batch	AA10119	TC	3	-	2	
		ii. Soundness of plates >25 mm	Ultrasonic testing	100%	AA 0850120	TC	3	-	2	
2.0	Fabrication of Ceramic Lined Items	i. Fit up exam	Measurement	100%	Drawing	Dim.report	3	-	2	
		ii.Heat Treatment	Revfiew of HT Chart	100%	HY0640763	Heat treatment chart	3	-	2	
		iii. D.P.Testing of welded joints	D.P.test	100%	AA0850131 & AA0850129	TC	3	2	-	D.P.test shall be witnessed by BHEL representataive
		iv.Soundness of Butt welded joints	Spot RT testing	10%	HY0850170	Insp.Report	3	-	2	If mentioned in PO
3.0	Final Inspection of Fabricated items	i. Dimensions	Measurement	100%	Drawing	Dim.report	3	2	-	
		ii. Painting & preservation	Paint shade and DFT	10% by BHEL on random basis	As mentioned in PO	Insp.Report	3	2	-	
		iii.Identification & Marking	Punching of Drg. No., P.O.No. & Inspector Seal	100% by BHEL	-	Inspection Report	3/2	2	-	
			APPROVED BY		PREPARED BY					
QP. NO. RV/FAB /CL/1 Rev-00			SIGNATURE & DATE		SIGNATURE & DATE					

P = PERFORM
W = WITNESS
T.C. = TEST CERTIFICATE
H.T. = HEAT TREATMENT

BHEL HERP VARANASI

Dated:

V. Code:		PO No. & Date:	
Name of Item:		W/O No.:	
Drawing No.:		Project Name:	
Job ID:		Qty Offer:	
S No	**Description**	**Details of Inspection (with sketch)**	**Remarks/Inspection comment**
		fit up with	**Dim's**
	Sub-Contractor (QC)		**BHEL QC/AIA**
Signature:		Signature:	
Name:		Name:	
Date:		Date:	

Vendor Name:
Vendor Adress:

VISUAL EXAMINATION REPORT

DESCRIPTION	CHECK POINTS	OTHER INFORMATION
NAME OF THE ITEM: **DRG NO:** **W. O. NO:** **SCO NO:** **SCO DATE:** **PROJECT:** **ID NO:** **QTY:** **P.I.R. NO:**	All Weld 100% Visual Examination carried out with **Hand Lamp/Torch** and found free from following defects. a) Weld spatters b) Gas cut Notches c) Uneven welds d) Unequal fillet size e) Under cuts f) Arc Strikes g) Blow holes & Porosity h) Slags i) Craters j) Lack of Fusion/Lack of Penetration k) Cracks l) Weld spatters m) Sharp Corners * Welding Quality at the underside invisible areas are ensured by **lifting/ reversing** the job * All weld fillet sizes checked and found as per Scope & Drg. **Clear for further operation** ( ) S. R. ( ) Grit Blasting/ Painting ( ) Final M/c ( ) Cleared for dispatch **Tick whichever is applicable.**	
Signature of Inspector **Date:**	**Signature of Inspection Agency/ BHEL QC** **Date:**	

BHARAT HEAVY ELECTRICALS LIMITED

Ramachandrapuram, Hyderabad – 502 032, INDIA

QW – 482 WELDING PROCEDURE SPECIFICATION (WPS)

Welding Procedure Specification No.: WE006 **Date: 02.08.86** **Supporting PQR No.:** 516, **Dt** : 11.05.10

Revision No.: 07 **Date:** 24.04.2016

Welding Process (es) : *SMAW* **Type (s) :** *MANUAL*

JOINTS (QW 402)

Joint Design: *As per manufacturing drawing (groove/fillet)*

Root Spacing : *As per manufacturing drawing*

Backing (Yes) : *for double side butt welds and backing strip joints*

(No) : *for single side welds*

Backing Material (Type) : *Base metal / Weld metal*

Metal: *Yes* **Non-Fusing Metal**: *No*

Retainer: *No*

BASE METALS (QW – 403)

