



Bharat Heavy Electricals Limited

Heavy Equipment Repair Plant

Tarna Shivpur Varanasi-221003

website: <https://herp.bhel.com>

Enquiry Number : E-312-26-0189-63-1 Date : 19/Aug/2026

Enquiry For Material :-

Sl No	Material Description	Material Code	Quantity	Unit
1	COUPLING FOR CONTROL VALVE (HW-364.33) -- FULLY M/CD & ASSEMBLED ITEM AS PER DRG. 01140224200 REV.05 WITH MATL. AS PER CBOM. 01140224200 REV.08	RV1019432379	1.0	NOS

Remarks

(A)SUPPLY CONDITION

1. ITEM TO BE SUPPLIED AT BHEL HERP STORES.
2. PRE DESPATCH INSPECTION WILL BE CARRIED OUT AS PER DRAWING/QP HW/GA/001 REV.02 AT PARTY'S WORKS BY BHEL REPRESENTATIVE. FOR REVISION OF DRAWING/STANDARD/SPECIFICATION, PLEASE REFER THE ATTACHED DOCUMENT NO. " IND202610592 ", DURING INSPECTION.

(B)TECHNICAL DELIVERY CONDITION

1. MATERIAL OF THE INDIVIDUAL ITEMS SHOULD BE AS PER SPECN. AS MENTIONED IN THE CBOM.
2. DIMENSIONS AND TOLERANCES OF THE INDIVIDUAL ITEMS TO BE MAINTAINED STRICTLY AS PER PART DRAWINGS.
3. ALL TECH. REQUIREMENTS MENTIONED ON THE DRG./PART DRGS. ARE TO BE FOLLOWED STRICTLY.
4. THE FITTING TOLERANCES BETWEEN ASSEMBLED ITEMS SHOULD BE STRICTLY WITHIN THE SPECIFIED RANGE MENTIONED ON THE DRG.

5.FREE ISSUED DETAIL:

FOR ITEM NO. 7 (ROD DIA 25 IN MULTIPLE OF 35 MM MATL. HW10683, 1 NO. PER ASSLY.),
FOR ITEM NO. 8 (ROD DIA 90 IN MULTIPLE OF 40 MM MATL. AA10622, 1 NO. PER ASSLY.),
FOR ITEM NO. 10 (ROD DIA 45 MM IN MULTIPLE OF 90 MM MATL. AA10622, 1 NO. PER ASSLY.)
FOR ITEM NO. 16 (ROD DIA 25 IN MULTIPLE OF 30 MM MATL. HW10683, 1 NO. PER ASSLY.) AND
FOR ITEM NO. 34 (ROD DIA 36 IN MULTIPLE OF 60 MM MATL. AA10622, 5 NO. PER ASSLY.)

WILL BE FREE ISSUE TO THE PARTY BY BHEL, HERP FREE OF COST. REST ALL THE ITEMS AS PER CBOM WILL BE ARRANGED BY THE PARTY. THE ITEMS WHICH ARE NOT REQUIRED IN ASSEMBLY TO BE SUPPLIED IN LOOSE WITH PROPER IDENTIFICATION..

6. THE FORGED ITEM (MATL. AA19331) SHOULD BE CHECKED AND OK ULTRASONICALLY AS PER STD. AA0850118 .

7. 100% DIMENSION (COVERING ALL THE DIMENSION FROM THE SECTIONAL VIEW ALSO)SHOULD BE REPORTED IN DIMENSION REPORT FOR DRG./PART DRG.

8. SURFACE TREATMENT WHEREVER MENTIONED (NITRIDING.) IN THE PART DRG. ARE TO BE DONE AS PER THE RELEVANT STANDARD MENTIONED THEREIN AND SHOULD BE DONE FROM BHEL APPROVED SOURCES ONLY.

BHEL APPROVED SOURCES FOR NITRIDING (PMD-STSC-016) ARE;

1 M/s HEAT TREAT ENTERPRISE AHMEDABAD

2 M/s MODERN METALS INDIA PRIVATE LIMITED FARIDABAD

3 M/s SHIVA TECHNIQUES SURFACES PRIVATE LIMITED FARIDABAD

9. ALL THE ITEMS SHOULD BE CLEARLY IDENTIFIED BY PUNCHING/ENGRAVING THE DRG. NO. ON THE LOCATION GIVEN ON THE RESPECTIVE DRAWINGS.

10. FASTNERS REQUIRED FOR THE ASSLY. SHOULD BY OF STANDARD MAKE ONLY LIKE UNBRAKO/TVS/LPS/GKW.

11. DP TEST OF THE WELD JOINT TO BE CARRIED OUT AS PER MENTIONED IN THE DRG.

12. UST OF THE FORGING (MATL. HW19386) TO BE CARRIED OUT AS PER SPECN. EN10228-3

13. THE OPERATION REQUIRED DURING ASSLY. WILL NOT TO BE DONE BY THE PARTY, AS MENTIONED IN THE ASSLY. DRG.

14. RAW MATL. ARE TO BE PROCURE FROM APPROVED SOURCES OF BHEL AS MENTIONED BELOW ONLY..

APPROVED SOURCES FOR RAW MATL. FORGING AA19331 (ST02/05) ARE:

Sl VendorName CITY

- 1 M/S ALKA FORGINGS GHAZIABAD
- 2 M/S BAY-FORGE PRIVATE LIMITED NUNGAMBAKKAM
- 3 M/S GHAZIABAD FORGINGS PVT. LTD GHAZIABAD
- 4 M/S GOOD LUCK ENGINEERING CO. GHAZIABAD
- 5 M/s KISAAN DIE TECH PVT. LTD. GHAZIABAD
- 6 M/s KISAAN STEELS PRIVATE LIMITED GHAZIABAD
- 7 M/s KONDAPALLY FORGINGS PRIVATE LIMITED SANGAREDDY
- 8 M/s LAL METAL FORGE PRIVATE LIMITED GHAZIABAD
- 9 M/s METAL FORGINGS PRIVATE LIMITED NEW DELHI
- 10 M/s PUNJAB FORGING INDUSTRIES MANDI GOBINDGARH
- 11 M/S PUNJAB HAMMERS PVT.LTD. MANDI GOBINDGARH
- 12 M/s R D F ENGINEERING PRIVATE LIMITED GHAZIABAD
- 13 M/S SAURABH METALS PVT. LTD. BHOPAL
- 14 M/s SHIVA FORGING INDIA PRIVATE LIMITED Ghaziabad
- 15 M/S STAR WIRE (INDIA) LIMITED BALLABGARH
- 16 M/s SURYAA STEELS GHAZIABAD
- 17 M/S TRIVENI REFRACTORIES (P) LIMITED GHAZIABAD
- 18 M/s WESTERN INDIA FORGINGS PRIVATE LIMITED PUNE

APPROVED SOURCES FOR RAW MATL. ROD HW10683/AA10622 (ST09/03) ARE:

Sl VendorName CITY

- 1 M/S BGH EDELSTAHL FREITAL GMBH FREITAL
- 2 M/s BHEL HEEP HARIDWAR HARIDWAR
- 3 M/S BOHLER INTERNATIONAL GMBH VIENNA
- 4 M/S LAXCON STEELS LIMITED AHMEDABAD
- 5 M/S MAHINDRA SANYO SPECIAL STEEL PRIVATE LIMITED RAIGAD
- 6 M/S MISHRA DHATU NIGAM LIMITED HYDERABAD
- 7 M/S STAR WIRE (INDIA) LIMITED BALLABGARH
- 8 M/S STEEL AUTHORITY OF INDIA LIMITED NEW DELHI

APPROVED SOURCES FOR RAW MATL. ROD HW10673 (ST09/15) ARE:

Sl VendorName CITY

- 1 M/S BGH EDELSTAHL FREITAL GMBH FREITAL
- 2 M/S BOHLER INTERNATIONAL GMBH VIENNA
- 3 M/S KISCO CASTINGS (INDIA) LTD MANDI GOBINDGARH
- 4 M/S LAXCON STEELS LIMITED AHMEDABAD
- 5 M/S MAHINDRA SANYO SPECIAL STEEL PRIVATE LIMITED RAIGAD
- 6 M/S MISHRA DHATU NIGAM LIMITED HYDERABAD
- 7 M/S SAARLOHA ADVANCED MATERIALS PRIVATE LIMITED PUNE
- 8 M/S STAR WIRE (INDIA) LIMITED BALLABGARH
- 9 M/S STEEL AUTHORITY OF INDIA LIMITED NEW DELHI

15. ALL THE ITEMS SHOULD BE CO-RELATED WITH RESPECT TO SOURCE OF RAW MATL.

a) EITHER THROUGH MILL TC OF RAW MATL. SUPPLIER

b) IN CASE OF MATL. OTHER THAN CASTING/FORGING WHERE QUANTITY IS SMALL, MILL TC IS NOT FEASIBLE. ITEM IS TO BE IDENTIFIED BY UNIQUE NO./HEAT NO. AND LAB TC SHALL BE PROVIDED FROM NABL APPROVED/GOVT. APPROVED LABS ONLY.

16. THE DETAILS OF RAW MATL./UNIQUE NO. SHOULD BE PUNCHED ON THE ITEM AND ON TC. THE DETAIL FOR LINKING THE ITEM WITH RAW MATL. SOURCE TO BE MAINTAINED BY VENDOR.

(C) TEST CERTIFICATE : REQUIRED FOR

1) CHEMICAL AND MECHANICAL PROPERTIES FOR ALL THE ITEMS EXCEPT STD. FASTNERS. FOR FORGINGS MILL TC IS REQUIRED.

2) UST RESULT OF THE FORGINGS (MATL. AA19331)

3) HARDNESS AND CASE DEPTH AFTER NITRIDING.

4) UST OF BAR

5) ALL HEAT TREATMENT CHART

6) WELD TEST

(D) GUARANTEE CERTIFICATE : REQUIRED FOR 24 MONTHS AGAINST ANY MANUFACTURING DEFECTS

(E) PACKING INSTRUCTION: ITEM TO BE SUPPLIED IN PROPERLY PACKED CONDITION IN WOODEN BOX OF 1" THICK PLANK WITH 1.5"X4" BKTS. PAINTING AND CONSERVATION SHOULD BE DONE AS PER STD. ST33004. MACHINED SURFACE AND THREADS SHOULD BE PROTECTED PROPERLY WITH IOCL-SERVO RP-330 OR EQUIVALENT OIL TO PREVENT ANY RUSTING DURING TRANSIT AND STORING. ITEM SHOULD BE COMPLETELY WRAPPED IN POLYTHENE PAPER/FOAM SHEET. NITRIDED SURFACES SHOULD BE COVERED WITH BUBBLE SHEET, FOAM SHEET ETC. TO PROTECT IT FROM DAMAGE DURING TRANSPORTATION. THIS ITEM SHOULD NOT BE CLUBBED WITH OTHER LOOSE ITEMS AND ITEM SHOULD BE PACKED TIGHTLY IN THE BOX. EXCESSIVE RELATIVE MOTION MAY CAUSE DAMAGE OF PROTECTION LAYERS AND SUBSEQUENT DAMAGE OF ITEMS.

(F) DELIVERY PERIOD SHALL BE 04 MONTHS FROM THE DATE OF RECEIPT OF FREE ISSUED MATERIAL. HOWEVER EARLY DELIVERY IS ACCEPTABLE.

(G) THE APPROXIMATE COST OF FREE ISSUED MATL./PIECE IS RS. 2400/--

(H) PARTY HAVE TO QUOTE BY CONSIDERING THE COST OF SCRAP GENERATED DURING MACHINING OF BHEL FIM AS THIS SCRAP IS TO BE KEPT WITH THEM.

(I) REVERSE AUCTION WILL NOT BE CARRIED OUT FOR THIS TENDER.

(J) 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. (a) PARTY WILL HAVE TO SUBMIT EQUAL AMOUNT OF SECURITY DEPOSIT (IN THE FORM OF 10% BG/FDR/DD/CHEQUE/BANK TRANSFER AND 90% 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 MAINTAINED.
- (b) IN CASE OF TRIAL/DEVELOPMENTAL ORDER, PARTY WILL HAVE TO SUBMIT 30% BG/FDR/DD/CHEQUE/BANK TRANSFER AND 70% INDEMNITY BOND TOWARDS THE COST OF BHEL FIM.
2. BHEL MAY ASK THE SUPPLIER FOR SUBMISSION OF FULL SECURITY DEPOSIT AMOUNT OR PART DEPENDING UPON THE AVAILABILITY OF FREE ISSUE MATERIALS 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 ABOVE,
- (a) BHEL MAY HOLD THE PENDING PAYMENTS OF SUPPLIER AVAILABLE AT BHEL ON THEIR CONSENT.
- (b) IF NO PAYMENT IS PENDING AT BHEL END, ACTION FOR ALTERNATE PROCUREMENT ACTION MAY BE INITIATED.
5. THE FORMAT OF BG AND IB SHALL BE PER ATTACHED ANNEXURE-BG/FIM AND IB-FIM RESPECTIVELY.

(K) TRANSPORTATION CHARGES FOR SENDING BHEL FREE ISSUE MATERIALS (FIM) TO THE PARTY WORKS WILL BE BORNE BY BHEL ONLY. THE FREIGHT CHARGES FOR SENDING THE BHEL FIM FROM HERP STORES TO PARTY'S WORK FOR EACH ITEM WILL BE LOADED AS PER BHEL TRANSPORT CONTRACT AT THE TIME OF TOTAL LANDED COST CALCULATION. HOWEVER, VARANASI/LOCAL BASED VENDORS WILL LIFT THE FIM FROM BHEL STORES AND BORNE ITS TRANSPORTATION CHARGES. TRANSPORTATION CHARGES FOR SENDING THE FINISHED COMPONENTS FROM PARTY'S WORKS TO BHEL HERP, VARANASI WILL BE BORNE BY THE PARTY.

(L) ANY BIDDER FALLING UNDER MSE CATEGORY SHALL FURNISH THE DECLARATION AS PER ATTACHED ANNEXURE-MSES 2012 REV 01 ALONG WITH THEIR TECHNO-COMMERCIAL OFFER. THIS DECLARATION, ALONG WITH THE UDYAM CERTIFICATE, SHALL BE MANDATORY FOR BIDDERS TO AVAIL BENEFITS UNDER THE PUBLIC PROCUREMENT POLICY.

(M) THE OFFERS FROM PMD VENDORS UNDER HOLD CATEGORY AS WELL AS VENDORS BANNED BY BHEL MAY NOT BE CONSIDERED.

(N) ALL OTHER TERMS AND CONDITIONS SHALL BE AS PER THE ATTACHED GTC (PARTY HAS TO STRICTLY ADHERE THESE TERMS & CONDITIONS).

List of required Quality Documents along with supply:-

S.No	Material Code	Material Description	Documents Description
1	RV1019432379	COUPLING FOR CONTROL VALVE (HW-364.33) -- FULLY M/CD ITEM AS PER DRG. 0-11402-24200 REV.05 WITH MATL. AS PER CBOM. 01140224200 REV.03	1. Dimension Report 2. DP Report 3. Guarantee Certificates 4. Hardness test

S.No	Material Code	Material Description	Documents Description
			5. Heat Treatment Chart 6. Inspection Report by TPI/BHEL 7. NDT test Report 8. Nitriding report 9. Test Certificates Chemical Properties 10. Test Certificates-Mechanical Properties 11. UT Report
Note : Any other document mentioned in QP/Drg/Spec will also be applicable			

PQR (Turbine Spares)

	PQR Ref No: PQR/24-25/ Turbine Spares	Date: 23.08.2024
	Rev No: 03	Review Date: 22.08.2025
	PQR Revision Date: 22.08.2025	
Sl. No.	BHEL Terms	Supplier's ComplianceYES/NO
	1 Offers are accepted from:	
	1 Only Manufacturer's Offers shall be considered for the Tender Enquiry.	
	2 Supplier shall give list of In-House Facilities:	
2.a	Vendor shall have in-House necessary Manufacturing facilities required for manufacturing and supply of the item/s as per drng/spec..	
2.b	BHEL reserves right to visit the Works of the Manufacturer for Physical verification of the Manufacturing facilities (as declared by them) and assessment of their Quality systems during Technical Evaluation of the Offers.	
	3 Experience:	
3.a	Bidders shall submit the necessary documents proving their Experience in Supplying same or similar items to any Power Plant Equipment Manufacturer (Original Equipment Manufacturer)/ Defence Equipment Manufacturer (Original Equipment Manufacturer) (Govt or PSU)/AeroSpace Equipment Manufacturer (Original Equipment Manufacturer) (Govt or PSU) during last Five (05) years from the date of Enquiry. Documentary evidences to be submitted in the form of Executed Purchase Order copies along with Material Acceptance Report and drawings/specifications of the supplied item/items. No relaxation in experience shall be given to MSEs & Notified start-ups.	
3.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.	
	4 Manufacturing Process Plan:	
4.a	Bidders shall submit detailed Manufacturing process Plan along with the Technical Offer.	
	5 Financial Capability:	
5.a	Turn Over:- Turn over of Non-MSE vendors should be 100% of tender value. Relaxation for MSE vendors/ Notified Start-Ups on turn over will be as per MSME guidelines. Latest UDYAM Certificate required for MSE status.	
5.b	Applicable only for Non-MSE vendors: Audited balance Sheet and Profit and Loss account Statement of last three consecutive year (with UDIN) required along with part-1 bid. Or A CA Certified Consolidated summary (with UDIN) for last 3 consecutive years having annual turn over and Profit and Loss to be enclosed along with Part-1 bid . For Vendors having Turn over less than 1 crore in any of the financial year, CA certified Financial Turn over and Profit Loss (with UDIN) may be accepted for that year only.	
6	After placement of Purchase Order, Vendor shall submit Material Test Certificate before dispatching the Material to BHEL, for review and Dispatch clearance.	
Note-1: Non Submission of the above requested documents/non compliance to the above points is liable for rejection of the Offers without any further Notice/Intimation to the Bidder and no correspondence will be entertained at later stage.		
Note-2: "Similar items" means items having same or similar Constructional feature, manufacturing process, similar nature of use, etc.		

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

**Amendment- 28
ANNEXURE-A**

**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-COMMERCIALY 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 DISCOUNT, 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.	
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 (RATE OF BHEL TRANSPORT CONTRACT SHALL BE AS APPLICABLE RATE ON PART-1 BID OPENING DATE).	
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.	
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 THE MATERIAL AND CLEARANCE OF ‘OBJECTION IN THE BILL PROCESSING’ (IF THERE IS ‘OBJECTION IN THE BILL PROCESSING’ AND SAME HAS BEEN RAISED AND COMMUNICATED TO SUPPLIER WITHIN 15 DAYS OF THE MATERIAL RECEIPT AT BHEL-HERP). IN CASE IF OBJECTION IS RAISED AND COMMUNICATION IS MADE AFTER 15 DAYS OF THE MATERIAL RECEIPT, NUMBER OF DAYS AS MENTIONED AGAINST ABOVE POINT NO. I, II AND III WILL BE APPLICABLE SUBJECT TO ACCEPTANCE OF THE MATERIAL. 2. NO. OF DAYS MENTIONED AGAINST ABOVE POINT NO. I,II AND III IS SUBJECT TO CLEARANCE OF ‘OBJECTION IN THE BILL PROCESSING’ (IF ANY). IN CASE IF THERE IS ‘OBJECTION IN THE BILL PROCESSING’, DUE DATE WILL BE CALCULATED FROM THE DATE OF CLEARANCE OF THE OBJECTION AND NO INTEREST WILL BE PAYABLE ON THE LATE PAYMENT OF THE INVOICE. FEW ILLUSTRATIVE REASONS OF ‘OBJECTION IN THE BILL PROCESSING’ ARE MENTIONED BELOW ILLUSTRATIVE REASONS OF OBJECTIONS: ORIGINAL INVOICE, E-WAY BILL, LR/GR COPY NOT SUBMITTED, INVOICE NOT UPLOADED ON THE SUVIDHA PORTAL, INVOICE NOT UPLOADED ON GEM PORTAL, ALL REQUIRED QC DOCUMENTS NOT SUBMITTED, INCOMPLETE SUPPLY, CREDIT NOTE NOT SUBMITTED ETC.	

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

**Amendment- 28
ANNEXURE-A**

	3. ADVANCE PAYMENT IS NOT ACCEPTABLE BY BHEL HERP VARANASI IN ANY CASE. 4. IF ANY SUPPLIER FALLS UNDER "NON MSE" OR "NON MEDIUM" CATEGORY AT THE TIME OF PO PLACEMENT AND IF PARTY DOES NOT INFORM BHEL REGARDING CHANGE IN THEIR STATUS BEFORE PROCESSING OF THE PAYMENT, THEIR PAYMENT TERM WILL BE CONSIDERED AS NON MSME SUPPLIER WITHOUT ANY FURTHER INTIMATION. IF SUCH SUPPLIER INFORM BHEL OR BHEL GETS UPDATED ON THEIR OWN ABOUT PARTY'S STATUS CHANGE (WHEN PARTY BECOMES MSME FROM NON-MSME) BEFORE PROCESSING OF THE PAYMENT, PARTY'S PAYMENT TERM WILL BE CHANGED AS PER APPLICABLE STATUS. ACCORDINGLY, PURCHASING OFFICER WILL CHANGE PAYMENT TERMS IN THE APPLICABLE PO/S ALSO.	
18.	LOADING OF PAYMENT TERM: IN CASE OF DEVIATION, LOADING @ REPO RATE+4% (AS ON PART-1 OPENING DATE) SHALL BE LOADED WHILE ARRIVING AT LANDED COST TO BHEL.	
19.	LIQUIDATED DAMAGES/ LATE DELIVERY (LD) PENALTY CLAUSE: 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.	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.	DELIVERY PERIOD: VENDOR SHOULD STRICTLY QUOTE THE DELIVERY PERIOD AS MENTIONED IN NIT.	
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.	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 (a). PARTY WILL HAVE TO SUBMIT EQUAL AMOUNT OF SECURITY DEPOSIT (IN THE FORM OF 10% BG/FDR/DD/CHEQUE/BANK TRANSFER AND 90% 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 MAINTAINED. (b) IN CASE OF TRIAL/DEVELOPMENTAL ORDER, PARTY WILL HAVE TO SUBMIT 30% BG/FDR/DD/CHEQUE/BANK TRANSFER AND 70% INDEMNITY BOND TOWARDS THE COST OF BHEL FIM. 2. BHEL MAY ASK THE SUPPLIER FOR SUBMISSION OF FULL SECURITY DEPOSIT AMOUNT OR PART DEPENDING UPON THE AVAILABILITY OF FREE ISSUE MATERIALS 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 ON THEIR CONSENT. II. IF NO PAYMENT IS PENDING AT BHEL END, ACTION FOR ALTERNATE PROCUREMENT ACTION MAY BE INITIATED. 5. THE FORMAT OF BG AND IB SHALL BE PER ATTACHED ANNEXURE-BG/FIM AND IB-FIM RESPECTIVELY 6. PARTY SHALL HAVE TO ARRANGE FURNISHING OF THE SFMS CODE ALONG WITH THE BG.	
24.	TRANSPORTATION CHARGES FOR SENDING BHEL FREE ISSUE MATERIALS (FIM) TO THE PARTY WORKS WILL BE BORNE BY BHEL ONLY. THE FREIGHT CHARGES FOR SENDING THE BHEL FIM FROM HERP STORES TO PARTY'S WORK FOR EACH ITEM WILL BE LOADED AS PER BHEL TRANSPORT CONTRACT AT THE TIME OF TOTAL LANDED COST CALCULATION (RATE OF BHEL TRANSPORT CONTRACT SHALL BE AS APPLICABLE RATE ON PART-1 BID OPENING DATE) . HOWEVER, VARANASI/LOCAL BASED VENDORS WILL LIFT THE FIM FROM BHEL STORES AND BORNE ITS TRANSPORTATION CHARGES.	
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.	
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-COMMERCIALY QUALIFIED BIDDERS. PRICE BIDS OF ALL TECHNO-COMMERCIALY 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.	
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.	
28.	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,	
29.	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	
30.	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.	
31.	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.	
32.	SETTLEMENT OF DISPUTE: IF ANY DISPUTE OR DIFFERENCE OF ANY KIND WHATSOEVER SHALL ARISE BETWEEN BHEL AND THE SUPPLIER/VENDOR, ARISING OUT OF THE CONTRACT FOR THE PERFORMANCE OF THE WORK WHETHER DURING THE PROGRESS OF CONTRACT TERMINATION, ABANDONMENT OR BREACH OF THE CONTRACT, IT SHALL IN THE FIRST PLACE REFERRED TO DESIGNATED ENGINEER FOR AMICABLE RESOLUTION BY THE PARTIES. DESIGNATED ENGINEER (TO BE NOMINATED BY BHEL FOR SETTLEMENT OF DISPUTES ARISING OUT OF THE CONTRACT) WHO WITHIN 60 DAYS AFTER BEING REQUESTED SHALL GIVE WRITTEN NOTICE OF HIS DECISION TO THE CONTRACTOR. SAVE AS HEREINAFTER PROVIDED, SUCH DECISION IN RESPECT OF EVERY MATTER SO REFERRED SHALL FORTHWITH BE GIVEN EFFECT TO BY THE SUPPLIER/VENDOR WHO SHALL PROCEED WITH THE WORK WITH ALL DUE DILIGENCE, WHETHER HE OR BHEL DESIRES TO RESOLVE THE DISPUTE AS HEREINAFTER PROVIDED OR NOT. IF AFTER THE DESIGNATED ENGINEER HAS GIVEN WRITTEN NOTICE OF THIS DECISION TO THE PARTY AND NO INTENTION TO PURSUE THE DISPUTE HAS BEEN COMMUNICATED TO HIM BY THE AFFECTED PARTY WITHIN 30 DAYS FROM THE RECEIPT OF SUCH NOTICE, THE SAID DECISION SHALL BECOME FINAL AND BINDING ON THE PARTIES. IN THE EVENT THE SUPPLIER/VENDOR BEING DISSATISFIED WITH ANY SUCH DECISION OR IF AMICABLE SETTLEMENT CANNOT BE REACHED THEN ALL SUCH DISPUTED ISSUES SHALL BE RESOLVED THROUGH CONCILIATION IN TERMS OF THE BHEL CONCILIATION SCHEME 2018 AS PER CLAUSE 14.1	
33.	CONCILIATION (Clause 14.1):	

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	ANY DISPUTE, DIFFERENCE OR CONTROVERSY OF WHATEVER NATURE HOWSOEVER ARISING UNDER OR OUT OF OR IN RELATION TO THIS AGREEMENT (INCLUDING ITS INTERPRETATION) BETWEEN THE PARTIES, AND SO NOTIFIED IN WRITING BY EITHER PARTY TO THE OTHER PARTY (THE "DISPUTE") SHALL, IN THE FIRST INSTANCE, BE ATTEMPTED TO BE RESOLVED AMICABLY IN ACCORDANCE WITH THE CONCILIATION PROCEDURE AS PER BHEL CONCILIATION SCHEME 2018. THE PROCEEDINGS OF CONCILIATION SHALL BROADLY BE GOVERNED BY PART-III OF THE ARBITRATION AND CONCILIATION ACT 1996 OR ANY STATUTORY MODIFICATION THEREOF AND AS PROVIDED IN - "PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS" (AS AVAILABLE IN WWW.BHEL.COM)). Note: MINISTRY OF FINANCE HAS ISSUED OM REFERENCE NO. 1/2/24 DATED 03.06.2024 REGARDING "GUIDELINES FOR ARBITRATION AND MEDIATION IN CONTRACTS OF DOMESTIC PUBLIC PROCUREMENT. IN THE SAID OM IT HAS BEEN RECOMMENDED THAT GOVERNMENT DEPARTMENTS/ ENTITIES/AGENCIES ARE TO ENCOURAGE MEDIATION UNDER THE MEDIATION ACT. 2023. THE SAID ACT HAS NOT YET BEEN NOTIFIED BY THE GOVERNMENT. THEREFORE, THE CLAUSE "SETTLEMENT OF DISPUTES" SHALL BE MODIFIED ACCORDINGLY AS AND WHEN THE MEDIATION ACT 2023 GETS NOTIFIED.	
34.	ARBITRATION (14.2) : 14.2.1 EXCEPT AS PROVIDED ELSEWHERE IN THIS CONTRACT, IN CASE PARTIES ARE UNABLE TO REACH AMICABLE SETTLEMENT (WHETHER BY CONCILIATION TO BE CONDUCTED AS PROVIDED IN CLAUSE 14.1 HEREIN ABOVE OR OTHERWISE) IN RESPECT OF ANY DISPUTE OR DIFFERENCE; ARISING OUT OF THE FORMATION, BREACH, TERMINATION, VALIDITY OR EXECUTION OF THE CONTRACT; OR, THE RESPECTIVE RIGHTS AND LIABILITIES OF THE PARTIES; OR, IN RELATION TO INTERPRETATION OF ANY PROVISION OF THE CONTRACT; OR, IN ANY MANNER TOUCHING UPON THE CONTRACT (HEREINAFTER REFERRED TO AS THE 'DISPUTE'), THEN, EITHER PARTY MAY, REFER THE DISPUTES TO ARBITRAL INSTITUTION (TO BE IDENTIFIED BY BHEL VARANASI) AND SUCH DISPUTE TO BE ADJUDICATED BY SOLE ARBITRATOR APPOINTED IN ACCORDANCE WITH THE RULES OF SAID ARBITRAL INSTITUTION. 14.2.2 A PARTY WILLING TO COMMENCE ARBITRATION PROCEEDING SHALL INVOKE ARBITRATION CLAUSE BY GIVING NOTICE TO THE OTHER PARTY IN TERMS OF SECTION 21 OF THE ARBITRATION & CONCILIATION ACT, 1996 (HEREINAFTER REFERRED TO AS THE 'NOTICE') BEFORE REFERRING THE MATTER TO ARBITRAL INSTITUTION. THE NOTICE SHALL BE ADDRESSED TO THE HEAD OF THE UNIT, BHEL, EXECUTING THE CONTRACT AND SHALL CONTAIN THE PARTICULARS OF ALL CLAIMS TO BE REFERRED TO ARBITRATION WITH SUFFICIENT DETAIL AND SHALL ALSO INDICATE THE MONETARY AMOUNT OF SUCH CLAIM INCLUDING INTEREST, IF ANY. 14.2.3 AFTER EXPIRY OF 30 DAYS FROM THE DATE OF RECEIPT OF AFORESAID NOTICE, THE PARTY INVOKING THE ARBITRATION SHALL SUBMIT THAT DISPUTE TO THE ARBITRAL INSTITUTIONS (TO BE IDENTIFIED BY BHEL VARANASI)AND THAT DISPUTE SHALL BE ADJUDICATED IN ACCORDANCE WITH THEIR RESPECTIVE ARBITRATION RULES. THE MATTER SHALL BE ADJUDICATED BY A SOLE ARBITRATOR WHO SHALL NECESSARILY BE A RETD JUDGE HAVING CONSIDERABLE EXPERIENCE IN COMMERCIAL MATTERS TO BE APPOINTED/NOMINATED BY THE RESPECTIVE INSTITUTION. THE COST/EXPENSES PERTAINING TO THE SAID ARBITRATION SHALL ALSO BE GOVERNED IN ACCORDANCE WITH THE RULES OF THE RESPECTIVE ARBITRAL INSTITUTION. THE DECISION OF THE PARTY INVOKING THE ARBITRATION FOR REFERENCE OF DISPUTE TO A SPECIFIC ARBITRAL INSTITUTION FOR ADJUDICATION OF THAT DISPUTE SHALL BE FINAL AND BINDING ON BOTH THE PARTIES AND SHALL NOT BE SUBJECT TO ANY CHANGE THEREAFTER. THE INSTITUTION ONCE SELECTED AT THE TIME OF INVOCATION OF DISPUTE SHALL REMAIN UNCHANGED. 14.2.4 THE FEE AND EXPENSES SHALL BE BORNE BY THE PARTIES AS PER THE ARBITRAL INSTITUTIONAL RULES. 14.2.5 THE ARBITRATION PROCEEDINGS SHALL BE IN ENGLISH LANGUAGE AND THE SEAT AND VENUE OF ARBITRATION SHALL BE AT Varanasi (U.P.). 14.2.6 SUBJECT TO THE ABOVE, THE PROVISIONS OF ARBITRATION & CONCILIATION ACT 1996 AND ANY AMENDMENT THEREOF SHALL BE APPLICABLE. ALL MATTERS RELATING TO THIS CONTRACT AND ARISING OUT OF INVOCATION OF ARBITRATION CLAUSE ARE SUBJECT TO THE EXCLUSIVE JURISDICTION OF THE COURT(S) SITUATED AT Varanasi (U.P.). 14.2.7 NOTWITHSTANDING ANY REFERENCE TO THE DESIGNATED ENGINEER OR CONCILIATION OR ARBITRATION HEREIN, A. THE PARTIES SHALL CONTINUE TO PERFORM THEIR RESPECTIVE OBLIGATIONS UNDER THE CONTRACT UNLESS THEY OTHERWISE AGREE. SETTLEMENT OF DISPUTE CLAUSE CANNOT BE INVOKED BY THE CONTRACTOR, IF THE CONTRACT HAS BEEN MUTUALLY CLOSED OR 'NO DEMAND CERTIFICATE' HAS BEEN FURNISHED BY THE CONTRACTOR OR ANY SETTLEMENT AGREEMENT HAS BEEN SIGNED BETWEEN THE EMPLOYER AND THE CONTRACTOR. 14.2.8 IT IS AGREED THAT MECHANISM OF RESOLUTION OF DISPUTES THROUGH ARBITRATION SHALL BE AVAILABLE ONLY IN THE CASES WHERE THE VALUE OF THE DISPUTE IS LESS THAN RS. 10 CRORES. 14.2.9 IN CASE THE DISPUTED AMOUNT CLAIM, COUNTER CLAIM INCLUDING INTEREST IS RS. 10 CRORES AND ABOVE, THE PARTIES SHALL BE WITHIN THEIR RIGHTS TO TAKE RECOURSE TO REMEDIES OTHER THAN ARBITRATION, AS MAY BE AVAILABLE TO THEM UNDER THE APPLICABLE LAWS AFTER PRIOR INTIMATION TO THE OTHER PARTY. SUBJECT TO THE AFORESAID CONDITIONS, PROVISIONS OF THE ARBITRATION AND CONCILIATION ACT, 1996 AND ANY STATUTORY MODIFICATIONS OR RE-ENACTMENT THEREOF AS AMENDED FROM TIME TO TIME, SHALL APPLY TO THE ARBITRATION PROCEEDINGS UNDER THIS CLAUSE. 14.2.10 IN CASE, MULTIPLE ARBITRATIONS ARE INVOKED (WHETHER SUB-JUDICE OR ARBITRAL AWARD PASSED) BY ANY PARTY TO UNDER THIS CONTRACT, THEN THE CUMULATIVE VALUE OF CLAIMS (INCLUDING INTEREST CLAIMED OR AWARDED) IN ALL SUCH ARBITRATIONS SHALL BE TAKEN IN ACCOUNT WHILE ARRIVING AT THE TOTAL CLAIM IN DISPUTE FOR THE SUBJECT CONTRACT FOR THE PURPOSE OF CLAUSE 14.2.9. DISPUTES HAVING CUMULATIVE VALUE OF LESS THAN 10 CRORES SHALL BE RESOLVED THROUGH ARBITRATION AND ANY ADDITIONAL DISPUTE SHALL BE ADJUDICATED BY THE COURT OF COMPETENT JURISDICTION. 14.2.11 IN CASE OF CONTRACT WITH PUBLIC SECTOR ENTERPRISE (PSE) OR A GOVERNMENT DEPARTMENT, THE FOLLOWING SHALL BE APPLICABLE: IN THE EVENT OF ANY DISPUTE OR DIFFERENCE RELATING TO THE INTERPRETATION AND APPLICATION OF THE PROVISIONS OF COMMERCIAL CONTRACT(S) BETWEEN CENTRAL PUBLIC SECTOR ENTERPRISES (CPSES)/ PORT TRUSTS INTER SE AND ALSO BETWEEN CPSES AND GOVERNMENT DEPARTMENTS/ORGANIZATIONS (EXCLUDING DISPUTES CONCERNING RAILWAYS, INCOME TAX, CUSTOMS & EXCISE DEPARTMENTS), SUCH DISPUTE OR DIFFERENCE SHALL BE TAKEN UP BY EITHER PARTY FOR RESOLUTION THROUGH AMRCD (ADMINISTRATIVE MECHANISM FOR RESOLUTION OF CPSES DISPUTES) AS MENTIONED IN DPE OM NO. 05/0003/2019-FTS-10937 DATED 14-12-2022 AS AMENDED FROM TIME TO TIME.	
35.	JURISDICTION : THIS CONTRACT SHALL BE GOVERNED BY THE LAW FOR THE TIME BEING IN FORCE IN THE REPUBLIC OF INDIA. THE CIVIL COURT HAVING ORIGINAL CIVIL JURISDICTION AT VARANASI-UP, SHALL ALONE HAVE EXCLUSIVE JURISDICTION IN REGARD TO ALL MATTERS IN RESPECT OF THE CONTRACT.	
36.	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: 05 (FIVE) COPIES OF GST INVOICES - COPY OF GR/RR. - 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) IMMEDIATELY.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.	

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37.	THE VENDOR SHALL ENSURE THAT THEIR BANK DETAILS ARE UPDATED WITH US FOR TIMELY PAYMENT THROUGH EFT (ELECTRONICS FUND TRANSFER).	
38.	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.	
39.	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.	
40.	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.	
41.	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 EXACTLY 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.III.IN CASE OF PDI, VENDOR SHALL RAISE ONLINE INSPECTION CALL IN ONLINE INSPECTION PORTAL/INTIMATE BHEL IN WRITTING (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 DEFECTS ARE FOUND AT LATER STAGE, IT IS THE SOLE RESPONSIBILITY OF THE VENDOR TO REPLACE/RECTIFY THE SAME.	
42.	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 .	
43.	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.	
44.	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, 4 % 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 RESPECTIVE 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.	
45.	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	

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	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.	
46.	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 (PREFERENCE 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)).	
47.	13.1 "FORCE MAJEURE" SHALL MEAN CIRCUMSTANCE WHICH IS: A) BEYOND CONTROL OF EITHER OF THE PARTIES TO CONTRACT, B) EITHER OF THE PARTIES COULD NOT REASONABLY HAVE PROVIDED AGAINST THE EVENT BEFORE ENTERING INTO THE CONTRACT, C) HAVING ARISEN, EITHER OF THE PARTIES COULD NOT REASONABLY HAVE AVOIDED OR OVERCOME, AND D) IS NOT SUBSTANTIALLY ATTRIBUTABLE TO EITHER OF THE PARTIES AND PREVENTS THE PERFORMANCE OF THE CONTRACT SUCH CIRCUMSTANCES INCLUDE BUT SHALL NOT BE LIMITED TO: I) WAR, HOSTILITIES, INVASION, ACT OF FOREIGN ENEMIES. II) REBELLION, TERRORISM, REVOLUTION, INSURRECTION, MILITARY OR USURPED POWER, OR CIVIL WAR. III) RIOT, COMMOTION OR DISORDER BY PERSONS OTHER THAN THE CONTRACTOR'S PERSONNEL AND OTHER EMPLOYEES OF THE CONTRACTOR AND SUB-CONTRACTORS. IV) STRIKE OR LOCKOUT NOT SOLELY INVOLVING THE CONTRACTOR'S PERSONNEL AND OTHER EMPLOYEES OF THE CONTRACTOR AND SUB-CONTRACTORS. V) ENCOUNTERING MUNITIONS OF WAR, EXPLOSIVE MATERIALS, IONIZING RADIATION OR CONTAMINATION BY RADIO-ACTIVITY, EXCEPT AS MAY BE ATTRIBUTABLE TO THE CONTRACTOR'S USE OF SUCH MUNITIONS, EXPLOSIVES, RADIATION OR RADIO- ACTIVITY. VI) NATURAL CATASTROPHES SUCH AS EARTHQUAKE, TSUNAMI, VOLCANIC ACTIVITY, HURRICANE OR TYPHOON, FLOOD, FIRE, CYCLONES ETC. VII) EPIDEMIC, PANDEMIC ETC 13.2 THE FOLLOWING EVENTS ARE EXPLICITLY EXCLUDED FROM FORCE MAJEURE AND ARE SOLELY THE RESPONSIBILITIES OF THE NON-PERFORMING PARTY: A) ANY STRIKE, WORK-TO-RULE ACTION, GO-SLOW OR SIMILAR LABOUR DIFFICULTY (B) LATE DELIVERY OF EQUIPMENT OR MATERIAL (UNLESS CAUSED BY FORCE MAJEURE EVENT) AND (C) ECONOMIC HARDSHIP. 13.3 IF EITHER PARTY IS PREVENTED, HINDERED OR DELAYED FROM OR IN PERFORMING ANY OF ITS OBLIGATIONS UNDER THE CONTRACT BY AN EVENT OF FORCE MAJEURE, THEN IT SHALL NOTIFY THE OTHER IN WRITING OF THE OCCURRENCE OF SUCH EVENT AND THE CIRCUMSTANCES THEREOF WITHIN 15 (FIFTEEN) DAYS AFTER THE OCCURRENCE OF SUCH EVENT. 13.4 THE PARTY WHO HAS GIVEN SUCH NOTICE SHALL BE EXCUSED FROM THE PERFORMANCE OR PUNCTUAL PERFORMANCE OF ITS OBLIGATIONS UNDER THE CONTRACT FOR SO LONG AS THE RELEVANT EVENT OF FORCE MAJEURE CONTINUES AND TO THE EXTENT THAT SUCH PARTY'S PERFORMANCE IS PREVENTED, HINDERED OR DELAYED. THE TIME FOR COMPLETION SHALL BE EXTENDED BY A PERIOD OF TIME EQUAL TO PERIOD OF DELAY CAUSED DUE TO SUCH FORCE MAJEURE EVENT. 13.5 DELAY OR NON-PERFORMANCE BY EITHER PARTY HERETO CAUSED BY THE OCCURRENCE OF ANY EVENT OF FORCE MAJEURE SHALL NOT I) CONSTITUTE A DEFAULT OR BREACH OF THE CONTRACT. II) GIVE RISE TO ANY CLAIM FOR DAMAGES OR ADDITIONAL COST EXPENSE OCCASIONED THEREBY, IF AND TO THE EXTENT THAT SUCH DELAY OR NON-PERFORMANCE IS CAUSED BY THE OCCURRENCE OF AN EVENT OF FORCE MAJEURE.	

