BHEL Tenders

Government eProcurement System

Tender Details

Date : 24-Sep-2024 02:01 PM

Print

Basic Details

Organisation Chain	Bharat Heavy Electricals Limited||HERP - Varanasi||Purchase		
Tender Reference Number	E-RC-304-24-0328-61-1		
Tender ID	2024_BHEL_40272_1	**Withdrawal Allowed**	Yes
Tender Type	Open Tender	**Form of contract**	Buy
Tender Category	Goods	**No. of Covers**	2
General Technical Evaluation Allowed	No	**ItemWise Technical Evaluation Allowed**	Yes
Payment Mode	Not Applicable	**Is Multi Currency Allowed For BOQ**	No
Is Multi Currency Allowed For Fee	No	**Allow Two Stage Bidding**	No

Cover Details, No. Of Covers - 2

Cover No	Cover	Document Type	Description
1	Fee/PreQual/Technical	.pdf	TECHNO COMMERCIAL BID
2	Finance	.xls	PRICE BID

Tender Fee Details, [Total Fee in ₹ * - 0.00]

Tender Fee in ₹	0.00		
Fee Payable To	Nil	**Fee Payable At**	Nil
Tender Fee Exemption Allowed	No		

EMD Fee Details

EMD Amount in ₹	0.00	**EMD Exemption Allowed**	No
EMD Fee Type	fixed	**EMD Percentage**	NA
EMD Payable To	Nil	**EMD Payable At**	Nil

Click to view modification history

Work /Item(s)

Title	RATE CONTRACT FOR MACHINED COMPONENTS				
Work Description	RATE CONTRACT FOR MACHINED COMPONENTS				
Pre Qualification Details	Please refer Tender documents.				
Independent External Monitor/Remarks	NA				
Show Tender Value in Public Domain	No				
Tender Value in ₹	1,00,00,000	**Product Category**	Machinery and Machining Tools	**Sub category**	NA
Contract Type	Tender	**Bid Validity(Days)**	90	**Period Of Work (Days)**	120
Location	BHEL , VARANASI	**Pincode**	221003	**Pre Bid Meeting Place**	NA
Pre Bid Meeting Address	NA	**Pre Bid Meeting Date**	NA	**Bid Opening Place**	BHEL , VARANASI
Should Allow NDA Tender	No	**Allow Preferential Bidder**	No		

Critical Dates

Publish Date	24-Sep-2024 03:00 PM	**Bid Opening Date**	05-Oct-2024 04:00 PM

Document Download / Sale Start Date	24-Sep-2024 03:00 PM	**Document Download / Sale End Date**	05-Oct-2024 01:00 PM
Clarification Start Date	NA	**Clarification End Date**	NA
Bid Submission Start Date	24-Sep-2024 03:00 PM	**Bid Submission End Date**	05-Oct-2024 01:00 PM

Tender Documents

NIT Document

S.No	Document Name	Description	Document Size (in KB)
1	Tendernotice_1.pdf	TECHNO COMMERCIAL PART	10395.77

Work Item Documents

S.No	Document Type	Document Name	Description	Document Size (in KB)
1	Tender Documents	NICENQUIRY.pdf	TECHNO COMMERCIAL PART	10380.20
2	BOQ	BOQ_41974.xls	PRICE BID PART	346.00

Bid Openers List

S.No	Bid Opener Login Id	Bid Opener Name	Certificate Name
1.	abhishek@bhel.in	ABHISHEK GUPTA	ABHISHEK
2.	kumarpraveen@bhel.in	PRAVEEN KUMAR	PRAVEEN KUMAR
3.	sushilku@bhel.in	Sushil Kumar	SUSHIL KUMAR
4.	amaresh@bhel.in	AMARESH YADAV	Amaresh Yadav

GeMARPTS Details

Reason for non availability of GeMARPTS ID	Any other reason
Remarks	ITEM NOT AVAILABLE ON GEM PORTAL
Document Name	Enquiry.pdf
Document Size (in KB)	146.89

Tender Properties

Auto Tendering Process allowed	No	**Show Technical bid status**	Yes
Show Finance bid status	Yes	**Stage to disclose Bid Details in Public Domain**	Technical Bid Opening
BoQ Comparative Chart model	Normal	**BoQ Compartive chart decimal places**	3
BoQ Comparative Chart Rank Type	L	**Form Based BoQ**	No

TIA Undertaking

S.No	Undertaking to Order	Tender complying with Order	Reason for non compliance of Order
1	PPP-MII Order 2017	Agree	OK
2	MSEs Order 2012	Agree	OK

Tender Inviting Authority

Name	ABHISHEK
Address	BHEL , VARANASI

Tender Creator Details

Created By	ABHISHEK GUPTA
Designation	Sr Engineer
Created Date	24-Sep-2024 01:51 PM

Bharat Heavy Electricals Limited

Heavy Equipment Repair Plant

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

Enquiry Number : **E-RC-304-24-0328-61-1** Date : **21/Sep/2024**

Enquiry For Material :-

Sl No	Material Description	Material Code	Quantity	Unit
1	SEAL RUNNER ASSLY (HY-207.02) - FULLY M/CD ITEM AS PER DRG. 26118000611/04 WITH MATL AS PER SPECN. AA10119/15	RV1019919221	100.0	NOS.
2	SEAL RUNNER ASSY. (HY-259.B) - FULLY M/CD ITEM AS PER DRG. 26117001086/01 WITH MATL. AS PER SPECN. AA10119/15	RV1019919418	20.0	NOS.
3	SEAL RUNNER ASSLY (HY-918.01) - FULLY M/CD ITEM AS PER DRG. 26118802142/04 WITH MATL AS PER SPECN. AA10119/15	RV1019922018	20.0	NOS
4	SEAL WEAR RING (HY-802.03) AS PER DRG. 36108000964/00 WITH MATL. AS PER SPECN. HY-19366/01 OR SA 106 Gr.'B'	RV1045955078	30.0	NOS
5	WEAR SLEEVE 'VAR-02' OR 'VAR-03' (HY-816.00) - FULLY M/CD ITEM AS PER DRG. 36118000863/05 WITH MATL AS PER SPECN. AA19332/10 OR AA10455	RV1045955442	50.0	NOS
6	JR. HEAD INSERT (HY-1102.19) - QUENCHED AND TEMPERED AS PER DRG. 46100402192/00 WITH MATL SPECN. HY10561/04	RV1055901051	20.0	NOS
7	SP.STUD INSERT (HY-339.04) - FULLY M/CD ITEM AS PER DRG. 36130000694/03 WITH MATL. AS PER SPECN. HY-10565/03	RV1055965025	50.0	NOS
8	THRUST PLATE - T.E. (HY-97.00) - FULLY M/CD FORGING AS PER DRG. 36137600091/05 WITH MATL AS PER SPECN. HY19366/01	RV1930166010*	50.0	NOS.
9	THRUST PLATE - T.E. (HY-311.A.37) - FULLY M/CD FORGING AS PER DRG. 46100000663/04 WITH MATL AS PER SPECN. HY19366/01	RV1930166036	100.0	NOS.
10	SEAL WEAR RING (HY-215.A.53) - FULLY M/CD ITEM AS PER DRG. 36108002400/00 WITH MATL AS PER SPECN. HY-19366/01	RV1930166044	250.0	NOS.
11	SEAL WEAR RING (HY-311.A.17) - FULLY M/CD HARD CROME PLATED SEAL WEAR RING AS PER DRG. 36100000544/02 WITH MATL AS PER SPECN. HY-19366/01	RV1930166052	50.0	NOS
12	SEAL WEAR RING (HY-312.A.07) 'VAR-01 OR VAR-02' - FULLY M/CD ITEM AS PER DRG. 36100000668/05 WITH MATL AS PER SPECN. HY-19366/01 OR AA19511/09	RV1930166060	300.0	NOS.
13	SEAL WEAR RING (HY-1101.21) - FULLY M/CD ITEM AS PER DRG. 26100402257/01 WITH MATL. HY-19366/01 OR PIPE AS PER SPECN. AA10455/10	RV1930166095	30.0	NOS
14	THRUST PLATE - T.E. (HY-1102.05) - FULLY M/CD ITEM AS PER DRG. 46100402190/00 WITH MATL AS PER SPECN. HY19366/01	RV1930166109	10.0	NOS
15	FULLY MACHINED AND CARBURISED JOURNAL HEAD INSERT (HY-313.18) AS PER DRG. 36100000628/05 WITH MATL AS PER SPECN. HY19366/01	RV1935966049	25.0	NOS
16	SEAL WEAR RING (HY-902.19) - FULLY M/CD ITEM AS PER DRG. 36108802132/02 WITH MATL AS PER SPECN. HY19366/01	RV1935966057	100.0	NOS
17	JOURNAL HEAD INSERT - FULLY M/CD & CARBURISED ITEM AS PER DRG 36109600297/00 WITH MATL AS PER SPECN. HY19366/01	RV1935966073	20.0	NOS

Remarks

A) SCOPE OF SUPPLY:-

1. THIS ENQUIRY HAS BEEN RAISED FOR ENTERING INTO FRAMEWORK AGREEMENT (VALUE WISE) WITH VENDORS FOR M/CD COMPONENTS WITH CASE CARBURISING / HARD CHROME PLATING. SEPARATE POs WILL BE GIVEN TIME TO TIME AS PER REQUIREMENT UNDER THIS RC. ITEM QUANTITY MENTIONED IN THE INDENT IS TENTATIVE & IT MAY INCREASE OR DECREASE AS PER OUR FINAL REQUIREMENT.

2.THE % WEIGHTAGE FOR CALCULATING TOTAL COST OF INDIVIDUAL ITEM HAS BEEN ARRIVED CONSIDERING INDIVIDUAL ITEM'S CONTENT IN TOTAL ESTIMATED COST OF ALL THE ENQUIRY ITEMS. THE % WEIGHTAGE WILL BE AS PER ANNEXURE-IV.

3. VALUE WISE MEANS FA WILL DONE ON SINGLE SET BASIS FOR ALL THE 17 ITEMS WITH THEIR FULL QUANTITY AND NOT QUANTITY OF INDIVIDUAL ITEM.

4. RATE FOR INDIVIDUAL ITEM WILL BE ARRIVED AS PER PERCENTAGE WEIGHTAGE MENTIONED IN ANNEXURE IV-ATTACHED.

5. RATES OF ITEMS AGAINST FA WILL BE FIRM & VALID FOR ORDERING FOR A PERIOD OF ONE YEAR FROM THE DATE OF AGREEMENT. PRICE VARIATION CLAUSE (PVC) IS NOT ACCEPTABLE.

6. VENDOR HAS TO QUOTE FOR ALL THE 17 ITEMS OF TENDER ENQUIRY COMPULSORILY. IN CASE, ANY VENDOR QUOTES FOR PART ITEM, THEIR OFFER WILL NOT BE CONSIDERED FOR FURTHER EVALUATION.

7. L-1 VENDOR WILL BE DECIDED ON TOTAL COST ON SET BASIS.

8. RC QTY AGAINST EACH ITEM IS INDICATIVE ONLY. PO WILL BE PLACED BASED ON ACTUAL REQUIREMENT IRRESPECTIVE OF RC QUANTITY NOT EXCEEDING THE TOTAL RATE CONTRACT VALUE.

AFTER FINALIIZATION OF RATE CONTRACT, PO QUANTITY WILL BE PLACED AS PER REQUIREMENT.

REMARKS FOR RV1019919221, RV1019919418, RV1019922018, RV1045955078, RV1045955442, RV1930166044, RV1930166052, RV1930166060, RV1930166095 & RV1935966057

(A) SUPPLY CONDITION :
1. ITEM TO BE SUPPLIED AT HERP STORES.
2. PRE-DESPATCH INSPECTION TO BE CARRIED OUT AS PER QUALITY PLAN NO. RV/MCD/23.A REV02 AT PARTY'S WORK BY BHEL REPRESENTATIVE.