P. No. *: 1* **Group No. :** *1 & 2* **TO** **P. No.:** *1* **Group No.:** *1 & 2*

OR

Specification type & grade: -------- **to** Specification type & grade : -------

OR

Chemical Analysis & Mechanical Properties: --- to Chemical Analysis & Mechanical Properties: ----

Thickness Range :

Base Metal : **Groove:** *5.0 mm to 38 mm* ** **Fillet :** *all sizes*

Deposited pass thickness > 13mm – Not Permitted

Other : None

Filler Metals (QW – 404)

	SMAW
Spec. No. (SFA)	*5.1*
AWS NO (CLASS)	A5.1 (*E 7018*)
F. No.	4
A. No.	*1*
Size of Filler Metals	*Dia 2.5, 3.15, 4.0, 5.0mm*
Filler Metal Product Form	N.A
Supplemental Filler Metal	N.A
Deposited Weld Metal Thickness Range : Groove: Fillet:	38 *mm Max.* *38 mm Max Throat*
Electrode Flux (Class)	*Basic*
Consumable Insert	*No*
Max. Bead Thickness	5 *mm*

** Note : For Unequal thicknesses base material thickness qualified upto 50mm and weld metal thickness limited to 38mm max.

Rev : 07 – Note added regarding base material thickness

N.A – Not Applicable

POSITIONS (QW-405)

Position(s) Groove : *ALL POSITIONS*
Welding Progression: *UP for Vertical*
Down –Not permitted
Position (s) Fillet: *ALL*
Other : None

POSTWELD HEAT TREATMENT (QW-407)

Not Permitted
Temperature Range: *NA*

Time Range: *NA*
Other : *None*

PREHEAT (QW-406)

Preheat Temp Min: *10 º C min for < 31mm*
100 º C min for 31mm and above
Interpass Temp Max: *300 º C*
Preheat Maintenance: *Minimum specified temperature for every restart*
Other : None

GAS (QW - 408)

	Gas(es)	Percentage Composition Mixture	Flow Rate
Shielding :	N.A	-	-
Trailing :	N.A	-	-
Backing :	N.A	-	-

Other : None

ELECTRICAL CHARACTERISTICS (QW-409)

Weld Pass (es)	Process	Filler Metal		Current type & Polarity	Amps (Range)	Wire feed speed	Energy or Power (Range)	Volts (Range)	Travel speed	Other
		Classification	Diameter							
Root& Subsequent as required	*SMAW*	*E 7018*	*2.5mm*	*DCEP*	*60 – 90A*	N.A	N.A	*22-34V*	N.A	*String for horizontal; Others Weave (Max 3 times Electrode Core Dia)*
	-do-	*-do-*	*3.15mm*	*-do-*	*100-150A*	*-do-*	*-do-*	*-do-*	*-do-*	
	-do-	*-do-*	*4.0mm*	*-do-*	*150-200A*	*-do-*	*-do-*	*-do-*	*-do-*	
		-do-	*5.0mm*	*-do-*	*200-260A*	*-do-*	*-do-*	*-do-*	*-do-*	

Pulsing Current : *N.A*

Heat Input *: N.A*

Tungsten Electrode Size and Type : *N.A*

Mode of Metal Transfer for GMAW (FCAW): *N.A*

Others **:** None

TECHNIQUE (QW-410)

String or Weave Bead: *string and/or weave*

Orifice or Gas Cup Size : *N.A*

Initial / Interpass Cleaning : *chipping / brushing / grinding*

Method of Back Gouging: *grinding/gouging if required*

Oscillation *: N.A*

Contact tube to work distance : N.A

Multiple or Single Pass : *Multiple pass*

Multiple or Single Electrodes : *Single electrode*

Closed to out chamber : *N.A*

Peening : *Not allowed*

Use of thermal processes : *N.A*

Other : *Clean weld area to remove oil, rust, grease, etc. prior to welding.*

Prepared by

Welding Engineer

Approved by

HEAD / Welding Engg

N.A – Not Applicable