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	13.6 BHEL AT ITS DISCRETION MAY CONSIDER SHORT CLOSURE OF CONTRACT AFTER 1 YEAR OF IMPOSITION OF FORCE MAJEURE IN LINE WITH EXTANT GUIDELINES. IN ANY CASE, SUPPLIER/VENDOR CANNOT CONSIDER DEEMED SHORT-CLOSURE AFTER 1 YEAR OF IMPOSITION OF FORCE MAJEURE.	
48.	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.	
49.	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.	
50.	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.	
51.	THE BIDDER DECLARES THAT THEY WILL NOT ENTER INTO ANY ILLEGAL OR UNDISCLOSED 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 COMPETITIVENESS OR TO INTRODUCE 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.	
52.	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 .	
53.	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.	
54.	TREATMENT OF CASES REGARDING CONFLICT OF INTEREST: THE BIDDER NOTES THAT A CONFLICT OF INTEREST WOULD SAID TO HAVE OCCURRED IN THE TENDER PROCESS AND EXECUTION OF THE RESULTANT CONTRACT, IN CASE OF ANY OF THE FOLLOWING SITUATIONS: I) IF ITS PERSONNEL HAVE A CLOSE PERSONAL, FINANCIAL, OR BUSINESS RELATIONSHIP WITH ANY PERSONNEL OF BHEL WHO ARE DIRECTLY OR INDIRECTLY RELATED TO THE PROCUREMENT OR EXECUTION PROCESS OF THE CONTRACT, WHICH CAN AFFECT THE DECISION OF BHEL DIRECTLY OR INDIRECTLY; II) THE BIDDER (OR HIS ALLIED FIRM) PROVIDED SERVICES FOR THE NEED ASSESSMENT/ PROCUREMENT PLANNING OF THE TENDER PROCESS IN WHICH IT IS PARTICIPATING; III) PROCUREMENT OF GOODS DIRECTLY FROM THE MANUFACTURERS/ SUPPLIERS SHALL BE PREFERRED. HOWEVER, IF THE OEM/ PRINCIPAL INSISTS ON ENGAGING THE SERVICES OF AN AGENT, SUCH AGENT SHALL NOT BE ALLOWED TO REPRESENT MORE THAN ONE MANUFACTURER/ SUPPLIER IN THE SAME TENDER. MOREOVER, EITHER THE AGENT COULD BID ON BEHALF OF THE MANUFACTURER/ SUPPLIER OR THE MANUFACTURER/ SUPPLIER COULD BID DIRECTLY BUT NOT BOTH. IN CASE BIDS ARE RECEIVED FROM BOTH THE MANUFACTURER/ SUPPLIER AND THE AGENT, BID RECEIVED FROM THE AGENT SHALL BE IGNORED. HOWEVER, THIS SHALL NOT DEBAR MORE THAN ONE AUTHORISED DISTRIBUTOR (WITH/ OR WITHOUT THE OEM) FROM QUOTING EQUIPMENT MANUFACTURED BY AN ORIGINAL EQUIPMENT MANUFACTURER (OEM) IN PROCUREMENTS UNDER A PROPRIETARY ARTICLE CERTIFICATE. IV) A BIDDER PARTICIPATES IN MORE THAN ONE BID IN THIS TENDER PROCESS. PARTICIPATION IN ANY CAPACITY BY A BIDDER (INCLUDING THE PARTICIPATION OF A BIDDER AS A PARTNER/ JV MEMBER OR SUB-CONTRACTOR IN ANOTHER BID OR VICE-VERSA) IN MORE THAN ONE BID SHALL RESULT IN THE DISQUALIFICATION OF ALL BIDS IN WHICH HE IS A PARTY. HOWEVER, THIS DOES NOT LIMIT THE PARTICIPATION OF AN ENTITY AS A SUB-CONTRACTOR IN MORE THAN ONE BID IF HE IS NOT BIDDING INDEPENDENTLY IN HIS OWN NAME OR AS A MEMBER OF A JV. THE BIDDER DECLARES THAT THEY HAVE READ AND UNDERSTOOD THE ABOVE ASPECTS, AND THE BIDDER CONFIRMS THAT SUCH CONFLICT OF INTEREST DOES NOT EXIST AND UNDERTAKES THAT THEY WILL NOT ENTER INTO ANY ILLEGAL OR UNDISCLOSED AGREEMENT OR UNDERSTANDING, WHETHER FORMAL OR INFORMAL WITH OTHER BIDDER(S), IN THIS REGARD. THIS APPLIES IN PARTICULAR TO PRICES, SPECIFICATIONS, CERTIFICATIONS, SUBSIDIARY CONTRACTS, SUBMISSION OR NON-SUBMISSION OF BIDS OR ANY OTHER ACTIONS TO RESTRICT COMPETITIVENESS OR TO INTRODUCE CARTELIZATION IN THE BIDDING PROCESS. IN CASE, THE BIDDER IS FOUND HAVING INDULGED IN ABOVE ACTIVITIES, THE SAME WILL BE CONSIDERED AS A VIOLATION OF THE TENDER CONDITIONS, AND SUITABLE ACTION SHALL BE TAKEN BY BHEL AS PER EXTANT POLICIES/ GUIDELINES.	
55.	VENDOR MUST VISIT OUR WEBSITE https://herp.bhel.com REGULARLY FOR ENQUIRY/PO/CLARIFICATIONS/FOR ANY LATEST UPDATES.	
56.	MSME VENDORS CAN AVAIL BENEFITS OF PAYMENT THROUGH TREDS.	
57.	"THE OFFERS OF THE BIDDERS WHO ARE UNDER SUSPENSION AS ALSO THE OFFERS OF THE BIDDERS, WHO ENGAGE THE SERVICES OF THE FIRMS DEBARRED ACROSS BHEL, SHALL BE REJECTED. THE LIST OF FIRMS DEBARRED ACROSS BHEL IS AVAILABLE ON BHEL WEBSITE WWW.BHEL.COM. 1.0 INTEGRITY COMMITMENT, PERFORMANCE OF THE CONTRACT AND PUNITIVE ACTION THEREOF: 1.1. COMMITMENT BY BHEL: BHEL COMMITS TO TAKE ALL MEASURES NECESSARY TO PREVENT CORRUPTION IN CONNECTION WITH THE TENDER PROCESS AND EXECUTION OF THE CONTRACT. BHEL WILL DURING THE TENDER PROCESS TREAT ALL BIDDER(S) IN A TRANSPARENT AND FAIR MANNER, AND WITH EQUITY. 1.2. COMMITMENT BY BIDDER/ SUPPLIER/ CONTRACTOR: 1.2.1. THE BIDDER/ SUPPLIER/ CONTRACTOR COMMIT TO TAKE ALL MEASURES TO PREVENT CORRUPTION AND WILL NOT DIRECTLY OR INDIRECTLY INFLUENCE ANY DECISION OR BENEFIT WHICH HE IS NOT LEGALLY ENTITLED TO NOR WILL ACT OR OMIT IN ANY MANNER WHICH TANTAMOUNT TO AN OFFENCE PUNISHABLE UNDER ANY PROVISION OF THE INDIAN PENAL CODE, 1860 OR ANY OTHER LAW IN FORCE IN INDIA. 1.2.2. THE BIDDER/ SUPPLIER/ CONTRACTOR WILL, WHEN PRESENTING HIS BID, DISCLOSE ANY AND ALL PAYMENTS HE HAS MADE, AND IS COMMITTED TO OR INTENDS TO MAKE TO AGENTS, BROKERS OR ANY OTHER INTERMEDIARIES IN CONNECTION WITH THE AWARD OF THE CONTRACT AND SHALL ADHERE TO RELEVANT GUIDELINES ISSUED FROM TIME TO TIME BY GOVT. OF INDIA/ BHEL. 1.2.3. THE BIDDER/ SUPPLIER/ CONTRACTOR WILL PERFORM/ EXECUTE THE CONTRACT AS PER THE CONTRACT TERMS & CONDITIONS AND WILL NOT DEFAULT WITHOUT ANY REASONABLE CAUSE, WHICH CAUSES LOSS OF BUSINESS/ MONEY/ REPUTATION, TO BHEL. IF ANY BIDDER/ SUPPLIER/ CONTRACTOR DURING PRE-TENDERING/ TENDERING/ POST TENDERING/ AWARD/ EXECUTION/ POST-EXECUTION STAGE INDULGES IN MALPRACTICES, CHEATING, BRIBERY, FRAUD OR AND OTHER MISCONDUCT OR FORMATION OF CARTEL SO AS TO INFLUENCE THE BIDDING PROCESS OR INFLUENCE THE PRICE OR ACTS OR OMITS IN ANY MANNER WHICH TANTAMOUNT TO AN OFFENCE PUNISHABLE UNDER ANY PROVISION OF THE INDIAN PENAL CODE, 1860 OR ANY OTHER LAW IN FORCE IN INDIA, THEN, ACTION MAY BE TAKEN AGAINST SUCH BIDDER/ SUPPLIER/ CONTRACTOR AS PER EXTANT GUIDELINES OF THE COMPANY AVAILABLE ON WWW. BHEL.COM AND/OR UNDER APPLICABLE LEGAL PROVISIONS".	
58.	BID SECURITY OR EARNEST MONEY DEPOSIT (EMD): TO SAFE GUARD AGAINST A BIDDER'S WITHDRAWING OR ALTERING ITS/ HIS BID DURING THE BID VALIDITY PERIOD, BID SECURITY [ALSO KNOWN AS EARNEST MONEY DEPOSIT (EMD)] SHALL BE OBTAINED FROM THE BIDDERS ALONG WITH THEIR BIDS (EXCEPT MICRO AND SMALL ENTERPRISES (MSES) OR STARTUPS AS RECOGNIZED BY DEPARTMENT FOR PROMOTION OF INDUSTRY AND INTERNAL TRADE (DPIIT)). THE AMOUNT OF EMD SHALL BE AS MENTIONED IN ENQUIRY. 1. MODES OF DEPOSIT A) THE EMD MAY BE ACCEPTED ONLY IN THE FOLLOWING FORMS AND THE SAME MUST BE SUBMITTED BEFORE TENDER OPENING:	

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	(I) ELECTRONIC FUND TRANSFER CREDITED IN BHEL ACCOUNT. (II) BANKER'S CHEQUE/ PAY ORDER/ DEMAND DRAFT, IN FAVOUR OF BHEL. (III) FIXED DEPOSIT RECEIPT (FDR).(IN THE NAME OF " BIDDER'S NAME A/C BHEL") (IV) BANK GUARANTEE FROM ANY OF THE SCHEDULED BANKS. (V) INSURANCE SURETY BONDS. B) IN CASE THE EMD IS MORE THAN RUPEES TWO LAKH AND IN CASE OF FOREIGN BIDDERS, IT MAY BE IN THE FORM OF A BANK GUARANTEE (IN EQUIVALENT FOREIGN EXCHANGE AMOUNT, IN CASE OF FOREIGN BIDDERS) ISSUED/ CONFIRMED FROM ANY OF THE SCHEDULED COMMERCIAL BANK IN INDIA IN AN ACCEPTABLE FORM. THE EMD SHALL REMAIN VALID FOR A PERIOD OF 45 (FORTY-FIVE) DAYS BEYOND THE FINAL BID VALIDITY PERIOD. 2. FORFEITURE OF EMD I) A BIDDER'S EMD WILL BE FORFEITED IF THE BIDDER WITHDRAWS OR AMENDS ITS/HIS TENDER OR IMPAIRS OR DEROGATES FROM THE TENDER IN ANY RESPECT WITHIN THE PERIOD OF VALIDITY OF THE TENDER OR IF THE SUCCESSFUL BIDDER FAILS TO FURNISH THE REQUIRED PERFORMANCE SECURITY WITHIN THE SPECIFIED PERIOD MENTIONED IN THE TENDER. (II) EMD BY THE TENDERER SHALL BE WITHHELD IN CASE ANY ACTION ON THE BIDDER IS ENVISAGED UNDER THE PROVISIONS OF EXTANT "GUIDELINES ON SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS/ CONTRACTORS" AND FORFEITED/ RELEASED BASED ON THE ACTION AS DETERMINED UNDER THESE GUIDELINES. 3. RETURN OF EMD (I) BID SECURITIES OF THE UNSUCCESSFUL BIDDERS SHALL BE RETURNED TO BIDDER AT THE EARLIEST AFTER EXPIRY OF THE FINAL BID VALIDITY PERIOD AND LATEST BY THE 30TH DAY AFTER THE AWARD OF THE CONTRACT. HOWEVER, IN CASE OF TWO PACKET OR TWO STAGE BIDDING, BID SECURITIES OF UNSUCCESSFUL BIDDERS DURING FIRST STAGE I.E. TECHNICAL EVALUATION ETC. SHALL BE RETURNED WITHIN 30 DAYS OF DECLARATION OF RESULT OF FIRST STAGE I.E. TECHNICAL EVALUATION ETC. (II) BID SECURITY SHALL BE REFUNDED TO THE SUCCESSFUL BIDDER ON CONCLUSION OF THE ORDER/ RECEIPT OF A PERFORMANCE SECURITY (IF CALLED IN THE TENDER). (III) EMD SHALL NOT CARRY ANY INTEREST.	
59.	PERFORMANCE SECURITY (PS): TO ENSURE DUE PERFORMANCE OF THE CONTRACT, PERFORMANCE BANK GUARANTEE (PBG) OR SECURITY DEPOSIT (SD), HEREAFTER REFERRED AS PERFORMANCE SECURITY SHALL BE OBTAINED FROM THE SUCCESSFUL BIDDER AWARDED THE CONTRACT. THE PERFORMANCE SECURITY OF REQUIRED AMOUNT IS TO BE SUBMITTED BY THE DATE SPECIFIED IN THE PO/CONTRACT. 1. MODES OF DEPOSIT: A) PERFORMANCE SECURITY MAY BE FURNISHED IN THE FOLLOWING FORMS: (I) LOCAL CHEQUES OF SCHEDULED BANKS (SUBJECT TO REALIZATION)/ PAY ORDER/ DEMAND DRAFT/ ELECTRONIC FUND TRANSFER IN FAVOUR OF BHEL. (II) BANK GUARANTEE FROM SCHEDULED BANKS / PUBLIC FINANCIAL INSTITUTIONS AS DEFINED IN THE COMPANIES ACT. THE BANK GUARANTEE FORMAT SHOULD HAVE THE APPROVAL OF BHEL. (III) FIXED DEPOSIT RECEIPT ISSUED BY SCHEDULED BANKS / PUBLIC FINANCIAL INSTITUTIONS AS DEFINED IN THE COMPANIES ACT (FDR SHOULD BE IN THE NAME OF THE CONTRACTOR, A/C BHEL). (IV) SECURITIES AVAILABLE FROM INDIAN POST OFFICES SUCH AS NATIONAL SAVINGS CERTIFICATES, KISAN VIKAS PATRAS ETC. (HELD IN THE NAME OF CONTRACTOR FURNISHING THE SECURITY AND DULY ENDORSED/ HYPOTHECATED/ PLEDGED, AS APPLICABLE, IN FAVOUR OF BHEL). (V) INSURANCE SURETY BOND. (NOTE: BHEL WILL NOT BE LIABLE OR RESPONSIBLE IN ANY MANNER FOR THE COLLECTION OF INTEREST OR RENEWAL OF THE DOCUMENTS OR IN ANY OTHER MATTER CONNECTED THEREWITH) B) IN CASE OF GTE TENDERS, THE PERFORMANCE SECURITY SHALL BE IN THE SAME CURRENCY AS THE CONTRACT AND MUST CONFORM TO UNIFORM RULES FOR DEMAND GUARANTEES (URDG 758) - AN INTERNATIONAL CONVENTION REGULATING INTERNATIONAL SECURITIES. (C) PERFORMANCE SECURITY IS TO BE FURNISHED WITHIN A SPECIFIED DATE (GENERALLY 14(FOURTEEN) DAYS AFTER NOTIFICATION OF THE AWARD) AND IT SHOULD REMAIN VALID FOR A PERIOD OF 60 (SIXTY) DAYS BEYOND THE DATE OF COMPLETION OF ALL CONTRACTUAL OBLIGATIONS OF THE SUPPLIER, INCLUDING WARRANTY OBLIGATIONS. "BIDDER AGREES TO SUBMIT PERFORMANCE SECURITY REQUIRED FOR EXECUTION OF THE CONTRACT WITHIN THE TIME PERIOD MENTIONED. IN CASE OF DELAY IN SUBMISSION OF PERFORMANCE SECURITY, ENHANCED PERFORMANCE SECURITY WHICH WOULD INCLUDE INTEREST (REPO RATE+4%) FOR THE DELAYED PERIOD, SHALL BE SUBMITTED BY THE BIDDER. FURTHER, IF PERFORMANCE SECURITY IS NOT SUBMITTED TILL SUCH TIME THE FIRST BILL BECOMES DUE, THE AMOUNT OF PERFORMANCE SECURITY DUE SHALL BE RECOVERED AS PER TERMS DEFINED IN NIT CONTRACT, FROM THE BILLS ALONG WITH DUE INTEREST" 2. FORFEITURE OF PERFORMANCE SECURITY: THE PERFORMANCE SECURITY WILL BE FORFEITED AND CREDITED TO BHEL'S ACCOUNT IN THE EVENT OF A BREACH OF CONTRACT BY THE SUPPLIER. 3. RETURN OF PERFORMANCE SECURITY (PS): PS SHALL BE REFUNDED TO THE BIDDER WITHOUT INTEREST, AFTER HE DULY PERFORMS AND COMPLETES THE CONTRACT IN ALL RESPECTS BUT NOT LATER THAN 60(SIXTY) DAYS OF COMPLETION OF ALL SUCH OBLIGATIONS INCLUDING THE WARRANTY UNDER THE CONTRACT. 4. THE PERFORMANCE SECURITY SHALL NOT CARRY ANY INTEREST.	
60.	BREACH OF CONTRACT, REMEDIES AND TERMINATION: 16.1 BREACH OF CONTRACT: THE FOLLOWING SHALL AMOUNT TO BREACH OF CONTRACT: I. NON-SUPPLY OF MATERIAL/ NON-COMPLETION OF WORK BY THE SUPPLIER/VENDOR WITHIN SCHEDULED DELIVERY/ COMPLETION PERIOD AS PER CONTRACT OR AS EXTENDED FROM TIME TO TIME. II. THE SUPPLIER/VENDOR FAILS TO PERFORM AS PER THE ACTIVITY SCHEDULE AND THERE ARE SUFFICIENT REASONS EVEN BEFORE EXPIRY OF THE DELIVERY/ COMPLETION PERIOD TO JUSTIFY THAT SUPPLIES SHALL BE INORDINATELY DELAYED BEYOND CONTRACTUAL DELIVERY/ COMPLETION PERIOD. III. THE SUPPLIER/VENDOR DELIVERS EQUIPMENT/ MATERIAL NOT OF THE CONTRACTED QUALITY. IV. THE SUPPLIER/VENDOR FAILS TO REPLACE THE DEFECTIVE EQUIPMENT/ MATERIAL/ COMPONENT AS PER GUARANTEE CLAUSE. V. WITHDRAWAL FROM OR ABANDONMENT OF THE WORK BY THE SUPPLIER/VENDOR BEFORE COMPLETION AS PER CONTRACT. VI. ASSIGNMENT, TRANSFER, SUBLETTING OF CONTRACT BY THE SUPPLIER/VENDOR WITHOUT BHEL'S WRITTEN PERMISSION RESULTING IN TERMINATION OF CONTRACT OR PART THEREOF BY BHEL. VII. NON-COMPLIANCE TO ANY CONTRACTUAL CONDITION OR ANY OTHER DEFAULT ATTRIBUTABLE TO SUPPLIER/VENDOR. VIII. ANY OTHER REASON(S) ATTRIBUTABLE TO VENDOR TOWARDS FAILURE OF PERFORMANCE OF CONTRACT. IN CASE OF BREACH OF CONTRACT, BHEL SHALL HAVE THE RIGHT TO TERMINATE THE PURCHASE ORDER/ CONTRACT EITHER IN WHOLE OR IN PART THEREOF WITHOUT ANY COMPENSATION TO THE SUPPLIER/VENDOR. IX. ANY OF THE DECLARATIONS FURNISHED BY THE CONTRACTOR AT THE TIME OF BIDDING AND/ OR ENTERING INTO THE CONTRACT FOR SUPPLY ARE FOUND UNTRUTHFUL AND SUCH DECLARATIONS WERE OF A NATURE THAT COULD HAVE RESULTED IN NON-AWARD OF CONTRACT TO THE CONTRACTOR OR COULD EXPOSE BHEL AND/ OR OWNER TO ADVERSE CONSEQUENCES, FINANCIAL OR OTHERWISE. X. SUPPLIER/VENDOR IS CONVICTED OF ANY OFFENCE INVOLVING CORRUPT BUSINESS PRACTICES, ANTI-NATIONAL ACTIVITIES OR ANY SUCH OFFENCE THAT COMPROMISES THE BUSINESS ETHICS OF BHEL, IN VIOLATION OF THE INTEGRITY PACT ENTERED INTO WITH BHEL HAS THE POTENTIAL TO HARM THE OVERALL BUSINESS OF BHEL/ OWNER NOTE- ONCE BHEL CONSIDERS THAT A BREACH OF CONTRACT HAS OCCURRED ON THE PART OF SUPPLIER/VENDOR, BHEL SHALL NOTIFY THE SUPPLIER/VENDOR BY WAY OF NOTICE IN THIS REGARD. CONTRACTOR SHALL BE GIVEN AN OPPORTUNITY TO RECTIFY THE REASONS CAUSING THE BREACH OF CONTRACT WITHIN A PERIOD OF 14 DAYS. IN CASE THE CONTRACTOR FAILS TO REMEDY THE BREACH, AS MENTIONED IN THE NOTICE, TO THE SATISFACTION OF BHEL, BHEL SHALL HAVE THE RIGHT TO TAKE RECOURSE TO ANY OF THE REMEDIAL ACTIONS AVAILABLE TO IT UNDER THE RELEVANT PROVISIONS OF CONTRACT 16.2 REMEDIES IN CASE OF BREACH OF CONTRACT.	

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

**Amendment- 28
ANNEXURE-A**

	I. WHEREIN THE PERIOD AS STIPULATED IN THE NOTICE ISSUED UNDER CLAUSE 14.1 HAS EXPIRED AND SUPPLIER/VENDOR HAS FAILED TO REMEDY THE BREACH, BHEL WILL HAVE THE RIGHT TO TERMINATE THE CONTRACT ON THE GROUND OF "BREACH OF CONTRACT" WITHOUT ANY FURTHER NOTICE TO CONTRACTOR. II. UPON TERMINATION OF CONTRACT, BHEL SHALL BE ENTITLED TO RECOVER AN AMOUNT EQUIVALENT TO 10% OF THE CONTRACT VALUE FOR THE DAMAGES ON ACCOUNT OF BREACH OF CONTRACT COMMITTED BY THE SUPPLIER/VENDOR. THIS AMOUNT SHALL BE RECOVERED BY WAY OF ENCASHING THE SECURITY INSTRUMENTS LIKE PERFORMANCE BANK GUARANTEE ETC AVAILABLE WITH BHEL AGAINST THE SAID CONTRACT. IN CASE THE VALUE OF THE SECURITY INSTRUMENTS AVAILABLE IS LESS THAN 10% OF THE CONTRACT VALUE, THE BALANCE AMOUNT SHALL BE RECOVERED FROM OTHER FINANCIAL REMEDIES (I.E. AVAILABLE BILLS OF THE SUPPLIER/VENDOR, RETENTION AMOUNT, FROM THE MONEY DUE TO THE SUPPLIER/VENDOR ETC. WITH BHEL) OR THE OTHER LEGAL REMEDIES SHALL BE PURSUED III. WHEREVER THE VALUE OF SECURITY INSTRUMENTS LIKE PERFORMANCE BANK GUARANTEE AVAILABLE WITH BHEL AGAINST THE SAID CONTRACT IS 10% OF THE CONTRACT VALUE OR MORE, SUCH SECURITY INSTRUMENTS TO THE EXTENT OF 10% CONTRACT VALUE WILL BE ENCASHED. IN CASE NO SECURITY INSTRUMENTS ARE AVAILABLE OR THE VALUE OF THE SECURITY INSTRUMENTS AVAILABLE IS LESS THAN 10% OF THE CONTRACT VALUE, THE 10% OF THE CONTRACT VALUE OR THE BALANCE AMOUNT, AS THE CASE MAY BE, WILL BE RECOVERED IN ALL OR ANY OF THE FOLLOWING MANNERS: IV. IN CASE THE AMOUNT RECOVERED UNDER SUB CLAUSE (A) ABOVE IS NOT SUFFICIENT TO FULFIL THE AMOUNT RECOVERABLE THEN; A DEMAND NOTICE TO DEPOSIT THE BALANCE AMOUNT WITHIN 30 DAYS SHALL BE ISSUED TO SUPPLIER/VENDOR. V. IF SUPPLIER/VENDOR FAILS TO DEPOSIT THE BALANCE AMOUNT WITHIN THE PERIOD AS PRESCRIBED IN DEMAND NOTICE, FOLLOWING ACTION SHALL BE TAKEN FOR RECOVERY OF THE BALANCE AMOUNT: A. FROM DUES AVAILABLE IN THE FORM OF BILLS PAYABLE TO DEFAULTED SUPPLIER/VENDOR AGAINST THE SAME CONTRACT. B. IF IT IS NOT POSSIBLE TO RECOVER THE DUES AVAILABLE FROM THE SAME CONTRACT OR DUES ARE INSUFFICIENT TO MEET THE RECOVERABLE AMOUNT, BALANCE AMOUNT SHALL BE RECOVERED FROM ANY MONEY(S) PAYABLE TO SUPPLIER/VENDOR UNDER ANY CONTRACT WITH OTHER UNITS OF BHEL INCLUDING RECOVERY FROM SECURITY DEPOSITS OR ANY OTHER DEPOSIT AVAILABLE IN THE FORM OF SECURITY INSTRUMENTS OF ANY KIND AGAINST SECURITY DEPOSIT OR EMD. C. IN-CASE RECOVERIES ARE NOT POSSIBLE WITH ANY OF THE ABOVE AVAILABLE OPTIONS, LEGAL ACTION SHALL BE INITIATED FOR RECOVERY AGAINST DEFAULTED SUPPLIER/VENDOR. VI. IT IS AN AGREED TERM OF CONTRACT THAT THIS AMOUNT SHALL BE A GENUINE PRE-ESTIMATE OF DAMAGES THAT BHEL WOULD INCUR IN COMPLETION OF BALANCE CONTRACTUAL OBLIGATION OF THE CONTRACT THROUGH ANY OTHER AGENCY AND BHEL WILL NOT BE REQUIRED TO FURNISH ANY OTHER EVIDENCE TO THE SUPPLIER/VENDOR FOR THE PURPOSE OF ESTIMATION OF DAMAGES. VII. IN ADDITION TO THE ABOVE, IMPOSITION OF LIQUIDATED DAMAGES, DEBARMENT, TERMINATION, DE-SCOPING, SHORT-CLOSURE, ETC., SHALL BE APPLIED AS PER PROVISIONS OF THE CONTRACT. NOTE: 1) THE DEFAULTING SUPPLIER/VENDOR SHALL NOT BE ELIGIBLE FOR PARTICIPATION IN ANY OF THE FUTURE ENQUIRIES FLOATED BY BHEL TO COMPLETE THE BALANCE WORK. THE DEFAULTING CONTRACTOR SHALL MEAN AND INCLUDE: (A) IN CASE DEFAULTED SUPPLIER/VENDOR IS THE SOLE PROPRIETORSHIP FIRM, ANY SOLE PROPRIETORSHIP FIRM OWNED BY SAME SOLE PROPRIETOR (B) IN CASE DEFAULTED SUPPLIER/VENDOR IS THE PARTNERSHIP FIRM, ANY FIRM COMPRISING OF SAME PARTNERS/ SOME OF THE SAME PARTNERS ; OR SOLE PROPRIETORSHIP FIRM OWNED BY ANY PARTNER(S) AS A SOLE PROPRIETOR.	
61.	NO INTEREST PAYABLE TO CONTRACTOR: NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED IN ANY OTHER DOCUMENT COMPRISING IN THE CONTRACT, NO INTEREST SHALL BE PAYABLE BY BHEL TO CONTRACTOR ON ANY MONEYS OR BALANCES INCLUDING BUT NOT LIMITED TO THE SECURITY DEPOSIT, EMD, RETENTION MONEY, RA BILLS OR THE FINAL BILL, OR ANY AMOUNT WITHHELD AND/OR APPROPRIATED BY BHEL ETC., WHICH BECOMES OR AS THE CASE MAY BE, IS ADJUDGED TO BE DUE FROM BHEL TO CONTRACTOR WHETHER UNDER THE CONTRACT OR OTHERWISE	
62.	OVER RUN CHARGES: NO OVERRUN CHARGES ARE APPLICABLE	
63.	ORDER OF PRECEDENCE: THE PURCHASE ORDER ALONG WITH ITS ANNEXURES THE NIT, ITS AMENDMENTS /CORRIGENDUM'S SHALL ALL TOGETHER CONSTITUTE THE ENTIRE CONTRACT BETWEEN THE PARTIES AND SHALL BE COMPLEMENTARY TO ONE ANOTHER. IN CASE OF ANY CONTRADICTION, THE ORDER OF PRECEDENCE SHALL BE AS BELOW: - PURCHASE ORDER ALONG WITH ITS ANNEXURES - AMENDMENTS/CLARIFICATIONS/CORRIGENDA/ERRATA ETC. ISSUED IN RESPECT OF THE TENDER DOCUMENTS BY BHEL. - NIT	
64.	OTHER POINTS: YOU SHALL HAVE TO OBSERVE ALL WORK QUALITY, SAFETY REGULATIONS, GENERAL TECHNICAL GUIDE LINES AS STIPULATED IN RELEVANT CLAUSES TENDER SPECIFICATION. YOU SHALL SUBMIT PROGRESS REPORTS TO BHEL AS PER TENDER CONDITIONS, REVIEW THE PROGRAMME FROM TIME TO TIME AND TAKE SUITABLE STEPS TO MEET OVERALL PROJECT SCHEDULE, IN CONSULTATION WITH BHEL/ BIFCL ENGINEER VENDOR SHOULD FOLLOW THE AGREED TENDER TERM (CL. NO. 29.0 OF GTC) STRICTLY: -- "THE OFFERS OF THE BIDDERS WHO ARE ON THE BANNED LIST AS 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)". ALL OTHER TERMS & CONDITIONS NOT COVERED HERE SHALL BE AS PER THOSE SPECIFIED IN THE TENDER DOCUMENT (NIT) ALONG WITH TCNS INCLUDING TECHNICAL SPECIFICATION, SPECIFIC CONDITIONS OF CONTRACT & GENERAL CONDITIONS OF CONTRACT. YOU ARE REQUESTED TO SEND US THE ACKNOWLEDGEMENT AS PER SPECIFIED FORMAT AND CONVEY YOUR UNQUALIFIED ACCEPTANCE TO THIS PURCHASE ORDER AS PER ENCLOSED ANNEXURE-X WITHIN 7 (SEVEN) DAYS ELSE IT WILL BE DEEMED ACCEPTED.	

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

Amendment- 28
ANNEXURE-A

65.	FOR SUPPLY ORDERS PLACED ON INDIAN SUPPLIERS: IRRESPECTIVE OF THE VALUE OF THE INVOICE AMOUNT, THE BIDDER / VENDOR SHOULD NECESSARILY UPLOAD THE DESPATCH & INVOICE DETAILS ON BHEL SUVIDHA PORTAL AT HTTPS://SUVIDHA.BHEL.IN/SUVIDHA/, PRIOR TO DESPATCH. ALL DOCUMENTS AS PER PO CHECKLIST , ALONG WITH ADDITIONAL DOCUMENTS (IF ANY), MUST BE UPLOADED ON THE PORTAL. IT IS MANDATORY THAT TAX INVOICES WITH A NET AMOUNT (INCLUDING TAXES) EXCEEDING RS FIVE LAKHS UPLOADED ON THE PORTAL ARE DIGITALLY SIGNED USING A CLASS 3 DIGITAL SIGNATURE CERTIFICATE (DSC) ISSUED BY A LICENSED CERTIFYING AUTHORITY. SUBMISSION OF INVOICE DOCUMENT IN HARD COPY IS ALLOWED FOR INVOICES WITH A NET AMOUNT (INCLUDING TAXES) EQUAL TO AND UPTO RS FIVE LAKHS , IN CASE THEY WERE NOT DIGITALLY SIGNED AND UPLOADED ON THE PORTAL. THE MATERIAL WILL NOT BE ACCEPTED INSIDE BHEL IN ABSENCE OF THE ABOVE.	
66.	GRIEVANCE REDRESSAL MECHANISM: TO PROMOTE TRANSPARENCY AND ENSURE FAIR TREATMENT OF ALL BIDDERS, A STRUCTURED GRIEVANCE REDRESSAL MECHANISM IS IN PLACE TO ADDRESS ANY CONCERNS OR ISSUES ARISING DURING THE TENDERING PROCESS OR IN SUBSEQUENT BUSINESS DEALINGS WITH THE COMPANY. SUPPLIERS/CONTRACTORS ARE REQUESTED TO FOLLOW THE BELOW ESCALATION PROCESS FOR GRIEVANCE RESOLUTION: 1. FIRST LEVEL: ANY GRIEVANCE SHOULD INITIALLY BE ADDRESSED TO THE DESIGNATED DEALING OFFICER, WHOSE CONTACT DETAILS ARE PROVIDED IN THE NOTICE INVITING TENDER (NIT)/CONTRACT. SECOND LEVEL: IF THE ISSUE REMAINS UNRESOLVED, IT MAY BE ESCALATED BY LODGING A FORMAL GRIEVANCE THROUGH THE SUVIDHA PORTAL: HTTPS://SUVIDHA.BHEL.IN/SUVIDHA/. RESPONSES WILL BE PROVIDED IN ACCORDANCE WITH THE DEFINED ESCALATION MATRIX	
67.	IN RESPECT OF PROCUREMENT OF GOODS OR SERVICES FROM MICRO, SMALL AND MEDIUM ENTERPRISES (MSMEs), THE SETTLEMENT OF INVOICE SHALL BE ONLY THROUGH ANY OF THE TREDS PLATFORM ((I.E RXIL, M1XCHANGE,INVOICEMART,KREDX, C2FO), AUTHORISED BY THE RESERVE BANK OF INDIA. SUCH MSME SUPPLIERS TO SELECT THEIR PREFERRED TREDS PLATFORM BEFORE AWARD OF CONTRACT SO THAT THE DATA IS CAPTURED IN THE ORDER /CONTRACT DATABASE OF THE UNIT. THEY ALSO WILL HAVE THE OPTION TO CHANGE THE TREDS PLATFORM FROM THE DROP DOWN MENU ON SUVIDHA PORTAL OF BHEL, AT THE TIME OF INVOICE SUBMISSION. WHEREVER THE TRADE RECEIVABLE IS ACCEPTED BY BHEL, THE SAME SHALL BE VALIDATED BY THE UNIT ON THE RESPECTIVE TREDS PLATFORM SELECTED BY THE SUPPLIER. THE ROUTING OF INVOICES THROUGH THE TREDS PLATFORM SHALL NOT BE CONSTRUED AS MANDATING DISCOUNTING OF SUCH INVOICES AND THE MSMEs SUPPLIER SHALL HAVE THE OPTION TO AVAIL OR NOT AVAIL FINANCING OR DISCOUNTING OF ITS RECEIVABLES ON THE TREDS PLATFORM. IN CASE DISCOUNTING IS NOT AVAILED BY THE SUPPLIER ON TREDS, THE TRADE RECEIVABLES WILL BE PAID THROUGH TREDS AS PER THE PAYMENT TIMELINES INDICATED IN THE CONTRACT	

NOTE:

1. PLEASE FILL IN THIS FORMAT AND SEND COMPULSORILY ALONG WITH QUOTATION WITH VENDOR'S SEAL, SIGNATURE AND DATE.

SIGNATURE ALONG WITH SEAL AND DATE:

BANK GUARANTEE FOR SUPPLY FREE ISSUE MATERIAL

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of Bharat Heavy Electricals Limited¹ (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____¹ through its Unit at _____ (name of the Unit) having awarded to _____² (Name of the Vendor / Contractor / Supplier), with its registered office at _____² (hereinafter called "the Vendor/Contractor/Supplier" which expression shall include its successors and permitted assigns) a contract Ref No _____ dated _____³ valued at Rs _____ (Rupees -----) / FC _____ (in words _____) for _____⁴ (hereinafter called the 'Contract')

AND WHEREAS the Employer having agreed as per the terms and conditions of the Contract to supply free issue material costing Rs. _____ for the manufacture/fabrication of the equipment at the 'Contractor/Supplier/Fabricator's' site on furnishing of a Bank Guarantee for Rs./FC _____ (Rupees/FC _____) in the manner hereinafter specified for the due safeguard of the free issue material, we, _____, (hereinafter referred to as the Bank), having registered/Head office at _____ and inter alia a branch at _____ being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount but not exceeding Rs/FC ----- (Rupees/FC -----) without any demur, merely on a demand from the Employer and without any reservation, protest and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the 'Contractor/Supplier/Fabricator' in any suit or proceeding pending before any Court or Tribunal or Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the 'Contractor/Supplier/Fabricator' shall have no claim against us for making such payment.

We the _____ Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and till the reconciliation of the free issue material has been carried out and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We, _____ Bank further agree that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said 'Contractor/Supplier/Fabricator' from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Contractor/Supplier/Fabricator and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said 'Contractor/Supplier/Fabricator' or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said 'Contractor/Supplier/Fabricator' or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor/Supplier/ Fabricator and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's/Supplier's/ Fabricator's liabilities.

This Guarantee shall remain in force upto and including _____⁶ and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/ Supplier/ Fabricator but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the _____⁷ we shall be discharged from all liabilities under this guarantee thereafter.

We, _____ BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed _____⁵
- b) This Guarantee shall be valid up to _____⁶
- c) Unless the Bank is served a written claim or demand on or before _____⁷ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated _____.

Place of Issue _____.

¹ NAME AND ADDRESS OF THE EMPLOYER. i.e Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF THE CONTRACTOR / SUPPLIER/ FABRICATOR .

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ PROJECT/SUPPLY DETAILS AND CONTRACT VALUE

⁵ BG AMOUNT IN FIGURES AND WORDS

⁶ VALIDITY DATE

⁷ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 3-6 months after validity date. It may be ensured that the same is in line with the agreement/ contract entered with the Vendor.
2. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.
3. In line with the GCC, SCC or contractual terms, Unit may carry out minor modifications in the Standard BG Formats. If required, such modifications may be carried out after taking up appropriately with the Unit/Region's Law Deptt.

4. In Case of Bank Guarantees submitted by Foreign Vendors-

- a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
- b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
 - b.2 **In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank** (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). The BG Format provided to them should clearly specify the same.

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)

Annexure – MSEs 2012 Rev 01

OWNERSHIP STATUS (SC/ ST OR WOMEN-OWNED OR OTHERS) UNDER MSE
(Mandatory for all Non-GeM tenders and custom bids on GeM)

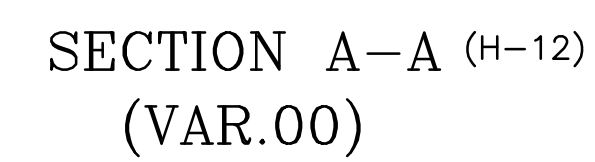
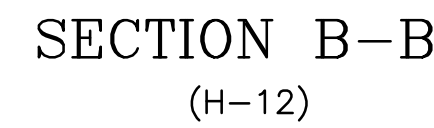
In order to avail benefits of MSE under various categories, all Bidders falling under MSE category shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer.

Type under MSE	SC/ST Owned	Women Owned	Others (excluding SC/ST & Women Owned)
Micro			
Small			

(Bidder details with Sign and date)

Note: In case party is falling under any of the above category, they shall mention **YES** in the against the box.

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TECHNICAL REQUIREMENTS

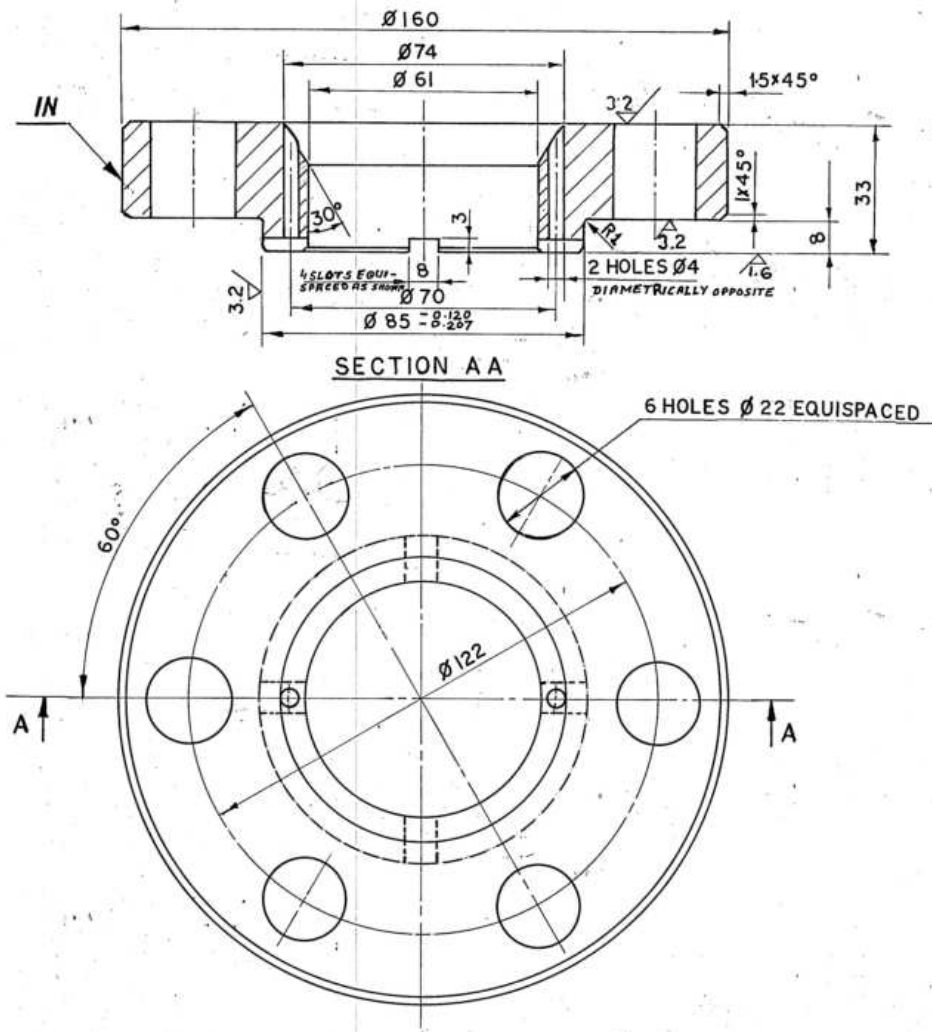
1. DIMENSION GIVEN IN BRACKET IS FOR REFERENCE ONLY HOWEVER THE ACTUAL DIMENSION SHALL BE DECIDED DURING ASSY.
2. TWO NUMBERS OF TECHNOLOGICAL PINS OF SIZE $\phi 3\text{h}8\text{x}50$ (AS PER ST 05005) ARE REQUIRED FOR ASSY.
3. AFTER TIGHTENING OF NUT ITEM NO.8 THE SHEET ITEM NO.14 SHALL BE FITTED, BENT AND WELDED AS SHOWN IN DRAWING.
4. CLASSIFICATION OF WELDING GROUP CK SHALL BE AS PER HW 0620099.
- b. WELD TEST SCOPE SHALL CONFORM TO HW 0850199 WITH CATEGORY OF SERVICE REQUIREMENTS 4.