(B) TECHNICAL DELIVERY CONDITION:
1. MATERIAL IS TO BE SUPPLIED AS PER ITEM DESCRIPTION.
2. DIMENTIONS AND TOLERANCES TO BE MAINTAINED AS PER DRAWING.
3. UST OF THE FORGING TO BE DONE AS PER SPECN. AA0850118 CAT.02.
4. CHROME PLATING TO BE DONE AS PER DRG.
5. ALL THE TECHNICAL REMARKS MENTIONED IN THE DRG MUST BE FULFILLED.
6. DIMENSIONS REPORT IS REQUIRED.

(C) TEST CERTIFICATE: REQUIRED FOR CHEMICAL & MECHANICAL PROPERTIES, UST AND HARDNESS AFTER CHROME PLATING.

(D) GUARANTEE CERTIFICATE: REQUIRED FOR 24 MONTHS AGAINST ANY MANUFACTURING DEFECTS FROM THE DATE OF RECIPT AT BHEL HERP.

(E) PACKING INSTRUCTIONS : EACH SEAL WEAR RINGS & SEAL RUNNER ASSLY SHALL BE WRAPPED IN PUF SHEET AND EACH LOT SHALL BE PACKED IN WOODEN BOXES OF 1" PLANK AND 1.5" BRACKETS. QTY OF LOT SHOULD BE SUITABLY SELECTED AS PER CAPACITY OF WOODEN BOX. ANY SEAL WEAR RINGS & SEAL RUNNER ASSLY SHALL BE REJECTED IF DENTS ARE OBSERVED AFTER UNPACKING AT OUR WORKS.THEREFORE, PROPER CARE MUST BE TAKEN IN PACKING AND HANDLING DURING TRANSIT."

(A) SUPPLY CONDITION FOR RV1055901051,RV1055965025, RV1930166010*, RV1930166036, RV1930166109, RV1935966049 & RV1935966073

1. ITEMS ARE TO BE SUPPLIED AT HERP STORES.
2. PRE-DESPATCH INSPECTION TO BE CARRIED OUT AS PER QUALITY PLAN NO. RV/C&F/23 REV 02 AT PARTY'S WORKS BY BHEL REPRESENTATIVE.

(B) TECHNICAL DELIVERY CONDITION :
1. MATERIAL IS TO BE SUPPLIED AS PER SPECN MENTIONED IN THE DESCRIPTION.
2. DIMENTIONS AND TOLERANCES TO BE MAINTAINED AS PER DRAWING.
3. UST OF FORGINGS TO BE DONE AS PER SPECN. AA0850118 CAT.02.
4. CARBURIZING IS TO BE DONE AS PER DRG.
5. ALL NOTES MENTIONED ON THE DRAWING SHOULD BE STRICTLY FOLLOWED.

(C) TEST CERTIFICATE : REQUIRED FOR CHEMICAL & MECHANICAL PROPERTIES AND HARDNESS AFTER CARBURIZING. CARBURIZING THICKNESS SHOULD BE MAINTAINED AS PER DRG. CERTIFICATE REGARDING TEST RESULT OF UST IS ALSO REQUIRED.

(D) GUARANTEE CERTIFICATE : REQUIRED FOR 24 MONTHS AGAINST ANY MANUFACTURING DEFECTS FROM THE DATE OF RECIPT AT BHEL HERP.

(E) "PACKING INSTRUCTION : EACH ITEMS SHALL BE WRAPPED IN PUF SHEET AND EACH LOT SHALL BE PACKED IN WOODEN BOXES OF 1" PLANK AND 1.5" BRACKETS. QTY OF LOT SHOULD BE SUITABLY SELECTED AS PER CAPACITY OF WOODEN BOX. ANY ITEM SHALL BE REJECTED IF DENTS ARE OBSERVED AFTER UNPACKING AT OUR WORKS.THEREFORE, PROPER CARE MUST BE TAKEN IN PACKING AND HANDLING DURING TRANSIT."

(F) RATE CONTRACT VALIDITY: FOR 1 (ONE) YEAR FROM THE RC-PO DATE.

(G) SPECIAL REMARKS:

1. ITEM WISE MAXIMUM QTY IN EACH LOT (WHICH MAY BE REQUIRED IN A PARTICULAR ORDER) WILL BE AS MENTIONED IN RC-LOT- BA07-05. THERE WILL BE A GAP OF 01 MONTH BETWEEN TWO CONSECUTIVE LOTS.

2.DELIVERY IS WITHIN 120 DAYS FROM DATE OF PO FOR FIRST LOT.

*** SPLITTING CONDITION:

1. THE SPLITTING WILL BE DONE WITH RESPECT TO TOTAL VALUE OF ITEM.

2. BHEL WILL SPLIT THE TOTAL QUANTITY (VALUE WISE) FOR ENTERING INTO FRAMEWORK AGREEMENT BETWEEN TWO VENDORS IN RATIO OF 60:40. IF NONE OF THE OTHER BIDDERS ACCEPT THE L1 PRICE, THEN THE ENTIRE QUANTITY OF THE TENDER WOULD BE ORDERED TO THE ORIGINAL L1 PARTY ONLY.

3. IN NO CASE THE HIGHEST QUOTED BIDDER (H1) WILL BE GIVEN THE OPPORTUNITY OF THE QUANTITY SPLIT.

4. THE EQUATED L1 PRICE ON TOTAL COST BASIS TO BHEL WOULD BE COUNTER OFFERED TO THE NEXT HIGHER BIDDER IN ORDER OF THEIR RANKING AND THE VALUE SPLIT WOULD BE GIVEN TO THE BIDDER WHO ACCEPT THE EQUATED L1 PRICE ON THE BASIS OF THEIR RANKING IN THE PRICE BID.

5. AT ANY POINT OF TIME OR IF THE PERFORMANCE OF ANY VENDOR IS FOUND UNSATISFACTORY, THE ABOVE DISTRIBUTION RATIO MAY BE CANCELLED OR CHANGED BY BHEL AND ITEMS MAY BE PROCURED FROM PERFORMING VENDORS.

*** REVERSE AUCTION:

1. BHEL SHALL BE RESORTING TO REVERSE AUCTION (RA) (GUIDELINES AS AVAILABLE ON WWW.BHEL.COM FOR THIS TENDER. RA SHALL BE CONDUCTED AMONG ALL THE TECHNO COMMERCIALLY QUALIFIED BIDDERS.

2. PRICE BIDS OF ALL TECHNO COMMERCIALLY QUALIFIED BIDDERS SHALL BE OPENED AND SAME SHALL BE CONSIDERED AS INITIAL BIDS OF BIDDERS IN RA. IN CASE ANY BIDDER(S) DO(ES) NOT PARTICIPATE IN ONLINE REVERSE AUCTION, THEIR SEALED ENVELOPE PRICE BID ALONG WITH APPLICABLE LOADING, IF ANY, SHALL BE CONSIDERED FOR RANKING.

(J) ALL OTHER TERMS AND CONDITIONS SHALL BE AS PER GTC ATTACHED WITH ENQUIRY.

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

Amendment- 25
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-COMMERCIALLY SUITABLE AFTER SCRUTINY OF THEIR PART-I OFFERS.	
8	NO REVISED OFFERS WILL BE ACCEPTED UNLESS ASKED BY BHEL AFTER OPENING OF PART-1 BID IN ANY CASE.	
9	THE RATE OF GST SHOULD BE CLEARLY MENTIONED IN THE OFFER.	
10	VALIDITY OF OFFER SHOULD BE MINIMUM 90 DAYS FROM THE DATE OF TECHNO - COMMERCIAL BID OPENING OR 60 DAYS FROM THE REVERSE AUCTION DATE.	
11	BHEL RESERVES THE RIGHT TO REJECT THE OFFER, WHICH IS HAVING DEVIATIONS TO THE TERMS AND CONDITIONS GIVEN IN THE TENDER ENQUIRY.	
12	**PRICING TERMS**: PRICES ONCE QUOTED SHALL REMAIN FIRM WITHIN THE VALIDITY OR ANY EXTENSION THEREOF FOR PLACEMENT OF ORDER, TILL COMPLETE EXECUTION OF THE ORDER, WITHOUT ANY ESCALATION/INCREASE FOR ANY REASON, WHATSOEVER, UNLESS SPECIFICALLY PROVIDED FOR IN THE ENQUIRY & PO. IN CASE OF FOREIGN VENDORS, THE QUOTED PRICE SHALL BE TAKEN AS INCLUSIVE OF THIRD PARTY INSPECTION AND TESTING CHARGES AS CALLED FOR IN THE NIT.	
13	**BID EVALUATION:** UNLESS SPECIFIED IN THE TENDER, VENDOR MUST NOTE THAT BHEL WILL ARRIVE THE L1 STATUS FOR EACH ITEM ON LANDED COST BASIS. ACCORDINGLY, ORDER SHALL BE PLACED ON LOWEST BIDDER ON INDIVIDUAL ITEM BASIS ONLY, UNLESS BHEL ASK FOR TERMS OTHER THAN THIS ON EXCEPTION BASIS. IN THE COURSE OF EVALUATION, IF MORE THAN ONE BIDDER HAPPENS TO OCCUPY L-1 STATUS, EFFECTIVE L-1 WILL BE DECIDED BY SOLICITING DISCOUNTS FROM THE RESPECTIVE L-1 BIDDERS. IN CASE MORE THAN ONE BIDDERS HAPPENS TO OCCUPY THE L-1 STATUS EVEN AFTER SOLICITING DISCOUNST, THE L-1 BIDDER SHALL BE DECIDED BY A TOSS/DRAW OF LOTS, IN THE PRESENCE OF THE RESPECTIVE BIDDER(S) OR THEIR REPRESENTATIVE(S). RANKING WILL BE DONE ACCORDINGLY. BHEL'S DECISION IN SUCH SITUATION SHALL BE FINAL AND BINDING.	
14	**TERMS OF DELIVERY:** **I. FOR INDIGENOUS SUPPLIERS**: THE TERMS OF DELIVERY SHOULD BE QUOTED ON F.O.R. DESTINATION (BHEL HERP STORES VARANASI) BASIS ONLY (i.e. FREIGHT & INSURANCE ON VENDOR'S ACCOUNT ONLY). IF ANY BIDDER STILL QUOTES OTHER DELIVERY TERM IN PLACE OF BHEL HERP STORES, THEIR OFFER MAY NOT BE CONSIDERED FOR FURTHER PROCESSING. IT MUST BE SPECIFICALLY NOTED.	
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.	
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 MATERIAL. 2. ADVANCE PAYMENT IS NOT ACCEPTABLE BY BHEL HERP VARANASI IN ANY CASE. 3. IF ANY SUPPLIER FALLS UNDER "NON MSE" OR "NON MEDIUM" CATEGORY, THEIR PAYMENT TERM WILL BE CONSIDERED AS NON MSME SUPPLIER PAYMENT WITHOUT ANY INTIMATION.	
18	**LOADING OF PAYMENT TERM:** IN CASE OF DEVIATION, LOADING OF INTEREST RATE @SBI MCLR RATE + 6% (AS ON PART-1 OPENING DATE) SHALL BE LOADED WHILE ARRIVING AT LANDED COST TO BHEL.	
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,	

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

Amendment- 25

ANNEXURE-A

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

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

	2017 DATED 04.06.2020 ISSUED BY DPIIT. IN CASE OF SUBSEQUENT ORDERS ISSUED BY THE NODAL MINISTRY, CHANGING THE DEFINITION OF LOCAL CONTENT FOR THE ITEMS OF THE NIT, THE SAME SHALL BE APPLICABLE EVEN IF ISSUED AFTER ISSUE OF THIS NIT, BUT BEFORE OPENING OF PART –II BIDS AGAINST THIS NIT. **MODEL CLAUSE FOR TENDER.** I. ANY BIDDER FROM A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA WILL BE ELIGIBLE TO BID IN THIS TENDER ONLY IF THE BIDDER IS REGISTERED WITH THE COMPETENT AUTHORITY. II. "BIDDER" (INCLUDING THE TERM 'TENDERER', 'CONSULTANT' OR 'SERVICE PROVIDER' IN CERTAIN CONTEXTS) MEANS ANY PERSON OR FIRM OR COMPANY, INCLUDING ANY MEMBER OF A CONSORTIUM OR JOINT VENTURE (THAT IS AN ASSOCIATION OF SEVERAL PERSONS, OR FIRMS OR COMPANIES), EVERY ARTIFICIAL JURIDICAL PERSON NOT FALLING IN ANY OF THE DESCRIPTIONS OF BIDDERS STATED HEREINBEFORE, INCLUDING ANY AGENCY BRANCH OR OFFICE CONTROLLED BY SUCH PERSON, PARTICIPATING IN A PROCUREMENT PROCESS. III. "BIDDER FROM A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA" FOR THE PURPOSE OF THIS ORDER MEANS: - a) AN ENTITY INCORPORATED, ESTABLISHED OR REGISTERED IN SUCH A COUNTRY: OR b) A SUBSIDIARY OF AN ENTITY INCORPORATED, ESTABLISHED OR REGISTERED IN SUCH A COUNTRY; OR c) AN ENTITY SUBSTANTIALLY CONTROLLED THROUGH ENTITIES INCORPORATED, ESTABLISHED OR REGISTERED IN SUCH A COUNTRY; OR d) AN ENTITY WHOSE BENEFICIAL OWNER IS SITUATED IN SUCH A COUNTRY; OR e) AN INDIAN (OR OTHER) AGENT OF SUCH AN ENTITY; OR f) A NATURAL PERSON WHO IS A CITIZEN OF SUCH A COUNTRY; OR g) A CONSORTIUM OR JOINT VENTURE WHERE ANY MEMBER OF THE CONSORTIUM OR JOINT VENTURE FALLS UNDER ANY OF THE ABOVE IV. THE BENEFICIAL OWNER FOR THE PURPOSE OF (III) ABOVE WILL BE AS UNDER: 1. IN CASE OF A COMPANY OR LIMITED LIABILITY PARTNERSHIP, THE BENEFICIAL OWNER IS THE NATURAL PERSON (S) WHO, WHETHER ACTING ALONE OR TOGETHER, OR THROUGH ONE OR MORE JURIDICAL PERSON, HAS A CONTROLLING OWNERSHIP INTEREST OR WHO EXERCISES CONTROL THROUGH OTHER MEANS. EXPLANATION – a. "CONTROLLING OWNERSHIP INTEREST" MEANS OWNERSHIP OF OR ENTITLEMENT TO MORE THAN TWENTY-FIVE PER CENT. OF SHARES OR CAPITAL OR PROFITS OF THE COMPANY b. "CONTROL" SHALL INCLUDE THE RIGHT TO APPOINT MAJORITY OF THE DIRECTORS OR TO CONTROL THE MANAGEMENT OR POLICY DECISIONS INCLUDING BY VIRTUE OF THEIR SHAREHOLDING OR MANAGEMENT RIGHTS OR SHAREHOLDER'S AGREEMENTS OF VOTING AGREEMENTS; 2. IN CASE OF A PARTNERSHIP FIRM, THE BENEFICIAL OWNER IS THE NATURAL PERSON (S) WHO, WHETHER ACTING ALONE OR TOGETHER, OR THROUGH ONE OR MORE JURIDICAL OF CAPITAL OR PROFITS OF THE PARTNERSHIP; 3. IN CASE OF AN UNINCORPORATED ASSOCIATION OR BODY OF INDIVIDUALS, THE BENEFICIAL OWNER IS THE NATURAL PERSON (S), WHO, WHETHER ACTING ALONE OR TOGETHER, OR THROUGH ONE OR MORE JURIDICAL PERSON, HAS OWNERSHIP OF OR ENTITLEMENT TO MORE THAN FIFTEEN PERCENT OF THE PROPERTY OF CAPITAL OF PROFITS OF SUCH ASSOCIATION OR BODY OF INDIVIDUALS; 4. WHERE NO NATURAL PERSON IS IDENTIFIED UNDER (1) OR (2) OR (3) ABOVE, THE BENEFICIAL OWNER IS THE RELEVANT NATURAL PERSON WHO HOLDS THE POSITION OF SENIOR MANAGING OFFICIAL; 5. IN CASE OF TRUST, THE IDENTIFICATION OF BENEFICIAL OWNER (S) SHALL INCLUDE IDENTIFICATION OF THE AUTHOR OF THE TRUST, THE TRUSTEE, THE BENEFICIARIES WITH FIFTEEN PERCENT OR MORE INTEREST IN THE TRUST AND ANY OTHER NATURAL PERSON EXERCISING ULTIMATE EFFECTIVE CONTROL OVER THE TRUST THROUGH A CHAIN OF CONTROL OR OWNERSHIP. V. AN AGENT IS A PERSON EMPLOYED TO DO ANY ACT FOR ANOTHER, OR TO REPRESENT ANOTHER IN DEALINGS WITH THIRD PERSON. **CERTIFICATE:** IN ORDER TO AVAIL THE BENEFITS, VENDORS TO SUBMIT (ALONG WITH OFFER) THE SELF-CERTIFICATION THAT THE ITEM OFFERED MEETS THE CONTENT REQUIREMENT FOR CLASS-I/ CLASS-II LOCAL SUPPLIER AS THE CASE MAY BE, INDICATING THE PERCENTAGE OF LOCAL CONTENT. AND SHALL GIVE DETAILS OF LOCATION AT WHICH THE LOCAL VALUE ADDITION IS MADE (refer attached Make in India (Model Certificate no I).	
46	**FORCE MAJEURE** : NOTWITHSTANDING ANYTHING CONTAINED IN THE CONTRACT, NEITHER THE VENDOR NOR THE BHEL SHALL BE HELD RESPONSIBLE FOR TOTAL OR PARTIAL NON-EXECUTION OF ANY OF THE CONTRACTUAL OBLIGATIONS, SHOULD THE OBLIGATION BECOME UNREASONABLY ONEROUS OR IMPOSSIBLE DUE TO OCCURRENCE OF A 'FORCE MAJEURE' WHICH DIRECTLY AFFECTS THE OBLIGATIONS TO BE PERFORMED BY THE BHEL OR THE VENDOR ; SUCH EVENTS INCLUDE WAR, MILITARY OPERATIONS OF ANY NATURE, BLOCKAGES, REVOLUTIONS, INSURRECTIONS, RIOTS, CIVIL COMMOTIONS, INSURGENCY, SABOTAGE, ACTS OF PUBLIC ENEMY, FIRES, EXPLOSION, EPIDEMICS, QUARANTINE RESTRICTIONS, FLOODS, EARTHQUAKE, OR ACTS OF GOD, RESTRICTIONS BY GOVT. AUTHORITIES; OVER WHICH THE VENDOR OR THE BHEL HAS NO CONTROL. THE PARTY CLAIMING TO BE AFFECTED BY FORCE MAJEURE SHALL NOTIFY THE OTHER PARTY IN WRITING WITHOUT DELAY, WITHIN TWO WEEKS ON THE INTERVENTION AND ON THE CESSATION OF SUCH CIRCUMSTANCE. EXTENSION OF TIME SOUGHT BY THE VENDOR ALONG WITH SUPPORTING EVIDENCE AND SO GRANTED BY THE BHEL FOR THE SUPPLY/ WORK AFFECTED, IF ANY, SHALL NOT BE CONSTRUED AS WAIVER IN RESPECT OF REMAINING DELIVERIES. RESCHEDULING OF DELIVERIES ON ACCOUNT OF FORCE MAJEURE CONDITIONS, IF SO AGREED BY THE BHEL, WILL NOT ENTAIL THE VENDOR TO CLAIM ANY INCREASE IN THE PRICE ON WHATSOEVER ACCOUNT. NOTWITHSTANDING ABOVE PROVISIONS, BHEL SHALL RESERVE THE RIGHT TO CANCEL THE ORDER/ CONTRACT, WHOLLY OR PARTLY, IN ORDER TO MEET THE OVERALL PROJECT SCHEDULE AND MAKE ALTERNATIVE ARRANGEMENTS. IF DEEMED NECESSARY, BHEL MAY TAKEOVER PARTLY PROCESSED MATERIAL AT A MUTUALLY AGREED PRICE.	
47	**FRAUD PREVENTION POLICY :** THE BIDDER ALONG WITH ITS ASSOCIATE/ COLLABORATORS/ SUB-CONTRACTORS/ SUB-VENDORS/ CONSULTANTS/ SERVICE PROVIDERS SHALL STRICTLY ADHERE TO BHEL FRAUD PREVENTION POLICY DISPLAYED ON BHEL WEBSITE WWW.BHEL.COM AND SHALL IMMEDIATELY BRING TO THE NOTICE OF BHEL MANAGEMENT ABOUT ANY FRAUD OR SUSPECTED FRAUD AS SOON AS IT COMES TO THEIR NOTICE.	
48	**SHORT SHIPMENTS/ WARRANTY/GUARANTEE REPLACEMENTS**: IN CASE OF ANY SHORT SHIPMENT DURING INITIAL SUPPLY WHICH IS SUBSEQUENTLY DISPATCHED BY THE VENDOR OR ANY GUARANTEE / WARRANTY REPLACEMENTS SHALL BE DISPATCHED ON "FOR-BHEL STORES/DESIGNATED DESTINATION" BASIS FOR INDIGENOUS ITEMS. TAXES, IF ANY PAID BY INDIGENOUS VENDOR FOR GUARANTEE /WARRANTEE REPLACEMENT, REPAIR ACTIVITY EXCLUDING SHORT SUPPLY SHALL BE TO VENDOR'S ACCOUNT ONLY. THE VENDOR HAS TO RAISE A CREDIT NOTE FOR SHORT SUPPLIED QUANTITY AS PER GST PROVISIONS.	
49	**E WAY BILL**: THE SUPPLIER HAS TO ARRANGE FOR E WAY BILL AS APPLICABLE FOR ANY MOVEMENT OF GOODS ALONG WITH OTHER PRESCRIBED DOCUMENTS AS PER GST LAW. THE SUPPLIER HAS ALSO TO COMPLY WITH ANY AMENDMENT AS PRESCRIBED FROM TIME TO TIME UNDER E WAY BILL RULE. ANY FINANCIAL IMPLICATION ARISES ON BHEL DUE TO NONCOMPLIANCE OF E WAY BILL RULE WILL BE PASSED ON TO THE SUPPLIER.	
50	THE BIDDER DECLARES THAT THEY WILL NOT ENTER INTO ANY ILLEGAL OR UNDICLOSED AGREEMENT OR UNDERSTANDING, WHETHER FORMAL OR INFORMAL WITH OTHER BIDDER (S). THIS APPLIES IN PARTICULAR TO PRICES, SPECIFICATIONS, CERTIFICATIONS, SUBSIDIARY CONTRACTS, SUBMISSION OR NON- SUBMISSION OF BIDS OR ANY OTHER ACTIONS TO RESTRICT COMPETITIVENES OR TO INTRODUE CARTELIZATION IN THE BIDDING PROCESS. IN CASE, THE BIDDER IS FOUND HAVING INDULGED IN ABOVE ACTIVITIES, SUITABLE ACTION SHALL BE TAKEN BY BHEL AS PER EXTANT POLICIES / GUIDELINES.	
51	THE BIDDER SHALL REGISTER THEMSELVES ON GEM PORTAL AND SHALL QUOTE THEIR GEM SELLER ID IN THEIR OFFER. GEM SELLER ID IS MANDATORY FOR PLACEMENT OF PURCHASE ORDER EXCEPT IN CASES WHERE FREE ISSUE MATERIAL IS TO BE ISSUED BY BHEL .	
52	**REJECTION/REPLACEMENT:** THE SELLER SHALL ARRANGE REPLACEMENT / REPAIR UNDER ITS OBLIGATION UNDER THE CONTRACT. SELLER SHALL BE GIVEN GROUND RENT FREE PERIOD OF 90 DAYS FROM THE DATE OF REJECTION TO LIFT REJECTED MATERIAL. BEYOND 90 DAYS, A GROUND RENT OF 0.25% OF VALUE OF REJECTED MATERIAL PER WEEK WILL BE LEVIED FOR A MAXIMUM PERIOD OF 4 WEEKS. BEYOND THIS PERIOD SUPPLIER FORFEITS THEIR RIGHT TO THE MATERIALS.	
53	**CONFLICT OF INTEREST AMONG BIDDERS/AGENTS:** A BIDDER SHALL NOT HAVE CONFLICT OF INTEREST WITH OTHER BIDDERS. SUCH CONFLICT OF INTEREST CAN LEAD TO ANTI-COMPETITIVE PRACTICES TO THE DETRIMENT OF PROCURING ENTITY'S INTERESTS. THE BIDDER FOUND TO HAVE A CONFLICT OF INTEREST SHALL BE DISQUALIFIED. A BIDDER MAY BE CONSIDERED TO HAVE A CONFLICT OF INTEREST WITH ONE OR MORE PARTIES IN THIS BIDDING PROCESS, IF a) THEY HAVE CONTROLLING PARTNER (S) IN COMMON; OR b) THEY RECEIVE OR HAVE RECEIVED ANY DIRECT OR INDIRECT SUBSIDY FINANCIAL STAKE FROM ANY OF THEM; OR c) THEY HAVE THE SAME LEGAL REPRESENTATIVE/AGENT FOR PURPOSES OF THIS BID; OR d) THEY HAVE RELATIONSHIP WITH EACH OTHER, DIRECTLY OR THROUGH COMMON THIRD PARTIES, THAT PUTS THEM IN A POSITION TO HAVE ACCESS TO INFORMATION ABOUT OR INFLUENCE ON THE BID OF ANOTHER BIDDER; OR e) BIDDER PARTICIPATES IN MORE THAN ONE BID IN THIS BIDDING PROCESS. PARTICIPATION BY A BIDDER IN MORE THAN ONE BID WILL RESULT IN THE DISQUALIFICATION OF ALL BIDS IN WHICH THE PARTIES ARE INVOLVED. HOWEVER, THIS DOES NOT LIMIT THE INCLUSION OF THE COMPONENTS/ SUB-ASSEMBLY ASSEMBLIES FROM ONE BIDDING MANUFACTURER IN MORE THAN ONE BID; OR	