DIBOW NO. 01140224200				STATUS OF DRG 0		TYPE OF PRODUCT STEAM TURBINE	
AGREED TO ST		NAME N.SINGH		SIGN Sd-		DATE 12.12.93	
NAME OF CUSTOMER/ PROJECT							
GRADE OF UNTOL. DIM.- W/C-C - 1/2M/F 1A 0230208 WELDING-A/B/C/D - A6621104 GAS CUTTING - 13A96621104				 BHARAT HEAVY ELECTRICALS LTD. HARDWARE			
REV. DATE 12.12.93		ALTERED CHECKED		Sd- Sd-		DRN NAME SIGN DATE NO. OF DRN BHARTNEY Sd- 25.9.01 VAR. CHD Sd- 30.9.03 APP. BS. GUPTA Sd- 13.12.93	
DEPT. SITE 4011		SCALE NTS		WEIGHT(Kg.) 36.0		REF. TO ASSY. DRG. -	
SUPERSEDES THE OLD DRG. UNDER THE SAME NUMBER WITHOUT ANY CHANGE C/A NO STE-08-F				ITEM NO. OF 030 25-7		DRAWING NO. 0-11402-24200-1 12.12.93	
5				4		SHEET NO. 01 NO. OF SHEETS 01	

2-11402-02201

DRAWING NO.

12.5/ ALL OVER UNLESS OTHERWISE STATED.



TECHNICAL REQUIREMENTS:

1. IDENTIFICATION AS PER HW0400397 AT THE PLACE MARKED WITH IN.
2. ALL THE EDGES WHERE CHAMFER IS NOT SPECIFIED SHALL BE CHAMFERED TO 0.5x45°.

 REF. DRG. NO.
1770815
SIGN & DATE

COVER		2-11402-02201	STF 21 Cr Mo Ni V 47	
VAR.00	REMARKS	ITEM NO.	DESCRIPTION	DRAWING NO.
09	64 65	79 25 27 28	58 60 60	77 32 33 46
CARD TYPE-3		28	CARD TYPE-1	
CARD TYPE-2		28	CARD TYPE-2	
GMS/GR. SP. NO. GMS01140202200		STATUS OF DRG.		
APPROVED	NAME	SIGN.	DATE	
ATT	N.C. TANEJA		23-2-83	
MTE	C.D. SHARMA		16/1/83	
TYPE OF PRODUCT OR NAME OF CUSTOMER / PROJECT				
STEAM TURBINE 500 MW				
BHSR		BHARAT HEAVY ELECTRICALS LTD. RANIPUR - HARDWAR.		
NAME	SIGN.	DATE	NO. OF	
H.C. GUPTA		23-2-83	ITEM	
G.K.D.		16/1/83	NO.	
M.R.K.		18-3-83	NO.	
DEPT.	STE	GRADE OF	SCALE	WEIGHT (Kg)
CODE	4011	INTOLDIM	1:1	3.00
TITLE	COVER		DRAWING NO.	2-11402-02201
CARD CODE			SHEET NO.	1
		NO. OF SHEETS:- 1		REV.

SIZE A2

DRAWING NO. 2-11402-24201

5 HOLES M16 AS SHOWN
CSK 1-2 X 120°TECHNOLOGICAL
THREADED HOLE2 HOLES M16 TO BE MADE
DURING ASSLY.2 HOLES Ø8 FOR TAPER PIN
TO BE MADE DURING ASSLY

SECTION A-A

SECTION B-B

6 HOLES Ø12.0
AS SHOWN, TO BE DRILLED
AND REAMED FOR CYL.
PIN 12n6 X 20 DURING ASSLY12% ALL OVER UNLESS
OTHERWISE STATED

TECHNICAL REQUIREMENTS:-

1. IDENTIFICATION AS PER HW0400397 AT THE PLACE MARKED WITH IN
2. ALL THE EDGES WHERE CHAMFERING IS NOT SPECIFIED SHALL BE CHAMFERED TO 0.5 X 45°.

SUPERSEDES THE OLD DRG.
UNDER THE SAME NO.
CHANGE ADVICE NO. STE-94-615
SIGN *Dec* DATE 16-12-94

INVENTORY NO. 2-11402-24201

SIGN & DATE

REF. DRG. NO.

REV. DATE ALTD. *Chandran*
01 12/11/02 CHD.
CHANGED AS PER C/ADV.
STE-02-F1381

REV. DATE ALTD. *Chandran*
03 12/11/02 CHD.
CHANGED AS PER C/ADV.
No. STE-01-391

REV. DATE ALTD. *Chandran*
02 25.5.95 CHECKED *ALL*
CHANGED AS PER C/ADV.
STE-95-220.

REV. DATE ALTD. *Chandran*
01 16.12.94 CHECKED *NW*
SUPERSEDES THE OLD DRG.
UNDER THE SAME NO.
CHANGE ADVICE NO.
STE-94-615

GRADE OF UNTOL DIM —
M/CG-C/M/F AA 0230208
WELDING-A/B/C/DAA0621104
GAS CUTTING-T3-AA0621104

RING		2-11402-24201		HW1065280050		500	
VAR. 00	REMARKS	ITEM NO.	DESCRIPTION	DRAWING NO.	MATERIAL CODE	UNIT WEIGHT	NO. OF SHEETS
59	64 65	75 25 27 29	58 69 60	77	32 1 23 26	55 58 53 66	71 72
CARD TYPE 3 28 → 28 → CARD TYPE-1				28 → CARD TYPE-2			
GMS NO./GP SP NO. GMS 01140224200				STATUS OF DRG			
APPROVED	NAME	SIGN	DATE	TYPE OF PRODUCT OR NAME OF CUSTOMER / PROJECT			
MTE	C/S/DRAMA	<i>Chandran</i>	5/11/95	STEAM TURBINE			
EXT	N. SINGH	<i>Dec</i>	28-12-94	BHARAT HEAVY ELECTRICALS LTD HARDWAR			
DEPT STE				SCALE	WEIGHT (kg)	REF TO ASSY DRG.	ITEM NO
CODE 4.01				1:1	5.00	0-11402-24200	002
TITLE				CARD CODE	DRAWING NO.		
RING				2-11402-24201	SHEET NO. 01 NO. OF SHEETS 01		

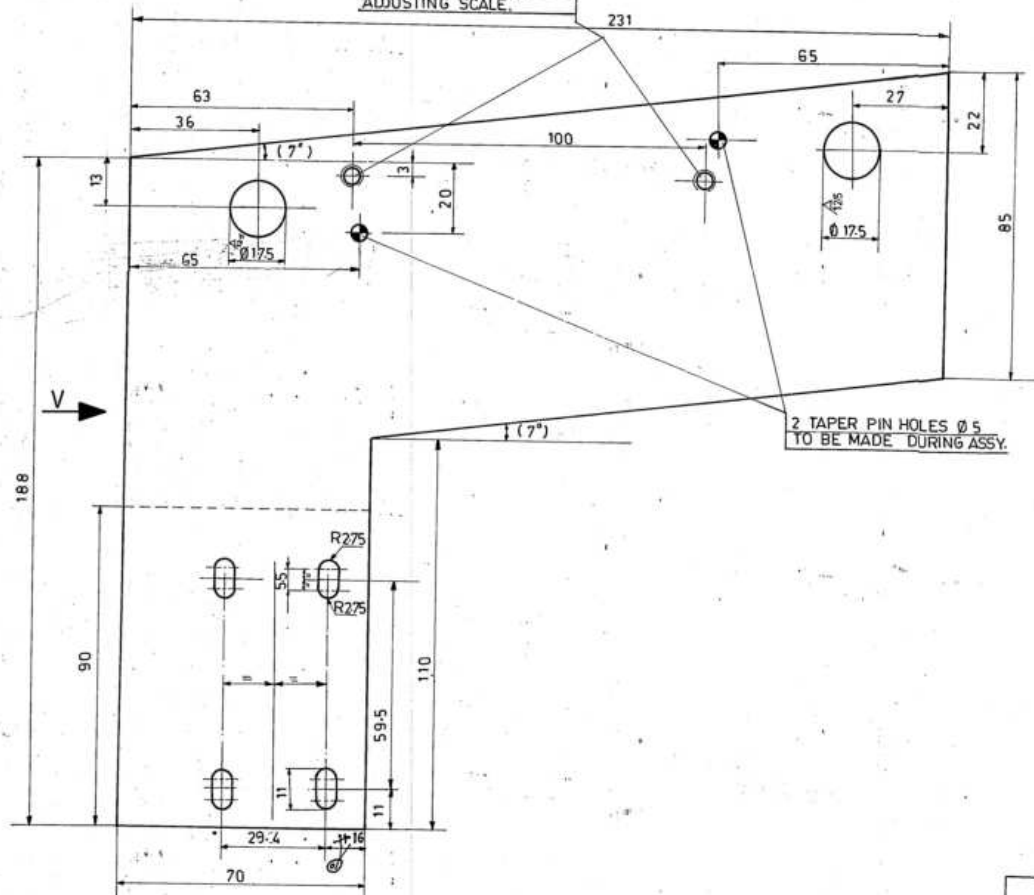
SIZE A2



2-11402-24205

THROUGH HOLES M5 TO BE MADE
DURING ASSY. AFTER
ADJUSTING SCALE.

50/ ALL OVER UNLESS
OTHERWISE STATED



TECH. REQUIREMENTS:

1. ALL UNDIMENSIONED EDGES SHALL BE CHAMFERED TO 1X45°.
2. IDENTIFICATION ACCORDING TO HW 040035 AT A PLACE MARKED WITH IN.

VIEW-V

PLATE		2-11402-24205		AA 1011819112 AA 10119		No. 1129	
VAR 00	REMARKS	ITEM No.	DESCRIPTION	DRAWING No.	MATERIAL CODE	UNIT WEIGHT	ZONE
50	64 65	75 25	27 29	58 59 60	77 32 33 46	54 C 55 57 66	71 72
CARD TYPE-3				CARD TYPE-1			
GMS No./GR. SP. No. GMS 011402 24200				STATUS OF DRG			
AGREED DEPT. NAME SIGN DATE				TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT			
INT. B. CHODHARY 16/11/73				STEAM TURBINE			
S.T. N. SINGH 17/11/73				HARDWARE			
GRADE OF UNTOL DIM. —				SHARAT HEAVY ELECTRICALS LTD.			
MCG: — C/M/P/ AA 023 0208				DRN. NAME SIGN DATE No. OF VAR			
WELDING: — 'T1' O 610 003				CHD S. K. S. 24/9/73 73 74			
GAS CUTTING: — 'T3' AA 0621101				APPD B. S. GUPTA 13/11/73 75 77			
REV DATE ALTERED CHECKED				DRT STE SCALE WEIGHT (KG) REF. TO ASSY. DRG. ITEM No. OF ITEMS			
01 20.9.95 CHECKED				1:1 2.0 0-11402-24200 27 75 77			
ZONE CHANGED AS PER C/ADV STE-95-472				DRAWING No. 2-11402-24205			
ZONE				SHEET No. 1 No. OF SHEETS			

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REF. DRG. No.

2-11402-24205

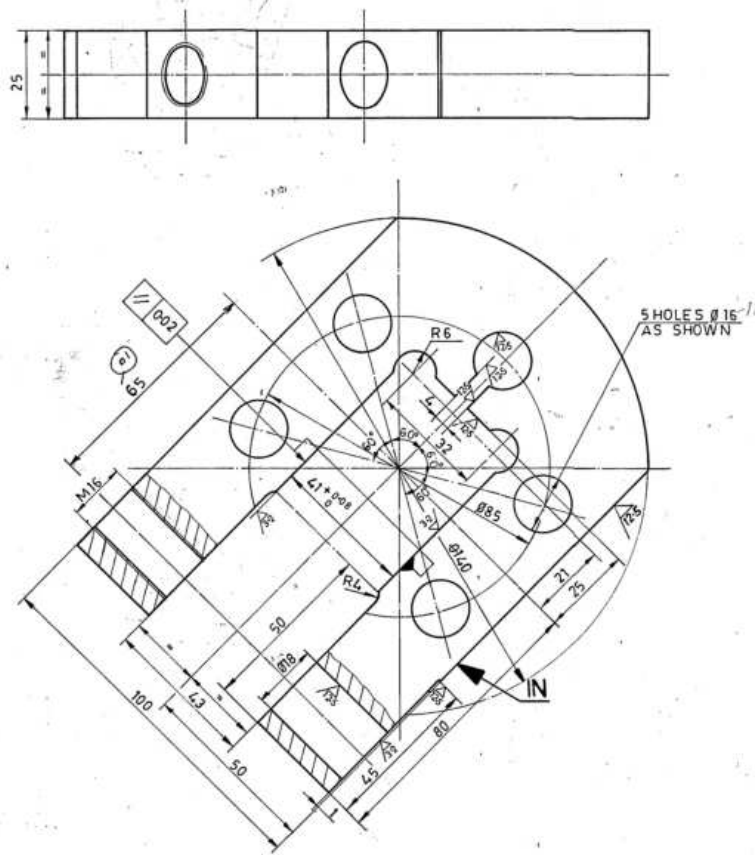
INVENTORY No.

50/ ALLOVER UNLESS
✓ OTHERWISE STATED

DRAWING NO. 2-11402-24207

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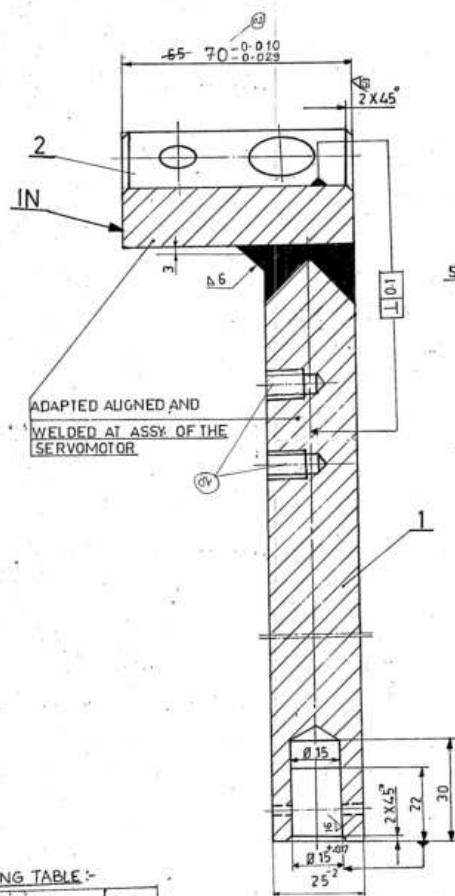
INVENTORY NO.	51-28084	SIGN & DATE	12/1/95	REF DRG. NO.	—
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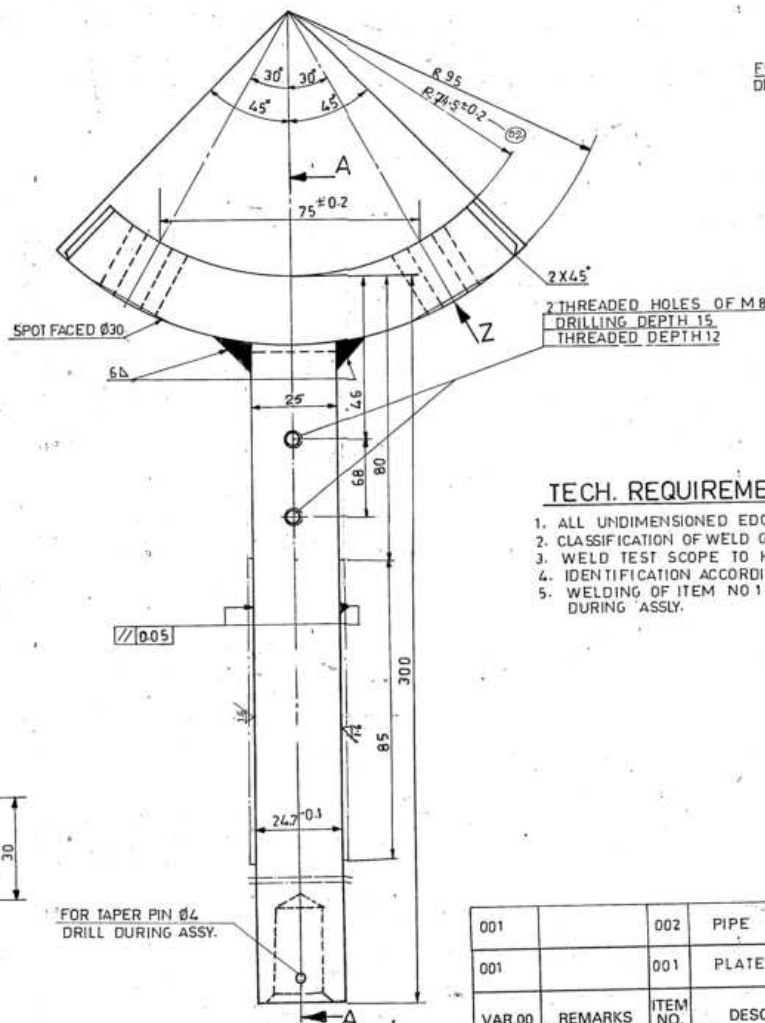
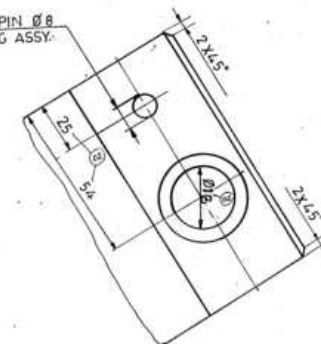
1. IDENTIFICATION AS PER HW0400397 AT THE PLACE MARKED WITH IN

				CLAMP		2-11402-24207		AA 1011819155 AA 10119		200																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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12.5/ ALL OVER UNLESS OTHERWISE STATED

01072-20711-2
012 ON 9MMVUS

SECTION-AA

FOR TAPER PIN Ø 8
DRILL DURING ASSY.

VIEW Z

TECH. REQUIREMENTS:

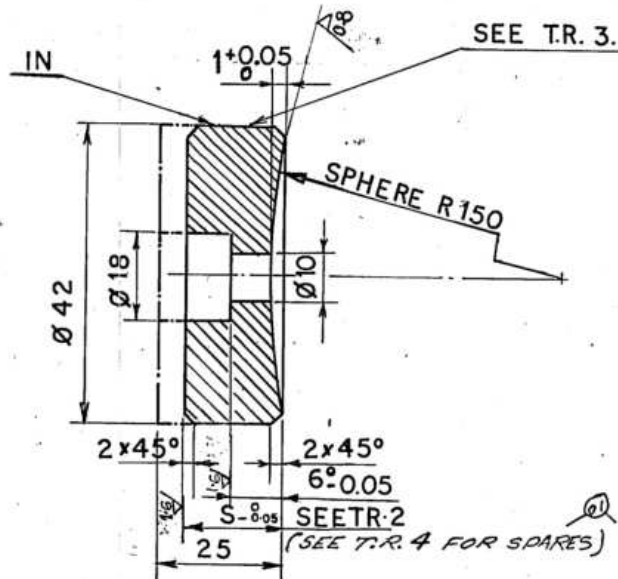
1. ALL UNDIMENSIONED EDGES SHALL BE CHAMFERED TO 1X45°.
2. CLASSIFICATION OF WELD GROUP BS/BK HW:0620099.
3. WELD TEST SCOPE TO HW 0850199, CATEGORY-2.
4. IDENTIFICATION ACCORDING TO HW 0400397: AT IN.
5. WELDING OF ITEM NO 1 IS TO BE CARRIED OUT DURING ASSY.

WELDING TABLE:-

WELD SYMBOL	6b
WELD SEAM LENGTH IN METERS (TOTAL)	0.10
WEIGHT OF DEPOSITED METAL IN Kg.	0.05
TYPE OF ELECTRODE	E7018

FOR TAPER PIN Ø 4
DRILL DURING ASSY.

001	002	PIPE	3-11402-24 212	AA 10152 24 113	NO	1/40
001	001	PLATE	3 11402 242 11	AA 19331	NO	1/20
VAR.00	REMARKS	ITEM NO.	DESCRIPTION	DRAWING NO.	MATERIAL CODE	UNIT WEIGHT
59	64 65	75 25 27 29	58 59 60	77	29.31	66
CARD TYPE - 3 → 28			28 → CARD TYPE - 1			
GMS NO. / GR-SP-NO. GMS			STATUS OF ORG.			
0-114 02 24200			TYPE OF PRODUCT			
AGREED DEPT			OR			
NAME SIGN DATE			NAME OF CUSTOMER / PROJECT			
STT N. SINGH 7.12.93			BHARAT HEAVY ELECTRICALS LTD.			
WT B. Chaudhary 7.12.93			HARDWAR			
REV. DATE			DEPT. STE			
02 28-1-95			CODE 4011			
ALTERED			SCALE			
CHECKED			1:1			
ZONE			WEIGHT (kg.)			
CHANGED AS PER CHANGE			3.50			
ADVICE NO. STE-95-09			REF. TO ASSY. DRG.			
DRG. NO. CORRECTED			0-11402-24200			
AS PER C/ADV-STE-94-58			ITEM NO. OF ITEM			
ZONE			024 002			
TITLE			DRAWING NO. 210			
LEVER ASSLY.			2-11402-24010			
SHEET NO. 01			NO. OF SHEET 01			
SIZE A2						

12.5
✓ ALL OVER UNLESS
OTHERWISE STATEDDRAWING NUMBER
3-11402-02203

TECHNICAL REQUIREMENTS:

1. IDENTIFICATION AS PER HW 0400397 AT THE PLACE MARKED WITH IN BY ELECTRICAL SCRIBER.
2. THE FINAL THICKNESS 'S' OF THE PACKER SHALL BE DETERMINED AND ACHIEVED DURING ASSEMBLY.
3. VALVE NUMBER SHALL BE MARKED BY THE ELECTRICAL SCRIBER AT THE PLACE ASSIGNED - FOR, AS SHOWN IN THE DRAWING. THE FORM OF VALVE NUMBER SHALL BE "HPCV-X"; OR "PCV-X" AS THE CASE MAY BE, WHERE 'X' IS THE NUMBER OF VALVE.
4. PACKER SHALL BE SUPPLIED WITH ALLOWANCE FOR FINAL MACHINING TO BE DONE WHILE FITTING.

ST.x22 CR. MOV. 121/1

PACKER			3-11402-02203	HW 1060283123	022
VAR.00	REMARKS	ITEM NO.	DESCRIPTION	DRAWING NO.	MATERIAL CODE
59	64 65	75 25 27 29	58 60 60	77 32 33 40	55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72
CARD TYPE-3 28 →			CARD TYPE-1		28 → CARD TYPE-2

GMS/NO.	STATUS OF DRG.
GMS01140202000	
AGREED DEPT.	NAME SIGN DATE
STT	TANEJA-N.C. 14.7.82

TYPE OF PRODUCT
OR
STEAM TURBINE 500MW
NAME OF CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.
RANIPUR - HARDWAR

DRN	NAME	SIGN	DATE	NO. OF VAR.
CHD	H.C. GUPTA	H.C. GUPTA	27.8.81	
APPO	G.K.D	G.K.D	18.3.83	
	M.R.K	M.R.K	18.3.83	

REV	DATE	ALTERED BY	CHECKED BY
01	18.3.83	A. SHAH	
T.R. No. 4 FOR SPARES IS ADDED			
CHG. ADV. NO. STE-84-152			

DEPT	GRADE OF	SCALE	WEIGHT (Kg)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
STE	UNTOLDIM	NTS	0.22	0-11402-02200	003	75, 77
CODE	TIME					
4011						
TITLE				DRAWING NO.	REV.	
PACKER				3-11402-02203	01	
				SHEET NO. 1	NO. OF SHEETS:- 1	

SIZE A3

Inventory No.

Sign & Date

1870315
Ref. Drg. No.

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It must not be used directly or indirectly in anyway detrimental to the interest of the company.

DRAWING NO.

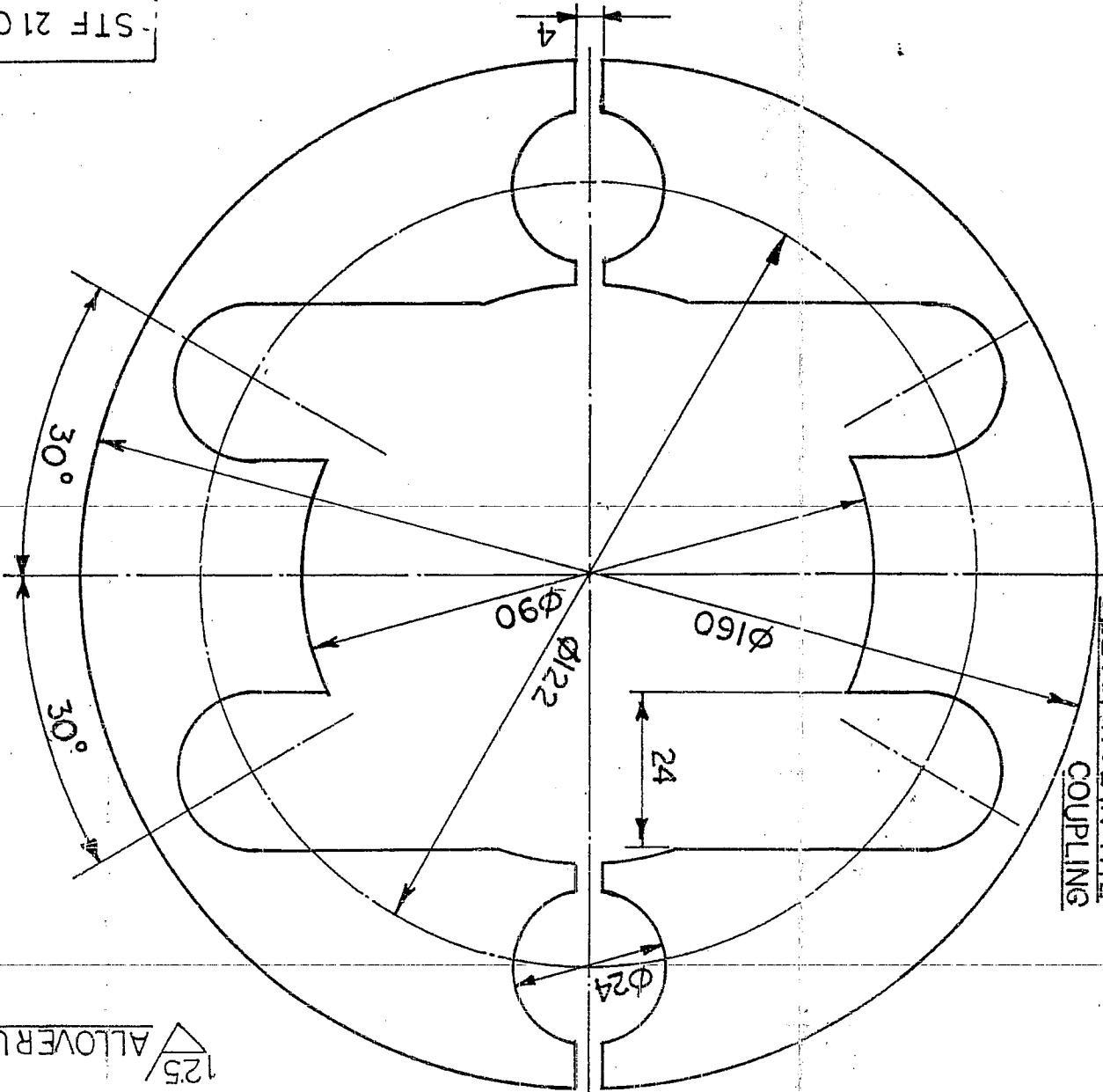
90220-20411-3

TECHNICAL REQUIREMENTS

1. IDENTIFICATION AS PER HW0400397 AT THE
2. THE SPACER SHALL BE SPLIT IN TWO PARTS AFTER MANUFACTURE.
3. ALL THE EDGES WHERE CHAMFER IS NOT SPECIFIED SHALL BE CHAMFERED TO 05*45°

0.8/5.5
C.8

REFINISH HERE FOR MAINTAINING OF THE
CLEARANCE IN THE
COUPLING



125
ALLOWER UNLESS OTHERWISE STATED

VAR. 00	REMARKS	ITEM NO.	DESCRIPTION	DRAWING NO.	VAR.	MATERIAL SPECN.	UNIT	UNIT WT. (KG.)
-	-	-	SPACER	3-11402-02206	HW19386	HW10652.80050C		0.52

CARD TYPE-3	CARD TYPE-1	CARD TYPE-2
59	58	57
64	58	32
65	59	33
		46
		54
		55
		56
		57
		58
		59
		60
		61
		62
		63
		64
		65
		66
		67
		68
		69
		70
		71
		72

NAME	SIGN.	DATE	NO. OF
M. M. SINGH		28.8.81	
G. K. D.		13.11.81	
M. R. K.		18.3.85	

APPD.	CHD.	DRN.	VAR.
M. R. K.	G. K. D.	M. M. SINGH	

DATE	SIGN.	DATE	NO. OF
28.8.81		13.11.81	
18.3.85			

ITEM NO.	ITEM NO.	ITEM NO.	ITEM NO.
006	01140202200	0.52	3-11402-02206

REV.	DATE	ALTERED	CHECKED

DEPT.	CODE	ST. E.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	DRAWING NO.	REV.
4111	2/M/18	UNTOLDIM	N.T.S	0.52	01140202200	3-11402-02206	

TITLE	CARD	SHEET NO.	NO. OF SHEETS
SPACER		1	1

NAME OF CUSTOMER/PROJECT	TYPE OF PRODUCT	STATUS	GMS/GR-SP-NO.	GMS01140202200	DATE	SIGN.	DATE	NO. OF
STEAM TURBINE 500 MW.	OR				28/2/82		16/11/82	

-STF 21C1M0 N1V47

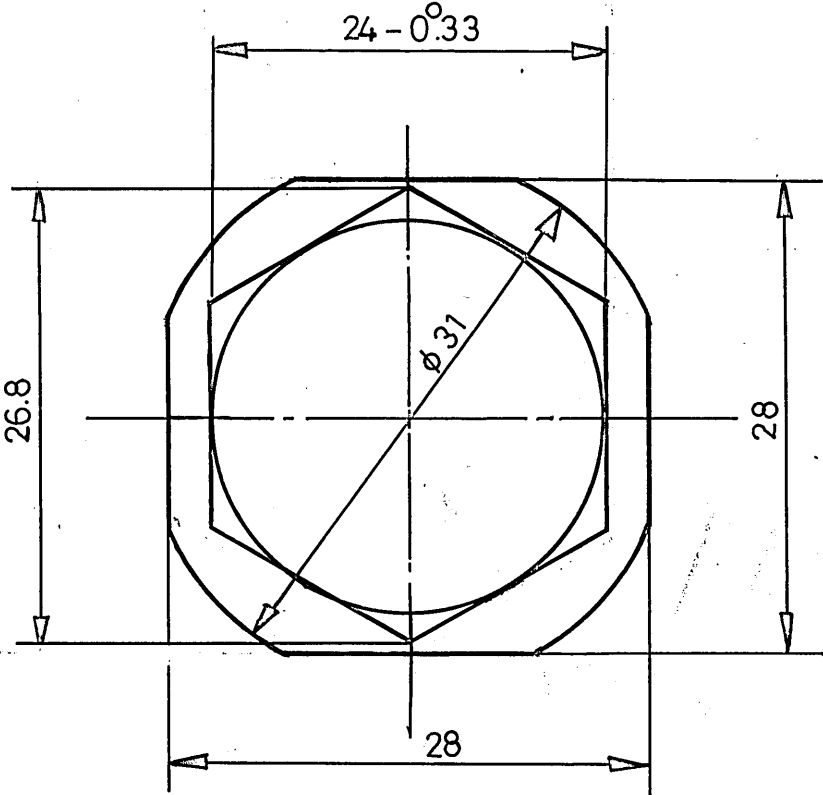
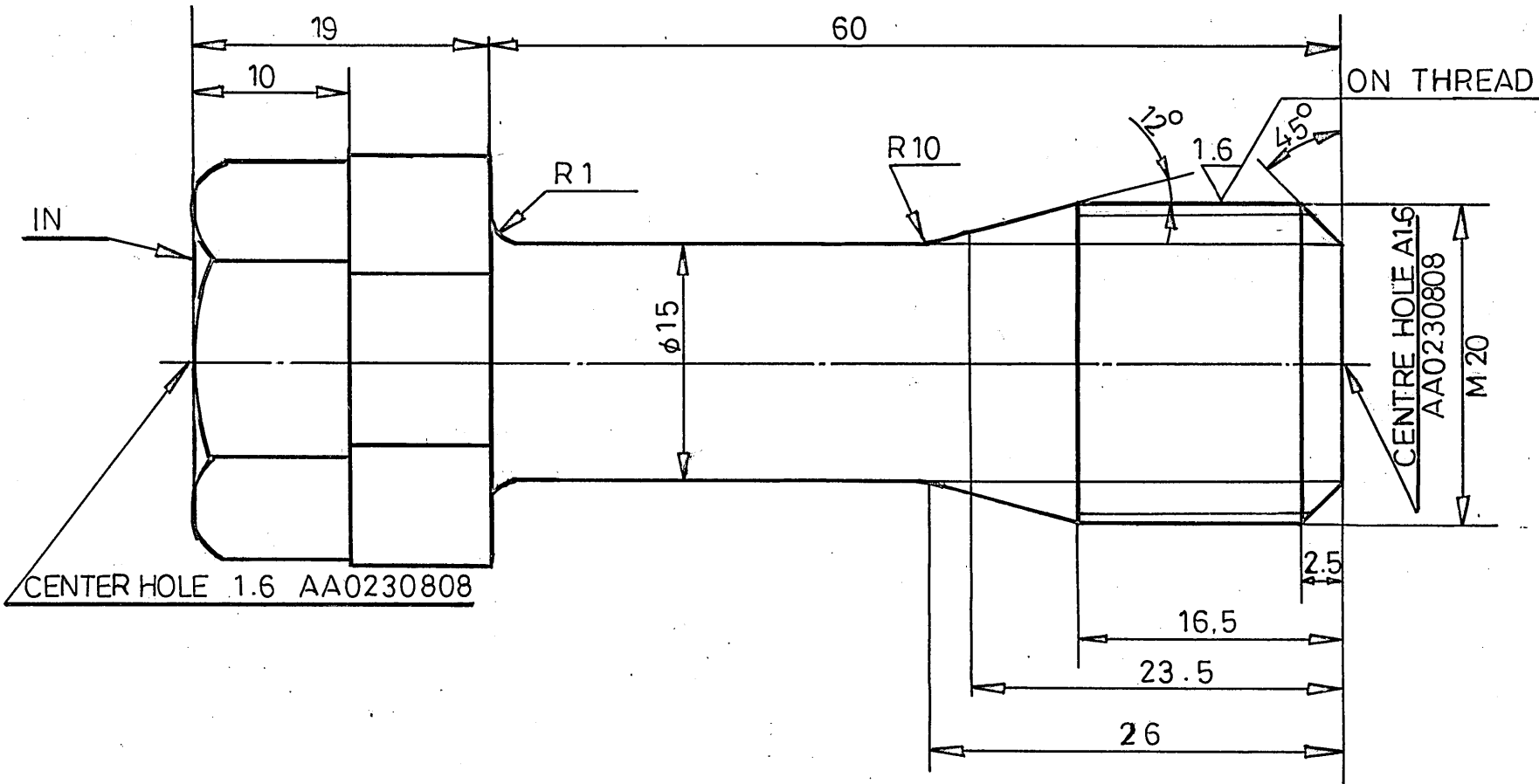
DRG. ARCHIVE BAY-III
SEC. 7
-9 OCT 2004
TUM SHOP

DRG. ARCHIVE BAY-III
SEC. 118
29/SEP 2005
TUM SHOP

MASTER COPY

80220-20411-3
DRAWING NO.

3.2 ALL OVER UNLESS OTHERWISE STATED.



TECHNICAL REQUIREMENTS:

1. BLANK IS TO BE HEAT THREADED TO CS 60 AS PER ST 36003.
2. IDENTIFICATION ACCORDING TO HW0400397 AT THE PLACE MARKED WITH IN.

001		001	SCRU HEX M20x60	3-11402-02208	HW1060297078	C	020
VAR. 00	REMARKS	ITEM NO.	DESCRIPTION	DRAWING NO.	0.500.213		
59	64	65	75	25	27	29	31
58	60	77	32	33	46	54	57
CARD TYPE-3				CARD TYPE-1			
CARD TYPE-3				CARD TYPE-2			

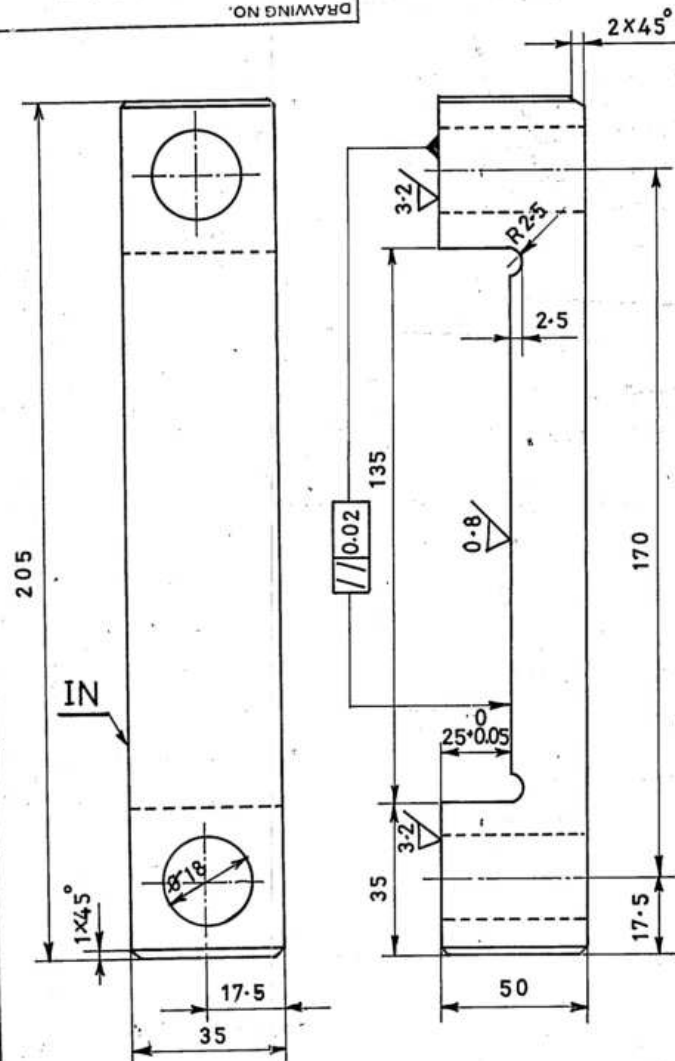
GMS/GR. SP. NO. GMS01140202200				STATUS OF DRG.			
AGREED DEPT.	NAME	SIGN.	DATE	TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT			
STT	TANETA NC	23/2/81	23/2/81	STEAM TURBINE 500 M.W.			
NTE	JPM	19/2/83	19/2/83	BHARAT HEAVY ELECTRICALS LTD. RANIPUR - HARDWAR.			
REV	DATE	ALTERED	DEPT. STE	GRADE OF UNTO DIM	SCALE	WEIGHT (Kg)	REF. TO ASSY. DRG.
		CHECKED	CODE 4011	2/M/F	N.T.S.	0.20	0-11402-02200
				TITLE SCRU HEX - M 20 x 60			
				DRAWING NO. 3-11402-02208			
				SHEET NO.1 NO. OF SHEETS:1			

3-1140-2-02217

DRAWING NO.

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in anyway detrimental to the interest of the company.3472 945
Ref. Drg. No.

Sign & Date

51-18295
Inventory No.

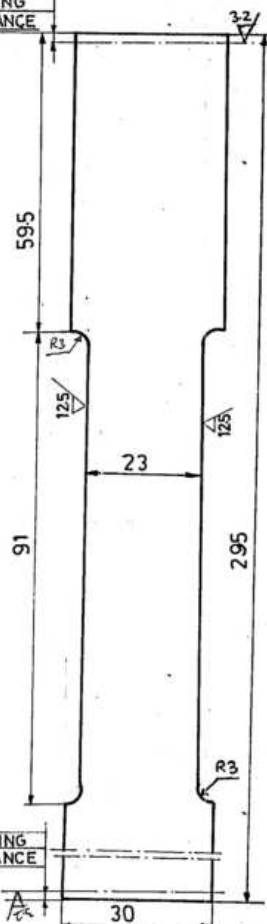
TECHNICAL REQUIREMENTS :-

1. IDENTIFICATION AS PER HW 0400397 AT THE PLACE MARKED WITH IN
2. ALL THE EDGES WHERE CHAMFRING IS NOT SPECIFIED, SHALL BE CHAMFERED TO 1.0 x 45°.

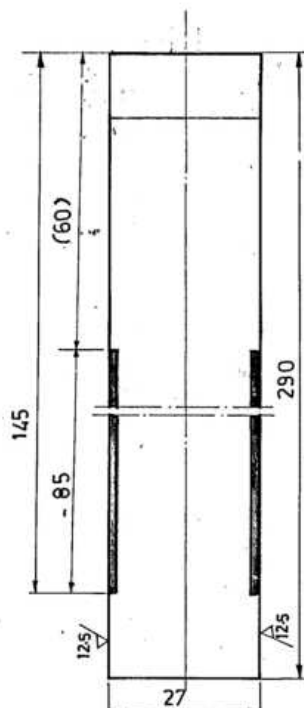
VAR. 00		REMARKS	ITEM NO.	DESCRIPTION	DRAWING NO.	ST X 20 CR 13.	
59		64	65	75	25	27	29
58		59	60	77	32	33	46
CARD TYPE-3		CARD TYPE-1		CARD TYPE-2			
GMS/GR. SP. NO.				TYPE OF PRODUCT			
GMS 01140202200				OR			
AGREED DEPT.				NAME OF CUSTOMER/PROJECT			
STT TANEJAN C.				STEAM TURBINE 500 MW			
NAME				NAME			
SIGN.				SIGN.			
DATE				DATE			
20.183				12.11.81			
BHARAT HEAVY ELECTRICALS LTD.				DRN.			
RANIPUR - HARDWAR.				CHD.			
DEPT. STE				APPD.			
GRADE OF UNTO DIM				REF. TO ASSY. DRG.			
CODE 04011				0-11402-02200			
TITLE				DRAWING NO.			
SUPPORT				3-11402-02217			
SCALE				WEIGHT (Kg)			
NTS				1.78			
SHEET NO.				NO. OF SHEETS			
1				1			

SIZE A3

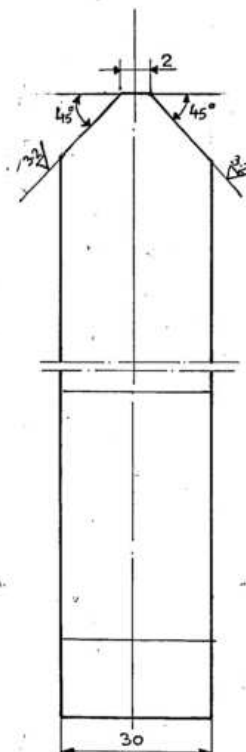
✓ THE REST

DRAWING NO.
3-11402-24211COPYRIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the Company.2.5mm
MACHINING
ALLOWANCE2.5mm
MACHINING
ALLOWANCE

PRE STELLING DETAIL



FINAL MACHINING DETAIL



TECH. REQUIREMENTS :-

1. IDENTIFICATION ACCORDING TO HW 0400397.
2. SHARP EDGES SHOULD BE ROUNDED OFF.
3. STELLING TO BE DONE ON SURFACE MARKED BY STELLITE-6.