	f) IN CASES OF AGENTS QUOTING IN OFFSHORE PROCUREMENTS, ON BEHALF OF THEIR PRINCIPAL MANUFACTURERS, ONE AGENT CANNOT REPRESENT TWO MANUFACTURERS OR QUOTE ON THEIR BEHALF IN A PARTICULAR TENDER ENQUIRY. ONE MANUFACTURER CAN ALSO AUTHORISE ONLY ONE AGENT/DEALER. THERE CAN BE ONLY ONE BID FROM THE FOLLOWING: 1. THE PRINCIPAL MANUFACTURER DIRECTLY OR THROUGH ONE INDIAN AGENT ON HIS BEHALF; AND 2. INDIAN/FOREIGN AGENT ON BEHALF OF ONLY ONE PRINCIPAL; OR g) A BIDDER OR ANY OF ITS AFFILIATES PARTICIPATED AS A CONSULTANT IN THE PREPARATION OF THE DESIGN OR TECHNICAL SPECIFICATIONS OF THE CONTRACT THAT IS THE SUBJECT OF THE BID; OR H) IN CASE OF A HOLDING COMPANY HAVING MORE THAN ONE INDEPENDENTLY MANUFACTURING UNITS, OR MORE THAN ONE UNIT HAVING COMMON BUSINESS OWNERSHIP/MANAGEMENT, ONLY ONE UNIT SHOULD QUOTE. SIMILAR RESTRICTIONS WOULD APPLY TO CLOSELY RELATED SISTER COMPANIES. BIDDERS MUST PROACTIVELY DECLARE SUCH SISTER/ COMMON BUSINESS/ MANAGEMENT UNITS IN SAME/ SIMILAR LINE OF BUSINESS.	
54	VENDOR MUST VISIT OUR WEBSITE https://herp.bhel.com REGULARILY FOR ENQUIRY/PO/CLARIFICATIONS/FOR ANY LATEST UPDATES.	
55	MSME VENDORS CAN AVAIL BENEFITS OF PAYMENT THROUGH TREDS/RXIL.	
56	"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".	
57	**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: (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.	
58	**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 AMOUT 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. 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.	
59	**BREACH OF CONTRACT, REMEDIES AND TERMINATION:** IN CASE OF BREACH OF CONTRACT, WHEREVER THE VALUE OF SECURITY INSTRUMENTS LIKE PERFORMANCE BANK GUARANTEE AVAILABLE WITH BHEL AGAINST THE SAID CONTRACT IS ATLEAST 10% OF THE CONTRACT VALUE, THE SAME BE ENCASHED. IN CASE THE VALUE OF THE SECURITY INSTRUMENTS AVAILABLE IS LESS THAN 10% OF THE CONTRACT VALUE, THE BALANCE AMOUNT BE RECOVERED FROM OTHER FINANCIAL REMEDIES (I.E. AVAILABLE BILLS OF THE CONTRACTOR, RETENTION AMOUNT, ETC. WITH BHEL) OR LEGAL REMEDIES BE PURSUED. FURTHER, LEVY OF LIQUIDATED DAMAGES, DEBARMENT, TERMINATION, DE-SCOPING, SHORT-CLOSURE, ETC., SHALL BE APPLIED AS PER PROVISIONS OF 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:

PQR for Crirical Regular Direct Mil items

PQR Ref No: PQR/24-25/ Crirical Regular Direct Mil items	**Date: 23.08.2024**
Rev No: 00	**Review Date: 23.08.2024**
PQR Revision Date:	

Sl. No.	BHEL Terms	Supplier's ComplianceYES/NO
1	**Offers are accepted from:**	
1.a	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 item/s as per drawing/specification.	
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.	
2.c	Bidders shall submit detailed Manufacturing process Plan along with the Technical Offer.	
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 (worldwide or within India) in last three years from the date of Enquiry. Documentary evidances to be submitted in the form of Customer's Purchase Order copies / Material Acceptance Report and item drawings/specifications. Documentary evidences submitted shall strictly meet all the technical requirement of the NIT.	
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	**Financial Capability:**	
4.a	**Turn Over:-** Turn over of Non-MSe vendors should be 100 LACS. Relaxation for MSe vendors/ Notified Start-Ups on turn over will be as per MSME guidelines. UDYAM Certificate required for Mse status.	
4.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.	

Note-1: Non Submission of the above requested documents/non compliance to the above points will result in rejection of the Offers without further Notice/Intimation to the Bidder and no correspondance will be entertained at later date.

Note-2: "Similar items" means items having same/similar manufacturing process,similar nature of use of item as that of enquired items etc.

ANNEXURE IV

SR No	MATERIAL CODE	ITEM DESCRIPTION	QTY	% WEIGHTAGE
1	RV1019919221	SEAL RUNNER ASSLY (HY-207.02) - FULLY M/CD ITEM AS PER DRG. 26118000611/04 WITH MATL AS PER SPECN.	100	14.9%
2	RV1019919418	SEAL RUNNER ASSY. (HY-259.B) - FULLY M/CD ITEM AS PER DRG. 26117001086/01 WITH MATL. AS PER SPECN.	20	7.5%
3	RV1019922018	SEAL RUNNER ASSLY (HY-918.01) - FULLY M/CD ITEM AS PER DRG. 26118802142/04 WITH MATL AS PER SPECN.	20	6.2%
4	RV1045955078	SEAL WEAR RING (HY-802.03) AS PER DRG. 36108000964/00 WITH MATL. AS PER SPECN. HY-19366/01 OR SA 106 Gr.'B'	30	2.4%
5	RV1045955442	WEAR SLEEVE 'VAR-02' OR 'VAR-03' (HY-816.00) - FULLY M/CD ITEM AS PER DRG. 36118000863/05 WITH MATL AS	50	2.4%
6	RV1930166044	SEAL WEAR RING (HY-215.A.53) - FULLY M/CD ITEM AS PER DRG. 36108002400/00 WITH MATL AS PER SPECN. HY-	250	14.7%
7	RV1930166052	SEAL WEAR RING (HY-311.A.17) - FULLY M/CD HARD CROME PLATED SEAL WEAR RING AS PER DRG. 36100000544/02	50	4.2%
8	RV1930166060	SEAL WEAR RING (HY-312.A.07) 'VAR-01 OR VAR-02' - FULLY M/CD ITEM AS PER DRG. 36100000668/05 WITH MATL AS	300	23.4%
9	RV1930166095	SEAL WEAR RING (HY-1101.21) - FULLY M/CD ITEM AS PER DRG. 26100402257/01 WITH MATL. HY-19366/01 OR PIPE	30	2.8%
10	RV1935966057	SEAL WEAR RING (HY-902.19) - FULLY M/CD ITEM AS PER DRG. 36108802132/02 WITH MATL AS PER SPECN.	100	8.6%
11	RV1055901051	JR. HEAD INSERT (HY-1102.19) - QUENCHED AND TEMPERED AS PER DRG. 46100402192/00 WITH MATL SPECN.	20	0.3%
12	RV1055965025	SP.STUD INSERT (HY-339.04) - FULLY M/CD ITEM AS PER DRG. 36130000694/03 WITH MATL. AS PER SPECN. HY-	50	0.6%
13	RV1930166010*	THRUST PLATE - T.E. (HY-97.00) - FULLY M/CD FORGING AS PER DRG. 36137600091/05 WITH MATL AS PER SPECN.	50	2.7%
14	RV1930166036	THRUST PLATE - T.E. (HY-311.A.37) - FULLY M/CD FORGING AS PER DRG. 46100000663/04 WITH MATL AS PER SPECN.	100	5.7%
15	RV1930166109	THRUST PLATE - T.E. (HY-1102.05) - FULLY M/CD ITEM AS PER DRG. 46100402190/00 WITH MATL AS PER SPECN.	10	0.8%
16	RV1935966049	FULLY MACHINED AND CARBURISED JOURNAL HEAD INSERT (HY-313.18) AS PER DRG. 36100000628/05 WITH MATL AS	25	0.6%
17	RV1935966073	JOURNAL HEAD INSERT - FULLY M/CD & CARBURISED ITEM AS PER DRG 36109600297/00 WITH MATL AS PER SPECN.	20	2.1%