VAR 00	REMARKS	ITEM No.	DESCRIPTION	STD	DRAWING No.	3-11402-24211	AA1010408135	NO	120
59	64	65	75	25	27	29	58	59	60
77	32	33	45	54	55	56	57	66	71
CARD TYPE-3			28	CARD TYPE-1			28	CARD TYPE-2	

GMS No./GR. SP. No.			STATUS
GMS 01140224200			OF DRG
			U
AGREED DEPT	NAME	SIGN	DATE
WT	B. CHOWDHARY	Blm	7-12-93
STT	LAZIT	Sm	8-12-93

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.

HARDWARE

DRN.	NAME	SIGN	DATE	No. OF VAR
CHD	S. K. S	del	30/9/93	-
APPD	B. S. GUPTA	Bgm	13.12.93	73, 74

DEPT	STE	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	No. OF ITEMS
CODE	4011	N.T.S	1.20	2-11402-24210	001	75, 77

TITLE :	PLATE	CARD CODE	3-11402-24211	REV	22, 23, 24
---------	-------	-----------	---------------	-----	------------

SHEET No. 01 No. OF SHEETS 01

SIZE - A3

REF. DRG. No.

SIGN & DATE

INVENTORY No.

GRADE OF UNTOL. DIM:-

MCG. :- 0/M/R/ AA 023 0208

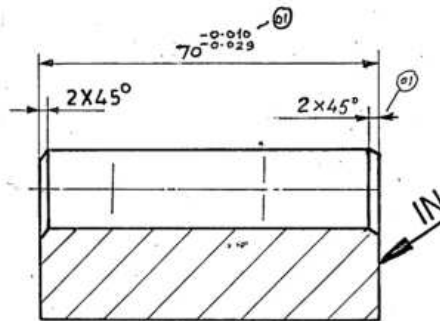
WELDING :- 'T1' O 610.003

GAS CUTTING :- 'T3' AA 0621101

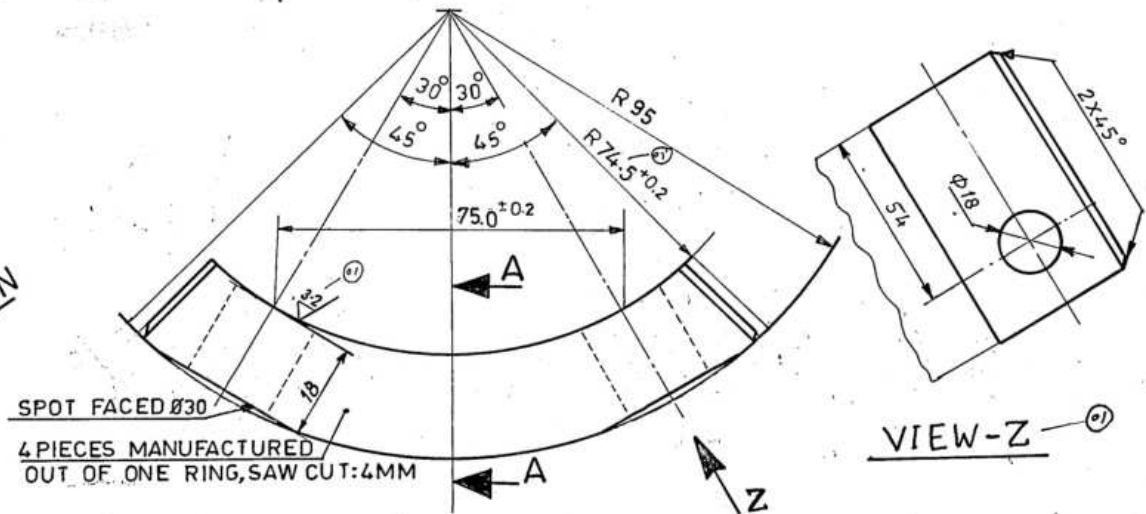
REV	DATE	ALTERED	CHECKED
ZONE			

DRAWING NO. 3-11402-24212

125/ THE REST



SECTION A-A



TECH. REQ'T.

1. IDENTIFICATION "ACCORDING TO HW.0400397 AT PLACE MARKED IN
2. SHARP EDGES SHOULD BE ROUNDED OFF.

		001	PIPE	3-11402-24212		AA1015224113		No		140	
						AA19331					
VAR. 00	REMARKS	ITEM NO.	DESCRIPTION	STD	DRAWING NO.	MATERIAL CODE		A	UNIT	UNIT WEIGHT	
59	64 65	75 25 27 29		58 69 60		29 31	VAR	32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	47 48	49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66	67 68 69 70 71 72
CARD TYPE 3		28	28 → CARD TYPE-1			28 → CARD TYPE-2					

GMS NO./GR SP NO GMS 01140224200			STATUS OF DRG ✓
AGREED DEPT.	NAME	SIGN	DATE
MTE.	CRABANA	<i>[Signature]</i>	4/2/99

TYPE OF PRODUCT **STEAM TURBINE**
OR
NAME OF CUSTOMER / PROJECT

GRADE OF UNTOL DIM :-
M/CG, C/M/F AA 0230208.
WELDING - A/B/C/DAA0621104
GAS CUTTING 'T3' AA0621101

REV	DATE	ALTERED
		CHECKED

REV	DATE	ALTERED	<i>Rev</i>
01	13.3.95	CHECKED	<i>Rev</i>

CHANGED AS PER CHANGE
ADVICE NO.
STE-95-139

	BHARAT HEAVY ELECTRICALS LTD HARDWAR		NAME	SIGN	DATE	NO- OF VAR. 73/74
		DRN	BHAREY & CO	<i>[Signature]</i>	7-9-93	
		CHD	S.K.S	<i>[Signature]</i>	30-9-93	
		APD	B.S.S	<i>[Signature]</i>	14-3-95	

DEPT STE		SCALE 1:1	WEIGHT (kg) 1.40	REF TO ASSY DRG. 2-11402-24210	ITEM NO 002	WOOF ITEMS - 13/17
-------------	---	--------------	---------------------	-----------------------------------	-------------------	-----------------------------

TITLE PIPE	CARD CODE	DRAWING NO. 3-11402-24212	REV. -
		7 22 24 24	
SHEET NO. 1		NO. OF SHEETS 1	

SIZE A3.

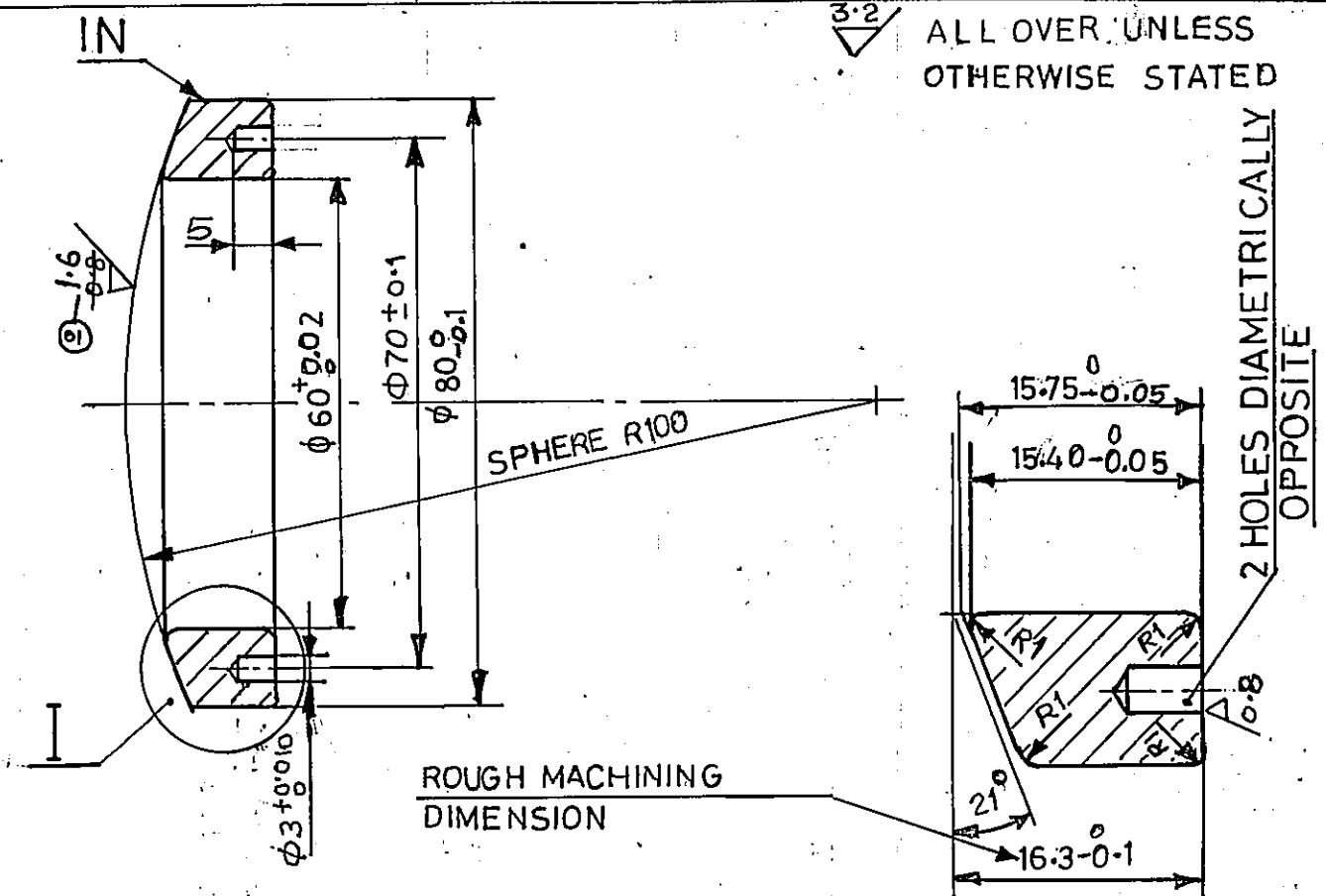
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REF. DRG. NO.

26/11/17
SIGN & DATE

51-24404
INVENTORY NO.

REV	DATE	ALTERED	REV	DATE	ALTERED	GMS NO. / GR-SP. NO.	STATUS OF DRG.	
01	26 3/87	CHECKED			CHECKED	GMS01140202200		
Change is incorporated as per STE-87/III					AGREED DEPT.	NAME	SIGN	DATE
					STT	N. CTANETA		14-7-87



TECH. REQUIREMENTS

- 1 IDENTIFICATION AS PER HW0400397 AT THE
PLACE MARKED WITH IN BY ELECTRICAL
SCRIBER.

DETAIL I
SCALE 2:1

6680510 b

Ref. Drg. No.

Sign & Date:

Inventory No.

										X 22Cr MOV 121/1																																							
					DISC										HW1060283018					C		024																											
															HW10683																																		
REMARKS					ITEM NO.					DESCRIPTION					29		31		MATERIAL CODE					45		A		UNIT WEIGHT																					
															34									C																									
65					75					25					27					29					58		59		32		33		46					54		55		56		57		66		71	
																									VAR.		MATERIAL SPECN																						
CARD TYPE-3										28 →					→ 28					CARD TYPE-1					→ 28					CARD TYPE-2																			
 BHARAT HEAVY ELECTRICALS LTD. HARDWAR										DRN.					NAME					SIGN					DATE					NO. OF VAR.																			
										CHD.					G, K, D					M. R. K					13/11/81					73					74														
										APPD.					M. R. K					18.3.83																													
EPT. S.T.E.					GRADE OF UNTOL.DIM.					SCALE					WEIGHT (KG)					REF. TO ASSY DRG.										ITEM NO.					NO. OF ITEMS														
0011					Ø1M1f					N.T.S.					0.24					011402 02200										004					75					77									
TITLE										DISC					1					3					DRAWING NO.										REV.														
															CARD CODE					4-11402-02204										01																			
																				7										22					23					24									
																				SHEET NO.										NO. OF SHEETS.																			

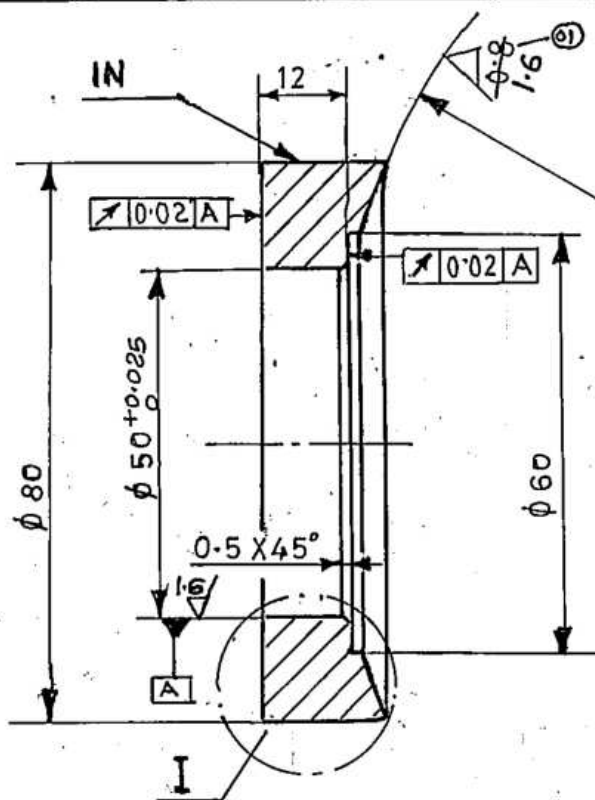
M F

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

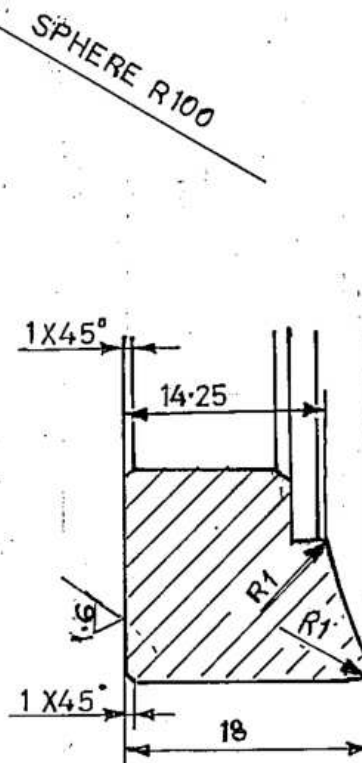
Form DG-39

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REV	DATE	ALTERED	REV	DATE	ALTERED	GMS NO./GR-SP. NO.	STATUS OF DRG.
01	26/87	CHECKED			CHECKED	GMS 011402.02200	
Change is incorporated as per STE-87/III						AGREED DEPT.	NAME
						STT	Tanoy M.
						SIGN	23.8.87
						DATE	



3.2/ ALLOVER UNLESS OTHERWISE STATED

DETAIL I
SCALE 2:1

TECH. REQUIREMENTS -

1. IDENTIFICATION AS PER

HW0400397 AT THE PLACE MARKED WITH IN BY ELECTRICAL SCRIBER.

ST NCR 20 TIAL

		DISC				HW060283018		C				035	
						HW10683							
REMARKS	ITEM NO.	DESCRIPTION	STD	29	31	MATERIAL CODE		45	A	UNIT WEIGHT			
				34									
65	75	25	27	29	58	32	33	46	54	55	56	57	66
						VAR. MATERIAL SPECN							
CARD TYPE-3		28	→	→	28	CARD TYPE-1		→	28	CARD TYPE-2			

BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

DRN.	NAME	SIGN	DATE	NO. OF VAR.
CHD.	N.K		27/8/87	
APPD.	G.K.D		13.11.81	
	M.R.K		18.3.83	

DEPT.	GRADE OF UNTOLO.DIM.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO. OF ITEMS
I.S.T.E.	1/M1/f	N.T.S.	0.35	011402 02200	005	
CODE	04011					

TITLE	CARD CODE	DRAWING NO.	REV.
DISC		4-11402-02205	01
SHEET NO. - 1		NO. OF SHEETS. - 1	

SIZE A4

6680511

Ref. Drg. No.

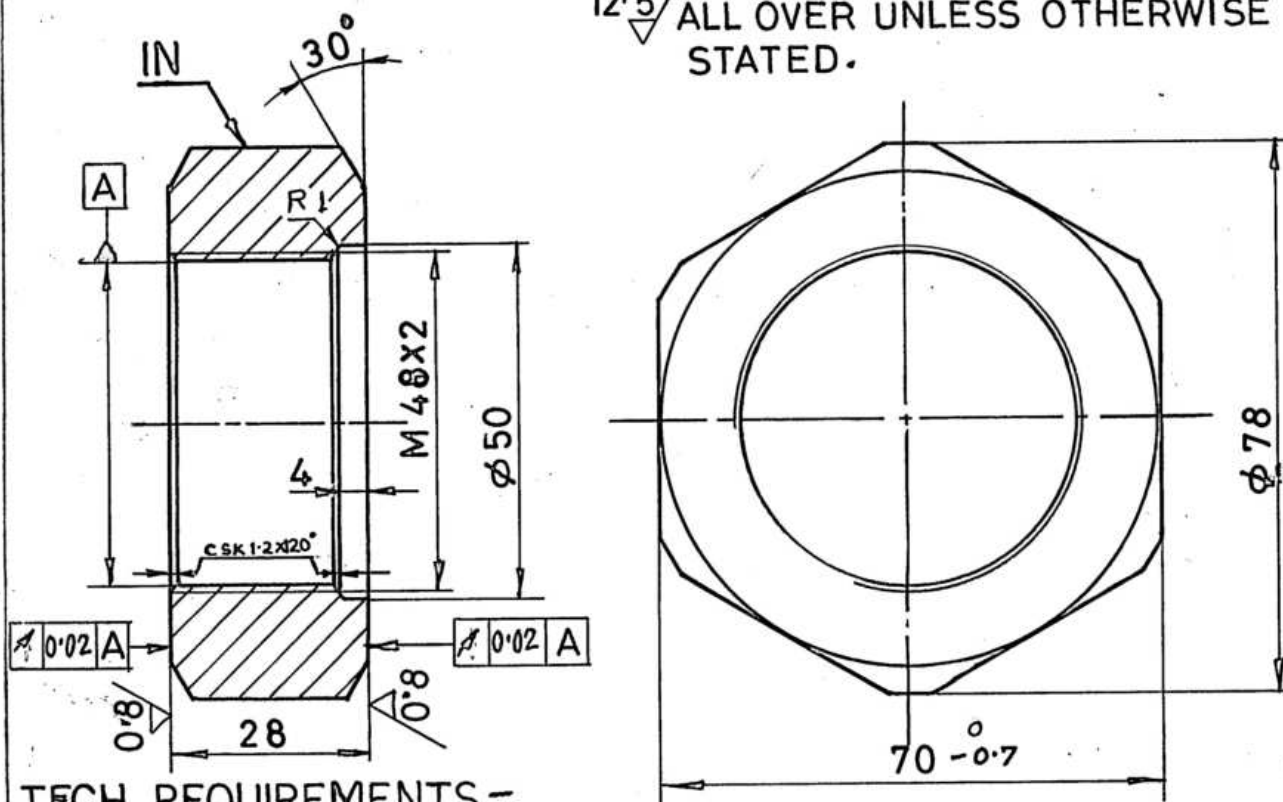
Sign & Date

Inventory No. 51-18304

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REV	DATE	ALTERED	REV	DATE	ALTERED	GMS NO./GR. SP. NO.	STATUS OF DRG.
		CHECKED			CHECKED	GMS01140202200	
						AGREED DEPT.	NAME
						STT	N.C.TANEJA
						MTE	J.P. MEENA
						SIGN	DATE
							23.2.83

12.5/ ALL OVER UNLESS OTHERWISE STATED.



TECH. REQUIREMENTS -

1. IDENTIFICATION AS PER HW0400397 AT THE PLACE MARKED WITH IN
2. BLANKS SHALL BE HEAT TREATED AS PER ST 36003 TO ACHIEVE CS-60.
3. ALL THE EDGES, WHERE CHAMFERING IS NOT SPECIFIED, CHAMFER TO 0.5X45°.

ST CR MO V - 686 N/1

HEAT TREATED.	NUT	HW1060297175	0500.213	C	057
REMARKS	ITEM NO.	DESCRIPTION	STD	VAR.	UNIT WEIGHT
65	75 25 27 29	58 59	32 33 46	54 55 56 57 66	71
CARD TYPE-3	28	CARD TYPE-1	28	CARD TYPE-2	



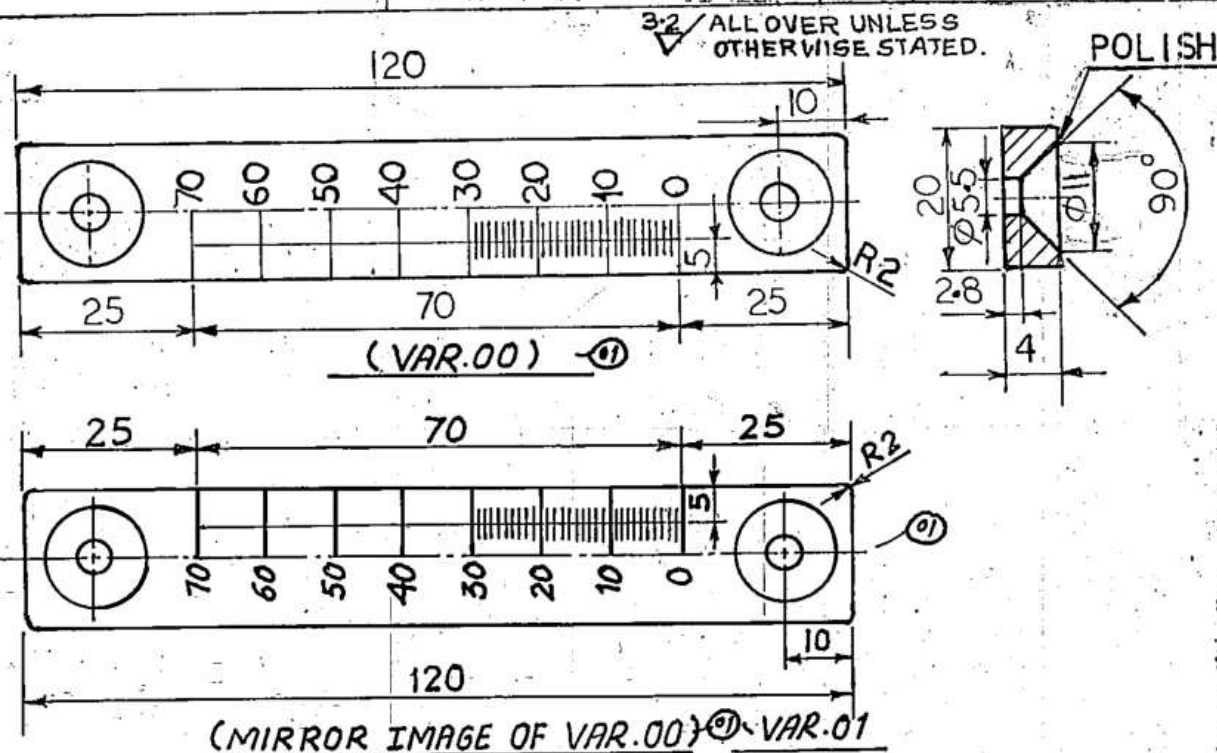
BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

DRN.	NAME	SIGN	DATE	NO. OF VAR.
CHD.	G.K.D		12/11/81	
APPD.	M.R.K		18.3.83	

DEPT. STE	GRADE OF UNTOLO DIM.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO. OF ITEMS
04011	1/1	1:1	0.57	0-11402-02200	008	
TITLE				DRAWING NO.		
NUT				4-11402-02207		
CARD CODE				SHEET NO. 1		
				NO. OF SHEETS. 1		

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REV. 01	DATE 20.9.95	ALTERED <i>AS PER C/ADV</i>	CHECKED <i>du</i>	REV.	DATE	ALTERED	CHECKED	GMS NO. / OR. SP. NO.	STATUS OF ORG.
CHANGED AS PER C/ADV STE-95-499								GMS 011402-02200	
AGREED DEPT.				NAME		SIGN		DATE	



TECH. REQUIREMENTS

1. BACKGROUND OF PLATE SHALL BE BRIGHT NICKLE PLATED. SCALE AND LETTERS SHALL BE ENGRAVED AND FILLED WITH BLACK PAINT.
2. THICKNESS OF SCALE LINING SHALL BE 0.2 mm.
3. THICKNESS OF LETTERING SHALL BE 0.3 mm.
4. LETTERS SHOULD BE OF SIZE 3x5 mm. OF BOLD TYPE.
5. IDENTIFICATION AS PER HW0400397 BY ATTACHING A TAG.
6. MATERIAL OF THE SCALE SHALL BE COLD ROLLED BRASS-CUZN 37; - HALF HARD. ①

—	002	SCALE	W97311402379	01	010
—	001	SCALE	W97311402085	C	010
REMARKS	ITEM NO.	DESCRIPTION	29 31 MATERIAL CODE	45 A	UNIT WEIGHT
65	75 25 27 29	50 59 32 33 46	VAR. MATERIAL SPECN	C	54 55 56 57 66

CARD TYPE-3

CARD TYPE-1

CARD TYPE-2



BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

DRN.	M.M. SIMH.	SIGN	DATE	NO. OF VAR.
CHD.	G.K. DIXIT		12.10.81	
APPD.	M.R. K.		18.3.82	73 74

DEPT. STE	GRADE OF UNTOL. DIM.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
4011	1:1	0.10	0-11402-02200	024	75 77	
TITLE: SCALE				DRAWING NO. 4-11402-02214		REV.
SHEET NO. - 1				NO. OF SHEETS - 1		22 23 24

SIZE AA

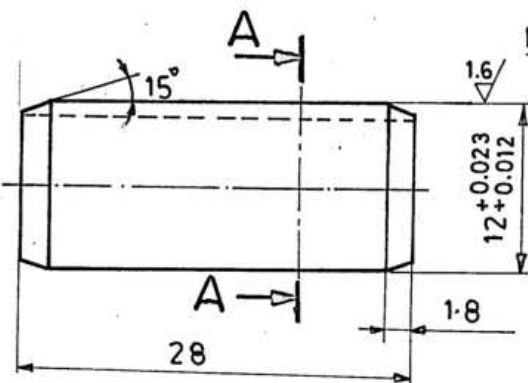
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) FORM DG39A

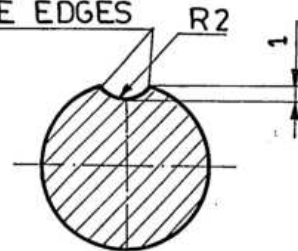
REV	DATE	ALTERED	REV	DATE	ALTERED	GMS No. / GR. SP. No.	STATUS OF DRG.
		CHECKED			CHECKED	GMS 01140224200	U
						AGREED DEPT.	NAME
						STT	LALIT
						MTE	JPM
						SIGN	DATE
							3.12.93
							3.12.93

GRADE OF UNTOL. DIM. M/CG/M/F AA 0230208 WELDING A/B/C/D AA 0621104 GASCUTTING T3 AA 0621104

12.5/ ALL OVER UNLESS OTHERWISE STATED



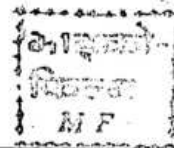
ROUND OF THE EDGES



SECTION A-A

TECH. REQUIREMENTS:

1. IDENTIFICATION AS PER HW0400397 BY ATTACHING A TAG.
2. BLANK SHALL BE HEAT TREATED AS PER HW064059970 ACHIEVE A CS 50.



ST CRMOV-686 N/1

HEAT TREATED	CYL. PIN 12n6 X 28	HW1060297027	C	NO.	0 030
REMARKS	ITEM No.	DESCRIPTION	MATERIAL CODE	UNIT WEIGHT	
65	75	25 27 29	58 59	54 55 56 57	66 71
CARD TYPE 3	20	CARD TYPE 1	28	CARD TYPE 2	28



BHARAT HEAVY ELECTRICALS LTD
HARDWAR

NAME	SIGN	DATE	No. OF VAR.
DRN B & CO		27/9/93	
CHD S.K.S.		30/9/93	
APD B.S. G.		10/10/93	73/74

DEPT STE	SCALE	WEIGHT (kg)	REF TO ASSY DRG.	ITEM No.	No. OF ITEMS
CODE 4011	2:1	0.030	0-11402-24200	15	75/77
TITLE			DRAWING No	REV	
CYL. PIN 12n6 X 28			4-11402-24202	22/23/24	
CARD CODE			SHEET No 1	No OF SHEETS 1	

SIZE A4

REF DRG No.

SIGN & DATE

INVENTORY No.

GRADE OF UN TOL.DIM.M/CG2/M/FAA0230208	WELDING A/B/C/D AA 0621104	GASCUTTING-T3 AA0521101
--	----------------------------	-------------------------

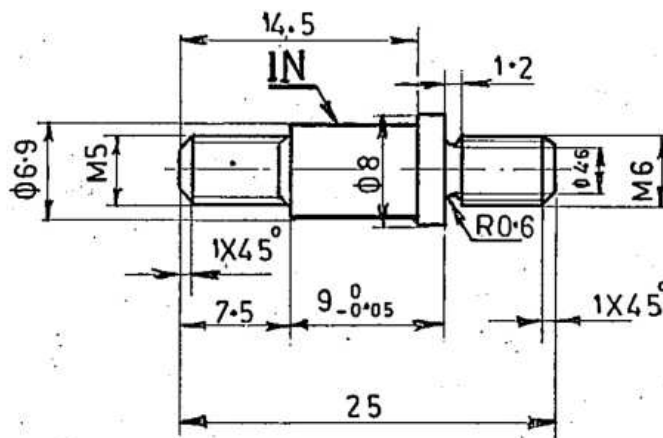


BR CU Zn 37; $\frac{1}{2}$ H

SIZE A4

STT Taneja N.C. 15-4-81

3.2/
▽ ALL OVER



IDENTIFICATION ACC. TO HW0400397 AT THE PLACE MARKED WITH
IN BY ELECTRICAL MARKER.

001		001	BOLT		HW 106 0283107	C		0	01
					HW10683				
VAR.	REMARKS	ITEM NO.	DESCRIPTION	STD.	MAT L. C O D E	A / C	UNIT	UNIT WT.(KG)	
					MATL. SPECN.	C			

DG-39

BHU
HARWAR

BHARAT HEAVY ELECTRICALS LTD.
RANIPUR - HARDWAR.

DEPT STE	CODE 4011		SCALE N.T.S.	WEIGHT (KG) 0.01	REF. TO ASSY. DRG. 0-12307-01100	ITEM NO. 007		
BOLT						NAME	SIGN.	DATE
					DRAWN	S.C.G.		19-2-81
					CHECKED	B.S.G.		20-3-81
					APPROVED	M.R.K.		19-2-81

Dimensions to be Controlled Within Limits as Shown
Machining Tolerance $\pm .25$ mm Unless Otherwise
Shown. Non Machining Tolerance $\pm$

**CARD
CODE**

DRAWING NO.

DRAWING NO.
4-12307-01107

SHEET NO. 1

NO. OF SHEETS, 1

SIZE A4

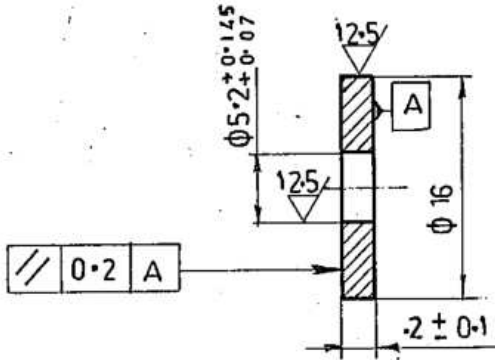
FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

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REV	DATE	ALTERED	REV	DATE	ALTERED
		CHECKED			CHECKED

STT Taneja N.C. 15-4-87

3:2 /  ALLOVER UNLESS OTHERWISE STATED



TECH. REQT. :

IDENTIFICATION ACC. TO HW0400397 BY ATTACHING A TAG.

X22 CRMOV121

001		001	RING	HW1060283085	C	0.003
VAR.	REMARKS	ITEM NO.	DESCRIPTION	MATL. CODE	A	UNIT WT.(KG)
				MATL. SPECN.	C	



BHARAT HEAVY ELECTRICALS LTD.
RANIPUR - HARDWAR.

DEPT	CODE	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.
STE	4011	2:1	0.003	0-12307-01100	021
RING				NAME	SIGN.
				DRAWN	S.C.G.
				CHECKED	B.S.G.
				APPROVED	M.R.K.

Dimensions to be Controlled Within Limits as Shown
Machining Tolerance $\pm$.25 mm Unless Otherwise
Shown. Non Machining Tolerance $\pm$

CARD
CODE

DRAWING NO.

4 - 12307 - 01112

SHEET NO. 1

NO. OF SHEETS, 1

SIZE A4

MUN6072/1
Ref Drg. No

DG-39
Sign & Date

S-15924
Inventory No.



CORPORATE PURCHASE SPECIFICATION

AA 101 09

Rev. No. 03

PREFACE SHEET

HOT ROLLED CARBON STEEL BARS (CLOSE TOLERANCES)

FOR INTERNAL USE ONLY

REMOVE THIS PREFACE SHEET BEFORE ISSUE TO SUPPLIERS

Comparable Standards:

1. INDIAN : IS : 1570 (Part II, section 1)-1979
(Reaffirmed 1998), Gr: 20C8(C20),
Hot Rolled

Suggested/Probable Suppliers And Grades:

Refer plant vendors list.

User Plant References:

1. BHOPAL : BP 10197, PS 101 14
2. HEER, HARDWAR : HW 10191

Revisions :

CI 24.4.3 of MOM of MRC-S&GPS

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (S&GPS)

Rev. No. 03

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1 st Issue

Dt: 15.01.2002

Dt :

Year:2013

BHOPAL

Corp. R&D

AUGUST, 1983



CORPORATE PURCHASE SPECIFICATION

AA 101 09

Rev. No. 03

PAGE 1 OF 4

HOT ROLLED CARBON STEEL BARS (CLOSE TOLERANCES)**1.0 GENERAL**

This specification governs the quality requirements of Hot Rolled Carbon Steel Bars having closed tolerances.

2.0 APPLICATION :

Production of machined parts (Note: AA 101 08 for general engineering purposes where close tolerances are not required).

3.0 CONDITION OF DELIVERY :

Hot Rolled .

Bars shall be supplied in straight lengths with ends square and true.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

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

IS : 1570, (Part 2-Sec.1)-1979' :
(Reaffirmed 1998) :
Gr : 20 C8 (C20), Hot rolled :

Schedules for Wrought Steels- Part 2 :
Carbon Steels (Unalloyed Steels) -Sec.1:
Wrought products (other than wire) with
specified Chemical Composition
and related Properties.

5.0 DIMENSIONS AND TOLERANCES :**5.1 Dimensions:****5.1.1 Sizes:**

Bars shall be supplied to the dimensions specified on BHEL order.

5.1.2 Length :

Bars shall be supplied in lengths of not less than 2.5 metres.

Revisions :

CI 24.43 of MOM of MRC-S&GPS

APPROVED :

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Corp. R&D

AUGUST, 1983

12/3/14

CS-722

AA 101 09

Rev. No. 03

CORPORATE PURCHASE SPECIFICATION



PAGE 2 OF 4

5.2 Tolerances :

The tolerances on bars shall be as follows:

5.2.1 On Size:

Diameter / width across flats, mm	Tolerance
Upto and including 20	- 0 + 0.38
Above 20	- 0 + 2 percent

5.2.2 Straightness :

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

6.0 MANUFACTURE:

The steel shall be manufactured by the open hearth, electric, basic oxygen or a combination of these processes.

Material shall be manufactured from killed steel.

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

7.0 FREEDOM FROM DEFECTS :

The bars shall be sound, straight and free from cracks, surface flaws, laminations, rough, jagged and imperfect wedges and internal & surface defects such as seams, laps and injurious imperfections. Bars shall be free from twists and bends.

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 follows :

Element	Melt analysis, percent		Permissible variation, percent
	Min.	Max.	
Carbon	0.15	0.25	± 0.02
Silicon	0.05	0.35	± 0.03
Manganese	0.60	0.90	± 0.04
Sulphur	—	0.045	+ 0.005
Phosphorus	—	0.045	+ 0.005

CS-722-12/2/14



CORPORATE PURCHASE SPECIFICATION

AA 101 09

Rev. No. 03

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9.0 TEST SAMPLES :

9.1 Tensile :

Bars from the same melt and of the same size shall be grouped in batches of 40,000 kg or part thereof. One tensile test piece shall be cut from a selected bar from each batch.

For bars of sizes upto and including 40 mm, the test pieces shall be machined concentrically from the bars selected for test. Alternatively the full cross-section of the bars may be tested.

For bars of sizes over 40 mm the longitudinal axes of the test pieces shall not be less than 12.5 mm from the surface of the bars selected for test.

Tensile test pieces shall have a gauge length equal to $5.65 \sqrt{S_o}$.

9.2 Bend Test:

One bend test shall be carried out for every 40,000 kg or part thereof the bars of the same size and from the same melt.

The bend test pieces shall preferably be cut from bars already selected for tensile test.

Bars of sizes upto and including 20mm shall be tested full size and the edges may be rounded to a radius not exceeding 1.6mm.

Bars of sizes over 20mm shall be turned down to a diameter of 20mm.

10.0 MECHANICAL PROPERTIES :

10.1 Tensile:

The test pieces shall show the following properties, when tested in accordance with IS:1608:

Tensile strength : 440 - 520 N/mm²

Elongation on $5.65 \sqrt{S_o}$ gauge length : 24 percent , min.

10.2 Bend:

Bend test shall be conducted in accordance with IS:1599. The test piece shall be bent through an angle of 180°, until the internal radius is equal to the size of the test piece. It shall not break and shall be free from cracks on the outside as seen by an unaided eye. No account need be taken of small cracks appearing at the edges.

11.0 HARDNESS (BRINELL):

When tested in accordance with IS:1500, the material shall show a Brinell hardness in the range of 126 - 179 HB.

Note: Hardness test shall be conducted only when tensile test can not be performed.

12/3/14

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AA 101 09

Rev. No. 03

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CORPORATE PURCHASE SPECIFICATION**12.0 TEST CERTIFICATES :**

Three copies of test certificates shall be supplied, unless otherwise stated on the order.

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

The test certificate shall bear the following information :

AA 1011 09; Rev. No. 03

BHEL order No,

Supplier's Reference :

Name

Identification No.

Melt No.

Details of heat treatment.

Results of Tests :

Results of Dimensional inspection.

Results of chemical analysis and mechanical tests.

13.0 PACKING AND MARKING :

The material shall be suitably packed in bundles - hessian wrapped-to prevent sagging, corrosion and damage during transit. A suitable clear temporary rust preventive shall be applied on all the bars.

Each bar over 50 mm shall be stamped at one end with "AA 101 09", melt no., BHEL order No., at one end or on the end face.

Bars 50 mm and below shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

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

AA 101 09: Hot rolled carbon steel bars (Close tolerance).

BHEL Order No.

Consignment/Identification No.

Melt No.

Size and Weight.

Supplier's Name.

14.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS: 1500

2. IS : 1570, Part II, Sec.1

3. IS :1599

4. IS : 1608

12/03/14

CS-722

	CORPORATE PURCHASING SPECIFICATION	AA10111 Rev No. 06 PAGE 1 of 4																		
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): <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Thickness, mm</th> <th style="padding: 5px;">Tolerance, mm</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">2.50</td> <td style="padding: 5px;">± 0.20</td> </tr> <tr> <td style="padding: 5px;">3.15</td> <td style="padding: 5px;">± 0.22</td> </tr> <tr> <td style="padding: 5px;">4.0</td> <td style="padding: 5px;">± 0.25</td> </tr> </tbody> </table>			Thickness, mm	Tolerance, mm	2.50	± 0.20	3.15	± 0.22	4.0	± 0.25										
Thickness, mm	Tolerance, mm																			
2.50	± 0.20																			
3.15	± 0.22																			
4.0	± 0.25																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3" style="padding: 5px;"> Revisions: As per Cl.No.38.1 of MOM of MRC – S&GPS </td> <td colspan="3" style="padding: 5px; text-align: center;"> APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(S&GPS) </td> </tr> <tr> <td style="width: 16.6%; padding: 5px;">Rev No.06</td> <td style="width: 16.6%; padding: 5px;">Amd No.</td> <td style="width: 16.6%; padding: 5px;">Reaffirmed</td> <td style="width: 16.6%; padding: 5px;">Prepared</td> <td style="width: 16.6%; padding: 5px;">Issued</td> <td style="width: 16.6%; padding: 5px;">Dt. of 1st Issue</td> </tr> <tr> <td style="padding: 5px;">Dt:22-02-2014</td> <td style="padding: 5px;">Dt:</td> <td style="padding: 5px;">Year:</td> <td style="padding: 5px;">HEP, Bhopal</td> <td style="padding: 5px;">Corp.R&D</td> <td style="padding: 5px;">April, 1978</td> </tr> </table>			Revisions: As per Cl.No.38.1 of MOM of MRC – S&GPS			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(S&GPS)			Rev No.06	Amd No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue	Dt:22-02-2014	Dt:	Year:	HEP, Bhopal	Corp.R&D	April, 1978
Revisions: As per Cl.No.38.1 of MOM of MRC – S&GPS			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(S&GPS)																	
Rev No.06	Amd No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue															
Dt:22-02-2014	Dt:	Year:	HEP, Bhopal	Corp.R&D	April, 1978															

CORPORATE PURCHASING SPECIFICATION



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 $5.65 \sqrt{S_0}$ 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/mm² Tensile)

BHEL Order No,

Supplier's name,

Identification No

Melt No,

Process of manufacture

Details of pickling, descaling and oiling

Results of dimensional inspection

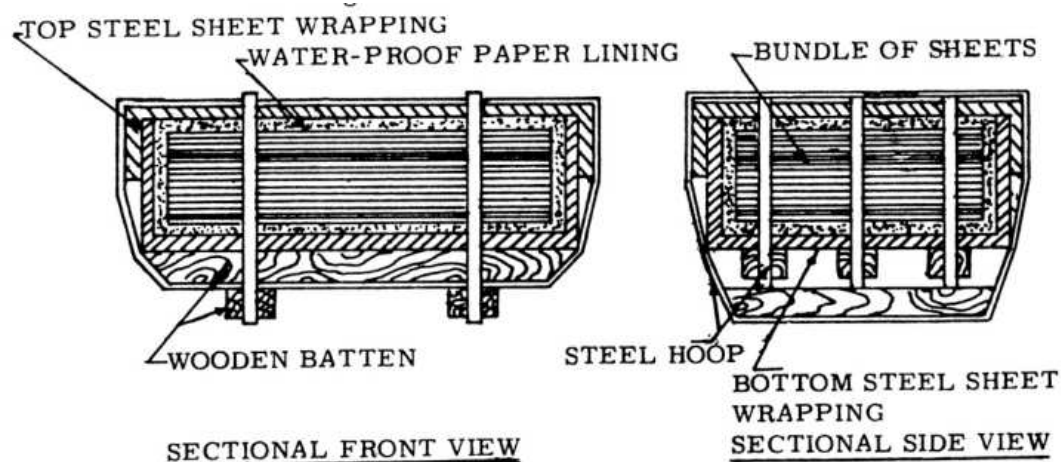
Results of Chemical analysis and Mechanical tests,

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:

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

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PAGE 4 of 4

CORPORATE PURCHASING SPECIFICATION



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

AA10111: HOT ROLLED CARBON STEEL SHEET (410 N/mm² 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



CORPORATE PURCHASING SPECIFICATION

AA10119

Rev No. 15

PAGE 1 of 2

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.

Revisions:

Clause No. 1, 3, 5 & 8 revised (as per MOM of 38th MRC meeting), Clause 10 added

APPROVED:

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE – MRC(S&GPS)

Rev No.15

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Year:

HPEP, Hyderabad

Corp.R&D

June, 1976

26/6/14

CS-72

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



CORPORATE PURCHASING SPECIFICATION

AA 102 18

Rev. No. 07

PAGE 1 OF 4

HOT ROLLED / FORGED CARBON STEEL BARS - H & T

1.0 GENERAL

This specification governs the quality requirements of Hot Rolled / Forged Carbon Steel Bars, Hardened and Tempered.

2.0 APPLICATION

For general engineering purposes.

3.0 CONDITION OF DELIVERY

Hot Rolled / Forged hardened and tempered.

Note: Sizes upto 100mm in hot rolled
>100 to 180mm in hot rolled or forged
above 180mm in forged

The ends of bars shall be reasonably square and true.

The bars shall be supplied in straight lengths without twists and bends.

4.0 COMPLIANCE WITH NATIONAL STANDARDS

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

IS : 5517-1993 (Reaffirmed 1998)	Steel for
Gr:40 C 8	Hardening and Tempering
Hardened & Tempered	

5.0 DIMENSIONS AND TOLERANCES

5.1 Sizes

The bars shall be supplied to the dimensions specified on BHEL order.

5.2 Tolerances:

5.2.1 For Forged bars:

The tolerances shall be + 8 mm - 0mm.

5.2.2 Tolerances on hot rolled bars shall comply with those of Grade 2 of IS:3739: reproduced below:

Revisions :

CI 24.4.19 of MOM of MRC-S&GPS

**APPROVED : Interplant Material
Rationalisation Committee-MRC (S&GPS)**

Rev. No. 07

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1 st Issue

Dt.:15.01.2002

Dt :

Year :

BHOPAL

Corp. R&D

SEP. '76

AA 102 18	CORPORATE PURCHASING SPECIFICATION	
Rev. No. 07		
PAGE 2 OF 4		

Round and Square Bars :

Nominal size. mm		Tolerance, mm	
Over	Upto & Including	Permissible deviation	Out of round/ square
---	25	± 0.50	0.50
25	50	± 0.75	0.75
50	80	± 1.00	1.00
80	100	± 1.25	1.25
100	125	± 1.50	1.50
125	160	± 2.00	2.00
160	200	± 2.50	2.50
200	250	± 3.00	3.00

5.2.3 On Straightness

Unless otherwise agreed to, the permissible deviation in straightness, shall not exceed the following limits in any 1000 mm length of the bar.

Upto & incl. 40 mm size of bars - 6 mm

Above 40 mm size of bars - 5 mm

5.3 Length

Bars shall be supplied in 3 to 6 metres length or in multiples with maximum of 10% shorts down to 1 metre.

Forged bars shall be supplied in length of 1.5 to 3 metres.

6.0 MANUFACTURE

Material shall be manufactured from fully killed steel.

7.0 HEAT TREATMENT

The recommended heat treatment is as follows:

Harden in oil / water from a temperature of 830-860°C.

Temper at a suitable temperature between 550-660°C.

8.0 FREEDOM FROM DEFECTS

The bars shall be sound, straight and free from internal and surface defects, such as seams, laps, cracks or any other defects which may impair the end use.



9.0 CHEMICAL COMPOSITION

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

Element	Melt analysis, percent,		Permissible variation, percent, in product analysis
	Min.	Max.	
Carbon	0.35	0.45	± 0.02
Silicon	0.10	0.35	± 0.03
Manganese	0.60	0.90	± 0.04
Sulphur	---	0.035	+ 0.005
Phosphorus	---	0.035	+ 0.005

10.0 TEST SAMPLES :

10.1 One sample shall be taken from each melt for chemical analysis.

10.2 One sample shall be taken from each heat treatment batch for testing of mechanical properties. Test pieces for mechanical tests shall be taken in the longitudinal direction of the piece.

For ruling section up to & including 40mm, the test piece shall be machined coaxially from the test bars. For ruling section above 40mm the longitudinal axis shall be atleast 12.5 mm from surface of the test bars.

Test methods for determining mechanical properties shall be as per IS:1598 (For IZOD impact test)/IS:1757 (For impact test in ISO-V Charpy) and IS:1608 (For tensile test).

10.3 For ruling section above 200mm, tensile test sample can be taken in tangential or transverse direction.

11.0 MECHANICAL PROPERTIES (In Hardened and Tempered Condition)

Ruling section, mm	Tensile strength, N/mm ²	0.2%/PS/YS N/mm ² , min	Y.E 5.65 $\sqrt{So}$ min	* IZOD impact J, min
≤ 30	700 -850	480	17	35 (30)
>30	600-750	380	18	41 (35)

- Average of 3 samples applicable for sizes above 16 mm ruling section only. Values in bracket are in ISO - V Charpy.



12.0 ULTRASONIC TEST

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

12.2 Optional tests: If specified on order, each bar > 40 to 100mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects and the norms of acceptance shall be as per category 2.

13.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied, unless otherwise stated on the order.

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

The test certificate shall bear the following information :

BHEL References :

AA 102 18; (Rev. No. 07)

BHEL order No,

Supplier's References :

Name

Identification No.

Melt No.

Details of heat treatment.

Result of Tests:

Dimensional inspection.

Results of chemical analysis, mechanical and & Ultrasonic tests.

14.0 PACKING AND MARKING

The material shall be suitably packed in bundles hession wrapped to prevent sagging, corrosion and damage during transit.

A suitable clear temperature rust preventive shall be applied on all the bars.

Each bar $\geq$ 50 mm shall be stamped with 'AA 102 18'.

Bars below 50 mm shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

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

AA 102 18 : Hot Rolled / Forged Carbon Steel Bars - H & T.

BHEL Order No.

Consignment/Identification No.

Melt No.

Size and Weight.

Supplier's Name.

15.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS : 1598

2. IS : 1608

3. IS : 1757

4. IS : 3739

5. IS: 5517

6. AA 085 01 18

	CORPORATE PURCHASING SPECIFICATION	AA10622 Rev No. 10 PAGE 1 of 4																		
ALLOY STEEL BARS FOR HIGH TEMPERATURE BOLTS UPTO 565° C – H&T (20CrMoVTiB4 – 10)																				
1.0 GENERAL: This specification governs the quality requirements of alloy steel bars suitable for machining. 2.0 APPLICATION: Used mainly for bolts, nuts and studs etc. 3.0 CONDITION OF DELIVERY: Hot rolled/forged bars shall be supplied in the hardened and tempered condition according to EN10269 to comply with the mechanical properties specified in the specification. 4.0 COMPLIANCE WITH NATIONAL STANDARDS: There is no Indian standard covering this material. However, assistance has been derived from EN 10269 material grade 20CrMoVTiB4 – 10 “Steels and Nickel alloys for fasteners with specified elevated and / or low temperature properties”. 5.0 DIMENSIONS AND TOLERANCES: 5.1 Sizes: Bars shall be supplied to the dimensions specified in BHEL order. 5.1.1 Length: Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 meters length or in multiples with maximum of 10 per cent, shorts down to 1 meter. Forged bars shall be supplied in lengths of 1.5 to 6 meters 5.2 Tolerances: 5.2.1 Hot rolled bars: The bars shall not vary from specified diameter or distance across flats by more than $\pm 2\frac{1}{2}$ %. 5.2.2 Forged bars: The tolerance on the forged bars shall be as follows: <table style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;"><u>Diameter, mm</u></th> <th style="text-align: left;"><u>Tolerance, mm</u></th> </tr> </thead> <tbody> <tr> <td>> 50 to 125</td> <td>+ 6.0</td> </tr> <tr> <td>>125 to 175</td> <td>+ 8.0</td> </tr> <tr> <td>>175</td> <td>+ 12.5</td> </tr> </tbody> </table>			<u>Diameter, mm</u>	<u>Tolerance, mm</u>	> 50 to 125	+ 6.0	>125 to 175	+ 8.0	>175	+ 12.5										
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<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3" style="border: 1px solid black; padding: 5px;"> Revisions: As per Clause No.39.7.3 A) of MOM of MRC – FCF+HTM </td> <td colspan="3" style="border: 1px solid black; padding: 5px; text-align: center;"> APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(FCF+HTM) </td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">Rev No.10</td> <td style="border: 1px solid black; padding: 5px;">Amd No.</td> <td style="border: 1px solid black; padding: 5px;">Reaffirmed</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Prepared</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Issued</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Dt. of 1st Issue</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">Dt:05-09-2014</td> <td style="border: 1px solid black; padding: 5px;">Dt:</td> <td style="border: 1px solid black; padding: 5px;">Year:</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">HPEP, Hyderabad</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Corp.R&D</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">June, 1977</td> </tr> </table>			Revisions: As per Clause No.39.7.3 A) of MOM of MRC – FCF+HTM			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(FCF+HTM)			Rev No.10	Amd No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue	Dt:05-09-2014	Dt:	Year:	HPEP, Hyderabad	Corp.R&D	June, 1977
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Rev No.10	Amd No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue															
Dt:05-09-2014	Dt:	Year:	HPEP, Hyderabad	Corp.R&D	June, 1977															

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Note: (FOR HOT ROLLED & FORGED BARS)

Insignificant surface defects in the form of dent and ripple marks are permissible provided their depth does not exceed half the tolerances on each size.

6.0 MANUFACTURE

The steel shall be made by electric furnace process and degassed (e.g. vacuum degassed). Any other process shall be subjected to the mutual agreement between BHEL and the manufacturers.

Note: The material as per this specification shall be supplied by the manufacturers who are having complete in-house steel melting, refining, hot rolling/forging/blooming/etc., heat treatment and testing facilities.

7.0 HEAT TREATMENT

Following heat treatment parameters are suggested to achieve the mechanical properties specified in Clause 11.0 of this specification.

Bars shall be annealed at 660 – 700°C followed by air cooling, hardened by heating uniformly to 970 – 990°C and quenching in air / water / oil. They shall be tempered at temperatures between 680 – 720°C.

If bars need to be straightened after heat treatment, stress relieving is mandatory after completion of the entire straightening process. Stress relieving shall be carried out at 30°C below the actual tempering temperature with a subsequent slow cooling rate.

8.0 FREEDOM FROM DEFECTS

The bars shall be straight, sound and free from internal defects. Cracks, other material separations or more severe linear inclusion lines are only acceptable when located in the dimensional tolerance areas.

9.0 CHEMICAL COMPOSITION:

The analysis of the material shall be as follows:

Element (wt%)	C	Si	Mn	Cr	Mo	V	Ti	B	S	P*	Al**
Minimum	0.17	–	0.35	0.90	0.90	0.60	0.07	0.001	–	–	0.015
Maximum	0.23	0.4	0.75	1.20	1.10	0.80	0.15	0.010	0.020	0.020	0.080

The following trace elements shall be restricted to the following maximum limits:

Copper	--	0.20
Tin	--	0.020*
Arsenic	--	0.020
Ni	--	0.20

* The elements P and Sn shall be controlled according to the formula $P+3.6XSn \leq 0.055\%$

** A maximum Al-value of 0.03% is to be aimed.

10.0 TEST SAMPLES

10.1 CHEMICAL ANALYSIS:

Each melt shall be analysed for chemical composition.



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10.2 MECHANICAL TESTS

A hardness test is to be carried out to verify the uniformity of the strength within the delivery lot (per melt and heat treatment batch). Hardness check shall be conducted on 10% of the bars or a minimum 10 numbers of bars whichever is higher. In case the lot consist of less than or equal 10 bars, then all the bars need to be checked for hardness. Mechanical properties shall be tested on hardest and softest bar.

Specimens are to be taken in longitudinal direction according to EN 10083-1. For bars with diameter (d) respectively side lengths (a, b) > 100mm, the specimens shall be taken at a distance d/3 respectively a/3 and b/3 from the respective surfaces. In this case transverse specimens are also allowed.

11.0 MECHANICAL PROPERTIES

11.1 When tested in accordance with IS:1608, the test pieces shall show the following properties tensile properties at room temperature (EN 10269):

Properties	$d \leq 100$	$100 < d \leq 250$
Ultimate tensile strength	820–1000 N/mm ²	820–1000 N/mm ²
0.2% proof stress	660 N/mm ² (min.)	660 N/mm ² (min.)
Elongation on $5.65\sqrt{s_0}$ gauge length	15 % (min.)	15 % (min.)
Reduction in area	50% (min.)	50% (min.)
Charpy 2mm V notch (J)	40 (min.)	27 (min.)

11.2 Charpy Impact Value (V notch)

When tested in accordance with IS:1757, using a test specimen of 10 mm x 10 mm x 55 mm and having a 2 mm V notch, the materials shall show a minimum Charpy impact value (in Joules) at room temperature as mentioned in the above table. This test is applicable for Bars of sizes above 16mm only.

11.3 Hardness (Brinell) - for information only

When tested in accordance with IS: 1500, the material shall have a Brinell hardness in the range of 245 – 310 BHN.

Note: In lieu of IS:1608, IS:1757 & IS:1500, any other National or International may be used.

12.0 NON-DESTRUCTIVE TEST

12.1 Verification test of all bars.

12.2 100% Ultrasonic inspection of all bars according to EN 10308 type 1a-1c (table 1). Acceptance criteria shall be quality class 4 according to EN 10308 (table 2). In general, the decision limits for loss of back wall echo is 4 dB for all bar dimensions. Every linear or surface-like in-homogeneity larger than 10mm in any direction is not acceptable.

13.0 RETESTS

As per EN10021.

CORPORATE PURCHASING SPECIFICATION



14.0 TEST CERTIFICATE:

Three copies of test certificates in English shall be supplied unless otherwise stated in the order.

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

The test certificate shall bear the following information:

BHEL references:

BHEL order No.

AA10622 (Rev.No.10):ALLOY STEEL BARS FOR HIGH TEMPERATURE BOLTS UPTO 565° C – H&T (20CrMoVTiB4 – 10)

Supplier References:

Supplier's Name

Heat or Cast No.

Process of manufacture

Identification No.

Particulars of heat treatment and Batch No.

Results of Tests:

Chemical analysis

Non-destructive tests

Mechanical properties

Results of dimensional inspection

The certificate must be signed by the Chief, Inspection Department / Chief Metallurgist of the supplier's plant.

15.0 PACKING AND MARKING

Bars shall be suitably packed to prevent corrosion and damage during transportation.

Bars over 63 mm diameter shall be individually stamped / painted on one end face with cast number and AA10622.

Bars of 63 mm diameter and less shall be bundled together and identified by means of a metal label stating the cast number and specification No. AA10622 attached to the bundle.

Each package shall, in addition bear the following information:

AA10622:Alloy steel bars for high temperature bolts up to 565 °C-H&T(20CrMoVTiB4 – 10)

BHEL Order No.

Cast / Batch No.

Identification No.

Weight.

Supplier's Name.

16.0 REFERRED STANDARD (Latest publications including amendments)

1) IS:1500

2) IS:1608

3) EN10021

4) EN 10204

5) EN 10308

6) EN10083-1

7) IS 1757



CORPORATE PURCHASING SPECIFICATION

AA 121 02

Rev. No. 03

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COLD ROLLED BRASS, SHEET, STRIP AND FOIL (HALF HARD)

1. GENERAL:

This specification governs the requirements of cold rolled brass sheet, strip, and foils.

2. APPLICATION:

Traction and Industrial machines, Controlgear, Boiler feed pump motors and steam turbine components.

3. CONDITION OF DELIVERY : Half-hard

4. COMPLIANCE WITH NATIONAL STANDARDS :

The material shall comply with the requirements of the following national standard and also meet the requirements of this specification.

IS : 410 - 1977 (Reaffirmed 1996) | COLD ROLLED BRASS SHEET,
Gr : Cu Zn 37 (HB) STRIP AND FOIL

5. DIMENSIONS AND TOLERANCES :

Dimensional tolerance (Normal) shall be as per IS : 3052.

6. MANUFACTURE:

The sheet, strip and foil may be manufactured by cold rolling process.

7. FREEDOM FROM DEFECTS :

The material shall be clean, smooth and free from harmful defects, which may affect the utility.

8. CHEMICAL COMPOSITION:

The chemical composition of the material, when analysed in accordance with IS:3635 (Methods of chemical analysis of brasses) or any other conventional/ instrumental methods shall be as follows:

Element	Percent	
	Min	Max.
Copper	61.5	64.5
*Lead		0.30
*Iron		0.075
*Zinc		Remainder
Total impurities(Including Iron)		0.60

*Note : These elements need not be determined when the material supplied conforms with mechanical properties

Revisions :

Refer cl. No. 13.4 of MOM MRC (NFC&W)
Cl.16.3.41 of MRC-NFCW+HE

APPROVED :

**INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (NFCW+HE)**

Rev. No. 03

Amd. No.01

Reaffirmed

Prepared
CORP. R&D

Issued
Corp. R&D

Dt. of 1 st Issue
01-03-78

Dt: 01-08-93

Dt :01-11-01

Year:



9. TEST SAMPLES :

- 9.1 Quantities of sheet (or strip) of the same width, thickness and temper shall be batched together. For each batch the number of samples taken shall be as given below :

The samples shall be cut off cold in longitudinal direction and shall receive no further treatment (except that they may be machined to the shape of the test piece) before being tested.

- 9.1.1 From batches weighing up to 1000 kg the number of samples taken shall be in the proportion of one per 200 kg of material submitted, and fractional remainder being considered as 200 kg. Where **strip** is supplied in coils weighing more than 200 kg, one sample shall be taken from each coil to provide the necessary test pieces.

If BHEL requires more than one sample to be taken from any coil, the method of taking the additional sample or samples shall be agreed to between the supplier and BHEL.

- 9.1.2 Batches exceeding 1000 kg shall be sub-divided into smaller batches of not less than 200 kg and not more than 1000 kg to which the provision of 9.1.1 shall then apply.

10. MECHANICAL PROPERTIES:

10.1 Tensile Strength and Hardness :

The material when tested in accordance with IS: 1608 (Method for tensile testing of copper and copper alloys) and IS: 1501, Part.1 (Method for Vicker's hardness test for copper and copper alloys) shall show the following properties :

Material	Tensile Strength N/mm ² Min.	%Elongation on 50mm Gauge length Min.	Hardness HV5 Min.
1. Width upto & Inclg. 450 mm	380	15	110
2. Width over 450mm & Upto 900 mm	345	15	100

Note:

1. Tensile strength shall be carried out for material above 0.5 thickness.
2. Percentage elongation shall be carried out for material above 0.8 mm thickness and above 12 mm width.

10.2 Bend Test :

Where possible the material shall be subjected to a transverse bend test made on test piece cut with their major axes at right angles to the direction of rolling; where this is not possible it shall be subjected to a longitudinal bend test, made on test pieces cut with their major axes



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parallel to the direction of rolling. Both surfaces of the test piece shall be tested. The test pieces shall not crack when bent once through the appropriate angle as specified below:

Material Thickness	Transverse Bend Angle deg.	Transverse Bend Radius	Longitudinal Bend Angle deg.	Longitudinal Bend Radius
Upto 3.5 mm	180	close	180	close
Above 3.5 mm & upto 10 mm	180	t	180	t

t = thickness of material

The bend test shall be made in accordance with IS: 1599. The test pieces shall be of convenient length and width. It shall be 12 mm for thickness upto 6 mm and twice the thickness for over 6 mm thickness.

The longer edges shall be carefully rounded and smoothened longitudinally so that the material up to 3.0 mm thick cross-section has approximately semi-circular edges;

For material over 3.0 mm thick the edges shall be rounded to a radius of 1.5 mm.

11. OPTIONAL TEST:

If specified in the drawing/order, the material shall be tested for its electrical conductivity. The electrical conductivity of the material at 20°C shall be 23.75 - 26.25 % IACS.

12. RETEST:

Should any of the test pieces first selected, fail to pass the prescribed tests mentioned under various clauses in this specification, two further samples from the same batch shall be selected for tested, one of which shall be from the same component from which the original test sample was taken, unless that component has been withdrawn by the supplier.

Should the test pieces from both these additional samples pass, the batch represented by the test sample shall be accepted. Should the test pieces from either of these additional samples fail the batch represented by the test sample shall be selected.

13. INSPECTION AT SUPPLIER'S WORKS:

Tests and inspection are to be conducted in the presence of the customer's representative. The representative shall have free access at all times while the work on the contract is being performed, to all parts of the manufacturer's works. The supplier shall offer the purchaser's representative all reasonable facilities, without charge, to satisfy the latter that the material is being furnished in accordance with this specification. The supplier shall prepare and provide necessary test specimens for testing to be carried out at his premises. If facilities are not available at his works, the supplier shall make necessary arrangement for carrying out the prescribed test elsewhere.

14. TEST CERTIFICATES:

The supplier shall submit 5 copies of test certificates giving the following information.

BHEL Order No.

AA 12102 - (Rev. No. xx) Cold Rolled Brass Sheet Strip and Foil (Half Hard)



Manufacturer's/Supplier's Name

Batch No./Heat No.

Sizes and quantity supplied

Results of chemical analysis, mechanical and all other tests as called for in this specification/order.

Consignment/Identification No.

15. PACKING AND MARKING :

The material shall be suitably packed to prevent corrosion and damage during transit.

Each package shall be legibly marked with the following information.

BHEL Order No.

AA 12102

Batch No.

Identification mark/No.

Weight

Supplier's Reference and Name

16. REJECTION AND REPLACEMENT:

In the event of the material proving defective in the course of preparation, machining forming, fabrication testing etc., such material shall be rejected notwithstanding any previous certification of satisfactory testing and/or inspection.

The supplier shall undertake to replace the material, free of charge, without any delay to arrange to take back the rejected material at his own cost.



CORPORATE PURCHASE SPECIFICATION

AA 193 31

Rev. No. 11

PAGE 1 OF 6

CARBON STEEL FORGINGS, CLASS 2

↑

1.0 GENERAL:

This specification governs the quality requirements of Carbon Steel Forgings, Class 2.

↑

2.0 APPLICATION:

Suitable for general engineering purposes and for use in welded constructions.

3.0 CONDITION OF DELIVERY:

Normalised / Normalised and tempered..

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

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

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

IS::2004 – 1991 (RA -2006) } Carbon Steel Forgings For General Engineering
 Gr: 2 (20C8), } Purposes.

↑

5.0 DIMENSIONS AND TOLERANCES:

The dimensions and tolerances shall be as specified on the order/ drawing. Wherever these are not specified, specified, the machining allowances and tolerances shall be as specified below:

For finish machined drawings : 3 ± 1 mm

For rough machined drawings : ± 1 mm

REVISIONS :

36th MOM OF MRC (FCF+HTM)

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
 COMMITTEE-MRC (FCF+HTM)

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Prepared

Issued

Dt. of 1st Issue

Dt. 30.01.2008

Dt :

Year:04-11-2011

HARDWAR

Corp. R&D

JULY, 1980

**6.0 MANUFACTURE:**

Forgings shall be manufactured from steel produced by the open hearth, electric or such other process as may be agreed to between BHEL and the manufacturer. ↑

Steel shall be fully killed.

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

The amount of hot working and finishing temperature shall be such as to ensure complete soundness and adequate uniformity of structure and mechanical properties after heat treatment. The forgings shall not be overheated.

The minimum reduction ratio when forgings are made out of ingots shall be 4:1.

For sizes above 250 mm ruling section, the minimum reduction ratio shall be 3.5:1

Note: Raw material like Ingots/Blooms/Billets required for forgings should be procured from BHEL approved sources along with test certificate."

7.0 FREEDOM FROM DEFECTS:

The forging shall be free from defects, such as cracks, fold, flakes, seams, segregation, nonmetallic inclusions and other injurious defects which may affect the utility of the forging.

8.0 HEAT TREATMENT:

Forgings shall be normalised / normalised and tempered at suitable temperature to achieve the mechanical properties specified. ↑

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

9.0 FINISH:

As mentioned in the drawing.

10.0 CHEMICAL COMPOSITION:

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

Element	Percent		Permissible variation , percent
	min.	max.	
Carbon	0.15	0.25	± 0.02
Silicon	0.15	0.35	± 0.03
Manganese	0.60	0.90	± 0.04
Sulphur	---	0.040	+ 0.005
Phosphorus	---	0.040	+ 0.005



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NOTE:

1. Elements not quoted above shall not be added to the steel, other than for the purpose of finishing the heat and shall not exceed the following limits:

<u>Element</u>	<u>Percent, max.</u>
Nickel	0.30
Chromium	0.30
Copper	0.25
Molybdenum	0.05
Vanadium	0.05
Tin	0.05
Boron	0.0003

2. When steel is aluminium killed or killed with both aluminium and silicon, the requirements of minimum silicon content shall not apply. For aluminium killed steel the total aluminium content shall be within 0.02 to 0.05 percent.
3. Percent Cu + 10 X (percent Tin) shall not exceed 0.5%.
4. Carbon equivalent (Melt analysis) value (C.E.) = 0.42%, max.

$$\text{C.E.} = \text{C} + \frac{\text{Mn}}{6} + \frac{\text{Cr} + \text{Mo} + \text{V}}{5} + \frac{\text{Ni} + \text{Cu}}{15}$$

5. Mo ≤ 0.15%, limiting to meeting conditions of Cr + Mo + Ni = 0.5%.

11.0 TEST SAMPLES:

- 11.1 Unless otherwise specified in the order/drawing, test samples shall be taken from each melt and heat treatment batch. Test samples should be cut from the heat treated forgings by cold process only and shall receive no further heat treatment.

Test samples shall be cylindrical or rectangular in shape and cut at a distance of 12.5 mm below the heat treated surface.

- 11.2 When integral test pieces are not called for, a test sample, having similar reduction ratio and heat treatment, as the forgings it represents, shall be provided per heat, per heat treatment batch, for check testing at BHEL, along with the forgings. The samples shall be properly identified and correlated with the Heat/Heat treatment batch No./Test certificate No. Test samples shall be taken, at a distance 12.5 mm below heat treatment surface.

- 11.3 Test samples shall generally be taken in the longitudinal direction. However, for economic reasons or where the size/configuration does not permit the same, test samples may be taken in the transverse or radial direction.

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12.0 MECHANICAL PROPERTIES :

The test pieces, after being heat treated as per clause 7.0 above, shall show the following properties upto a limiting ruling section of 800 mm. Properties for thicker sections shall be subject to agreement between BHEL and the manufacturer.

Test methods are specified below:

- 12.1 Tensile : IS: 1608
12.2 Hardness Test (Brinell) : IS:1500
12.3 Charpy Impact Value (2mm U-Notch) : IS:1499

The test is applicable for forgings of sizes above 16mm only.

Property	Sample (CI 11.3)	Limiting ruling section, mm		
		Upto & incl.100	> 100 & upto 400	> 400 & upto 800
Tensile strength, min, N/mm ²	Longitudinal Transverse/ Radial/ Tangential	430	390	370
Yield strength, min, N/mm ²	Longitudinal Transverse/ Radial/ Tangential	230	195	185
Elongation on 5.65√So gauge length percent, min.	Longitudinal Transverse/ Radial/ Tangential	24 12 16 18	23 11 15 17	21 9 13 15
* Hardness, Brinell, HB	----	120 – 167	111 – 156	111 - 156
Charpy Impact value (2mm U-Notch) min., joules	Longitudinal Transverse/ Radial/ Tangential	47 24 28 35	43 22 26 32	40 20 24 28

Note:

1. Unless otherwise stated on the order/drawing small forgings of non-critical nature weighing less than 300 kg shall be accepted on the basis of chemical composition and hardness.

*2. Hardness test can be conducted only when tensile test can not be performed.

13.0 ULTRASONIC TESTS:

- 13.1 For forgings ordered by BHEL, Hyderabad: Unless other wise specified on the drawing, ultrasonic test shall be carried out as per BHEL standard AA 085 01 18 and norms of acceptance shall be as per category 2. ↑
- 13.13.2 For forgings ordered by other units: If specified on the drawing/order, ultrasonic test shall be carried out as per BHEL standard AA 085 01 18 and norms of acceptance shall be as per category 2, unless otherwise specified. ↑



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Rev. No. 11

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14.0 ADDITIONAL TESTS: If specified in the drawing /order, the following tests shall be conducted:

14.1 Bend Test (Longitudinal):

The test pieces (230mm long and 32 mm square with edges rounded off, where the dimensions permit) shall be capable of being bent cold by direct pressure without fracture, until the sides are parallel, round a mandrel having a diameter of 44 mm when tested as per IS:1599.

14.2 Magnetic particle test:

14.3 Any other tests.

"Norms of acceptance shall be as specified on the drawing/order. "

15.0 SCOPE OF THIRD PARTY INSPECTION:

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

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

16.0 TEST CERTIFICATES:

Three copies of a test certificates shall be supplied, unless otherwise stated in the order, in the Test Certificate proforma annexed to this specification (Annexure -I).

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 following details shall be furnished in the test certificate:

Dimensional inspection.

Details of heat treatment.

Reduction ratio

Chemical composition including trace elements.

Results of mechanical tests.

Results of Ultrasonic test

Results of ultrasonic examination.

Results of additional tests called for in the drawing/order.

17.0 PACKING & MARKING:

Forgings shall be suitably packed to prevent damage during transit.

Machined surfaces shall be properly protected with anticorrosive compounds.

Each package or forging (when supplied separately) shall be legibly marked with the following information:

AA 193 31 - Carbon Steel Forgings, Class 2 (20C8).

BHEL Order No.

Suppliers Name

Consignment/ Identification No.

Batch No.

Weight.

18.0 REFERRED STANDARDS (Latest publications Including Amendments):

1) IS:1499

2) IS:1500

3) IS:1599

4) IS:1608

5) IS:2004

6) AA 085 01 18

[illegible]

		CORPORATE STANDARD		AA 040 12 01	
				Rev. No. 04	
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RATING PLATES (BILINGUAL) - TECHNICAL REQUIREMENTS AND GENERAL LAYOUT.					
GENERAL:					
1.1 This standard specifies sizes, material, layout , ordering details and other general Requirements for rating plates (Bilingual) i.e. Hindi and English to be used on various Equipment's manufactured by BHEL.					
1.2 All inscriptions on the rating plates shall be bilingual i.e. Hindi and English.					
2.0 LAYOUT:					
2.1 The rating plate is divided into 3 portions by the two main dividing lines and contents of each portion shall be as follows:					
2.1.1Top portion:					
Name of the company and company's monogram shall appear in this portion. Layout, Style and design of letters etc. are fixed for all the rating plates and are specified in this standard. Company's name in Hindi shall be on top and English on bottom.					
2.1.2 Middle portion:					
Name of the equipment ratings, diagrams in case of combined rating and diagram plates and other details (as required) shall appear in this portion. Specification No.(to which the equipment is manufactured). Serial No. of equipment name of manufacturing division i.e. 'Bhopal' etc. and year of manufacture shall also be included in above details.					
Keeping in view the uniformity and overall appearance the following shall be strictly followed.					
a) Name of the equipment shall always appear at the middle portion of the plate.					
b) Name of the manufacturing division i.e. Bhopal etc. shall always appear on the right hand side of the pad in Hindi on top and in English script below it. Its location is permanently fixed for all rating plates in between the pads of serial No. and year as shown in Fig. 1					
c) Rating description shall be in two languages with Hindi on top and English at the bottom. The rating values and units on the right hand portion of the pads shall be in English script only. However the layout of contents of this portion may vary as per products. The contents may be suitably arranged in 2 or 3 rows (as required).					
Revisions:As per Email Dt 5/1/2008 from Shri V K Chauhan , Sr. Manager, TSX, Hardwar			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE-WG (SMC+RP)		
Rev. No. 04	Amd.No.	Reaffirmed	Prepared	Issued	Dt. of 1st Issue
Dt. 28.04.2008	Dt :	Year:	HARDWAR	Corp. R&D	NOV. 1977



- d) All the rating particulars etc. shall appear on separate pads and shall be further separated by the dividing lines as illustrated In Fig. 1. Presentation, sequence of "different languages for various inscriptions, style and design of letters is fixed for all the rating plates and shall be as specified in this standard. The ratings shall be written in the center of the blocks or slightly higher, as shown in clause A2 of Annexure - A.

2.1.3 Bottom Portion:

'MADE IN INDIA' along with inscription to this effect in Hindi shall appear in this portion. Layout, sequence of languages, letter styles etc. are fixed for all the rating plates and shall be as specified in this standard.

- 2.2 A border shall be provided all around the rating plate as specified in this standard (See Fig. 1 for illustrated example).

3.0 MATERIAL :

- 3.1 Stainless steel sheet grade X04Cr19Ni9 solution Annealed (AA 10 739).

↑

4.0 DIMENSIONS:

- 4.1 Dimensions of plate, monogram size, fixing details and other dimensions shall be as specified in Table - 1.

- 4.2 Dimensions of various details of company's monogram shall be as per Corporate Standard AA 040 11 20.

5.0 LETTERING :

- 5.1 Style and Design of English letters shall as per standard AA 042 14 03.

- 5.2 Style and Design of Hindi letters shall be as per standard AA 042 14 02.

- 5.3 Letter heights for various headings for a particular plate size shall be as specified in table - 2.

6-0 FINISH AND OTHER TECHNICAL REQUIREMENTS:

- 6.1 SS plate (to be used for rating plate) should have a standard polished surface finish as per finish number 4 indicated in IS:6911-1992 clause 15.

↑

- 6.2 All rating plates shall be manufactured by etching and shall meet the following technical and other requirements.

- 6.2.1 **Top Portion:** All letters of the name of the company and monogram with border shall be raised. The background shall be etched and finished black. (Stoving enamel).

- 6.2.2 **Middle Portion:** The following details of this portion shall be raised.



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AA 040 12 01

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- All letters for the name of the equipment.
- All pads on which the rating particulars shall appear.

The following details of this portion shall be etched and finished black (stoving enamel).

- All letters, numerals etc. of rating details appearing on the pads.
- All the dividing lines separating the pads from each other.
- Remaining area in the background.

6.2.3 **Bottom Portion:** All letters shall be raised and remaining area in the background shall be etched and finished black (sieving enamel).

6.2.4 Border around the rating plate and the two dividing lines shall be raised.

7.0 **TECHNICAL DELIVERY CONDITIONS :** As per BHEL standard AA 085 14 14.

7.1 REFERRED STANDARDS (Latest Publications Including Amendments)

↑

- | | | |
|-----------------|-----------------|-----------------|
| 1) AA 040 11 20 | 2) AA 040 12 12 | 3) AA 042 14 02 |
| 4) AA 042 14 03 | 5) AA 085 14 14 | 6) AA 712 21 01 |
| 7) AA 10 739 | 8) IS:6911 | |

9.0 **NOTE :**

9.1 Weights given in table -1 are approximate and have been calculated on the basis that steels weights 785 g/cm³.

↑

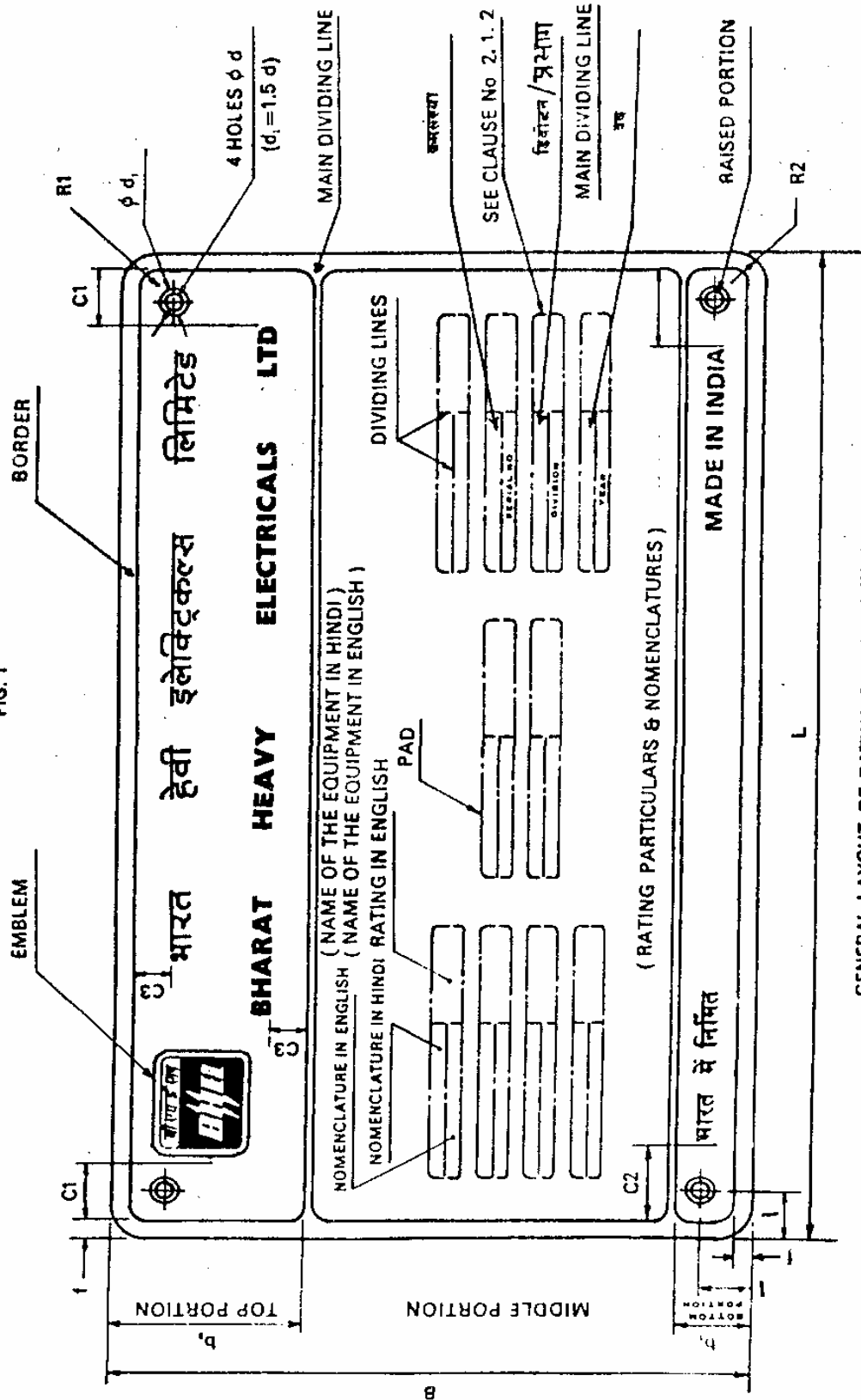
9.2 For general instructions see Annexure - A.

9.3 A sample Rating Plate of Turbo-generator has been shown in Annexure - B.

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FIG. 1



GENERAL LAYOUT OF RATING PLATE (BILINGUAL)
(For dimensions refer Table-1)



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TABLE-1

(All dimensions are in mm)

Length L	Width B	Thickness S	Emblem size î	b1	b2	f	R1	R2	C1	C2	c3	width of dividing line	L	ØD	size of a screw	weight/100 plates in kg(appx)
90	54	1.0	10	8	11	1.5	0.8	2.3	6.5	8	3	0.5	4.5	2.6	M2	6.5
125	75	1.0	15	11	18	2	1.0	3	9	11	4	0.5	6.5	3.6	M3	12.9
180	108	1.0	25	12	32.5	3.5	1.5	5	8.5	14.5	7	0.8	8	3.6	M3	26.7
210	126	1.0	25	14	38	4	2.0	6	10	17	8	1.0	9	4.8	M4	16.4
250	150	1.0	25	15	45	5	2.5	7.5	10	20	10	1.3	10	4.8	M4	5.6
320	190	1.5	40	19	57.8	6.5	3.0	9.5	13	26	13	1.6	13	7	M6	104.6
400	240	1.5	40	24	72	8	4.0	12	16	32	16	2.0	16	7	M6	165
500	300	2.0	60	30	90	10	5.0	15	20	40	20	2.5	20	10	M8	322
630	375	2.0	60	38	11.3	12.5	6.5	19	25	50	25	3.5	25	10	M8	512
750	450	2.5	100	45	135	15	7.5	22.5	30	60	30	4.0	30	12	M10	915

SCREWS, SLOTTED COUNTER SUNK HEAD COARSE PITCH,
STEEL PRODUCT Gr. A as per AA 7122101

î

TABLE - 2

(ALL DIMENSIONS ARE IN mm)

SIZE OF THE RATING PLATES		90 X 54	125 X 75	180 X 108	210 X 126	250 X 150	320 X 190	400 X 240	500 X 300	630 X 378	750 X 450
		HEIGHT OF THE LETTERS									
BHARAT HEAVY ELECTRICALS LTD	IN HINDI	2.0	3.0	4.0	5.5	6.5	8.0	10.5	11.0	16.5	20
	IN ENGLISH	1.5	2	3	4	5	6	8	10	12.5	15
MADE IN INDIA		1.5	2.0	2.5	3	4	5	6	8	8	10
NAME OF THE EQUIPMENT		1.5	2.0	2.5	3	4	5	6	8	8	10
RATING PARTICULARS/ NOMENCLATURES		1-1.5	1.5	2	2-3	2-3	3-4	3-5	4-6	5-6	6-8



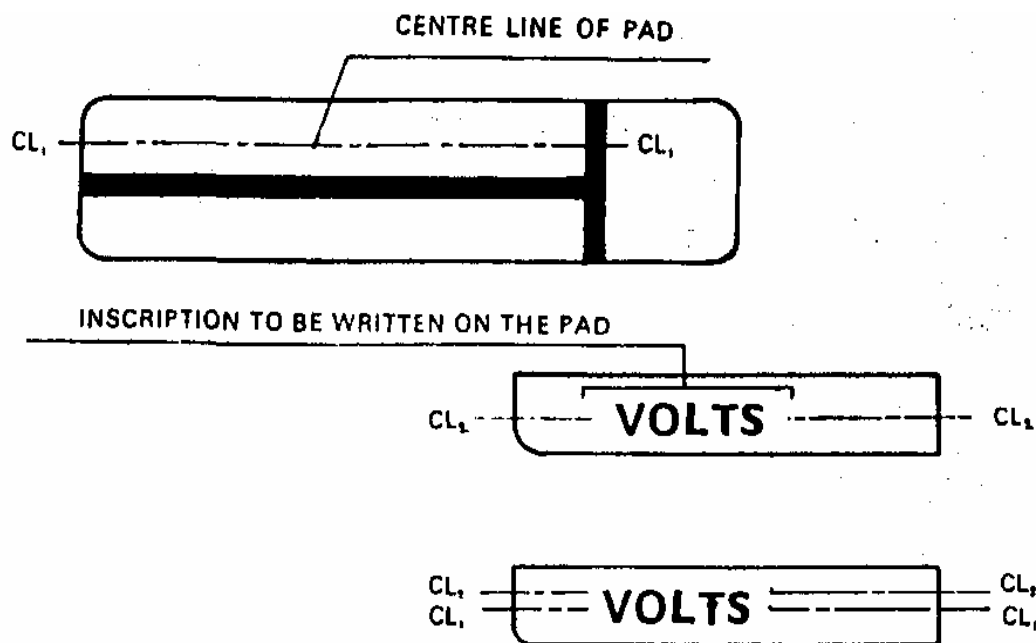
ANNEXURE - A

GENERAL INSTRUCTIONS

A1 To ensure legibility the selection of a plate size shall be based on the size of letters relative to the mounting position and in certain cases to its proportions to the equipment or available space.