RC-LOT- BA07/05

SR No	MATERIAL CODE	ITEM DESCRIPTION	QTY	MAX LOT QTY
1	RV1019919221	SEAL RUNNER ASSLY (HY-207.02) - FULLY M/CD ITEM AS PER DRG. 26118000611/04 WITH MATL AS PER SPECN. AA10119/15	100	25
2	RV1019919418	SEAL RUNNER ASSY. (HY-259.B) - FULLY M/CD ITEM AS PER DRG. 26117001086/01 WITH MATL. AS PER SPECN. AA10119/15	20	10
3	RV1019922018	SEAL RUNNER ASSLY (HY-918.01) - FULLY M/CD ITEM AS PER DRG. 26118802142/04 WITH MATL AS PER SPECN. AA10119/15	20	10
4	RV1045955078	SEAL WEAR RING (HY-802.03) AS PER DRG. 36108000964/00 WITH MATL. AS PER SPECN. HY-19366/01 OR SA 106 Gr.'B'	30	10
5	RV1045955442	WEAR SLEEVE 'VAR-02' OR 'VAR-03' (HY-816.00) - FULLY M/CD ITEM AS PER DRG. 36118000863/05 WITH MATL AS PER SPECN.	50	20
6	RV1930166044	SEAL WEAR RING (HY-215.A.53) - FULLY M/CD ITEM AS PER DRG. 36108002400/00 WITH MATL AS PER SPECN. HY-19366/01	250	50
7	RV1930166052	SEAL WEAR RING (HY-311.A.17) - FULLY M/CD HARD CROME PLATED SEAL WEAR RING AS PER DRG. 36100000544/02 WITH MATL AS PER	50	20
8	RV1930166060	SEAL WEAR RING (HY-312.A.07) 'VAR-01 OR VAR-02' - FULLY M/CD ITEM AS PER DRG. 36100000668/05 WITH MATL AS PER SPECN. HY-	300	50
9	RV1930166095	SEAL WEAR RING (HY-1101.21) - FULLY M/CD ITEM AS PER DRG. 26100402257/01 WITH MATL. HY-19366/01 OR PIPE AS PER SPECN.	30	10
10	RV1935966057	SEAL WEAR RING (HY-902.19) - FULLY M/CD ITEM AS PER DRG. 36108802132/02 WITH MATL AS PER SPECN. HY19366/01	100	20
11	RV1055901051	JR. HEAD INSERT (HY-1102.19) - QUENCHED AND TEMPERED AS PER DRG. 46100402192/00 WITH MATL SPECN. HY10561/04	20	5
12	RV1055965025	SP.STUD INSERT (HY-339.04) - FULLY M/CD ITEM AS PER DRG. 36130000694/03 WITH MATL. AS PER SPECN. HY-10565/03	50	10
13	RV1930166010*	THRUST PLATE - T.E. (HY-97.00) - FULLY M/CD FORGING AS PER DRG. 36137600091/05 WITH MATL AS PER SPECN. HY19366/01	50	10
14	RV1930166036	THRUST PLATE - T.E. (HY-311.A.37) - FULLY M/CD FORGING AS PER DRG. 46100000663/04 WITH MATL AS PER SPECN. HY19366/01	100	20
15	RV1930166109	THRUST PLATE - T.E. (HY-1102.05) - FULLY M/CD ITEM AS PER DRG. 46100402190/00 WITH MATL AS PER SPECN. HY19366/01	10	5
16	RV1935966049	FULLY MACHINED AND CARBURISED JOURNAL HEAD INSERT (HY-313.18) AS PER DRG. 36100000628/05 WITH MATL AS PER SPECN.	25	5
17	RV1935966073	JOURNAL HEAD INSERT - FULLY M/CD & CARBURISED ITEM AS PER DRG 36109600297/00 WITH MATL AS PER SPECN. HY19366/01	20	5

Enq.No.
Vendor Name
Quotation No.
Quotation Date

TECHNICAL CONDITION

Sl.No.	Description	Vendor Response	Comment
1	Technical condition as per NIT		
2	Acceptance of items and their quantity as per NIT		
3	Quoted for all the items of NIT		
4	Delivery Period as per NIT		
5	Submission of Guarantee/Warranty certificate as per NIT		
6	Submission of Test Certificate as per NIT		
7	Submission of Inspection Certificate as per NIT		
8	Acceptance of packing instruction/condition as per NIT		

COMMERCIAL CONDITION

Sl.No.	Description	Vendor Response	Comment
1	Delivery Term		
	(*Insurance will be in vendor scope if delivery term is accepted as BHEL Store*)		
2	MSE Status		
3	Payment Term		
4	Validity of offer as per NIT		
5	GST Type		
6	LD Clause as per GTC		
7	Risk purchase as per NIT		
8	Firm Price : The quoted/finalized rates shall be firm till execution of supplies.		
	Offer with PVC (Price Variation Clause) will not be considered.		
9	Submission of Bank Guarantee		
10	Acceptance of Reverse Auction clause of NIT		
11	I have read & understood all terms and conditions of GTC and hereby give my acceptance on the same		

NOTE **Vendors have to write in "Comment" box only if their response is not available in drop down menu.**

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 Yellow color field)

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) C.C.S

DRG. NO. 2-61-004-02257

SH. 01 OF 01

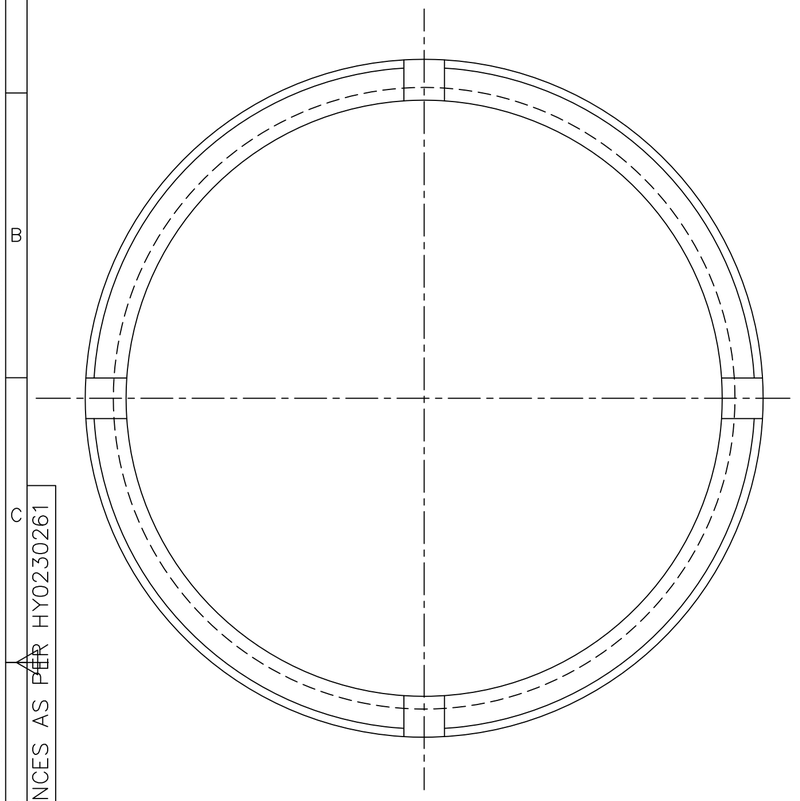
GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

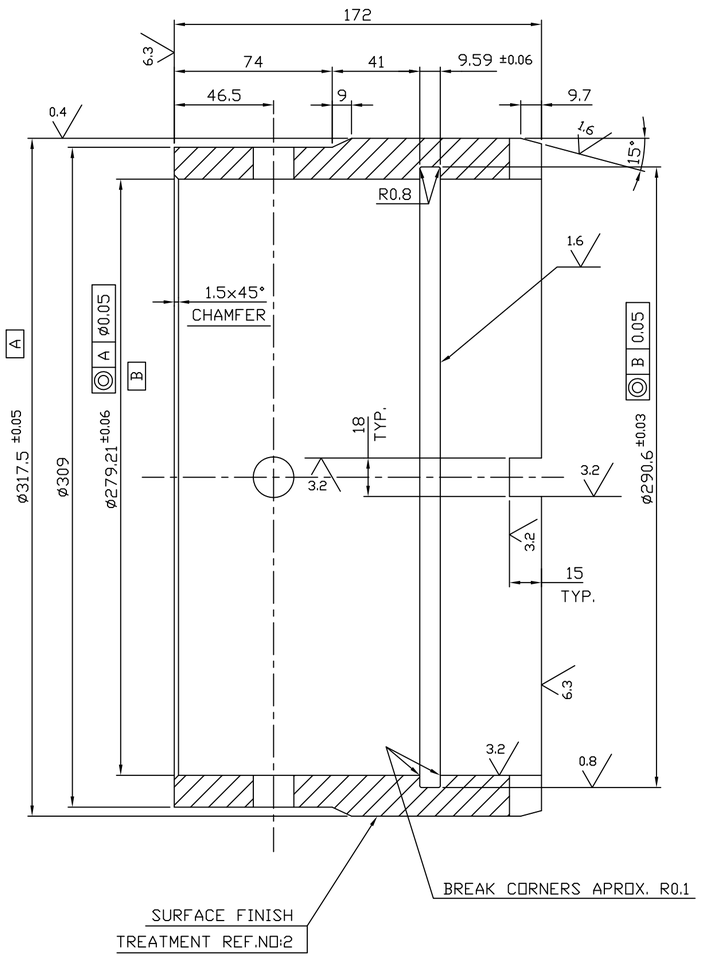
COMPUTER FILE NAME 20042257.DWG

REF. DRG. NO. C-110-00763

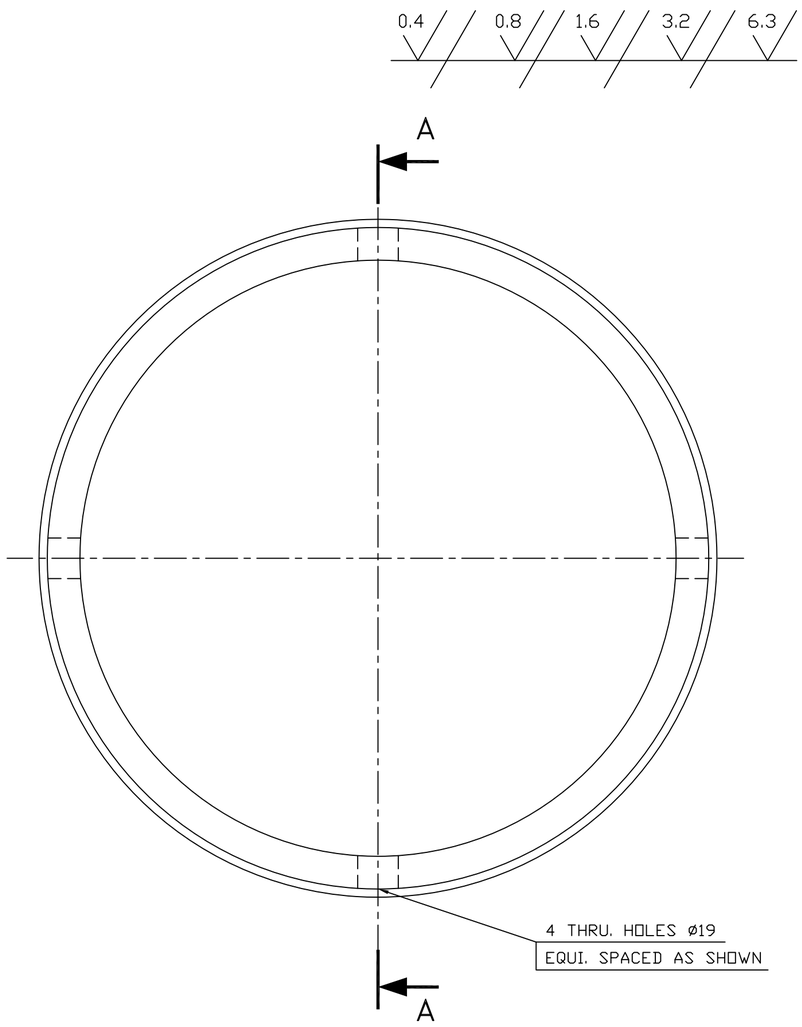
SIGN. AND DATE

INVENTORY NO





SECTION A-A



NOTES:-

1. BREAK ALL SHARP EDGES AND CORNERS UNLESS OTHERWISE NOTED.
2. CARBURIZED 56 TO 60 RC. 0.8mm MIN. DEPTH OR HARD CHROME PLATE 0.08 TO 0.13mm THICK

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
01	FORGING				BA9516650040	24.400	
					HY19366	1	
					MATERIAL SPECN.	QUANTITY	

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 1043 RP BOWL MILL, CHANDRAPUR-500MW

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	E.D.L	-sd-		
CHD.	N.D.S	-sd-	15.07.93	-
APPD.	Y.S.B.L.RAO	-sd-	16.07.93	