A.2 LAYOUT OF PADS FOR RATING DETAILS

A2.1 The rating shall be written exactly in the center of the pad or slightly higher as illustrated below :



CL.-CENTER LINE OF THE INSCRIPTION WRITTEN ON THE PAD.

CL, SHOWN SLIGHTLY HIGHER THAN CL.

A3 USE OF ABBREVIATIONS:

A3-1 Use of long nomenclatures for Rating shall be avoided. Whenever required, the description shall be suitably abbreviated to accommodate the details in the space available. The abbreviations used shall be as per National/Corporate/plant standards in order to avoid ambiguity.

A4 SERIAL NUMBER:

A4-1 The serial number of the equipment to be mentioned on the rating plate shall be prefixed by the alphabetic unit code i.e. BP for Bhopal. HY for Hyderabad. TP for Tiruchy etc. as finalised by IPSC.



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A.5 SPECIFICATION

A.5.1 Specifications to be mentioned on the rating plates to indicate the conformity of the equipment shall be ISO/ IEC/ IS.

A.6.0 FASTENERS AND FASTENING DETAILS

A.6.1 Screws slotted, counter sunk head, coarse pitch steel product Gr. to AA 7122101 have been Recommended for use in this standard. While making the working drawings, it shall be ensured that length and other requirements for fastening the plates are fully described in the drawing as per specific requirement to achieve the desired fastening. î

A.6.2 After fixing the screws on the plate, slots of heads shall be suitably filled with putty and shall be finished black so that the appearance of the fastener merges with the black background.

A.7.0 HINDI TRANSLATION

A.7.1 Hindi translation of the Rating particulars shall appear on the drawing at the appropriate place. Hindi words normally understood by all shall be used, as per AA 040 1212.

A.8.0 PACKING AND PROTECTION OF PLATES.

A.8.1 Due care should be taken to ensure that the plates are not damaged when the equipment is in transit or under erection at site. Wherever necessary the plates may be suitably covered with transparent paper till the equipment is commissioned and handed over, if any adhesive is used it shall be ensured that the plant is not spoiled.



ANNEXURE-B

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
BHARAT HEAVY ELECTRICALS LTD



टुर्बोजेनरेटर
TURBOGENERATOR

विनिर्माता KW	120,000	गैस का दबाव GAS PR.	3 kg/cm ² g
गो.एच.वो. P.F.	0.8	इन्सुलेशन क्लास INSUL. CLASS	B
वि.सि.वो.एच. KVA	150,000	मॉडल MODEL	TG-MH 1202
वोल्टेज VOLTS	13,800	स्पेसिफिकेशन SPEC.	IEC-34
स्टेटर AMPS	6,275	सीरियल नं. SERIAL NO.	BP 2220019
रोटर VOLTS	348	डिवीजन DIVISION	भोपाल BHOPAL
रोटर AMPS	2,380	वर्ष YEAR	1977

भारत में निर्मित

MADE IN INDIA

		CORPORATE STANDARD		AA7111122	
				Rev No.08	
				PAGE 1 of 3	
BOLTS, HEXAGON HEAD, PRODUCT GRADE 'A' COARSE PITCH, STEEL PROPERTY CLASS 8.8 (M3 - M16)					
1.0 DESIGNATION: A product Gr.A, hexagon head, steel bolt of nominal diameter 10 mm, length 60 mm, coarse pitch and conforming to property class 8.8 shall be designated as:					
1.1 On Drawings: i) Material specification column					

3.0 NOTE:

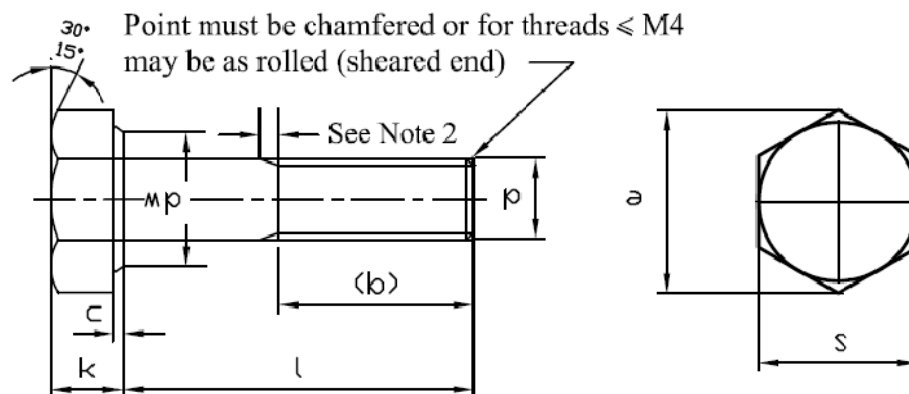
- 3.1** Length and diameter combination (refer Table-1 on page 3 of 3) between the bold lines should only be use
- 3.2** For screw threads, general (Metric) refer to BHEL standard AA0231800
- 3.3** For tolerance grade, position and class refer to BHEL standard AA0230201
- 3.4** Bolts to this standard would be un-plated, 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 meant for commercial transaction.
- 3.6** For product group Gr:A, hexagon head, steel bolts, property class 8.8 (M20 - M24) refer BHEL standard AA7111124
- 3.7** 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 amendment):

- 1) AA0231800 2) AA0230201 3) AA0231850
 4) IS:1367, Part 3, 9 & 17 5) AA7111124 6) IS:4218, Part2

EXPLANATORY NOTE

- In Clause 2.2, Year of the IS:1367, Part 3 has been removed.
- In Table–1, the sizes, sub-codes and their weights have been corrected in line with CMCC of fasteners for mainly M12 and M16
- In Clause 4.0, the Standard No.AA0231850 has been added at Sl. No.7



- 1) Corporate sub codes are shown in the table.
- 2) For thread runout refer AA0231850
- 3) Weights have been shown in kg per 1000Nos
- 4) Symbol Δ denotes the non-preferred size.

All dimensions are in 'mm'

Nom. Size d	Head			Washer		Thread Length b		Nominal Length (l)																								
	Flats	Crms	Tkns	Dia	Tkns	For Nom. Length ≤ 125	For Nom Length >125 & ≤ 200	20	25	30	35	40	45	50	55	60	65	70	80	90	100	110	120	130	140	150						
	Max.	Min.	Max.	Min.	Max.			Min.							Sub Code																	
	Min.		Min.						Weight																							
M3	5.5	6.01	2.12	4.6	0.4	12	-																									
	5.32		1.88		0.15																											
M4	7.0	7.66	2.92	5.9	0.4	14	-																									
	6.78		2.68		0.15																											
M5	8.0	8.79	3.65	6.9	0.5	16	-			550			569																			
	7.78		3.35		0.15					5.63			7.94																			
M6	10.0	11.05	4.15	8.9	0.5	18	-		011 Δ	020*	038	542	356	046																		
	9.78		3.85		0.15				7.36	8.47	9.58	10.2	11.8	12.9																		
M8	13.0	14.38	5.45	11.6	0.6	22	28			364 Δ	372	054	429	062		380	445		453	577 Δ												
	12.73		5.15		0.15					16.3	18.27	20.3	22.2	24.2		28.15	30.1		34.0	40.0												
M10	16.0	17.77	6.58	14.6	0.6	26	32				070 Δ	089	585	097	593	100	119	399	127	402	135	143	151 Δ									
	15.73		6.22		0.15						32.0	35.1	38.2	41.3	44.4	47.4	50.5	53.6	56.7	59.8	65.9	72.0	78.2									
M12	18.0	20.03	7.68	16.6	0.6	30	36					160*	178	186	194	208	216	607	224	410	470*	488	232	496								
	17.73		7.32		0.15						49.9	54.3	58.7	63.2	67.7	72.1	76.5	74.32	85.4	94.3	103.2	112.0	121.0									
M16	24.0	26.75	10.18	22.5	0.8	38	44						240 Δ	259	267	275	283	291	305	313	321	500*	518	330*	348							
	23.67		9.82		0.2							108.0	115.9	123.7	131.6	139.5	147.4	155.3	171.0	187.0	203.0	218.5	233.0	249.0								



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

Revisions :

APPROVED:

INTERPLANT MATERIAL
RATIONALIZATION 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

AA 7121123

Rev. No. 08

PAGE 2 OF 3

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.

4/3/11

CS-835-



CORPORATE STANDARD

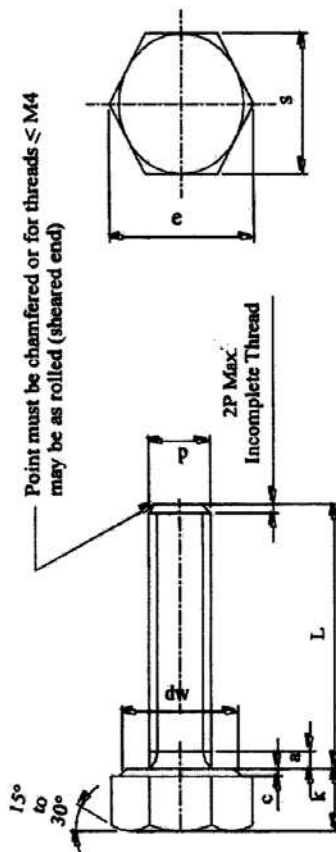
AA7121123

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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



All dimensions in 'mm.'

Table -1

Thread Size d	Head			Washer		Un- thread length a Max.	See Note - 4																			
	Flats s Max. Min.	Thickness k Max. Min.	Dia. d Min.	Thickness c Max. 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	086									
									Weight	4.40	4.75	5.45	6.25	7.36	8.47	9.58										
M8	13	12.73	14.38	5.45	5.15	11.8	0.6	0.15	4	Sub-Code		088	100	118	126	134	142	150	168		177	185				
									Weight		9.86	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	14.8	0.6	0.15	4.5	Sub-Code			207	215	223	231	240	258	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	53.8		65.9	72.0
M12	18	17.73	20.03	7.65	7.32	16.8	0.6	0.15	5.30	Sub-Code				347	355	363	371	380	398	401	410	428	438	444	460	
									Weight				33.7	37.0	41.0	45.4	49.9	54.3	58.7	63.2	67.8	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	39.88	15.21	14.78	33.8	0.8	0.2	9	Sub-Code																
									Weight																	

CS-835 4/3/18

	CORPORATE STANDARD			AA 716 10 01		
				Rev. No. 04		
				PAGE 1 OF 4		
WASHERS, MACHINED, STEEL						
1.0 DESIGNATION: A machined washer of size 8.4 mm made of steel shall be designated as: 1.1 On drawings: i) Material specification column : AA7161001 ii) Description column : WASHER MCD 8.4 -ST 1.2 On indents: Washer Machined 8.4 – Steel: AA7161001 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 and General requirements: As per IS; 2016-1967, Table-1, Reaffirmed 2006 2.2 Material: Steel as stated in IS: 2016 2.3 Finish: Plated as specified in BHEL order. 3.0 NOTE: 3.1 For machined washers of brass, refer to BHEL standard AA7161002 3.2 For machined washers of copper, refer to BHEL standard AA7161004						
Revisions : As per clause 29.4 of 29 th MOM of WG-F				APPROVED : INTERPLANT STANDARDIZATION COMMITTEE (WG-F)		
Rev. No. 04	Amd.No.		Prepared	Issued	Dt. of 1st Issue	
Dt:15.04.2011	Dt :	Year :	Haridwar	Corp. R&D	January, 1977	



3.3 Washers to this standard would be unplated, divisions wishing to have plated washers would have to get them plated.

3.4 For general requirements of washers, refer BHEL standard AA0230408

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

3.6 When fasteners are to be tested with in BHEL, the following sampling and acceptance plan based on IS:6821 (Table-2) shall be followed for physical properties.

LOT SIZE	SAMPLE SIZE	ACCEPTANCE NOS.
Up to 1000	5	0
1001 -3000	8	0
3001 -10000	13	0
10001-35000	20	0
over 35000	32	1

4.0 REFERRED STANDARDS (Latest publications including amendment):

- | | | |
|--------------|--------------|--------------|
| 1) IS:2016 | 2) IS: 6821 | 3) AA0230408 |
| 4) AA7161002 | 5) AA7161004 | |

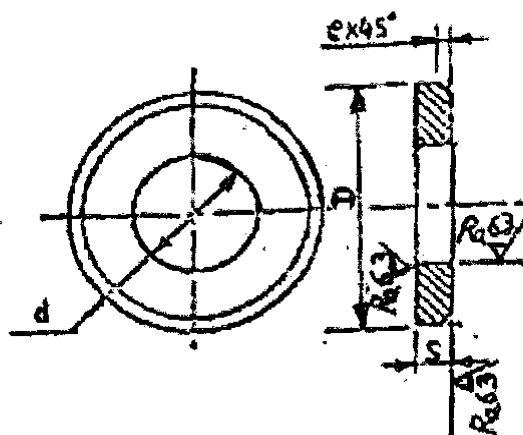


CORPORATE STANDARD

AA 716 10 01

Rev. No. 04

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Note:

1. Corporate sub codes are shown in the Table.
2. Weights have been shown in kg per 1000 Nos

Table - 1

All dimensions in mm.

SIZE NOM. d H12	OUTSIDE DIAMETER D		THICKNESS S		e NOM.	FOR BOLT OR SCREWS SIZE	SUB- CODE	WEIGHT
	BASIC	TOL.	BASIC	TOL.				
1.7	4	+ 0 - 0.3	0.3	± 0.1	0.1	M 1.6		
2.2	5	+ 0 - 0.3	0.3	± 0.1	0.1	M 2	170	
2.7	6.5	+ 0 - 0.3	0.5	± 0.1	0.2	M 2.5	161	
3.2	7	+ 0 - 0.3	0.5	± 0.1	0.2	M 3	013	0.11
4.3	9	+ 0 - 0.3	0.8	± 0.1	0.3	M 4	021	0.29
5.3	10	+ 0 - 0.3	1.0	± 0.1	0.4	M 5	030	0.42
6.4	12.5	+ 0 - 0.4	1.6	± 0.2	0.6	M 6	048	1.08
8.4	17	+ 0 - 0.4	1.6	± 0.2	0.6	M 8	056	2.07
10.5	21	+ 0 - 0.5	2	± 0.2	0.6	M 10	064	3.98
13	24	+ 0 - 0.5	2.5	± 0.3	0.6	M 12	072	6.16
17	30	+ 0 - 0.5	3	± 0.3	0.6	M 16	080	11.17
21	37	+ 0 - 0.8	3	± 0.3	1.0	M 20	099	16.70
25	44	+ 0 - 0.8	4	± 0.3	1.0	M 24	102	31.78
31	56	+ 0 - 1.0	4	± 0.3	1.0	M 30	110	52.95
37	66	+ 0 - 1.0	5	± 0.6	1.6	M 36	129	89.99
43	78	+ 0 - 1.0	7	± 1.0	1.6	M 42	137	180.3
50	92	+ 0 - 1.5	8	± 1.0	1.6	M 48	145	291.26
58	105	+ 0 - 1.5	9	± 1.0	1.6	M 56	188	421.8
66	115	+ 0 - 1.5	9	± 1.0	2.0	M 64	153	486.45

AA 716 10 01	CORPORATE STANDARD	
Rev. No. 04		
PAGE 4 OF 4		

EXPLANATORY NOTE

This standard was first issued in January 1977. The standard was based on IS:2016 – 1967 for dimensions, Tolerances and general requirements. Subsequently many changes have been agreed upon at International & IPSC level and were reflected in IS:2016 – 1967, Reaffirmed 2006.

There is no change in IS:2016 – 1967, Reaffirmed 2006. This standard has been reviewed and brought up to date.

- Clause 3.6 “Sampling plan” for washers has been modified in line with IS:6821
- Clause 4.0 has been modified accordingly.



CORPORATE STANDARD

AA7164001

Rev. No. 05

PAGE 1 of 3

WASHERS, SPRING LOCK, SINGLE COIL, RECTANGULAR SECTION, TYPE - A (WITH BENT ENDS) STEEL

1 DESIGNATION

A single coil, rectangular section, spring lock washer, Type-A (with bent ends) for right hand threads, of nominal size 5 mm, and made of steel shall be designated as:

1.1 On Drawings

- i) Material specification column: AA7164001
- ii) Description column: WASHER SPRING LOCK SC A 5-ST

1.2 On Indents

Washer Spring Lock A 5- AA7164001

1.3 For issuing enquiries and on purchase orders

While issuing enquiries and purchase orders, delete the corporate standard No. from the above description and add the information given under clause 2.

2 COMPLIANCE WITH STANDARDS

2.1 Dimensions, Tolerances & General Requirements

To IS 3063-1994, Type A (Table-1A) Reaffirmed 2010

2.2 Material

Spring steel Gr. 3 to Gr.6 as specified in IS 4072

2.3 Heat Treatment and Hardness

Spring Lock washer after coiling shall be suitably heat treated, so as to result in the finished washer having a hardness in the range of 430 - 530 HV

2.4 Finish

As specified in BHEL order.

Revisions: As per clause 33.5.a) of MOM of MRC-Fasteners			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE - MRC (F)		
Rev. No. 05	Amd. No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue
Dt: 14-03-2016	Dt:	Year:	HPEP, Hyderabad	Corp. R&D	01-04-1993

AA7164001

Rev. No. 05

PAGE 2 of 3

CORPORATE STANDARD**3 NOTE**

- 3.1 For washers spring lock (Type-B) refer corporate standard AA7164002.
- 3.2 Lock washers to this standard would be un-plated, divisions wishing to have plated washers would have to get them plated.
- 3.3 Weights given in this standard are for general reference only and are not meant for commercial transactions.
- 3.4 When the fasteners are to be tested within BHEL, the following sampling plan shall be followed for physical properties.

LOT SIZE	SAMPLE SIZE	ACCEPTANCE No.
Up to 1000	5	0
1001 – 3000	8	0
3001 - 10000	13	0
10000 – 35000	20	0
Over 35000	32	1

4 Referred Standards (Latest Publications including amendments)

- 1) AA7164002
- 2) IS 4072

EXPLANATORY NOTE

The following changes have been made in this revision:

- Clause 2.1, year of Reaffirmation of IS changed as IS 3063-1994, Reaffirmed 2010

CS-1281

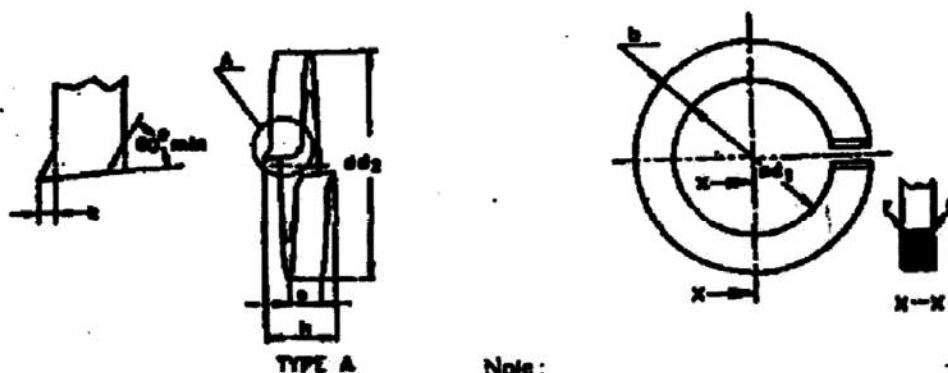


CORPORATE STANDARD

AA7164001

Rev. No. 05

PAGE 3 of 3



$$b = 2s + 2k$$

TYPE A

FIG. 1

Note :

1. Corporate sub-code Numbers only are shown in Table 1
2. Weights have been shown in kg per 1000 No.

Table 1

All dimensions are in 'mm'

Nom. size	Internal Diameter d_1		Outside Dia d_2 Max.	Width b		Thickness s		Radius r Nom.	Bent End k^*	For Bolt Nut or Screw Size	Sub code	Weight
	Basic	Tol. +		Basic	Tol. $\pm$	Basic	Tol. $\pm$					
2	2.1	0.3	4.4	0.9	0.1	0.5	0.1	0.1	-	M2		0.033
2.2	2.3	0.3	4.8	1.0	0.1	0.6	0.1	0.1	-	M2.2		0.050
2.5	2.6	0.3	5.1	1.0	0.1	0.6	0.1	0.1	-	M2.5		0.052
3.0	3.1	0.3	6.2	1.3	0.1	0.8	0.1	0.2	0.15	M3	014	0.11
4.0	4.1	0.3	7.6	1.5	0.1	0.9	0.1	0.2	0.15	M4	022	0.18
5.0	5.1	0.3	9.2	1.8	0.1	1.2	0.1	0.2	0.15	M5	030	0.36
6.0	6.1	0.4	11.8	2.5	0.15	1.6	0.1	0.3	0.2	M6	049	0.83
8.0	8.1	0.4	14.8	3.0	0.15	2.0	0.1	0.5	0.3	M8	057	1.60
10.0	10.2	0.5	18.1	3.5	0.2	2.2	0.15	0.5	0.3	M10	065	2.53
12.0	12.2	0.5	21.1	4.0	0.2	2.5	0.15	1.0	0.4	M12	073	3.82
16.0	16.2	0.8	27.4	5.0	0.2	3.5	0.2	1.0	0.4	M16	081	8.91
20.0	20.2	1.0	33.6	6.0	0.2	4.0	0.2	1.0	0.4	M20	090	15.2
24.0	24.5	1.0	40.0	7.0	0.25	5.0	0.2	1.6	0.5	M24	103	26.2
30.0	30.5	1.2	48.2	8.0	0.25	6.0	0.2	1.6	0.8	M30	111	44.3
36.0	36.5	1.2	58.2	10.0	0.25	6.0	0.2	1.6	0.8	M36		67.3
42.0	42.5	1.2	68.2	12.0	0.25	7.0	0.25	2.0	0.8	M42		111
48.0	49.0	1.5	75.0	12.0	0.25	7.0	0.25	2.0	0.8	M48		123
52.0	53.0	1.5	83.0	14.0	0.25	8.0	0.25	2.0	1	M52		182
56.0	57.0	1.5	87.0	14.0	0.25	8.0	0.25	2.0	1	M56		193
60.0	61.0	1.5	91.0	14.0	0.25	8.0	0.25	2.0	1	M60		203
64.0	65.0	1.5	95.0	14.0	0.25	8.0	0.25	2.0	1	M64	120	218

The bend "k" shall be made on the last length of the washer circumference without any sharp angle.

CS-1281

COMBINED BILL OF MATERIAL

Printed On:11.08.2026

Printed By:

CBOM No: 01140224200 CBOM Var: 00 Revno: 8 Rev Date: 19.02.2019
Description: COUPLING FOR CONTROL VALVE Total weight: 36.0

RECORD OF CHANGES

Drawing No	Var	Revno	Rev Date	Description
01140224200	00	1	02.09.2003	IN ITEM NO.33,MAT.CODE AA7121131021 TO BE REPLACED BY AA7111122518. FOR ITEM NO. 21 ITEM ODE W97371203020 REPLACED BY HW7122104850.
01140224200	00	2	29.09.2007	IN ITEM NO.1 AND 2 MAT.CODE HW1065280050 & HW1065280050 TO BE REPLACED BY HW1060273144.
01140224200	00	3	05.12.2008	AUTOMATIC-BULK MATCODE CHG
01140224200	00	4	16.11.2007	IN ITEM NO.6,MAT.CODE HW1065280050 TO BE REPLACED BY HW1060273144.
01140224200	00	5	31.08.2015	Auto Revision ST02014/381
01140224200	00	8	13.02.2019	FOR ITEM NO. 10 QTY. CHANGE FROM 01 TO 06
01140224200	00	6	07.01.2019	Auto Revision 31140220208/00

CBOM - 01140224200 00

	ENGG		MTE		TTX		WTX	
	Initial	Date	Initial	Date	Initial	Date	Initial	Date
Worked By	stescg	15.10.1997	mtechs	17.11.1997	ttxas	26.11.1997	wtxcbs	01.11.1997
Checked By	sterca	15.10.1997	mtechs	17.11.1997	ttxas	26.11.1997	wtxbch	01.11.1997
Approved By	stebss	29.11.1997	mteaks	17.11.1997	ttxdch	26.11.1997	wtxhpr	01.11.1997



COMBINED BILL OF MATERIAL

Printed On:11.08.2026

Printed By:

CBOM No: 01140224200 CBOM Var: 00
Description: COUPLING FOR CONTROL VALVE

Revno: 8

Rev Date: 19.02.2019

Total weight: 36.0

Item No	Drawingno Var Mvar	Mat Code	Mat Spec	Weight	Blank Sizes	Nos	Qty	Norm/pc	Extra Norm	Total Norm
Qty(Total)	Description		Assy. Remarks	Inclusion?	Mat Shape			Remarks		
Typ Cat Zone	Var/Matl. Description		ENGG SIZE/GRP	Fab Wt	Route				Spare Code	Unit
0	01140224200 00			36.0						
1(1)	COUPLING FOR CONTROL VALVE			Y						
MF DR			Y		0236					
1	21140202201 00 00	HW1060273144	HW10673	3.0	40.0	1	1	7.983	0.0	7.983
1(1)	COVER			Y	RND 180					
MF DR					0072-0236-0359-0236					KG
2	21140224201 00 00	HW1060273144	HW10673	5.0	78.0	1	1	15.568	0.0	15.568
1(1)	RING			Y	RND 180					
MF DR					0072-0236					KG
3	31140202203 00 00	HW1060283123	HW10683	0.22	35.0	1	1	0.54	0.0	0.54
1(1)	PACKER			Y	RND 50					
MF DR					0072-0236					KG
4	41140202204 00 00	HW1060283018	HW10683	0.24	25.0	1	1	1.25	0.0	1.25
1(1)	DISC			Y	RND 90					
MF DR					0072-0236					KG
5	41140202205 00 00	HW1060283018	HW10683	0.35	25.0	0	0	1.045	0.0	1.045
1(1)	DISC			Y	RND 90					
MF DR					0072-0236					KG
6	31140202206 00	HW1060273144	HW10673	0.52	15.0	1	1	2.994	0.0	2.994
1(1)	SPACER			Y	RND 180					
MF DR					0072-0236					KG
7	41230701107 00 00	HW1060283107	HW10683	0.01	35.0	1	1	0.024	0.0	0.024
1(1)	BOLT			Y	RND 10					
MF DR					0072-0236					KG
8	41140202207 00 00	AA1060222256	AA10622	0.57	40.0	1	1	1.996	0.0	1.996
1(1)	NUT			Y	RND 90					
MF DR					0072-0236-0652-0236					KG
9		AA7151115083	AA7151115	0.001	0.0	0	0	0.0	0.0	1.0
1(1)	NUT HEX. A-8			Y						
BO DR	M5				0075-0236					NO

ENGG

MTE

TTX

WTX

Initial

Date

Initial

Date

Initial

Date

Initial

Date

Worked By

stescg

15.10.1997

mtecbs

17.11.1997

ttxas

26.11.1997

wtxcbcs

01.11.1997

Checked By

sterca

15.10.1997

mtecbs

17.11.1997

ttxas

26.11.1997

wtxbch

01.11.1997

Approved By

stebss

29.11.1997

mteaks

17.11.1997

ttxdch

26.11.1997

wtxhpr

01.11.1997

Page 2 of 5

COMBINED BILL OF MATERIAL

Printed On:11.08.2026

Printed By:

CBOM No: 01140224200 CBOM Var: 00
Description: COUPLING FOR CONTROL VALVE

Revno: 8

Rev Date: 19.02.2019

Total weight: 36.0

Item No	Drawingno Var Mvar	Mat Code	Mat Spec	Weight	Blank Sizes	Nos	Qty	Norm/pc	Extra Norm	Total Norm
Qty(Total)	Description		Assy. Remarks	Inclusion?	Mat Shape			Remarks		
Typ Cat Zone	Var/Matl. Description		ENGG SIZE/GRP	Fab Wt	Route				Spare Code	Unit
10	31140202208 00	AA1060222167	AA10622	0.2	90.0	1	6	0.679	0.0	4.074
6(6)	SCRU.HEX.M20X60			Y	RND 40					
MF DR					0072-0236					KG
11		AA7121123592	AA7121123	0.155	0.0	0	0	0.0	0.0	2.0
2(2)	SCRU HEX A- 8.8			Y						
BO DR	M16X80				0075-0236					NO
12		AA7164001090	AA7164001	0.0	0.0	0	0	0.0	0.0	6.0
6(6)	WASHER SPRING LOCK SC A ST			Y						
BO DR	20				0075-0236					NO
13		HW7169096056	HW7169096	0.008	0.0	0	0	0.0	0.0	8.0
8(8)	WASHER TAB A-ST			Y						
BO DR	17				0075-0236					NO
14		AA1011711141	AA10111	0.006	8.0X30.0	1	1	0.008	0.0	0.008
1(1)				Y	SH 3.15			SHEET 3.15X8X30		
MF DR	ST-FE410-SHEET		30.0X8.0		0072-0321-0236					KG
15	41140224202 00 00	HW1060273306	HW10673	0.03	200.0	6	1	0.053	0.0	0.318
6(6)	CYL PIN 12N6X28			Y	RND 16					
MF DR					0072-0236-0632-0236					KG
16	41230701112 00 00	HW1060283085	HW10683	0.003	30.0	1	1	0.116	0.0	0.116
1(1)	RING			Y	RND 25					
MF DR					0072-0236					KG
17	ST27002 704	W97372434033	ST27002	0.01	0.0	0	0	0.0	0.0	2.0
2(2)	Deleted Ref AA7164012/13/HW-99			Y	ST27002.704					
BO DR	C14; GR1				0074-0236					NO
18	41140224203 00 00	AA1211702065	AA12102	0.02	81.0X95.0	1	1	0.26	0.0	0.26
1(1)	POINTER			Y	SH 4.0					
MF DR					0072-0321-0236					KG
19	41140202214 00 00	W97311402085	AA0401201	0.1	0.0	0	0	0.0	0.0	1.0
1(1)	SCALE			Y						
BO DR					0074-0236					NO

	ENGG		MTE		TTX		WTX	
	Initial	Date	Initial	Date	Initial	Date	Initial	Date
Worked By	stescg	15.10.1997	mtecbs	17.11.1997	ttxas	26.11.1997	wtxcbs	01.11.1997
Checked By	sterca	15.10.1997	mtecbs	17.11.1997	ttxas	26.11.1997	wtxbch	01.11.1997
Approved By	stebss	29.11.1997	mteaks	17.11.1997	ttxdch	26.11.1997	wtxhpr	01.11.1997

COMBINED BILL OF MATERIAL

Printed On:11.08.2026

Printed By:

CBOM No: 01140224200 CBOM Var: 00
Description: COUPLING FOR CONTROL VALVE

Revno: 8

Rev Date: 19.02.2019

Total weight: 36.0

Item No	Drawingno Var Mvar	Mat Code	Mat Spec	Weight	Blank Sizes	Nos	Qty	Norm/pc	Extra Norm	Total Norm
Qty(Total)	Description		Assy. Remarks	Inclusion?	Mat Shape			Remarks		
Typ Cat Zone	Var/Matl. Description		ENGG SIZE/GRP	Fab Wt	Route				Spare Code	Unit
20		AA7121123100	AA7121123	0.011	0.0	0	0	0.0	0.0	2.0
2(2)	SCRU HEX A- 8.8			Y						
BO DR	M8X16				0075-0236					NO
21		HW7122104850	AA7122104	0.014	0.0	0	0	1.0	0.0	2.0
2(2)	SCRU CSK - SOC A 12.9			Y						
MF DR	M5X10				0075-0236					NO
22		HW7169096021	HW7169096	0.002	0.0	0	0	0.0	0.0	2.0
2(2)	WASHER TAB A-ST			Y						
BO DR	8.4				0075-0236					NO
23	21140224204 00 00	HW1060273144	HW10673	17.5	175.0	1	1	34.927	0.0	34.927
1(1)	HOUSING			Y	RND 180					
MF DR					0072-0236					KG
24	21140224210 00			3.5						
1(1)	LEVER ASSY			Y						
MF DR			N		0236					
24-1	31140224211 00 00	AA1010209183	AA10109	1.2	295.0	1	1	4.543	0.0	4.543
1(1)	PLATE			Y	RND 50					
MF DR					0072-0236-0632-0236					KG
24-2	31140224212 00 00	AA1015224113	AA19331	1.4	0.0	1	1	23.0	0.0	23.0
1(1)	PIPE			Y	BL 150.0					
FI DR					0072-0356-0359-0236					KG
25	31140202217 00 00	HW1070386073	HW10786	1.78	215.0	1	1	4.084	0.0	4.084
1(1)	SUPPORT			Y	REC 65X38					
MF DR					0072-0236					KG
26	ST05004 001	AA1020218070	AA10218	0.003	60.0	2	1	0.03	0.0	0.06
2(2)	TAPER PIN			Y	RND 12					
MF DR	6X16				0072-0236					KG
27	21140224205 00 00	AA1011819112	AA10119	2.0	217.0X231.0	1	1	6.7	0.0	6.7
1(1)	PLATE			Y	PL 16					
MF DR					0072-0301-0236					KG

	ENGG		MTE		TTX		WTX	
	Initial	Date	Initial	Date	Initial	Date	Initial	Date
Worked By	stescg	15.10.1997	mtechs	17.11.1997	ttxas	26.11.1997	wtxcbcs	01.11.1997
Checked By	sterca	15.10.1997	mtechs	17.11.1997	ttxas	26.11.1997	wtxbch	01.11.1997
Approved By	stebss	29.11.1997	mteaks	17.11.1997	ttxdch	26.11.1997	wtxhpr	01.11.1997

COMBINED BILL OF MATERIAL

Printed On:11.08.2026

Printed By:

CBOM No: 01140224200 CBOM Var: 00
Description: COUPLING FOR CONTROL VALVE

Revno: 8

Rev Date: 19.02.2019

Total weight: 36.0

Item No	Drawingno Var Mvar	Mat Code	Mat Spec	Weight	Blank Sizes	Nos	Qty	Norm/pc	Extra Norm	Total Norm
Qty(Total)	Description		Assy. Remarks	Inclusion?	Mat Shape			Remarks		
Typ Cat Zone	Var/Matl. Description		ENGG SIZE/GRP	Fab Wt	Route				Spare Code	Unit
28		AA7121123509	AA7121123	0.085	0.0	0	0	0.0	0.0	2.0
2(2)	SCRU HEX A- 8.8			Y						
BO DR	M16X35				0075-0236					NO
29		AA7161001080	AA7161001	0.011	0.0	0	0	0.0	0.0	2.0
2(2)	WASHER MCD-ST			Y						
BO DR	17.0				0075-0236					NO
30	ST05004 018	AA1020218070	AA10218	0.01	70.0	2	1	0.065	0.0	0.13
2(2)	TAPER PIN			Y	RND 12			DIA 12X70		
MF DR	8X28				0072-0236					KG
32	21140224207 00 00	AA1011819155	AA10119	2.0	105.0X150.0	1	1	3.3	0.0	3.3
1(1)	CLAMP			Y	PL 25					
MF DR					0072-0301-0236					KG
33		AA7111122518	AA7111122	0.218	0.0	0	0	1.0	0.0	1.0
1(1)	BOLT HEX A-8.8			Y						
MF DR	M16X120				0075-0236					NO
34	ST02014 381	AA1060222140	AA10622	0.09	60.0	1	5	0.333	0.0	1.665
5(5)	SCREW HEX.			Y	RND 32					
MF DR	P M16X40				0072-0236					KG

CBOM

	ENGG		MTE		TTX		WTX	
	Initial	Date	Initial	Date	Initial	Date	Initial	Date
Worked By	stescg	15.10.1997	mtecbs	17.11.1997	ttxas	26.11.1997	wtxcbs	01.11.1997
Checked By	sterca	15.10.1997	mtecbs	17.11.1997	ttxas	26.11.1997	wtxbch	01.11.1997
Approved By	stebss	29.11.1997	mteaks	17.11.1997	ttxdch	26.11.1997	wtxhpr	01.11.1997



Document for REVISION NO. OF DRAWING/STD./SPECN./QP., etc.

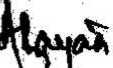
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SL.	DRAWING & SPEC.	REV
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02	CBOM 01140224200	08
03	HW/GA/001	02
04	21140202201	00
05	21140224201	04
06	21140224204	02
07	21140224205	01
08	21140224207	01
09	21140224210	02
10	31140202203	01
11	31140202206	00
12	31140202208	00
13	31140202217	00
14	31140224211	00
15	31140224212	01
16	41140202204	01
17	41140202205	01
18	41140202207	00
19	41140202214	01
20	41140224202	00
21	41140224203	01
22	41230701107	00
23	41230701112	00
24	AA0401201	04
25	AA10109	03
26	AA10111	06
27	AA10119	15
28	AA10218	07
29	AA10622	10
30	AA12102	03
31	AA19331	11
32	AA7111122	09
33	AA7121123	09
34	AA7122104	06
35	AA7151115	09
36	AA7161001	04
37	AA7164001	05
38	HW10673	03
39	HW10683	03
40	HW10786	07
41	HW7169096	01
42	ST02014	05
43	ST05004	03
44	ST27002	C


ASHISH UPADHYAY
ENGR./E&M

संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10673 मुख्य पृष्ठ PREFACE SHEET	
	HEAT RESISTANCE STEEL BARS $\leq$ 250 MM DIAMETER OR SIDE LENGTH of Grade 21CrMoV5-7+QT	
केवल आंतरिक प्रयोग हेतु प्रदायक को देने से पूर्व मुख्य पृष्ठ को निकाल दें FOR INTERNAL USE ONLY REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS.		
समतुल्य मानक सूची आदि / COMPARABLE STANDARDS / CATALOGUES ETC. } %NIL		
सुझाए संभावित प्रदायक एवं श्रेणी / SUGGESTED / PROBABLE SUPPLIERS AND GRADES. } %AS PER PMD		
कोई अन्य जानकारी ANY OTHER INFORMATION } As per TLV918601\DE\G, Feb 2019		
स्वतंत्र एवं दिनांक SIGN & DATE 23/05/20	समतुल्य सूची संख्या को INVENTORY NO. 23/44	स्वीकृति : संस्थान मानक समिति APPROVED : PLANT STANDARDS COMMITTEE जारी : मानक विभाग ISSUED : STANDARDS DIVISION दिनांक DATE 23.07.1990
REV 03 Dt. 23.05.20	Superseded	PREPARED : MTE

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10673 पृष्ठ का Page 1 of 3
सार्वजनिक सूची संख्या का INVENTORY NO. TLV918601/DE/G	HEAT RESISTANT STEEL BARS GRADE 21CrMoV 5-7+QT (Heat Treated Round Bars $\leq$ dia. 250 mm or Side Length)		
1.0 GENERAL: This specification governs the quality of alloy steel Bars of grade 21CrMoV5-7+QT, Material no. 1.7709 as per EN10269.			
2.0 APPLICATION: The Bars shall be used for turbine, generator and other components.			
3.0 CONDITION OF DELIVERY: The bars can either be rolled or forged provided that required mechanical properties are fulfilled. Bars shall be delivered in the quench and tempered condition according to EN 10269 table B.1.			
4.0 DIMENSIONS AND TOLERANCES Bars shall be supplied to the dimensions specified in BHEL order. Unless otherwise specified, hot rolled bars shall be supplied in length of 3 to 6 meters or in multiples with maximum of 10 % shorts down to 1 meter. Forged bars shall be supplied in length of 1.5 meter to 3 meters. The tolerance of the bar shall be as per IS:3739, Grade 2 / EN 10060. Negative tolerance is not acceptable.			
5.0 MANUFACTURE:			
5.1 GENERAL: The bars can either be rolled or forged provided that required mechanical properties are fulfilled.			
5.2 HEAT TREATMENT: Bars shall be supplied in quenched and tempered condition (QT1). Quench hardening : 890 - 950°C /air, oil or polymer* Tempering : 700 - 730°C at least 2 hour *In case of polymer the cooling rate shall be comparable to cooling in oil If bars need to be straightened after the heat treatment, a stress relieving treatment shall be performed after completion of the entire straightening process. Stress relieving is to be carried out at 20 - 50°C below the tempering temperature with a subsequent slow cooling rate.			
स्वतंत्रताधिकार एवं गोपनीयता The information on these documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.			
हस्ताक्षर एवं दिनांक SIGN & DATE 23/05/20	नाम NAME हस्ताक्षर एवं दिनांक SIGNATURE & DATE		
सार्वजनिक सूची संख्या INVENTORY NO. P-3144	अनुवादक TRANSLATED BY निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY पर्यवेक्षणकर्ता SUPERVISED BY		
सहमत विभाग AGREED DEPT.		नाम NAME दिनांक एवं हस्ताक्षर DATE & SIGNATURE	
SUPERSEDES		स्वीकृति : संस्थान मानक समिति APPROVED : PLANT STANDARDS COMMITTEE	
REV 03 Dt. 23.05.20 Change Advice number TSX(MTE)-19-117		निर्माण PREPARED : MTE जारी : मानक विभाग ISSUED : STANDARDS DIVISION दिनांक DATE : 23.07.1990	

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10673 पृष्ठ का Page 2 of 3																																				
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को प्रतिस्थापित करना है	7.0 PROPERTIES AND TEST: 7.1 CHEMICAL COMPOSITION: Heat analysis according to EN10269 in weight % except phosphorus and sulphur.																																						
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>C</th> <th>Si</th> <th>Mn</th> <th>P</th> <th>S</th> <th>Mo</th> </tr> <tr> <td>0.17 – 0.25</td> <td>≤ 0.40</td> <td>0.40 – 0.80</td> <td>≤ 0.020</td> <td>≤ 0.020</td> <td>0.55 – 0.80</td> </tr> <tr> <th>V</th> <th>Cr</th> <th>Ni*</th> <th>Al_{total}</th> <td></td> <td></td> </tr> <tr> <td>0.20 – 0.35</td> <td>1.20 – 1.50</td> <td>≤ 0.60</td> <td>≤ 0.030</td> <td></td> <td></td> </tr> </table>			C	Si	Mn	P	S	Mo	0.17 – 0.25	≤ 0.40	0.40 – 0.80	≤ 0.020	≤ 0.020	0.55 – 0.80	V	Cr	Ni*	Al _{total}			0.20 – 0.35	1.20 – 1.50	≤ 0.60	≤ 0.030														
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V	Cr	Ni*	Al _{total}																																				
0.20 – 0.35	1.20 – 1.50	≤ 0.60	≤ 0.030																																				
	* For dimensions 160-250 mm, the content of Ni must be at least 0.35 %																																						
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	7.2 MECHANICAL PROPERTIES: A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test scope shall be 10 % of the bars with a minimum of 10 bars. When the lot consists of less than 10 bars, all bars shall be tested. The mechanical properties shall be determined for both hardest and softest bar. The specimens are to be taken in a longitudinal direction (L) in accordance with EN 10083-1. For bars with diameter (d) or side lengths (a, b) > 100 mm, the specimens shall be taken at a distance d/3 or a/3 and b/3 from the respective surfaces. Transverse specimens (T) are also allowed. The following properties shall be achieved at room temperature:																																						
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="2">Diameter (d) / Side length (a)¹ (mm)</th> <th rowspan="2">0.2 % Yield Strength N/mm²</th> <th rowspan="2">Tensile Strength N/mm²</th> <th colspan="2">Elongation After Fracture A (%)</th> <th colspan="2">Reduction in area %</th> <th colspan="2">Impact Energy (J)²</th> <th rowspan="2">Hardn ess HB30</th> </tr> <tr> <th>L</th> <th>T</th> <th>L</th> <th>T</th> <th>L</th> <th>T</th> </tr> <tr> <td>d, a ≤ 160</td> <td>≥ 550</td> <td>700-850</td> <td>≥ 16</td> <td>≥ 16</td> <td>≥ 60</td> <td>≥ 60</td> <td>≥ 63</td> <td>≥ 63</td> <td>215-260</td> </tr> <tr> <td>160 < d, a ≤ 250</td> <td>≥ 550</td> <td>700-850</td> <td>≥ 16</td> <td>≥ 13</td> <td>≥ 60</td> <td>≥ 35</td> <td>≥ 63</td> <td>≥ 40</td> <td>215-260</td> </tr> </table>			Diameter (d) / Side length (a) ¹ (mm)	0.2 % Yield Strength N/mm ²	Tensile Strength N/mm ²	Elongation After Fracture A (%)		Reduction in area %		Impact Energy (J) ²		Hardn ess HB30	L	T	L	T	L	T	d, a ≤ 160	≥ 550	700-850	≥ 16	≥ 16	≥ 60	≥ 60	≥ 63	≥ 63	215-260	160 < d, a ≤ 250	≥ 550	700-850	≥ 16	≥ 13	≥ 60	≥ 35	≥ 63	≥ 40	215-260
Diameter (d) / Side length (a) ¹ (mm)	0.2 % Yield Strength N/mm ²	Tensile Strength N/mm ²	Elongation After Fracture A (%)				Reduction in area %		Impact Energy (J) ²		Hardn ess HB30																												
			L	T	L	T	L	T																															
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स्वतन्त्रताधिकार एवं गोपनीयता ; इस पत्रिका में दी गई सूचना भारत हीम इलेक्ट्रिकल्स की संपत्ति है। इसका प्रयोग एवं प्रकाशन बिना इस संपत्ति की रक्षा के बिना नहीं किया जा सकता, जो कि स्वतन्त्रता के बिना हीम इलेक्ट्रिकल्स की रक्षा के लिए आवश्यक है।	¹⁾ The value of smallest side length (a) shall be obtained. ²⁾ Average of 3 Charpy V-notch specimens. Each tested specimen shall reach at least 70% of this average value. An Impact energy test shall be performed on bars having side length ≥ 12 mm or diameter ≥ 16 mm respectively.																																						
	7.3 OUTER AND INNER QUALITY / NDE: 7.3.1 General: Cracks, other material separations or more severe linear inclusions lines are not acceptable.																																						
	7.3.2 Scope of Inspection: Following NDE shall be performed in delivery condition: • Visual Inspection • Material identity check for all bars • Complete ultrasonic inspection (UT) of all bars ≥ 30 mm according to EN 10308 type 1a – 1c (Table 1).																																						
हस्ताक्षर एवं दिनांक SIGN & DATE सामग्री सूची संख्या INVENTORY NO. P. 3144	REV 03		निर्माणकर्ता WORKED BY Subodh Rana 18-05-20																																				
			जाँचकर्ता CHECKED BY Ashish Ranjan 18/5/20																																				

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10673 पृष्ठ का Page 3 of 3		
सामग्री सूची संख्या को INVENTORY NO.	7.4 Recording level and acceptance criteria: Regarding UT inspection following quality classes in accordance with EN 10308 (Table 2) must be applied corresponding to the diameters or side length a, b: - d or (a, b) $\leq$ 200 mm : quality class 4 - d or (a, b) > 200 mm : quality class 3 The decision limit for backwall eco loss is 3 dB for all bar dimensions. No linear or planer indication larger than 10 mm in any direction is acceptable. This quality requirement applies also for bars with diameter d or side length (a, b) < 30 mm. This does not need to be proved by testing.					
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	8.0 MARKING: The marking of the material shall be such that Purchase Order Number, Size, Heat No., BHEL Specification number, material designation, Manufacturer identification are legible. 9.0 DOCUMENTATION: The supplier shall supply four copies of test certificates as per EN 10204, inspection certificate 3.1, unless otherwise stated in the order. The test certificates shall bear the following: BHEL References: - Specification no., Purchase orders no., material designation Suppliers references: - Name, emblem, Melt no, Heat-treatment batch no. Results of Testing: - Melting process, melt analysis, - Mechanical properties, all individual values shall be reported, - Dimensional results - Complete information on all heat treatments performed, - U.T result - Confirmation of the material identity check. - Visual inspection					
स्वेच्छाधिकार एवं गोपनीयता ; इस दस्तावेज में दी गई सूचना भारत भारती इंजीनियरिंग और मैन्युफैक्चरिंग लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण केवल केवल के निर्देशों और लिखित प्रमाणों के बिना ही नहीं किया जा सकता है।	10.0 CLEARANCE FOR DELIVERY: The total results of the tests carried out are the deciding factor for clearance for delivery. In case of any deviation from the ordering specification, vendor to inform BHEL with all test results. BHEL shall evaluate the total results taking into consideration the intended use of the material and examines accordingly the permissibility of deviation (if any) from the specified properties. Deviation shall be considered accepted only on written approval from BHEL. The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later.					
हस्ताक्षर एवं दिनांक SIGN & DATE	11.0 CROSS REFERRED STANDARDS: EN10269, IS 3739, EN10060, EN 10083-1, EN10308, EN 10204					
सामग्री सूची संख्या INVENTORY NO. P.3144	REV 03		निर्माणकर्ता WORKED BY	Subodh Rana		18.05.20
			जांचकर्ता CHECKED BY	Ashish Ranjan		18/5/20



संस्थान क्रय विनिर्देश (हीप - हस्तिवार)

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PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)

STEEL BARS GRADE X22CrMoV 12-1

1.0 GENERAL:

This specification governs the quality of steel Bars of grade X22CrMoV12-1 according to EN10269 material no. 1.4923.

2.0 APPLICATION:

The Bars shall be used for bolts and coupling bolts of governing components and other turbine components.

3.0 COMPLIANCE WITH NATIONAL / INTERNATIONAL STANDARD:

Based on TLV 9248 / 07, July'2012.

4.0 CONDITION OF DELIVERY:

The bars shall be supplied in quenched and tempered condition (QT1) according to EN10269 table B.1.

5.0 DIMENSION AND TOLERANCES:

Bars shall be supplied to the dimensions specified in BHEL order.

5.1 Length: Unless otherwise specified, hot rolled bars shall be supplied in length of 3 to 6 meters or in multiples with maximum of 10% shorts down to 1 meter.

Forged bars shall be supplied in length of 1.5 meter to 3 meters.

5.2 Tolerance:

5.2.1 Hot Rolled Bars:

The bars shall not vary from specified diameter or distance across flats by more than $\pm 2.5 \%$.

5.2.2 Forged Bars:

The tolerance on the forged bars shall be as follows:

Dia. mm	Tolerance. mm
> 50 to 125	+ 6.0
> 125 to 175	+ 8.0
> 175	+ 12.5

Note: (for hot rolled and forged bars)

Insignificant surface defects in the form of dent and ripple marks are permissible provided their depth does not exceed half the tolerance on each side.

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इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है। इसका प्रयोग एवं अपर्याप्त रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं दिनांक

सामग्री सूची संख्या

TSX	B. CHAUDHARY	Bluey 23/04/13	नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
MEM.- PSC	V.K. Chaudhary	V.K. Chaudhary		
STE	D.K. Ray	D.K. Ray 2.4.13	अनुवादक TRANSLATED BY	
QAX	S. AGARWAL	S. Agarwal 29.3.13	निर्माणकर्ता WORKED BY	PANKAJ AGARWAL 21/03/13
			जांचकर्ता CHECKED BY	ASHISH RANJAN 21/03/13
सहमत विभाग AGREED DEPTT	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	T S GOPALKRISHNAN 21/3/13
स्वीकृति : संस्थान मानक समिति APPROVED : PLANT STANDARDS COMMITTEE			Gr. No. 2.60	
REV. NO. 03	SUPERSEDES		निर्माण : PREPARED : MTE	जारी : मानक विभाग ISSUED : STANDARDS DIVISION
DI. 21.03.2013			दिनांक : DATE : 26.07.2007	



संस्थान क्रय विनिर्देश (हीप - हरिद्वार)
PLANT PURCHASE SPECIFICATION
(HEEP - HARDWAR)

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SUPERSEDES
सामग्री सूची संख्या
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INVENTORY NO

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इस प्रारंभ में ही यह स्पष्ट करना है कि इस दस्तावेज़ की सम्पत्ति है इसका प्रयोग एवं
अन्यथा रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।

हस्ताक्षर एवं दिनांक
SIGN & DATE

सामग्री सूची संख्या
INVENTORY NO

6.0 MANUFACTURE:

The bars shall either be rolled or forged for diameter $\leq 160\text{mm}$ provided that the requested mechanical properties are fulfilled. Bars of diameter greater than 160mm shall be forged.

The steel shall be made as per EN10269.

7.0 HEAT-TREATMENT:

Bars shall be delivered in quenched and tempered condition (QT1) in accordance with EN10269, Table B1.

Quench Hardening: 1020 - 1070° C / air, oil, polymer*, water

Tempering: 680 - 740°C (preferably 710 - 740°C), min. 2 hours

*with a center cooling rate comparable to oil

If bars need to be straightened after heat treatment, stress relieving is mandatory after completion of entire straightening process. The stress relieving shall be carried out at 20-50°C below the tempering temperature with a subsequent slow cooling rate.

8.0 FREEDOM FROM DEFECTS:

The bars shall be free from cracks, laminations, segregation, inclusions and other harmful defects.

9.0 CHEMICAL COMPOSITION:

Heat analysis in weight % in accordance with EN10269.

Element	C	Si	Mn	P	S	Ni	Cr	Mo	V
Min.	0.18	--	0.40	--	--	0.30	11.0	0.80	0.25
Max.	0.24	0.50	0.90	0.025	0.015	0.80	12.5	1.20	0.35

10.0 MECHANICAL PROPERTIES:

A hardness test shall be performed to verify the uniformity of the strength within a delivery lot (per melt and heat treatment batch). The test amount shall be 10% of the bars with a minimum of 10 bars. When the lot contains less than 10 bars, all bars shall be tested. The mechanical properties shall be tested on softest and hardest bars. The specimens are to be taken in longitudinal direction according to EN10083 -1 after all heat treatments performed.

For bars with diameter (d) or side lengths (a, b) $> 100\text{mm}$, the specimen shall be taken at a distance d/3 or (a/3, b/3) from the respective surfaces. In this case, transverse specimens are also allowed.

An impact test shall be performed on bars having side length $\geq 12\text{ mm}$ or diameter $\geq 16\text{mm}$ respectively.

REV. 03

निर्माणकर्ता Worked by	PANKAJ AGARWAL	<i>Pankaj</i>	21/3/13
जांचकर्ता Checked by	ASHISH RANJAN	<i>Aranjan</i>	21/3/13



संस्थान क्रय विनिर्देश (हीप - हर्द्वार)
PLANT PURCHASE SPECIFICATION
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स्वत्वाधिकार एवं गोपनीय

इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स लि. की संपत्ति है। इसका प्रयोग (ए) अथवा (ए) को बिना लिखी अनुमति के बिना न किया जाए।

 हस्ताक्षर एवं दिनांक
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 INVENTORY NO.

The following Mechanical properties shall be achieved at room temperature

0.2% yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	%Elongation (lo=5d)		%Reduction in area		Impact energy (J) **		Hardness HB30
		Long.	Trans.	Long.	Trans.	Long.	Trans.	
≥ 600	800-950	≥ 14	≥ 11	≥ 40	≥ 25	≥ 27	≥ 15	245-290

** Average of 3 Charpy V-notch specimens, Minimum Value: Longitudinal = 19J, Transverse = 15J

11.0 OUTER AND INNER QUALITY / NDE:

11.1 SURFACE CONDITION: Cracks and other material separation or more severe linear inclusions lines are only acceptable when located in the dimensional tolerances area.

11.2 SCOPE OF INSPECTION:

Following NDE shall be performed in delivery condition:

- Material identity check on all bars
- Complete ultrasonic inspection (UT) of all bars ≥ 30 mm thickness/diameter according to EN 10308 type 1a-1c (Table 1)

11.3 Criteria for registration and decision

Regarding the UT inspection, the following quality classes in accordance with EN10308 (Table 2) shall be applied depending on the diameter (d) or side length (a,b):

- d or (a,b) ≤ 200 mm: quality class 4
- d or (a,b) > 200 mm: quality class 3

The decision limit for backwall echo loss is 3dB for all bar dimensions. No linear or planar indication larger than 10mm in any direction is acceptable.

This quality requirement applies also for bars with diameter d or side length (a,b) < 30 mm. This does not need to be proved by testing.

12.0 PROCESS QUALIFICATION:

12.1 General

Product and process qualification procedures must be conducted for first order. The scope of such product and process qualification (stipulation of additional detailed requirements) has to be defined in coordination and agreement with the BHEL directly after receipt of the order. Such product and process qualification is required for each of the manufacturer's fabrication sites involved.

Depending on the complexity of the product and/or process and the experience from the first order, additional product and process qualification procedures may have to be implemented for subsequent orders.

REV. 03

निर्माणकर्ता Worked by	PANKAJ AGARWAL	Pankaj	21/3/13
जांचकर्ता Checked by	ASHISH RANJAN	Ashish	21/3/13



संस्थान क्रय विनिर्देश (हीप - हर्द्वार)

HW 10683

PLANT PURCHASE SPECIFICATION

(HEEP - HARDWAR)

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स्वत्वाधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है। इसका प्रयोग एवं प्रसारण के बिना भारत भारती इलेक्ट्रिकल्स की अनुमति के बिना न किया जाए।

हस्ताक्षर एवं दिनांक

SIGN & DATE

सामग्री सूची संख्या

INVENTORY NO.

Prior to the start of manufacturing, the manufacturer has to submit a manufacturing and testing plan to BHEL in which the quality assured process workflow, i.e. the sequence of process activities (manufacturing, testing and inspection steps) are specified in chronological order. The internal and external codes, standards, drawings, specifications and records applied to each sub process step must be noted along with the information about the equipment and test and inspection scopes used and, where related, any related subcontracting.

BHEL may inspect/review supplier internal documents also.

If any change in the manufacturing and testing process is required, prior approval from BHEL is to be taken. Depending on the type and scope and thus the significance of any given change, BHEL will decide whether it is necessary to requalify the product and/or process.

Subcontracting of process steps to sub suppliers is only allowable given express written agreement and approval by the purchaser.

12.2 The following additional tests have to be performed during qualification:

12.2.1 Tensile tests at elevated temperature

In accordance with EN 10002-5 a tensile test (in the same direction as at room temperature) has to be performed at 600°C.

The following properties must be achieved:

0.2% Yield Strength ≥ 205 MPa,

Tensile Strength ≥ 300 MPa,

Elongation (%) ≥ 20 ,

Reduction in area (%) ≥ 65

12.2.2 Microstructure Examination

The homogeneity of the microstructure has to be checked and documented by micro section. The microstructure must be uniform and free from porosity, excessive segregation and other inhomogeneities.

A Delta ferrite content $< 5\%$ is acceptable.

The inclusion content has to be determined in accordance with ASTM E45.

The grain size must be measured after all heat treatments have been performed.

In accordance with ASTM E 112 or ISO 643 grain size 4 or finer must be achieved. A deviation from the average grain size of more than 2 grain sizes is not permissible.

13.0 MARKING:

The marking of the materials shall be such that heat no., steel quality & manufacturer name / identifications are legible.

REV. 03

निर्माणकर्ता

PANKAJ

Worked by

AGARWAL

जांचकर्ता

ASHISH RANJAN

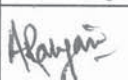
Checked by

Pankaj

21/3/13

Ashish

21/3/13

SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)		HW 10683	
				पृष्ठ का Page 5 of 5	
सामग्री सूची संख्या को अधिष्ठित करता है । INVENTORY NO.	SUPERSEDES INVENTORY NO.	14.0 TEST CERTIFICATES: The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1 B, unless otherwise stated on the order. The test certificates shall bear the following: BHEL References: - Specification no., Purchase orders no. Supplier's references: - Name, emblem, material designation, melt no, Heat-treatment batch no. Results of Testing: - Melting process, melt analysis, - Dimension reports - Mechanical properties, all individual values shall be reported - Heat-treatment details, - U.T result - Confirmation of the material identity check 15.0 CLEARANCE FOR DELIVERY: The total results of the tests carried out are the deciding factor for clearance for delivery. BHEL shall evaluate the total results taking into consideration the intended use of the material and examines accordingly the permissibility of deviation (if any) from the specified properties. The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later. 16.0 CROSS REFERRED STANDARDS: EN 10083-1, EN10204, EN10269, EN10308, EN10002-5, ASTM E45, ASTM E112, ISO 643.			
हस्ताक्षर एवं दिनांक SIGN & DATE 21/4/13	सामग्री सूची संख्या INVENTORY NO. P-2185	REV. 03			
		निर्माणकर्ता Worked by	PANKAJ AGARWAL		21/3/13
		जांचकर्ता Checked by	ASHISH RANJAN		21/3/13



संस्थान क्रय विनिर्देश (हीप : हरिद्वार)

PLANT PURCHASE SPECIFICATION
(HEEP: HARIDWAR)

HW10786

मुख्य पृष्ठ
PREFACE SHEET

13% Cr Stainless Steel Bars for Turbine Blades
GRADE: X20Cr13+QT800

केवल आंतरिक प्रयोग हेतु
प्रदायक को देने से पूर्व इस मुख्य पृष्ठ को निकाल दें।

FOR INTERNAL USE ONLY
REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS.

समतुल्य मानक / सूची आदि
COMPARABLE STANDARDS / CATALOGUES ETC. } : NIL

सुझाए / सम्भावित प्रदायक एवं श्रेणी
SUGGESTED / PROBABLE SUPPLIERS AND GRADES. } : AS PER PMD

कोई अन्य जानकारी
ANY OTHER INFORMATION } : Based on TLV9238, 01, Dec'2013

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स्वाधिकार एवं गोपनीय
इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है, इसका प्रयोग एवं प्रसारण रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में सुविधाकारक हो न किया जाए।

दिनांक एवं हस्ताक्षर
SIGN & DATE

सामग्री सूची संख्या
INVENTORY NO.

स्वीकृति संस्थान मानकीकरण समिति

APPROVED : PLANT STANDARDIZATION COMMITTEE

Gr. No.

2.60

REV.NO. 07

Supersedes

निर्याण

PREPARED : MTE

जारी

ISSUED: TSX

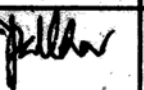
दिनांक

DATE : 30.03.1992

Dt. 02.05.17

P-2102

संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW10786	
		पृष्ठ का Page 1 of 8	
BHEL			
SUPERSEDES INVENTORY NO. TLV9238/01, Dec'13		13% Cr Stainless Steel Bars for Turbine Blades GRADE: X20Cr13+QT800	
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.		1.0 General: This specification governs the quality of Steel rectangular bars in steel grade X20Cr13, material no. 1.4021, EN10088-3.	
		2.0 Application: For machining of blades for Steam Turbine.	
		3.0 Condition of Delivery: Rolled or Forged and Heat Treated.	
		4.0 Dimension and Tolerances: Dimensional tolerance, straightness, twisting and bulging limits shall be as per HW0993Q08.	
		5.0 Manufacture: Degassed steel (e.g. vacuum degassed) shall be used. Cast ingot is to be used as initial material for production of the bars. The manufacturing process must ensure a homogenous grain structure over the entire length of the bar and the bar cross section.	
		6.0 General Requirements: - Prerequisite requirement for approval of a new vendor is a successful Process qualification. Manufacturing process established during this shall be the basis for future manufacture. - Manufacturing plan shall be prepared and submitted after successful process qualification. Manufacturing plan shall include specific information on manufacturing like rolling temperature, reduction ratio, heat treatment temperature, hardening method and soaking time, rate of heating and cooling etc. Test instructions for nondestructive and destructive testing are to be provided in the manufacturing and testing plan. - Product and process qualification is mandatory for supplier each manufacturing plants. - For new supplier, process qualification shall be required for three purchase orders. - If necessary, BHEL may ask for process qualification for verification of manufacturing reliability from regular suppliers also. - Any change in the agreed manufacturing plan shall be informed to BHEL. BHEL will review the requirement of renewed process qualification.	
स्वाधिकार एवं गोपनीयता इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है। इसका प्रयोग एवं प्रसारण केवल उसी व्यक्ति द्वारा ही किया जा सकता है जो कि कंपनी के लिए भविष्य में हितकारी हो न सिर्फ़। SIGN & DATE P. 2102		नाम NAME विवरण एवं हस्ताक्षर SIGNATURE & DATE	
TSX V.Srinivasan		TRANSLATED BY	
PSC G.KRISHNAN		WORKED BY ASHISH RANJAN	
QAX U. K. PANDA		CHECKED BY ASHISH RANJAN	
STE P. K. BANSAL		SUPERVISED BY GOPAL KRISHNAN	
AGREED DEPTT. नाम NAME दिनांक एवं हस्ताक्षर DATE & SIGNATURE		पर्यवेक्षणकर्ता SUPERVISED BY	
SUPERSEDES		स्वीकृति संस्थान मानकीकरण समिति APPROVED : PLANT STANDARDIZATION COMMITTEE	
REV.NO. 07		Gr. NO. 2.60	
Dt. 02.05.2017		विनिर्माण जारी PREPARED : MTE ISSUED : TSX	
CHANGE ADVICE NO. 17-33		दिनांक DATE : 30.03.1992	

हस्ताक्षर एवं दिनांक SIGN & DATE			संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10786 पृष्ठ का Page 2 of 8															
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को प्रतिस्थापित करता है		7.0 Heat Treatment: Hardening has to be done in accordance with EN 10088 - 3, + QT 800 in line with Table A.2 (950 - 1050°C /air or liquid quenching). Tempering must be done at a temperature $\geq 650^\circ\text{C}$. A fully transformed and tempered martensitic microstructure must be present over the entire cross section. Hardening and tempering in bundles are not allowed. Suitable gaps between two bars are to be ensured during heat treatment for uniformity of properties. If bars need to be straightened after the heat treatment, a stress relieving heat treatment shall be performed after completion of entire straightening process. Stress relieving is to be carried out at 20 - 30°C below the tempering temperature with a subsequent slow cooling. The lowest possible residual stresses shall be targeted. Distortion of the finish machined part due to residual stresses from the manufacturing process or heat treatment process shall not occur.																		
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		8.0 Properties and their verification: 8.1 Chemical Composition: Heat analysis in weight % <table border="1"> <thead> <tr> <th>C</th> <th>Si</th> <th>Mn</th> <th>P</th> <th>S</th> <th>Cr</th> <th>Ni</th> </tr> </thead> <tbody> <tr> <td>0.17 - 0.22</td> <td>0.10 - 0.60</td> <td>0.30 - 0.80</td> <td>≤ 0.030</td> <td>≤ 0.020</td> <td>12.5 - 14.0</td> <td>0.30 - 0.80</td> </tr> </tbody> </table> Cobalt content must be specified in the inspection certificate for information purposes.					C	Si	Mn	P	S	Cr	Ni	0.17 - 0.22	0.10 - 0.60	0.30 - 0.80	≤ 0.030	≤ 0.020	12.5 - 14.0	0.30 - 0.80
C	Si	Mn	P	S	Cr	Ni														
0.17 - 0.22	0.10 - 0.60	0.30 - 0.80	≤ 0.030	≤ 0.020	12.5 - 14.0	0.30 - 0.80														
स्वत्वधिकार एवं गोपनीय ; इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कम्पनी के हित में हानिकारक हो या किया जाए		8.2 Properties and Microstructure: The specimens shall be taken in the longitudinal direction in accordance with Attachment 1. The properties described below shall be determined at room temperature in the delivery condition, i. e. after the last heat treatment including any stress relieving heat treatment. The metallographic investigations shall be performed on the hardest and softest bar with an area of at least 320mm ² each. The areas to be investigated must be in the longitudinal direction. The longitudinal direction must be indicated in the documentation.																		
हस्ताक्षर एवं दिनांक SIGN & DATE		8.2.1 Mechanical Properties: Hardness of the bars in a test unit shall be verified by Brinell hardness testing in accordance with ISO 6506 -1, HBW10/3000 or HBW 5/750 may be used. The surface of the bar shall be prepared in the area of the hardness measurement so that the result is not affected by the surface condition. Hardness testing shall be performed on 10% of each test unit but at least on 10 bars or on each bar if test unit is less than 10 bars. The greatest resulting difference in hardness shall not exceed 35HBW. Mechanical properties shall be determined on the hardest and softest bar determined in a test unit. Tensile testing shall be performed in accordance with ISO 6892 -1 or ASTM E8M (round specimen with $L_0 = 50\text{mm}$ and $d_0 = 10\text{mm}$) or ASTM E8 (standard specimen in accordance with Figure 8). Standard specimens Charpy (V-notch) in accordance with ISO 148 -1 shall be used for determining the absorbed impact energy.																		
सामग्री सूची संख्या INVENTORY NO. P-2182		REV 07		निर्माणकर्ता WORKED BY	Ashish Ranjan	 02.05.17														
			जांचकर्ता CHECKED BY	Gopal Krishnan	 02.05.17															



संस्थान क्रय विनिर्देश (हीप - हरिद्वार)
PLANT PURCHASE SPECIFICATION
 (HEEP - HARIDWAR)

HW 10786

पृष्ठ का
Page 3 of 8हस्ताक्षर एवं दिनांक
SIGN & DATESUPERSEDES
INVENTORY NO.सामग्री सूची संख्या को
संश्लिष्ट करना है

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स्वत्वाधिकार एवं गोपनीय ;
 इस प्रलेख में दी गई सूचना भारत भारती इंजिनियरिंग्स की सम्पत्ति है इसका प्रयोग एवं अनुवाद
 किए बिना कभी नहीं किया जा सकता, जो कि सम्पत्ति के हित में हानिकारक हो या नुकसान

हस्ताक्षर एवं दिनांक
SIGN & DATEसामग्री सूची संख्या
INVENTORY NO.

The following properties must be achieved at room temperature:

0.2 % Proof Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation After Fracture (%)	Reduction in area %	Impact Energy (J) ¹	Hardness HBW
≥ 600	800 - 950	≥ 15	≥ 50	≥ 20	240 - 280

¹ Average of 3 specimens and minimum value for two specimens in accordance with EN10021, where the lowest value shall be at least 14 Joule.

8.2.2 Microstructure:

Microstructure must be uniform, without porosity, excessive segregation or other inhomogeneities.

8.2.2.1 Cleanliness:

The cleanliness shall be determined as per ASTM E45 method A. Acceptance criteria:

Inclusion: Thin Series

Type A, B, C: 2 max Type D: 2.5max

Inclusions: Heavy Series

Type A, B, C, D: 1.5max

Maximum Number and dimension of globular inclusions (type D)

IR (D) = $n_1 + 2.5n_2$, IR (D) is converted to an area of 160mm²

IR (D) ≤ 10

n = number of globular inclusions

n₁ (25-50μm); n₂ (51-75μm)

Any material discontinuities present at the inclusion must also be accounted for in determining the size of globular inclusion.

Inclusions > 75 μm, including any material discontinuities, are not allowed.

8.2.2.2 Delta Ferrite content and grain size:

- Delta ferrite content shall be < 5%. The determination of delta ferrite content shall be performed based on analysis methods in accordance with ASTM E45 Method A, "Worst field method" with V=100:1.
- An average grain size of 4 or finer has to be achieved. Grain size shall be determined on the martensitic secondary grain structure in accordance with ASTM E112 or ISO643. A deviation of more than 2 grain sizes in size of individual's grains from the average grain size is not allowable.

8.3 Non-destructive Testing:**8.3.1 Test Scope:**

The following Non - destructive inspections shall be performed in the as delivered condition:

- Visual inspections of all bars
- Ultrasonic examination of all bars in accordance with TWP 1204. 100% of the volume must be tested in accordance with the recording level.

8.3.2 Recording level and acceptance criteria:

- Indications of surface defects such as rolled marks shall be ground out to investigate their depth at least at both ends, in the middle of the indication and at an interval of approx. 250mm.
- Surface defects with a depth extension of ≥ 1mm are not allowable, and these areas shall be cut out of the bar.

REV 07

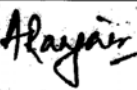
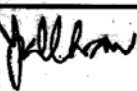
निर्माणकर्ता
WORKED BYAshish
Ranjan

02.05.17

जांचकर्ता
CHECKED BYGopal
Krishnan

02.05.17

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)	HW 10786 पृष्ठ का Page 4 of 8									
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को प्रतिस्थापित करता है	- Ultrasonic examination shall be carried out on all bars in accordance with TWP 1204. - Defects above the recording level are not acceptable and must be cut out. - It shall be confirmed in writing to the BHEL that bar sections containing defects above the recording level have been cut out of the bar. - The acceptance of material at vendor's works does not relieve the supplier of his responsibility for defects discovered at later stages. 8.3.3 Material Identity Test: An identity test must be conducted in the as – delivered condition on all bars.											
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	9.0 Process Qualification: In addition to testing as per clause 8.0 of this specification, following additional testing shall be performed in process qualification (see Attachment 2). All test results carried out during process qualification shall be submitted to BHEL for approval. - Tensile tests¹: The strength values (0.2% Proof Stress and Tensile Strength) in the transverse direction (specimen orientation ZQ) shall not differ by more than 10% from the corresponding longitudinal values. - The absorbed impact energy in the transverse direction (KQ 1 -3) should not differ by more than 25% from the values in the longitudinal direction (KI at room temperature). - FATT: Determination of FATT (fracture appearance transition temperature) in accordance with ASTM A370. The FATT should be preferably evaluated based on SEP 1670 (software). The test scope must include at least 10 specimens. FATT < 30°C is to be achieved. In accordance with ISO 6892 -2, a tensile test (in longitudinal direction) has to be performed at 500°C. The following properties must be achieved: <table border="1"> <thead> <tr> <th>0.2 % Proof Stress (N/mm²)</th> <th>Tensile Strength (N/mm²)</th> <th>Elongation After Fracture (%)</th> <th>Reduction in area (%)</th> </tr> </thead> <tbody> <tr> <td>≥ 380</td> <td>≥ 480</td> <td>≥ 20</td> <td>≥ 60</td> </tr> </tbody> </table>				0.2 % Proof Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation After Fracture (%)	Reduction in area (%)	≥ 380	≥ 480	≥ 20	≥ 60
0.2 % Proof Stress (N/mm ²)	Tensile Strength (N/mm ²)	Elongation After Fracture (%)	Reduction in area (%)									
≥ 380	≥ 480	≥ 20	≥ 60									
स्वतंत्रताधिकार एवं गोपनीय ; यह प्रलेख मे दी गई सूचना भारत की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग , जो कि कम्पनी के हित में हानिकारक हो या किया जाए	¹ For case where standard specimens in transverse direction cannot be made: - - For tensile test specimens, a round specimen with $L_0 = 5 d_0$ or a flat specimen with a proportionality factor of $k= 5.65$. Proportional specimens in accordance with Fig 8 shall be used if ASTM E8 is applied. - An undersized specimen in accordance with ISO 148 -1 for impact test specimen. Undersize dimension to be reported. - If dimension do not allow testing in the transverse direction, even with special specimen, testing will be carried out in the longitudinal direction only. Intergranular Fracture Determination Test: The fraction of Intergranular fracture shall be determined over the entire brittle fracture portion of the fracture surface of the impact test specimens tested at room temperature. The fraction of Intergranular fracture shall not exceed 10%. This test is not required for materials which indicate ≥90% ductile fracture at room temperature. Magnetic Particle Test: Performance of MT testing by the magnetic flux leakage method, alternating current phase shifted and a field strength of 20 – 65A/cm. Distribution, type and size of grain structure in-homogeneities (e.g. segregation or delta ferrite) shall not result in MT indications.											
हस्ताक्षर एवं दिनांक SIGN & DATE P-2102	REV 07	निर्माणकर्ता WORKED BY	Ashish Ranjan	02.05.17								
सामग्री सूची संख्या INVENTORY		जांचकर्ता CHECKED BY	Gopal Krishnan	02.05.17								

हस्ताक्षर एवं दिनांक SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARIDWAR)		HW 10786 पृष्ठ का Page 5 of 8	
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अपडेट किया गया है	10.0 Identification Marking: All bars are to be marked with following information: - Purchase Order Number - Size - Material Grade - Supplier Identification The details are to be clearly stamped and encircled by oil paint. Each bar shall be painted with pink colour with white strip on both ends. All the bars shall be suitably packed to protect them against corrosion and damage during transportation. Bars having maximum and minimum hardness (from which test samples are taken) shall be clearly marked by oil paint for easy identification. Their respective hardness values shall also be punched on these bars.				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	11.0 Documentation: Prior to, but in no case later than the delivery of the material, an inspection certificate as per EN 10204 shall be provided to BHEL in duplicate; this certificate must contain the following data: (a) Material code no and P.O. number (b) Material designation (c) Heat no., heat analysis and melting methods (d) Complete information on all heat treatments performed (d) Mechanical test results including hardness range and the metallurgical examination. (e) Results of non-destructive tests, UT inspection report (f) Confirmation of the material identity check (g) Dimensions and visual inspection reports				
स्वतंत्रताधिकार एवं गोपनीय ; इस प्रलेख में दी गई सूचना भारत की इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग , जो कि कम्पनी के हित में प्रतिस्पर्धा हो न किया जाए	12.0 Cross Referred Standard: EN10088-3, HW0993008, ISO 6506-1, ISO 6892, ASTM E8, ISO 148-1, EN10021, ASTM E45, TWP1204, ASTM E112, ISO 643, ASTM A370, EN10204 13.0 Modification with respect to last revision: • Clause 4.0 modified. • Clause 9.0 modified. • Clause 12.0 modified.				
हस्ताक्षर एवं दिनांक SIGN & DATE 					
सामग्री सूची संख्या INVENTORY NO. P. 2102	REV 07	निर्माणकर्ता WORKED BY	Ashish Ranjan		02.05.17
		जांचकर्ता CHECKED BY	Gopal Krishnan		02.05.17



संस्थान क्रय विनिर्देश (हीप - हरिद्वार)
PLANT PURCHASE SPECIFICATION
 (HEEP - HARIDWAR)

HW 10786

 पृष्ठ का
 Page 6 of 8

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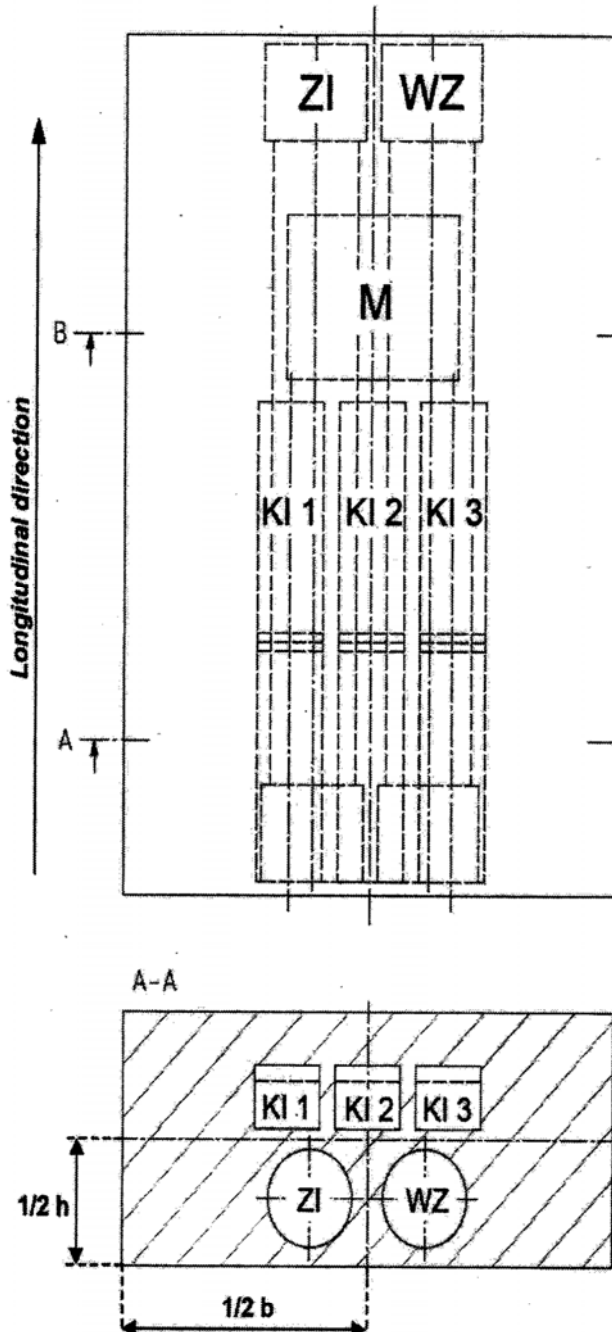
 SUPERSEDES
 INVENTORY NO.

 सामग्री सूची संख्या को
 प्रतिस्थापित करता है

 हस्ताक्षर एवं दिनांक
 SIGN & DATE

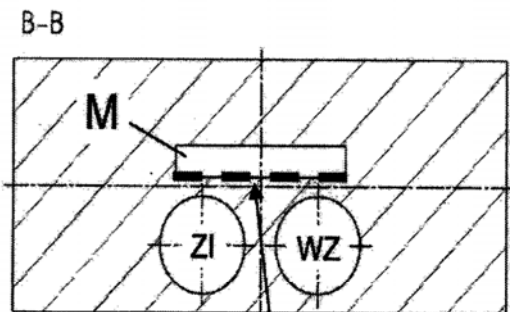
Attachment 1

Standard Testing



Label	Specimen
ZI	Tensile Specimen Centre
WZ*	Hot Tensile Specimen
KI 1 - KI 3	Notched Impact Specimen Centre
M	Metallographic Specimen

* if required in material specification



Lower Surface of the Metallographic Specimen has to be examined. Longitudinal direction must be indicated in the documentation. $A \geq 320 \text{ mm}^2$

 हस्ताक्षर एवं दिनांक
 SIGN & DATE

 सामग्री सूची संख्या
 INVENTORY

REV 07

 निर्माणकर्ता
 WORKED BY

Ashish Ranjan

02.05.17

 जांचकर्ता
 CHECKED BY

Gopal Krishnan

02.05.17

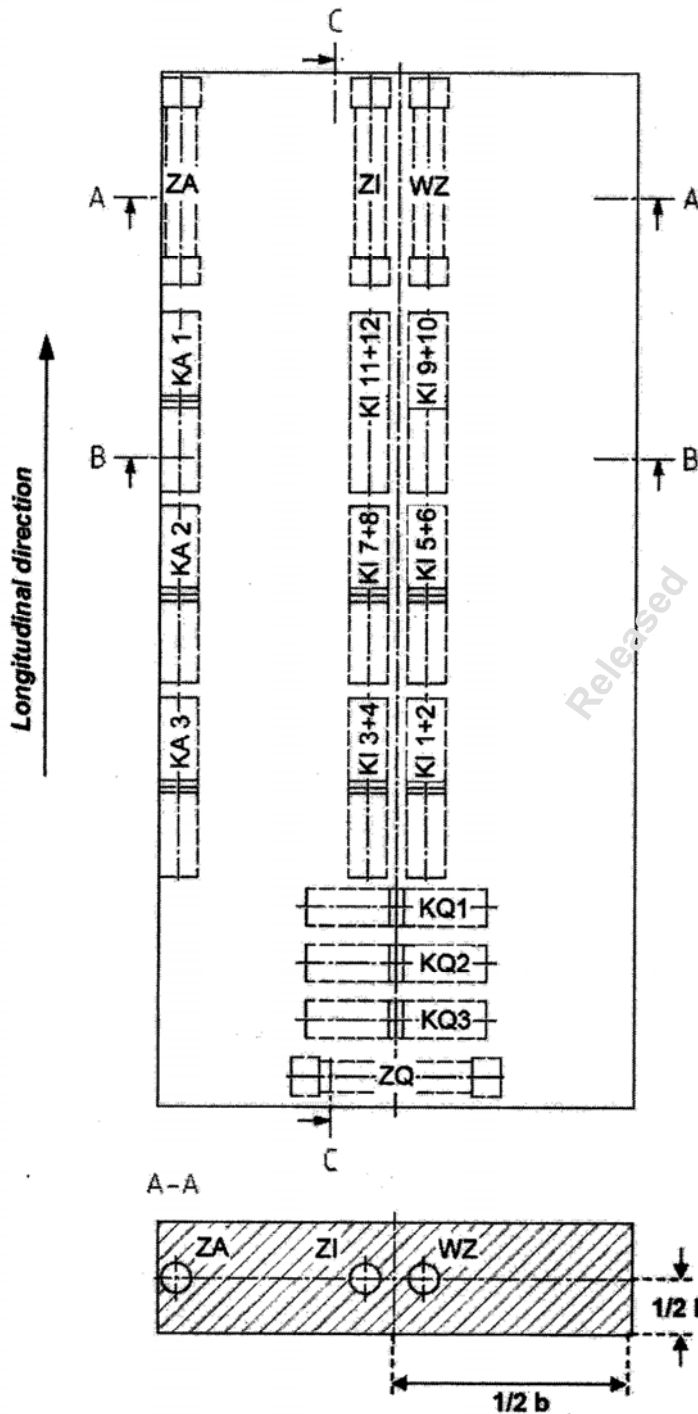


संस्थान क्रय विनिर्देश (हीप - हरिद्वार)
PLANT PURCHASE SPECIFICATION
 (HEEP - HARIDWAR)

HW 10786

 पृष्ठ का
 Page 7 of 8

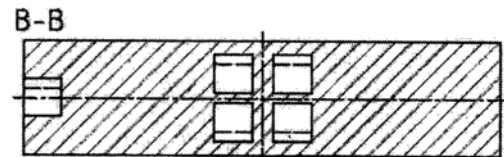
Attachment 2, Page 1/2

Process Qualification

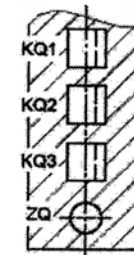
Label	Specimen
ZI	Tensile Specimen Centre
ZA	Tensile Specimen Rim
ZQ	Tensile Specimen Transverse
WZ*	Hot Tensile Specimen
KI 1 - KI 12	Notched Impact Specimen Centre (FATT)
KA 1 - KA 3	Notched Impact Specimen Rim
KQ 1 - KQ 3	Notched Impact Specimen Transverse

* if required in material specification

Note the notch positions of the notch impact specimens (see B - B and C - C).