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD	01	09.06.99	CHD/APPD
ZONE			ZONE			ZONE			ZONE			ZONE	DRAWING REDRAWN IN AUTOCAD	

DEPT.	UNTOL. DIMS.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
B.M.D	GR. ¢/M/f	N.T.S	24.400	1-61-004-01190	21	30
CODE 446						

TITLE: SEAL WEAR RING

CARD CODE

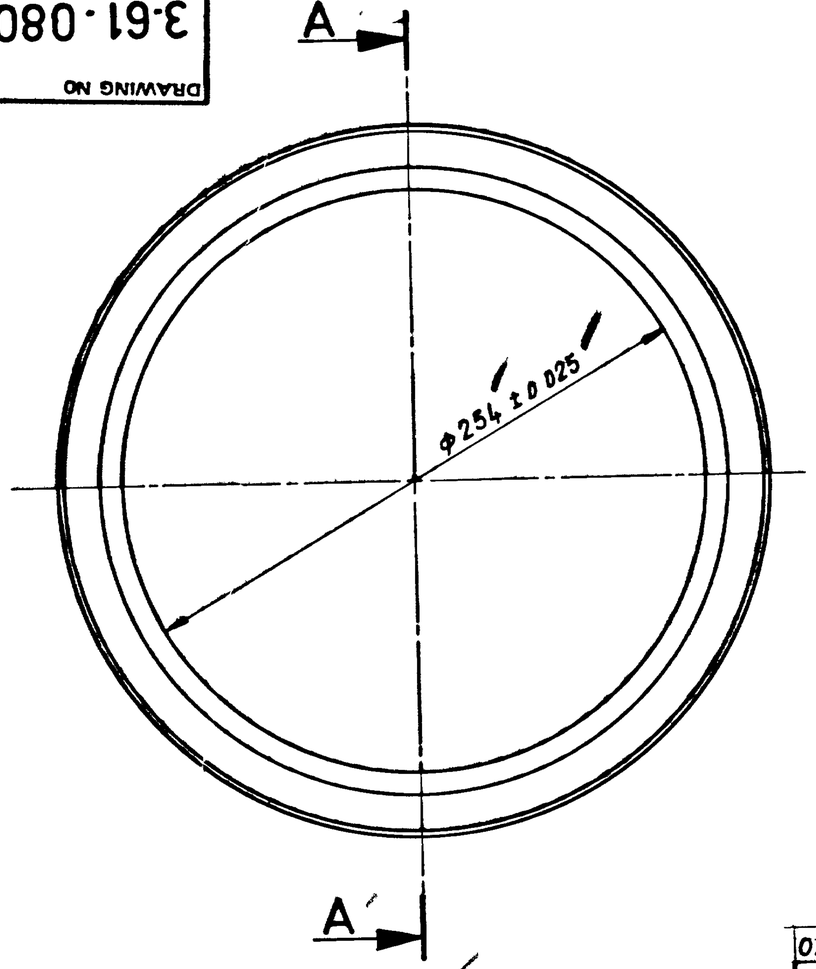
DRAWING NO. 2-61-004-02257 REV. 01

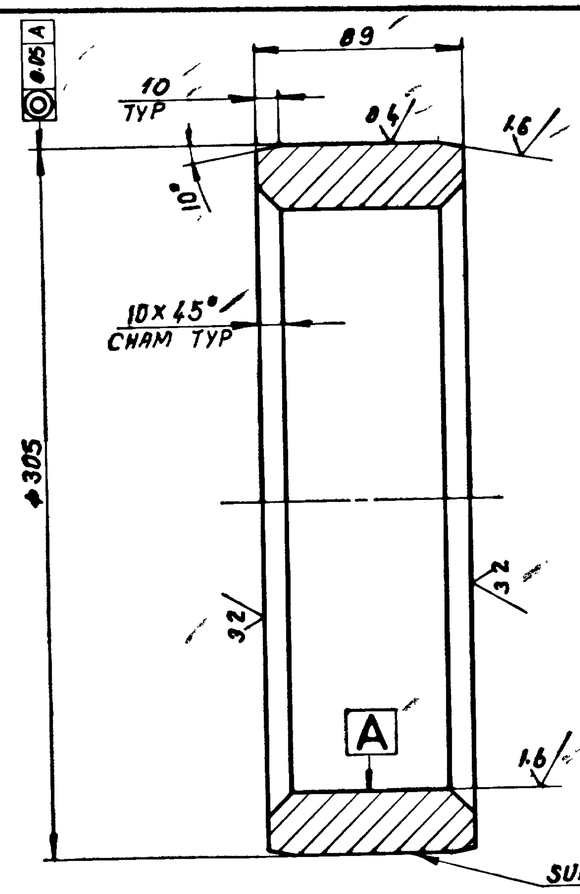
SHT. No 01 NO. OF SHT. 01

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MILLIMETRES)

05-229/C

DRAWING NO 3-61-080-00964





6.3 / 3.2 / 1.6 / 0.4

BREAK ALL SHARP EDGES AND CORNERS UNLESS OTHERWISE SPECIFIED

TOLERANCES UNLESS OTHERWISE SPECIFIED

CASTING ± 1.6 mm
DECIMAL ± 0.1 mm
ANGULAR ± 0°-6'
WELDMENT ± 1.6mm

SECTION-AA

NOTES:-

1. STRESS RELIEVE BEFORE SURFACE FINISH TREATMENT & MACHINING IF FLAME CUT FROM TUBING
2. CARBURIZE 58 To 62 Rc WITH MIN. EFFECTIVE CASE HARDNESS OF 50 Rc AT A DEPTH OF 0.80 OR HARD CHROME PLATE (MIN 58 Rc) 0.08 To 0.13 THICK

GENERAL DIMENSIONS, LIMITS FITS & TOLERANCES AS PER PS. HY 023026

1082286

VARIANT NO	ITEM NO	DESCRIPTION	STD	DRAWING NO	ITEM NO	MATL CODE	A/C	UNIT	UNIT WT	GS
					VAR NO	MATL SPEC		DI	QTY	
02	01	FORGING		HY19366		BA9516650023			2500	
01	01	SEAMLESS STL TUBE OD 323.9 x 45 95L				15 082 274			15300	
						SA 106 Gr B				

REV	DATE	ALTERED / CHECKED
01		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

Bharat Heavy Electricals Ltd.,
BOILER PLANT UNIT
TIRUCHIRAPALLI 620 014

	NAME	SIGN	DATE	NO OF VAR
DRN	G R		22.07.87	
CHD	J S N		24/09/87	
APPD	J S M		29/9/87	

DEPT	GRADE OF UNTOL DIM	SCALE	WEIGHT (kg)	REF TO ASSY / OLD DRG	ITEM NO
MILLS		1·25	15 300	B. GP. 3952.0	
CODE 240					

TITLE **SEAL WEAR RING**

CARD CODE U 01

DRAWING NO 3-61-080-00964

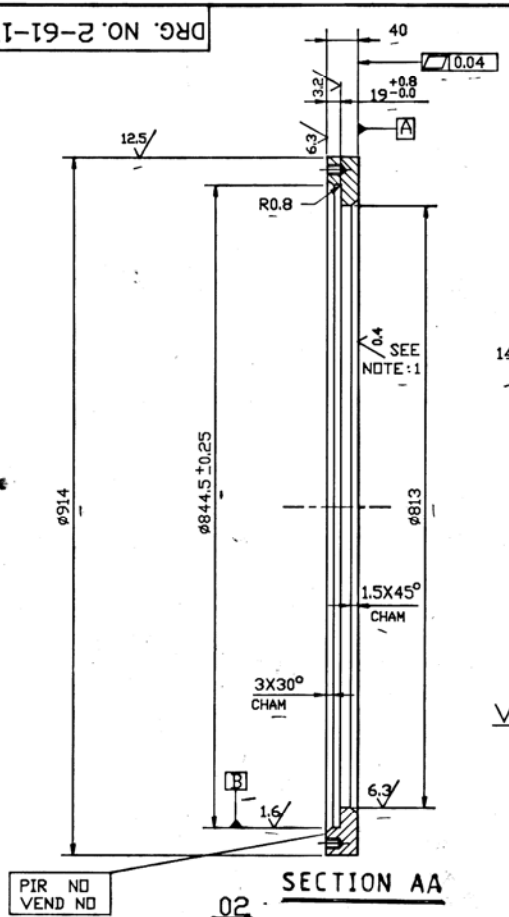
REV 00

Size A3

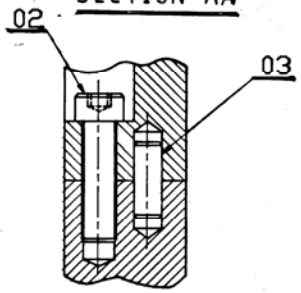
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 2-61-170-01086

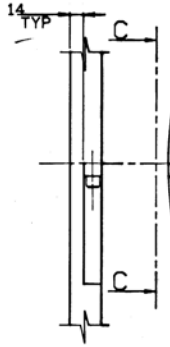


SECTION AA

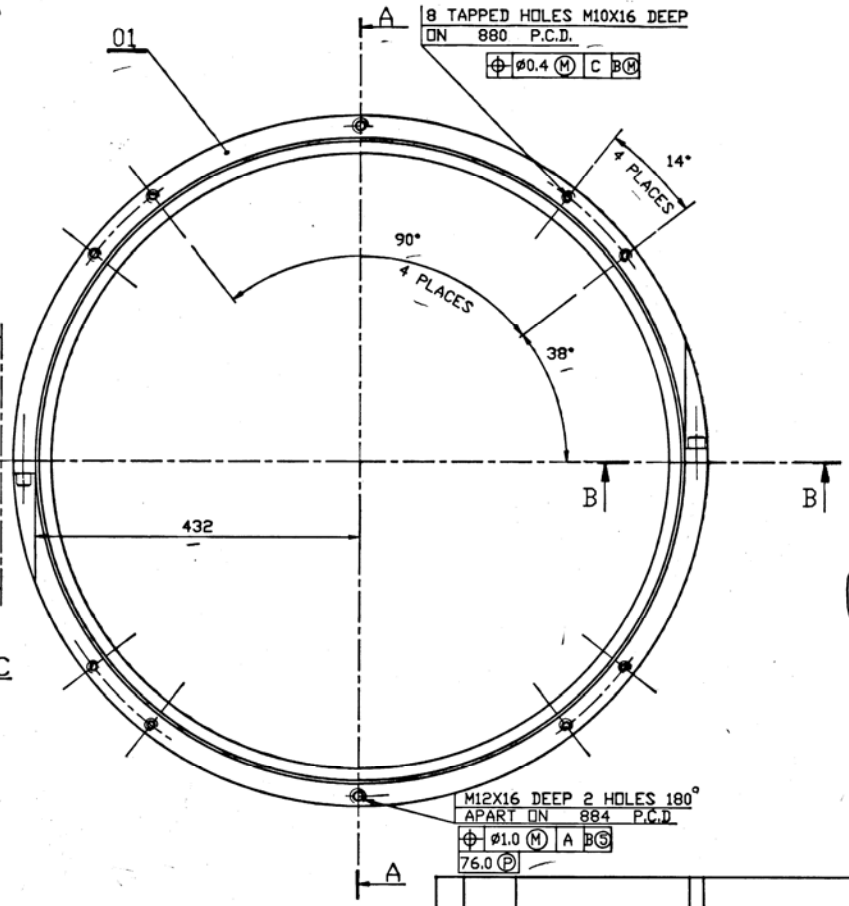


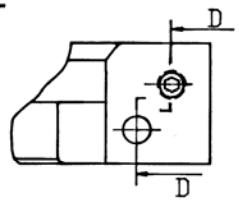
SECTION - DD

ROTATED 90° C/CLOCKWISE



VIEW - CC





SECTION - BB

NOTES:

1. HARD CHROME PLATE THIS SURFACE TO 60-65 RC. 0.08-0.125 THICKNESS TO REMAIN AFTER FINISH MACHINING.
2. FINISH MACHINING AFTER JOINING THE TWO HALFS WITH ITEMS 2 & 3.
3. DO NOT USE LOCTITE AT THIS ASSEMBLY.
4. PARTS MUST STAY TOGETHER AS SET.