C-C



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स्वत्वधिकार एवं गोपनीय ;

यस प्रत्येक में दो मई सूचना भारत हीवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्येक एवं अवलम्ब इस से किसी भी तरह प्रयोग, जो कि कम्पनी के हित में इतिहासक हो न किया जाए

 हस्ताक्षर एवं दिनांक
 SIGN & DATE

 सामग्री सूची संख्या
 INVENTORY

REV 07

 निर्माणकर्ता
 WORKED BY

Ashish Ranjan

02.05.17

 जांचकर्ता
 CHECKED BY

Gopal Krishnan

02.05.17



संस्थान क्रय विनिर्देश (हीप - हरिद्वार)
PLANT PURCHASE SPECIFICATION
 (HEEP - HARIDWAR)

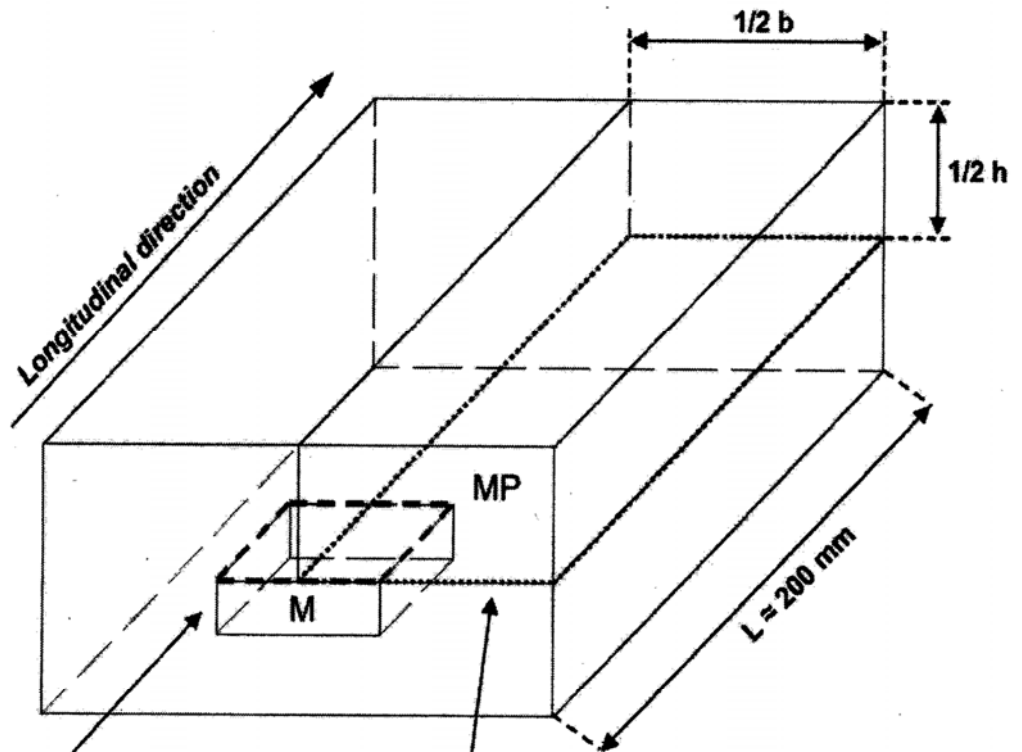
HW 10786

 पृष्ठ का
 Page 8 of 8

Attachment 2, Page 2/2

Process Qualification

Label	Specimen
M	Metallographic Specimen
MP	Specimen for Magnetic Particle Test



Upper Surface of the Metallographic Specimen has to be examined. Longitudinal direction must be indicated in the documentation. $A \geq 320 \text{ mm}^2$

Lower Surface of the specimen has to be examined in Magnetic Particle Test.

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स्वत्वधिकार एवं गोपनीय :

इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं आशय इस से किसी भी तरह प्रयोग, जो कि कम्पनी के हित में हानिकारक हो ना किया जाए

 हस्ताक्षर एवं दिनांक
 SIGN & DATE

 सामग्री सूची संख्या
 INVENTORY

REV 07

 निर्माणकर्ता
 WORKED BY

 Ashish
 Ranjan

 जांचकर्ता
 CHECKED BY

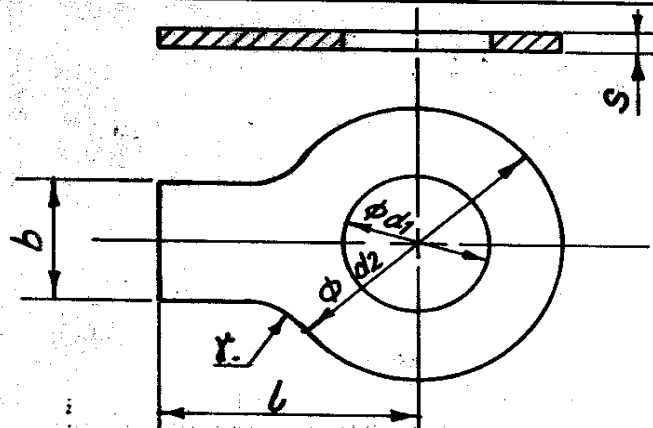
 Gopal
 Krishnan

02.05.17

02.05.17

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान मानक (हीप - हरिद्वार) PLANT STANDARD (HEEP - HARDWAR)	HW7169096 पृष्ठ का Page 1 of 3																																																												
SUPERSEDES INVENTORY NO. समझी सूची संख्या को अधिकृत करता है	TAB WASHER, TYPE - A, STEEL																																																														
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	1.0 DESIGATION: A Tab washer type-A of nominal size 17 mm and made of steel, shall be designated as: 1.1 On Drawings: i) Material specification column - HW 7169096. ii) Description column - WASHER TAB A17-ST. 1.2 On Indent: Washer Tab Type - A 17 - ST: HW 7169096. 1.3 For issuing enquiries and on purchase orders : While issuing enquiries and purchase orders, details the plant standard number from the above description and the information given under clause-2. 2.0 COMPLIANCE WITH STANDARDS : 2.1 Dimensions : To IS: 8068 (Table-1) - 1976 / Reaffirmed 1996. 2.2 General Requirements & Tolerances : To IS : 5369 -1975 / Reaffirmed 1996. 2.3 Material : Cold rolled carbon steel sheet grade - O (Ordinary quality) as specified in IS:513/ 1994 / Reaffirmed 1998. 2.4 Finish : Zinc Plated in accordance with IS:1367 (Pt.11) in bright finish with yellow iridescent colour (Designation L, Table D.3) having minimum coating thickness 5 microns. 2.5 Identification Marking : As stated in clause 9 of IS:1367 (Part 3).																																																														
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हो, निषेधित है।	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> </tr> <tr> <td>हस्ताक्षर एवं दिनांक SIGN & DATE</td> <td>17/4/04</td> <td></td> <td></td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर SIGNATURE & DATE</td> </tr> <tr> <td>समझी सूची संख्या INVENTORY NO.</td> <td>P-2578</td> <td>MEMBER PSC</td> <td>N. R. De</td> <td>अनुवादक TRANSLATED BY</td> <td></td> </tr> <tr> <td></td> <td></td> <td>Member of PSC</td> <td>R. BANJA</td> <td>निर्माणकर्ता WORKED BY</td> <td>Lalit Kumar</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>जांचकर्ता CHECKED BY</td> <td>Lalit Kumar</td> </tr> <tr> <td></td> <td></td> <td>सहमत विभाग AGREED DEPTT.</td> <td>नाम NAME</td> <td>पर्यवेक्षणकर्ता SUPERVISED BY</td> <td>D.L.Oberoi</td> </tr> <tr> <td></td> <td></td> <td></td> <td>दिनांक एवं हस्ताक्षर DATE & SIGNATURE</td> <td>स्वीकृति APPROVED :</td> <td>संस्थान मानक समिति PLANT STANDARDS COMMITTEE</td> </tr> <tr> <td></td> <td></td> <td>REV.NO. 01</td> <td></td> <td>निर्माण PREPARED :</td> <td>TSX</td> </tr> <tr> <td></td> <td></td> <td>Dt. 06/04/04</td> <td></td> <td>जारी ISSUED :</td> <td>मानक विभाग TSX</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>दिनांक DATE :</td> <td>23-10-82</td> </tr> </table>									हस्ताक्षर एवं दिनांक SIGN & DATE	17/4/04			नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE	समझी सूची संख्या INVENTORY NO.	P-2578	MEMBER PSC	N. R. De	अनुवादक TRANSLATED BY				Member of PSC	R. BANJA	निर्माणकर्ता WORKED BY	Lalit Kumar					जांचकर्ता CHECKED BY	Lalit Kumar			सहमत विभाग AGREED DEPTT.	नाम NAME	पर्यवेक्षणकर्ता SUPERVISED BY	D.L.Oberoi				दिनांक एवं हस्ताक्षर DATE & SIGNATURE	स्वीकृति APPROVED :	संस्थान मानक समिति PLANT STANDARDS COMMITTEE			REV.NO. 01		निर्माण PREPARED :	TSX			Dt. 06/04/04		जारी ISSUED :	मानक विभाग TSX					दिनांक DATE :	23-10-82
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दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान मानक (हीप - हरिद्वार) PLANT STANDARD (HEEP - HARDWAR)		HW7169096							
				पृष्ठ का Page 2 of 3							
समशी सूची संख्या में अभिदिष्ट करता है	SUPERSEDES INVENTORY NO.	3.0 NOTE : 3.1 Weight given in table -1 are for reference only and are not meant for commercial transactions. 3.2 For Tab washers, Type – A, Brass refer to Plant standard HW 716 90 95. 3.3 When fasteners are to be tested with in the BHEL ,the sampling & acceptance plan shall be as per IS:10102. 4.0 Referred standards (Latest publications including amendments) : <table border="0"> <tr> <td>(1) IS:513</td> <td>(2) IS:1367 (Pt.3)</td> <td>(3) IS:1367 (Pt.11)</td> </tr> <tr> <td>(4) IS:5369</td> <td>(5) IS:10102</td> <td>(6) HW7169095</td> </tr> </table>				(1) IS:513	(2) IS:1367 (Pt.3)	(3) IS:1367 (Pt.11)	(4) IS:5369	(5) IS:10102	(6) HW7169095
(1) IS:513	(2) IS:1367 (Pt.3)					(3) IS:1367 (Pt.11)					
(4) IS:5369	(5) IS:10102					(6) HW7169095					
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दिनांक SIGN & DATE	दिनांक एवं हस्ताक्षर SIGN & DATE										
समशी सूची संख्या P-2578	REV.NO. 01		निर्माणकर्ता WORKED BY Lalit Kumar	जांचकर्ता CHECKED BY D.L.Oberoi	06/04/04 07/04/04						

निर्माण क्रमांक (Drawing No.)		संस्थान मानक (हीप - हरिद्वार) PLANT STANDARD (HEEP - HARDWAR)					HW7169096 पृष्ठ का Page 3 of 3																																																																																																																																																	
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	स्वतंत्रिकार एवं गोपनीय (Copyright and Confidential)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>NOM. SIZE Φd_1</th> <th>DIA. d_2</th> <th>b</th> <th>l</th> <th>r</th> <th>s</th> <th>SUITABLE FOR BOLT SIZE</th> <th>WEIGHT OF 1000 PCS. IN KG.</th> <th>SUB-CODE</th> </tr> </thead> <tbody> <tr><td>3.2</td><td>12</td><td>4</td><td>13</td><td>2.5</td><td>0.4</td><td>M3</td><td>0.417</td><td>145</td></tr> <tr><td>4.3</td><td>14</td><td>5</td><td>14</td><td>2.5</td><td>0.4</td><td>M4</td><td>0.528</td><td>153</td></tr> <tr><td>5.3</td><td>17</td><td>6</td><td>16</td><td>2.5</td><td>0.5</td><td>M5</td><td>0.982</td><td>102</td></tr> <tr><td>6.4</td><td>19</td><td>7</td><td>18</td><td>4</td><td>0.5</td><td>M6</td><td>1.218</td><td>013</td></tr> <tr><td>8.4</td><td>22</td><td>8</td><td>20</td><td>4</td><td>0.8</td><td>M8</td><td>2.491</td><td>021</td></tr> <tr><td>10.5</td><td>26</td><td>10</td><td>22</td><td>6</td><td>0.8</td><td>M10</td><td>3.357</td><td>030</td></tr> <tr><td>13</td><td>30</td><td>12</td><td>28</td><td>10</td><td>1.0</td><td>M12</td><td>5.739</td><td>048</td></tr> <tr><td>17</td><td>36</td><td>15</td><td>32</td><td>10</td><td>1.0</td><td>M16</td><td>7.858</td><td>056</td></tr> <tr><td>21</td><td>42</td><td>18</td><td>36</td><td>10</td><td>1.0</td><td>M20</td><td>10.284</td><td>064</td></tr> <tr><td>25</td><td>50</td><td>20</td><td>42</td><td>10</td><td>1.0</td><td>M24</td><td>14.232</td><td>072</td></tr> <tr><td>31</td><td>63</td><td>26</td><td>52</td><td>16</td><td>1.6</td><td>M30</td><td>36.375</td><td>080</td></tr> <tr><td>37</td><td>75</td><td>30</td><td>60</td><td>16</td><td>1.6</td><td>M36</td><td>50.478</td><td>099</td></tr> <tr><td>43</td><td>88</td><td>35</td><td>70</td><td>16</td><td>1.6</td><td>M42</td><td>69.606</td><td>129</td></tr> <tr><td>50</td><td>100</td><td>40</td><td>80</td><td>16</td><td>1.6</td><td>M48</td><td>89.082</td><td>137</td></tr> <tr><td>28</td><td>58</td><td>23</td><td>48</td><td>16</td><td>1.6</td><td>M27</td><td></td><td>161</td></tr> </tbody> </table>							NOM. SIZE Φd_1	DIA. d_2	b	l	r	s	SUITABLE FOR BOLT SIZE	WEIGHT OF 1000 PCS. IN KG.	SUB-CODE	3.2	12	4	13	2.5	0.4	M3	0.417	145	4.3	14	5	14	2.5	0.4	M4	0.528	153	5.3	17	6	16	2.5	0.5	M5	0.982	102	6.4	19	7	18	4	0.5	M6	1.218	013	8.4	22	8	20	4	0.8	M8	2.491	021	10.5	26	10	22	6	0.8	M10	3.357	030	13	30	12	28	10	1.0	M12	5.739	048	17	36	15	32	10	1.0	M16	7.858	056	21	42	18	36	10	1.0	M20	10.284	064	25	50	20	42	10	1.0	M24	14.232	072	31	63	26	52	16	1.6	M30	36.375	080	37	75	30	60	16	1.6	M36	50.478	099	43	88	35	70	16	1.6	M42	69.606	129	50	100	40	80	16	1.6	M48	89.082	137	28	58	23	48	16	1.6	M27		161
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		8.4	22	8	20	4	0.8	M8	2.491	021																																																																																																																																														
		10.5	26	10	22	6	0.8	M10	3.357	030																																																																																																																																														
		13	30	12	28	10	1.0	M12	5.739	048																																																																																																																																														
		17	36	15	32	10	1.0	M16	7.858	056																																																																																																																																														
		21	42	18	36	10	1.0	M20	10.284	064																																																																																																																																														
		25	50	20	42	10	1.0	M24	14.232	072																																																																																																																																														
		31	63	26	52	16	1.6	M30	36.375	080																																																																																																																																														
		37	75	30	60	16	1.6	M36	50.478	099																																																																																																																																														
		43	88	35	70	16	1.6	M42	69.606	129																																																																																																																																														
50	100	40	80	16	1.6	M48	89.082	137																																																																																																																																																
28	58	23	48	16	1.6	M27		161																																																																																																																																																
संशोधन क्रमांक (Revision No.)	REV. NO. 01					निर्माणकर्ता WORKED BY Lalit Kumar		06/02/04																																																																																																																																																
	जांचकर्ता CHECKED BY D.L. Oberoi					7/4/2004																																																																																																																																																		

BHEL-HERP, VARANASI **QUALITY PLAN**

Components : GOVERNING ASSEMBLY

Sl.No.	Component / Operation	Characteristic Checked	Type/Method of Check	Extent of Check	Reference Documents & Acceptance Norm	Format of Record	Agency			Remarks
							P	W	V	
1.0	Raw material Inspection (All items except std. fasteners, rubber items, BOI items)	1.1) Composition 1.2) Heat Treatment 1.3) Mechanical Properties 1.4) Soundness	Chemical Analysis H.T. Chart Mechanical Test NDT TESTING	1 Sample per melt 1 Sample per H.T. batch -do- 100%	Matl. Specn. As per CBOM -do- -do- Standard refer in matl. Specn.	T.C H.T. Chart T.C Inspection Report	3/2 3/2 3/2 3/2	- - - 1	1 1 1 -	Material TC to be reviewed for all the items. All the raw materials is to be procured from BHEL approved sources mentioned in the PO along with mill TC. For materials other than casting, forging, HW10673, AA10622 & HW10683, where qty. is small, NABL approved lab TC is acceptable in place of mill TC. For castings and forgings, HT chart will be reviewed. NDT, wherever applicable as per drawing/specn./po will be witnessed by BHEL/Inspection agency.
2.0	WPS/PQR/WPQ	2.1) Scrutinizing of WPS, PQR & WPQ (if applicable as per drawing)	Record Review	100%	-	Inspection Report	2	-	1	WPS/PQR/WPQ should be approved by BHEL/Lloyds.
3.0	In process inspection	3.1) Dimensional check & visual inspection after machining of all items of assembly 3.2) Hardness after surface treatment (Nitriding/Flame hardening/stelliting etc.)	Visual & measurement measurement	100% 100%	Drawing/standard Drawing/standard	Inspection Report Inspection Report	2 2	1 -	- -	Engraving of drawing number in all component to be ensured.
		3.3) Stress Relieving 3.4) Hydraulic testing 3.5) Hardwares 3.6) Material verification	H.T. Chart Hydraulic testing Visual PMI by XRF Analyser	1 Sample per H.T. batch 100% 100% 10% on random basis 100%	-do- Drawing/standard - Matl. Specn. As per CBOM Drawing	H.T. Chart Inspection Report Inspection Report Inspection Report Dimension Report	2 2 2 2	- 1 - 1	1 - - -	applicable to those components of assembly where mentioned in the drawing. HARD FACING IS to be done from approved source of BHEL as mentioned in the PO. Chemical TC of stellite material will be verified by TPI. if applicable as per drawing/PO
4.0	Inspection after final machining	4.1) Verification of dimensions and surface finish after machining 4.2) Verify the cleanliness & completeness of assembly 4.3) Identification & Marking 4.4) Packing & Preservation	Visual and measurement Punching of P.O. No., Drawing No., Inspector Seal AS per Purchase Order ASHISH UPADHYAY/AE	100% 100% 100% Approved by	Drawing/CBOM Drawing P.O. ANAND SINGH/MGR	Inspection Report Inspection Report Inspection Report Inspection Report	2 2 2 2	1 1 1 1	- - - -	applicable to those components of assembly where mentioned in the drawing. All the hardwares used should be of reputed make like Unbrako/LPS/TVS etc. 100% by Vendor, 10% by BHEL on random basis.
Q.P.No.	HW/GA/001 REV.02	Prepared by								qty of all the items should be as per CBOM.
Date	29-12-2022	Signature & Date								

आनन्द गायन सिंह **Anand Narayan Singh**
प्रबंधक (अभियांत्रिकी एवं विपणन) / Manager (E & M)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Limited
एच.ई.आर.पी.-वाराणसी/HERP-Varanasi

3 = RAW MATL. MANUFACTURER
2 = VENDOR/SUPPLIER
1 = BHEL/INSP. AGENCY

LEGEND:
P = PERFORM
W = WITNESS
V = VERIFY
T.C = TEST CERTIFICATE
H.T. = HEAT TREATMENT
S.R. = STRESS RELIEVING

**PRODUCT STANDARD
STEAM TURBINE ENGINEERING**

ST 02014

PAGE 1 OF 7

BASED ON ENEL EXPERIENCE

SCREWS, HEXAGON, PRECISION PRODUCT GRADE A18
COARSE PITCH,
FULLY THREADED
ALLOY STEEL 21 Cr Mo V57
M1.6 - M52

1. DESIGNATION:

1.1 A precision, hexagon, steel screw, nominal diameter 12 mm, coarse pitch, length L = 150 mm and size number 340 shall be designated as:

1.1.1 On drawings: 1) Drawing Col. ST 02014.340

11) Description Col-

SCREW HEX PH 12x150

1.1.2 For Placing
Indents on Purchase:

SCREW PRECISION HEXAGON M12x150-ST02014.340

2. MATERIAL : As per AA 10622 With heat treatment to G 70
~~as specified in the specification AA 10622-02~~

3. DIMENSIONS, TOLERANCES,
& GENERAL REQUIREMENTS

Various dimensions of screws shall be as
Per tables-1,2 & Figure-1.

3.1 THREADS: Pitch coarse) to IS: 4218-1976 Pt II-III
[Reaffirmed 1990]

Tolerance Quality- Medium

Tolerance class- 6g

② THE SURFACE FINISH ON THE THREADS TO BE AS
PER ST 38014 EXCEPT OTHERWISE MENTIONED
ON THE STANDARD.

AGREED		NAME		SIGN & DATE	
		DRAWN	MS. BHAT	4/1/87	
		WORKED	PRITAM SINGH	4/1/87	
TSX	S. KUMAR	CHECKED	PRITAM SINGH	4/1/87	
DEPT.	NAME	SUPERVISED	PRITAM SINGH	4/1/87	
Revision: 04		Approved: [Signature]		ST.	
REAFFIRMED		ENG. DEV. MANAGER		5-13	
Date: 24.3.05		Prepared	Issued	Date	
[Signature]		PRITAM SINGH	STE (TE)	7-1-80	
		HARDWAR			

SIGN & DATE

SUPERSEDES
INVENTORY No.

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- 3.2 IDENTIFICATION: As per HW 0400 397
- 3.3 FINISH Unplated
- 3.4 Technical delivery conditions as per IS: 1367-1983 ~~[Refer to IS: 1367-1983]~~ ^{(a) (b)}
- 3.5 Free dimension tolerances shall be as per AA 0230208 class medium.
- 3.6 Blank drawing for screw is ST 02014-BD-1
4. NOTES:
- 4.1 Sizes within brackets are non preferred and should not be used *as far as possible*
- 4.2 For screw threads, general (metric) refer to standard AA 0231800.
- 4.3 For tolerance grade, position & class refer to standard AA 0230301.
- 4.4 For requirement of screws as per DIN 933, Material property class 8.8 the following standards should be used:

AA 7111105 ^(a)	(M 1.6-M5) ^(a)	
AA 7111122	(M 6-M16) ^(a)	M 3-M16 ^(a)
AA 7111124	(M 20-36) ^(a)	M 20-M 24 ^(a)
AA 7113124 ^(a)	M 30-M36 ^(a)	

For sizes M39-M52 product standard ST 02014 should be used.

CROSS REFERRED STANDARD :- AA 10622, IS: 4218, ST 38 014
HW 0400397, IS: 1367, AA 0230208, AA 0231800,
AA 0230201, DIN 933, AA 7111122, AA 7111124, AA 7113124
ST 02014.

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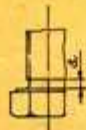
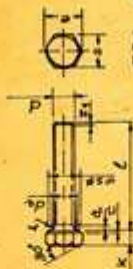
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Note:-

1. Manufacturer has option
to provide dimension 'd'
as per Fig-1 or Fig-2.

FIG-1

FIG-2

d₂ is minor thread dia.

TABLE - 1 ALL DIMENSIONS ARE IN M.M.

P	M 1.6	(M 1.7)	M 2	(M 2.3)	M 2.5	(M 2.6)	M 3	(M 3.5)	M 4	M 5	M 6	(M 7)	M 8	M 10	M 12	(M 14)	M 16	(M 18)	M 20	(M 22)	M 24	(M 27)	M 30	(M 33)	M 36	(M 39)	M 42	(M 45)	M 48	(M 51)	
C	-	-	-	-	-	-	-	-	0.1	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	-
d ₀ MAX.	2	2.1	2.6	2.9	3.1	3.2	3.6	4.1	4.7	5.7	6.8	7.8	9.2	11.2	14.2	16.2	18.2	20.2	22.2	24.4	26.4	30.4	33.4	36.4	42.4	45.6	48.6	52.6	56.6	-	
e MIN.	3.48	3.82	4.38	4.95	5.51	5.81	6.08	6.64	7.74	8.87	9.88	12.12	14.48	18.10	21.10	23.49	24.75	30.14	33.53	35.72	39.76	45.63	52.55	60.43	64.19	67.21	70.21	76.23	81.56	-	
k	1.1	1.2	1.4	1.6	1.7	1.8	2	2.4	2.8	3.5	4	5	5.5	7	8	9	10	12	13	14	15	17	19	21	23	25	26	28	30	33	
f ₂ MIN.	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.25	0.25	0.4	0.4	0.6	0.6	0.6	0.6	0.8	0.8	0.8	1	1	1	1	1	1.2	1.2	1.6	1.6	
s	3.2	3.5	4	4.5	5	5	5.5	6	7	8	10	11	13	17	19	22	24	27	30	32	36	41	46	50	55	60	65	70	75	80	
Q	1.05	1.05	1.2	1.2	1.35	1.55	1.5	1.8	2.1	2.4	3	3	4	4.5	5.3	6	6	7.5	7.5	9	9	10.5	10.5	12	12	13.5	13.5	15	15	15	-
Z ₁ MAX.	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.9	1.0	1.2	1.5	1.5	1.8	2.2	2.5	3	3	3.5	3.5	4.5	4.5	5	5	6	6	6.5	6.5	7.5	7.5	7.5	-

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The length 'L' Weights and size numbers of the screws shall be as per table-2

TABLE-2

l mm	M16	(M17)	M2	(M23)	M25	(M26)	M3	(M35)	M4	M5	M6	(M7)	M8	M10	M12
	Weight in kg/1000PCS. SIZE NUMBER.														
2	0.095 001	0.145 016													
3	0.105 002	0.135 017	0.201 031	0.280 046	0.370 061	0.383 076									
4	0.115 003	0.145 018	0.211 032	0.310 047	0.400 062	0.413 077	0.475 091								
5	0.125 004	0.155 019	0.231 033	0.340 048	0.430 063	0.443 078	0.525 092	0.240 106	1.25						
6	0.135 005	0.175 020	0.251 034	0.360 049	0.460 064	0.473 079	0.565 093	0.280 107	1.33 121	2.18 151	3.40 176	5.43 266			
7	0.145 006	0.185 021	0.271 035	0.380 050	0.480 065	0.513 080	0.615 094	0.440 108	1.41 123	2.26 152	3.57 177	5.68 267			
8	0.155 007	0.195 022	0.291 036	0.410 051	0.520 066	0.543 081	0.655 095	1.02 109	1.49 124	3.38 153	3.74 178	5.78 268	8.55 261	17.2 291	
(9)	0.165 008	0.215 023	0.311 037	0.440 052	0.550 067	0.573 082	0.695 096	1.08 110	1.56 125	3.61 154	3.91 179	6.18 269	8.85 262	17.7 292	
10	0.175 009	0.225 024	0.331 038	0.470 053	0.580 068	0.603 083	0.745 097	1.14 111	1.64 126	3.63 155	4.00 180	6.43 270	9.10 263	18.2 293	25.6 306
12	0.195 010	0.255 025	0.361 039	0.520 054	0.640 069	0.673 084	0.835 098	1.26 112	1.80 127	3.87 156	4.23 181	6.92 271	9.80 264	19.2 294	27.4 307
(14)		0.285 026	0.391 040	0.570 055	0.700 070	0.740 085	0.920 099	1.38 113	1.95 128	3.13 157	4.77 182	7.39 272	10.4 265	20.2 295	28.8 308
16		0.315 027	0.421 041	0.620 056	0.760 071	0.805 086	1.00 100	1.50 114	2.10 129	3.37 158	5.11 183	7.86 273	11.1 266	21.2 296	30.2 309
18				0.670 057	0.830 072	0.874 087	1.09 101	1.61 115	2.26 130	3.62 159	5.46 184	8.41 274	11.7 267	22.2 297	31.5 310
20				0.720 058	0.880 073	0.933 088	1.18 102	1.73 116	2.41 131	3.87 160	5.80 185	8.91 275	12.3 268	23.2 298	33.0 311
(22)					0.940 074	1.00 089	1.27 103	1.88 117	2.67 132	4.12 161	6.14 186	9.41 276	12.9 269	24.2 299	34.4 312
25						1.02 090	1.32 104	2.03 118	2.80 133	4.43 162	6.45 187	10.1 277	13.9 270	25.7 300	36.6 313
(28)							1.53 105	2.21 119	3.14 134	4.86 163	7.16 188	10.8 278	14.8 271	27.2 301	38.7 314
30									3.19 135	5.11 164	7.37 189	11.4 279	15.8 272	28.2 302	40.2 315
35										3.57 136	5.73 190	8.37 220	12.6 283	20.7 303	42.8 316
40										3.96 137	6.38 191	9.23 221	13.9 284	23.2 304	47.4 317
45										4.38 138	6.99 192	10.1 222	15.1 285	25.7 305	51.0 318
50										4.73 139	7.57 193	11.0 223	16.4 286	28.2 306	54.5 319
55										5.12 140	8.21 194	11.9 224	17.6 287	30.4 307	58.7 320

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(The length 'l' weights and size numbers of the screws shall be as per table-2)

TABLE-2 CONTINUED

l mm	M1.6	M1.7	M2	(M2.3)	M2.5	(M2.6)	M3	(M3.5)	M4	M5	M6	(M7)	M8	M10	M12
	WEIGHT IN KG/1000 PCS.														
	SIZE NUMBER														
60									5.50	8.83	12.7	18.8	25.0	43.3	61.7
									141	170	195	225	258	288	321
65									5.89	9.45	13.6	20.1	26.6	45.8	65.3
									142	171	196	226	259	289	322
70									6.28	10.1	14.4	21.3	28.2	48.3	68.9
									143	172	197	227	260	290	323
75									10.7	15.3	22.6	29.8	38.8	58.8	72.5
									173	198	228	261	291	324	
80									11.3	16.2	23.8	31.4	41.3	61.3	76.1
									174	199	229	262	292	325	
(85)									17.0	25.1	33.0	43.0	55.8	79.7	
									200	230	263	293	326		
90									17.9	26.5	34.6	45.3	58.3	83.3	
									201	231	264	294	327		
(95)											27.6	36.1	46.8	61.7	
											232	265	295	328	
100											28.8	37.7	48.3	63.3	
											233	266	296	329	
110												40.9	52.4	67.9	
												247	297	330	
120													73.4	95	
													298	331	
130													78.4	112	
													299	332	
140													83.4	119	
													300	333	
150													88.4	126	
													301	340	

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(The length 'L' Weights & size numbers of the screws shall be as per table-2)

TABLE-2 Continued

L m.m	(M16)	(M16)	(M18)	(M20)	(M22)	(M24)	(M27)	(M30)	(M33)	(M36)	(M39)	(M42)	(M45)	(M48)	(M52)
	WT IN kg/1000 PCS SIZE NUMBER														
10	38.0														
	38.1														
12	40.0	52.4													
	34.2	37.1													
(14)	42.0	55.6													
	34.3	37.2													
16	44.0	58.3	82.7	107	133	173	246								
	34.4	37.3	40.1	43.2	46.3	49.4	52.5								
(18)	46.0	60.9	85.4	112	137	178	253								
	34.6	37.4	40.2	43.3	46.4	49.5	52.6								
20	48.0	63.5	89.9	116	143	184	261								
	34.6	37.5	40.3	43.4	46.5	49.6	52.7								
(22)	50.0	66.2	92.9	120	148	190	269								
	34.7	37.6	40.4	43.5	46.6	49.7	52.8								
25	53.0	70.2	96.5	126	155	199	280								
	34.8	37.7	40.5	43.6	46.7	49.8	52.9								
(28)	55.9	74.2	101	132	161	208	292								
	34.9	37.8	40.6	43.7	46.8	49.9	53.0								
30	57.9	76.9	108	136	168	216	310								
	35.0	37.9	40.7	43.8	46.9	50.0	53.1								
35	62.4	83.5	113	147	181	229	319	524	543	680	869				
	35.1	38.0	40.8	43.9	47.0	50.1	53.2	65.6	58.1	60.6	63.1				
40	67.9	90.2	121	157	193	244	328	448	572	724	910	1090	1350	1540	
	35.2	38.1	40.9	44.0	47.1	50.2	53.3	55.7	58.2	60.7	63.2	65.6	68.1	70.6	
45	72.4	97.1	129	167	206	259	358	472	601	768	951	1130	1380	1650	
	35.3	38.2	41.0	44.1	47.2	50.3	53.4	55.8	58.3	60.8	63.3	65.7	68.2	70.7	
50	77.9	103	137	178	219	276	377	496	630	793	992	1180	1430	1700	2090
	35.4	38.3	41.1	44.2	47.3	50.4	53.5	55.9	58.4	60.9	63.4	65.8	68.3	70.8	73.1
(55)	82.9	110	146	188	232	289	397	519	649	827	1030	1230	1490	1770	2150
	35.5	38.4	41.2	44.3	47.4	50.5	53.6	56.0	58.5	61.0	63.5	65.9	68.4	70.9	73.2
60	87.8	117	154	199	244	304	416	543	681	861	1070	1270	1540	1850	2260
	35.6	38.5	41.3	44.4	47.5	50.6	53.7	56.1	58.6	61.1	63.6	66.0	68.5	71.0	73.3
65	92.8	123	162	209	257	319	435	566	719	896	1110	1310	1570	1870	2310
	35.7	38.6	41.4	44.5	47.6	50.7	53.8	56.2	58.7	61.2	63.7	66.1	68.6	71.1	73.4
70	97.8	130	170	219	269	334	456	590	744	930	1160	1390	1620	1850	2340
	35.8	38.7	41.5	44.6	47.7	50.8	53.9	56.3	58.8	61.3	63.8	66.2	68.7	71.2	73.5
75	102	137	178	229	282	348	473	614	775	964	1200	1420	1710	2020	2460
	35.9	38.8	41.6	44.7	47.8	50.9	54.0	56.4	58.9	61.4	63.9	66.3	68.8	71.3	73.6
80	107	144	187	240	295	363	492	637	806	1000	1240	1460	1750	2070	2560
	36.0	38.9	41.7	44.8	47.9	51.0	54.1	56.5	59.0	61.5	64.0	66.4	68.9	71.4	73.7
(85)	112	150	196	250	308	378	512	661	837	1030	1280	1510	1810	2140	2610
	36.1	39.0	41.8	44.9	48.0	51.1	54.2	56.6	59.1	61.6	64.1	66.5	69.0	71.5	73.8
90	117	157	203	258	317	388	523	675	866	1070	1320	1550	1840	2170	2680
	36.2	39.1	41.9	45.0	48.1	51.2	54.3	56.7	59.2	61.7	64.2	66.6	69.1	71.6	73.9
(95)	122	164	211	271	333	408	550	708	891	1100	1360	1600	1920	2260	2760
	36.3	39.2	42.0	45.1	48.2	51.3	54.4	56.8	59.3	61.8	64.3	66.7	69.2	71.7	74.0

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21/11/2017
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9-2011

PRODUCT STANDARD
STEAM TURBINE ENGINEERING

ST 02014

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(The length 'L' Weights and size numbers of the screws shall be as per table -2)

TABLE - 2 CONTINUED.

L mm	(M14)	(M16)	(M18)	M20	(M22)	M24	(M27)	M30	(M33)	M36	(M39)	M42	(M45)	M48	(M52)
	WT IN KG PER 1000 PCS SIZE NUMBER														
100	127	170	219	281	346	423	569	732	920	1150	1400	1650	1980	2320	2830
	366	393	427	452	483	514	545	569	594	619	644	668	693	718	741
110	137	184	236	302	371	453	608	779	978	1210	1480	1740	2090	2450	2970
	365	394	422	453	484	515	546	570	595	620	645	669	694	719	742
120	147	197	252	322	397	483	647	827	1040	1270	1560	1860	2190	2570	3120
	366	395	423	454	485	516	547	571	596	621	646	670	695	720	743
130	157	210	269	343	421	513	685	874	1090	1340	1650	1930	2300	2690	3260
	367	396	424	455	486	517	548	572	597	622	647	671	696	721	744
140	167	224	285	344	408	543	724	921	1150	1410	1730	2020	2410	2820	3470
	368	397	425	456	487	518	549	573	598	623	648	672	697	722	745
150	177	237	301	384	473	572	762	969	1210	1480	1810	2120	2520	2960	3550
	369	398	426	457	488	519	550	574	599	624	649	673	698	723	746
160			317	404	498	602	807	1010	1210	1500	1890	2210	2630	3100	3700
			427	458	489	520	551	575	600	625	650	674	699	724	747
170			333	424	523	632	839	1060	1320	1620	1970	2300	2760	3190	3850
			428	459	490	521	552	576	601	626	651	675	700	725	748
180			349	446	548	662	875	1110	1390	1690	2060	2400	2850	3370	4000
			429	460	491	522	553	577	602	627	652	676	701	726	749
190			365	464	573	692	911	1160	1440	1760	2140	2490	2960	3460	4150
			430	461	492	523	554	578	603	628	653	677	702	727	750
200			381	484	598	722	947	1210	1600	1820	2220	2590	3060	3560	4300
			431	442	493	524	555	579	604	629	654	678	703	728	751

Note : New size nos. shall be taken on computer only.

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PRODUCT STANDARD
STEAM TURBINE ENGINEERING

HW 7171393
ST 05004

PAGE 1 OF 3

BASED ON BHEL
EXPERIENCE

TAPER PIN WITH
INTERNAL THREAD
CARBON STEEL

1. DESIGNATION: A taper pin with nominal size
 $d_1 = 20 \text{ mm}$, length $l = 40 \text{ mm}$ and
size number 122 shall be designated as:
- 1.1 ON DRAWINGS: i) in drg. col. ST 05004.122
ii) in description col.
TAPER PIN 20x40
- 1.2 For placing
Indents on Purchase: Taper pin 20x40; ST05004.122
2. MATERIAL: As per AA10218
3. DIMENSIONS &
GEN. REQUIREMENTS: Various dimensions as per table-1
and figure-1.
- 3.1 THREADS: - Pitch-coarse as per IS: 4218
- Class of quality-medium
- Tol. class - 6 H
- 3.2 TOLERANCES: Free dimensions tolerances shall be
as per AA0230208 medium grade.
- 3.3 IDENTIFICATION: As per HW 0400 397
- 3.4 FINISH: Unplated
- 3.5 Blank drawings number: ST05004-BD-1

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DIN
7878
(Feb 77)

INVENTORY No.	SIGN & DATE	AGREED.	Revision : 03 REAFFIRMED		Distribution	Qty.	Approved :	Prepared	Issued	Date
			TSX	N. CHITRAN						
P-5085	11/2/80									16-5-80
			DEPTT.	NAME	SIGN. & DATE	SUPERVISED.	P. SINGH.			ST 5/3



PRODUCT STANDARD
STEAM TURBINE ENGINEERING

HW 7171393

ST 05004

PAGE 2 OF 3

4 NOTES:

4.1 For taper pins with internal threads of alloy steel refer ST 05006.

4.2 For taper pins of alloy steels refer ST 05007.

4.3 For pins taper, solid, type A of cold drawn steel bars grade C-40, refer AA 7171041.

4.4 The present product standard does not cover taper pins of type-B (turned) as given in DIN-7978

CROSS REFERRED STANDARD :- AA 10218, HW 0400397
IS: 4218, AA 0230208, ST 05006, ST 05007,
DIN 7978. AA 7171041

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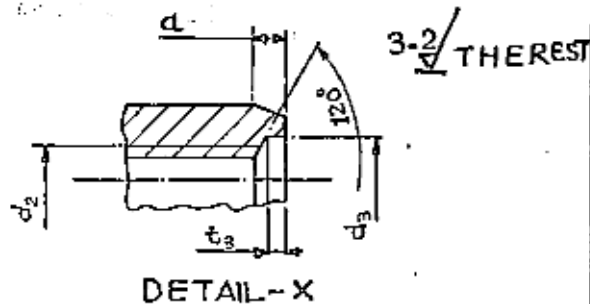
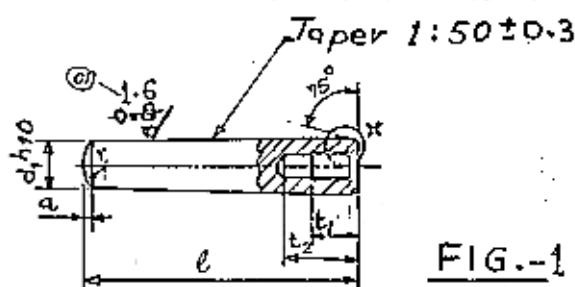
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PRODUCT STANDARD
STEAM TURBINE ENGINEERING

HW 7171393
ST 05004

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d_1, h_{10}	6	8	10	12	14	16	20	25	30	40	50
$d_1 \approx$	0.8	1	1.2	1.6	1.6	2	2.5	3	4	5	6.3
d_2	M4	M5	M6	M8	M8	M10	M12	M16	M20	M20	M24
d_3	4.3	5.3	6.4	8.4	8.4	10.5	13	17	21	21	25
t_1	6	8	10	12	12	16	18	24	30	30	36
t_2, min	10	12	16	20	20	25	27	34	42	42	50
t_3	1	1.2	1.2	1.2	1.2	1.5	1.5	2	2	2	2.5

WEIGHT IN KG./1000 PCS.
SIZE NUMBER.

l	16	20	24	28	32	36	40	45	50	55	60	70	80	90	100	110	120	130	140	150	165	180	200	230	260
16	2.54 001																								
20	3.70 002	6.2 016																							
24	4.87 003	8.0 017	11.9 036																						
28	6.02 004	9.8 018	14.7 037	17.9 056	27.0 076																				
32	7.20 005	11.6 019	17.5 038	22.1 057	32.5 077	37.0 046																			
36	8.35 006	12.5 020	20.4 039	26.3 058	38.0 078	44.0 097	68.0 121																		
40	9.15 007	15.9 021	23.4 040	30.5 059	42.6 079	51.0 098	76.0 122																		
45	10.5 008	17.7 022	26.8 041	35.5 060	50.4 080	60.0 099	89.0 123	115 146																	
50	12.2 009	20.2 023	30.5 042	40.8 061	57.0 081	68.8 100	103 124	138 147																	
55	14.0 010	22.8 024	34.3 043	46.2 062	64.2 082	77.5 101	116 125	147 148	185 166																
60		25.5 025	38.3 044	51.3 063	71.5 083	87.0 102	130 126	182 149	215 167																
70		31.0 026	46.5 045	62.5 064	85.8 084	104 103	158 127	225 150	275 168																
80		37.0 027	54.8 046	74.5 065	101 085	121 104	186 128	267 151	335 169																
90		43.2 028	63.3 047	86.5 066	116 086	139 105	216 129	310 152	395 170	800 186															
100			72.0 048	99.0 067	132 087	155 106	246 130	355 153	465 171	910 187															
110			80.5 049	121 068	148 088	172 107	276 131	400 154	525 172	1020 188	1580 201														
120				133 069	164 089	199 108	306 132	445 155	590 173	1130 189	1750 202														
130				145 070	180 090	217 109	337 133	490 156	660 174	1240 190	1910 203														
140					195 091	235 110	370 134	540 157	725 175	1350 191	2100 204														
150						253 111	402 135	610 158	785 176	1460 192	2270 205														
165						279 112	450 136	660 159	890 177	1630 193	2530 206														
180						305 113	500 137	740 160	990 178	1810 194	2790 207														
200							565 138	840 161	1130 179	2050 195	3150 208														
230							665 139	1000 162	1340 180	2310 196	3700 209														
260							770 140	1160 163	1570 181	2770 197	4250 210														

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