VARIENT NO.	ITEM NO.	DESCRIPTION	STD	DRAWING NO.	IT.NO. / VAR.	MATL CODE / MATL SPEC	A / C	UNIT	UNIT WT. / QTY.	CS	ZONE
	03	DOWEL PIN 10X20				AA7171001075 / AA7171001			0.010 / 2		
	02	HEX.SOC.HD CAP SCREW M10 X 35				HY7123123956 / HY7123123			0.030 / 2		
	01	SEAL RUNNER HALF SECTION		2-61-170-01088		AA1011819210 / AA10119			18.600 / 2		

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	J.GANGARAM		92.11.05	
CHD.	B.MURALI		921105	
APPD.	S.GHATOR		92-11-05	

REV.	DATE	ALTERED / CHECKED / APPROVED

REV.	DATE	ALTERED / CHECKED / APPROVED
01	921105	

DRAWING RETRACED

DEPT.	GRADE OF TOL.DRG.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
PULVERIZ. CODE 446	F/M/F	N.T.S.	37.280	C - 74 - 684		

TITLE: SEAL RUNNER ASSEMBLY

CARD CODE: U 01

DRAWING NO. 2.61.170.01086

REV. 01

SHEET NO. 01 NO OF SHEETS 01

INVENTORY NO | COMP.FILE NAME | REF. DRG. NO.
C:\DWG\SEAL

FIRST ANGLE PROJECTION

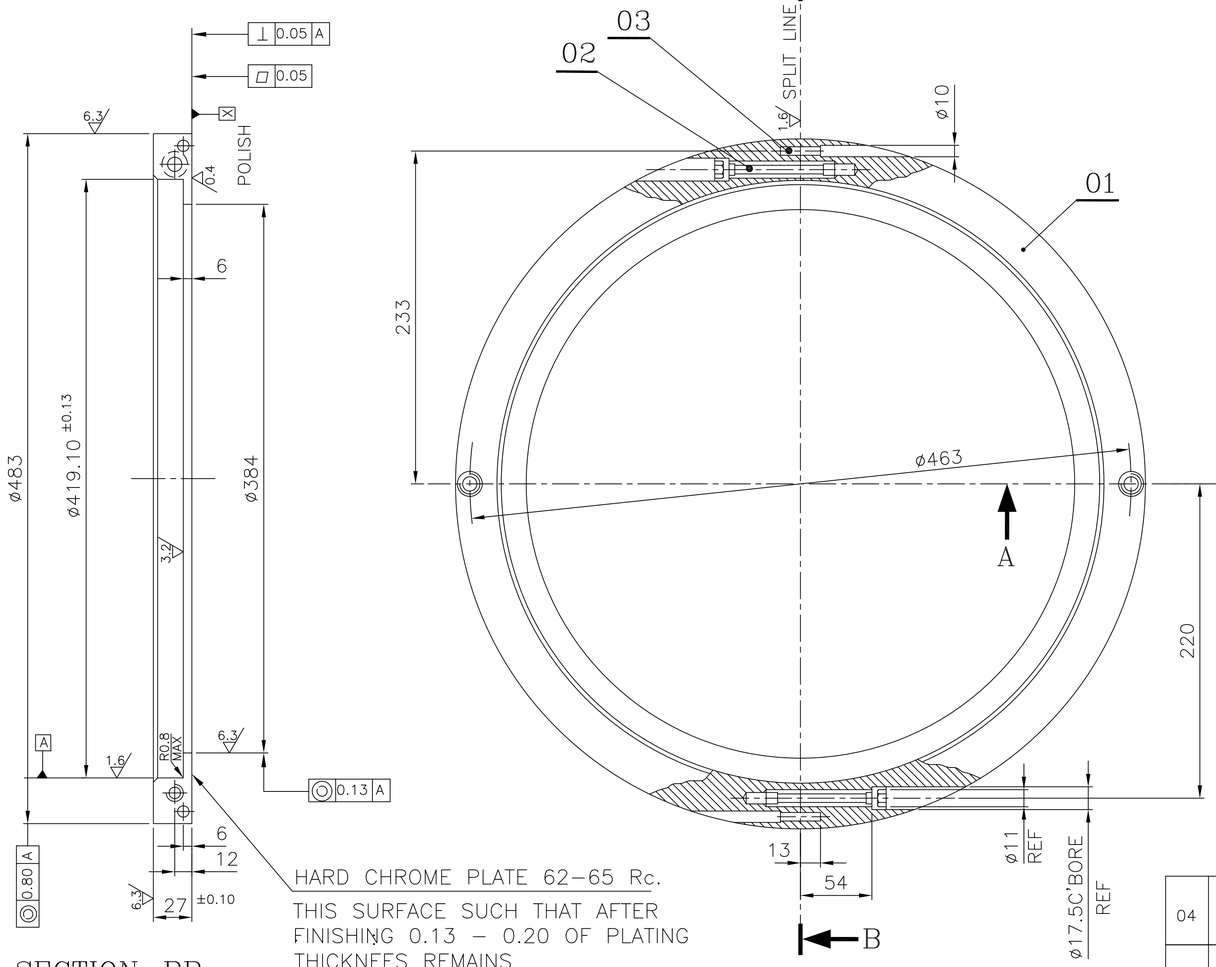
(ALL DIMENSIONS ARE IN mm)

DRG. NO. 2-61-180-00611

SHT. 01 OF 01

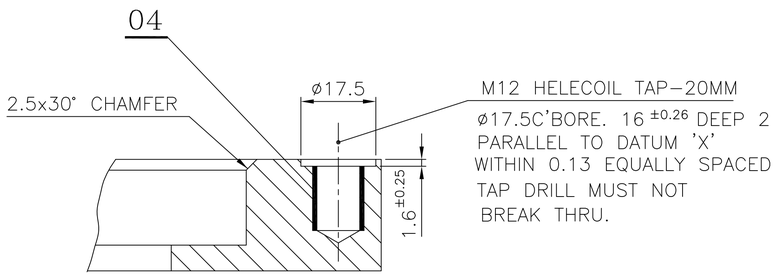
COMPUTER FILE NAME 26100611.DWG

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



SECTION–BB

ZONE–A6



SECTION–AA

0.4, 1.6, 3.2, 6.3

NOTES :–

1. BREAK ALL SHARP EDGES CORNERS.
2. STRESS RELIEVE BEFORE MACHINING.
3. ANTISEIZE COMPOUND TO BE APPLIED TO ITEM NO.–02

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
					MATERIAL SPECN.	QUANTITY	
04	M12x18 HELEEOIL WIRE INSERT				GT9751189055	0.02	
					GT 51189		2
03	DOWEL PIN 8x25				HY 7171001830	0.01	
					AA 7171001		2
02	HEX.SOC HEAD CAP SCREW M10x80				HY 7123123565	0.060	
					AA 7123123		2
01	SEAL RUNNER (HALF SECTION)	3–61–180–00554				5.33	
							2

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT

OR

NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.				
CHD.	NDS		23.7.98	–NA–
APPD.	S GHATGE		23.7.98	

DEPT.	UNTOL. DIMS.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
TGD	GR.		1:1	10.84	1–61–180–00329	01	–NA–
CODE 425	∅/M/∅		1:2				

TITLE

SEAL RUNNER ASSY.

CARD CODE

DRAWING NO. 2–61–180–00611 REV. 04

SHT. No 01 | NO. OF SHT. 01

REV.	DATE	ALTERED	ZONE	REV.	DATE	ALTERED	ZONE	REV.	DATE	ALTERED	ZONE	REV.	DATE	ALTERED	ZONE
04	23-7-98	CHD/APPD	ITEM–04 & NOTE–03 ARE ADDED DOWEL PIN 8x25 WAS GROOVED DOWEL PIN 6x24. M12 HELECOIL TAP 20 MIN WAS M10 TAP–16 MIN. WT. WAS 10.8	03	28-6-87	CHD/APPD	F7	02	22-12-86	CHD/APPD	E2 A8 B5 E5 B6	01	8-1-86	CHD/APPD	TRICCHY MAT. CODL DELETE HYD. MAT CODE SPEC. ADDED
							PERPON–01 CULARITY ADDED TO SURFACE–X				NOTE 1 & 2 ADDED 27 ±0.1 WAS 27. 13 WAS 12. CBORE WAS BLIND HOLE				

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

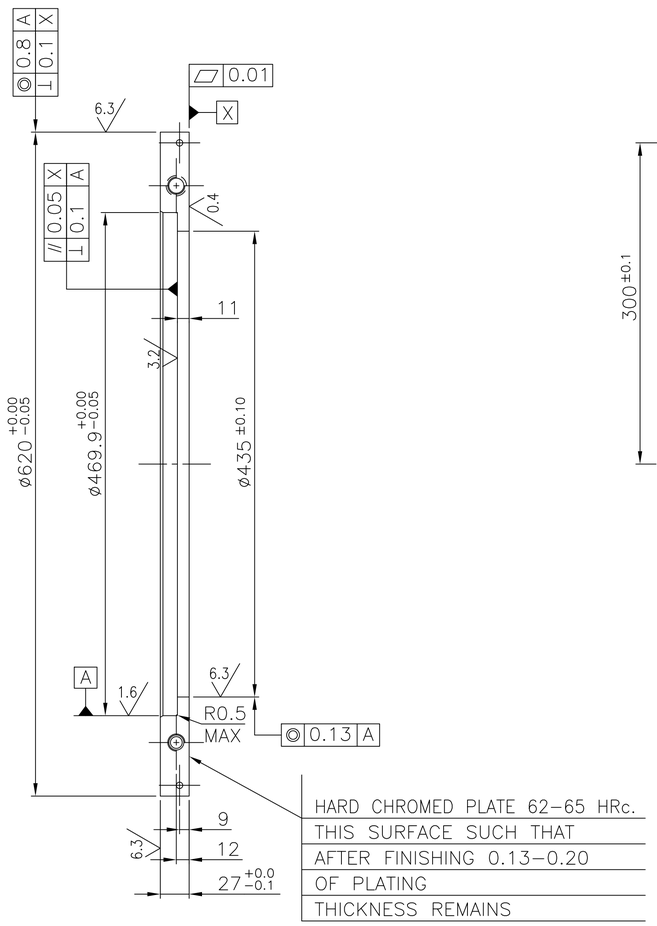
POORNIMA CAD

DRG.NO. 2-61-188-02142

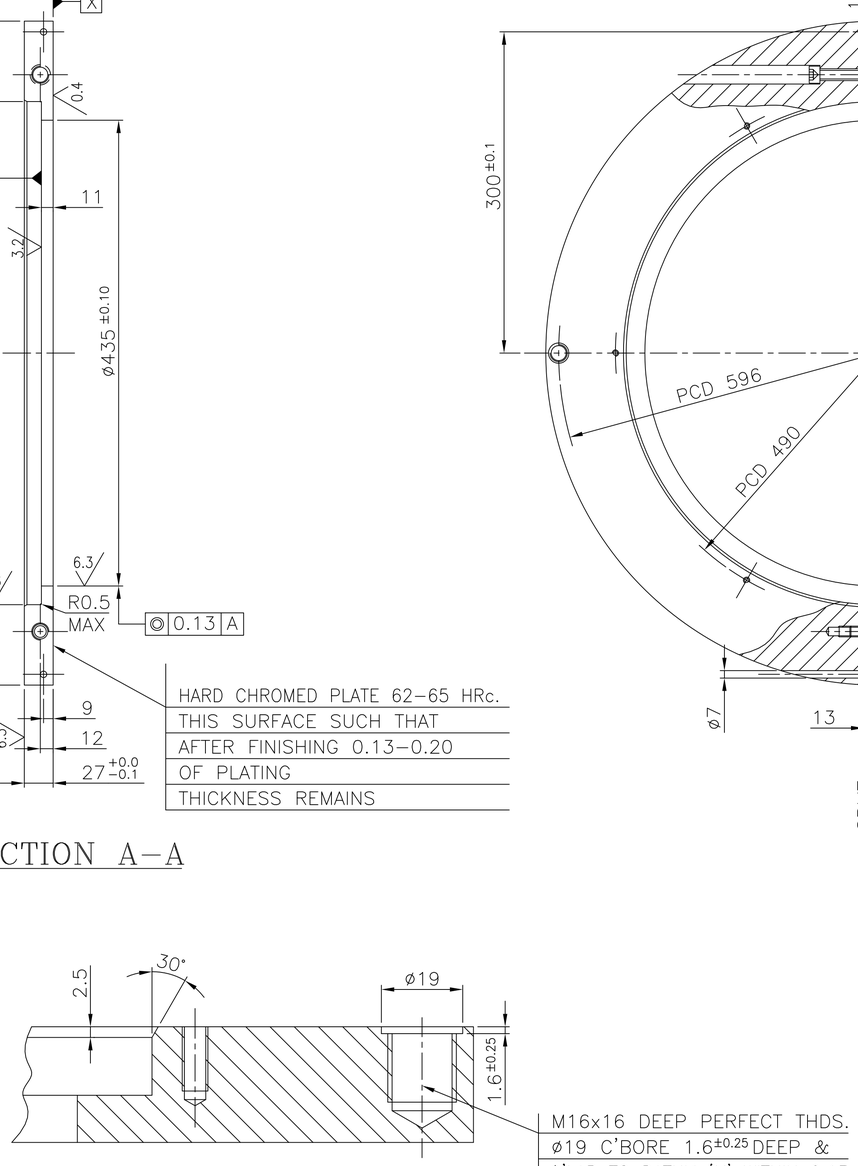
COMP. FILE NAME 26102142.DWG

REF.DRG.NO.

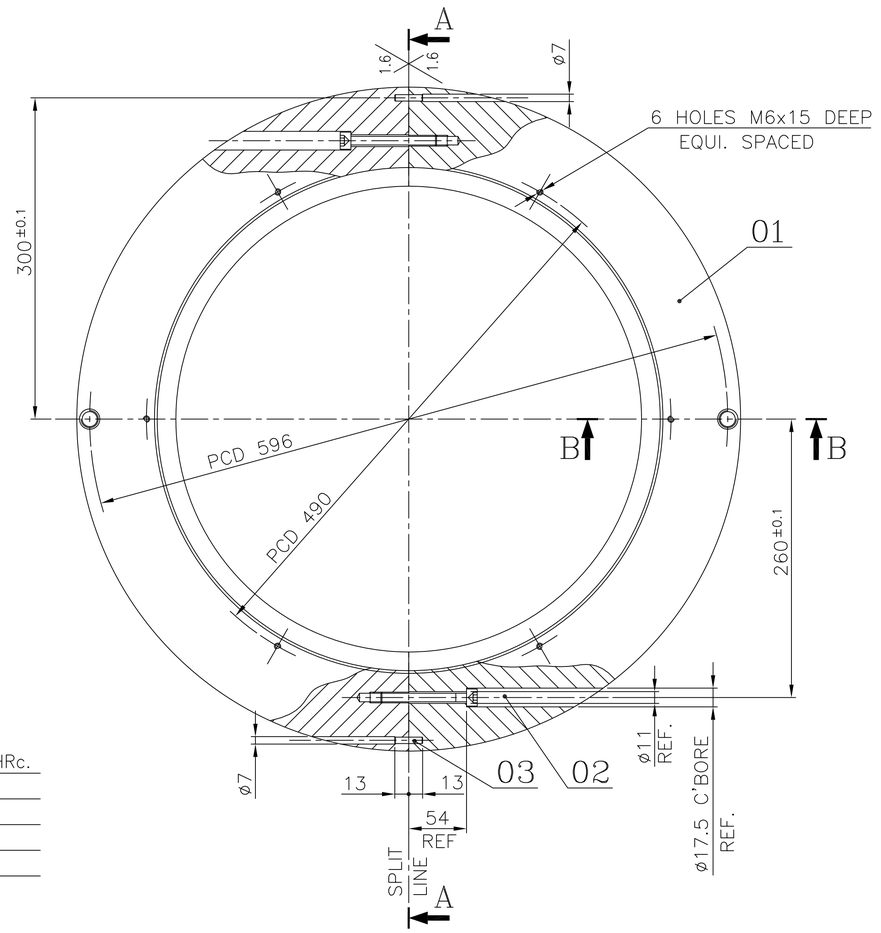
INVENTORY NO.



SECTION A-A



SECTION B-B



NOTE:-

1. BREAK ALL SHARP EDGES & CORNERS UNLESS OTHERWISE NOTED.
2. TOL. UNLESS OTHERWISE NOTED DECIMAL ±0.13, ANGULAR 0°-6'
3. STRESS RELIEVE BEFORE MACHINING.
4. 0.03mm FEELER GAUGE SHOULD NOT ENTER AT THE PARTING LINE.

CODE No. : BA9616912054

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
					MATERIAL SPECN.	QUANTITY	
03	DOWEL PIN			ø6x25	HY7171001857	0.006	
					AA7171001	2	
02	HEX. SOC HD. CAP SCREW			N10x80	HY7123123565	0.057	
					AA7123123	2	
01	SEAL RUNNER (HALF SECTION)	3-61-188-02126			AA1011819180	14.537	
					AA10119	2	

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 883 /1003 XRP BOWL MILL

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	POORNIMA		30.11.88	NA
CHD.	NDS		01.12.88	
APPD.	S.GHATGE		01.12.88	

DEPT.	PULV-ENGG	SCALE	WEIGHT(Kg)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
CODE	4460	1:4	29.200	1-61-188-01054	05	25

TITLE: SEAL RUNNER ASSY.

DRAWING NO. 2-61-188-02142 REV. 04

SHEET NO. 01 NO OF SHEETS 01

REV.	DATE	ALTERED	CHECKED	APPD.
ZONE				
REV.	DATE	ALTERED	CHECKED	APPD.
ZONE				
REV.	DATE	ALTERED	CHECKED	APPD.
ZONE				
04	12.07.04	DRAWING IS REDRAWN ON ACAD INCORPORATING ALL THE PREVIOUS REVISIONS	CHECKED	APPD.
ZONE				

TD-150/REV.NO.03 SIZE A2

FIRST ANGLE PROJECTION (ALL DIMENSIONS IN MILLIMETRES)

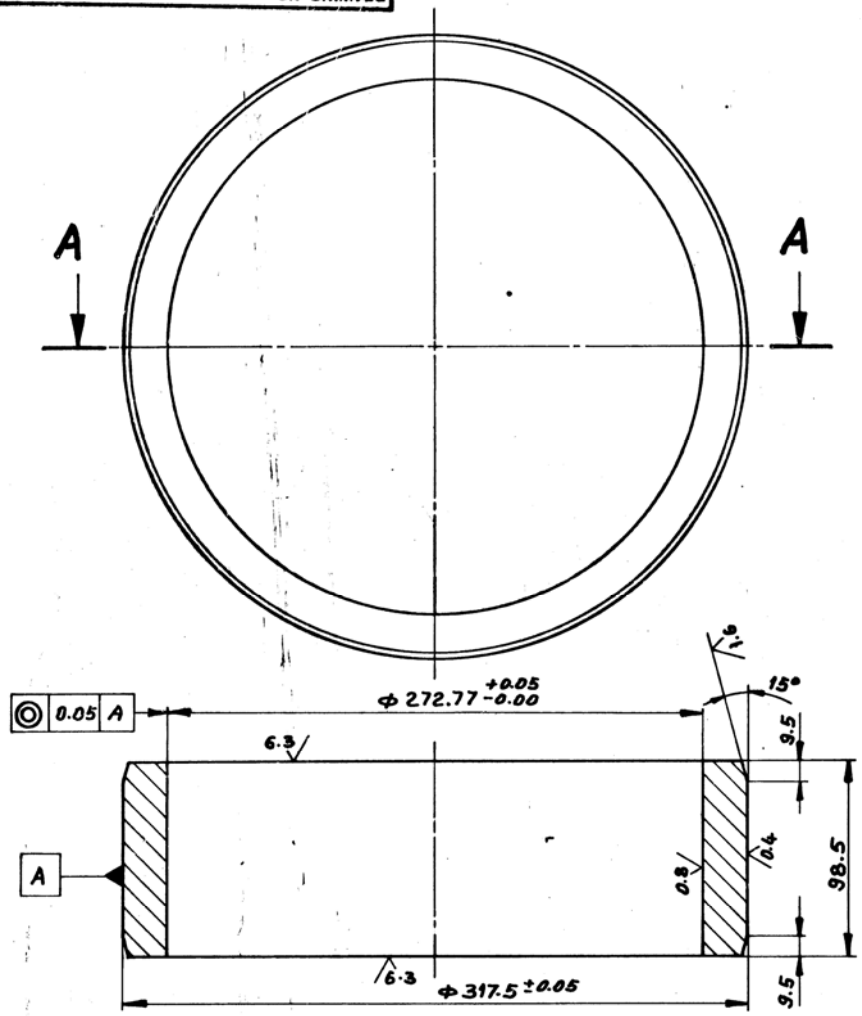
DRAWING NO. 3-61-000-00544

6.3 / 1.6 / 0.8 / 0.4

NOTE :-

1. CARBURIZE SURFACE-A 1.5 mm MIN. EFFECTIVE DEPTH, HEAT TREAT SURFACE TO Rc 58-62. OR HARDCHROME PLATE 0.08 TO 0.13 THK PER SIDE
2. FLAME HARDEN SURFACE-A TO Rc 55 MINIMUM.
3. COAT WITH TECTYL 506 OR EQUIVALENT AFTER MACHINING.
4. POLISHED AREA MUST BE WELL PROTECTED AGAINST ANY DAMAGE DURING ROUTINE HANDLING.
5. BREAK ALL SHARP EDGES AND CORNERS UNLESS OTHERWISE NOTED.

GENERAL DIMENSIONS, LIMITS, FITS & TOLERANCES, AS PER PS. NV.023826



SECTION-AA

VARIANT NO.	ITEM NO.	DESCRIPTION	STD	DRAWING NO.	ITEM NO. / VAR NO.	MATL. CODE / MATL. SPEC.	C/A	UNIT	UNIT WT. / QTY.	GS
	01	FORGING		4-61-000-90087 ⚠1		BA95166B0007 / HY19366			16.000 / 1	

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 1003 XRP BOWL MILL 2

Bharat Heavy Electricals Ltd.,
BOILER PLANT UNIT
TIRUCHIRAPALLI-620 014

	NAME	SIGN	DATE	NO OF VAR
DRN.	D.N.CHEZHIYAN	D.Nadhiyan	20-3-85	
CHD.	G.V.C		22.03.85	
APPD.	PS		22.3.85	

REV	DATE	ALTERED / CHECKED
02	18-12-85	ALTERED & CHD NDS APPD
01	861206	ALTERED S.SHANKAR / CHECKED J.G.K.V.

APPROVED

NOTE NO.1 REVISED BY THE ADDITION OF CHROME PLATING

FRG. DRG. NO. GIVEN.

DEPT	GRADE OF UNTOL DIM	SCALE	WEIGHT (kg)	REF TO ASSY/OLD DRG	ITEM NO.
MILLS	¢/M/F	1:2.5	16.000	C-101-00972/2 / 1-61-000-01231	19
CODE 240					

TITLE: **SEAL WEAR RING**

CARD CODE: U 01

DRAWING NO.: **3-61-000-00544** REV. 02

Size A3

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

POORNIMA CAD

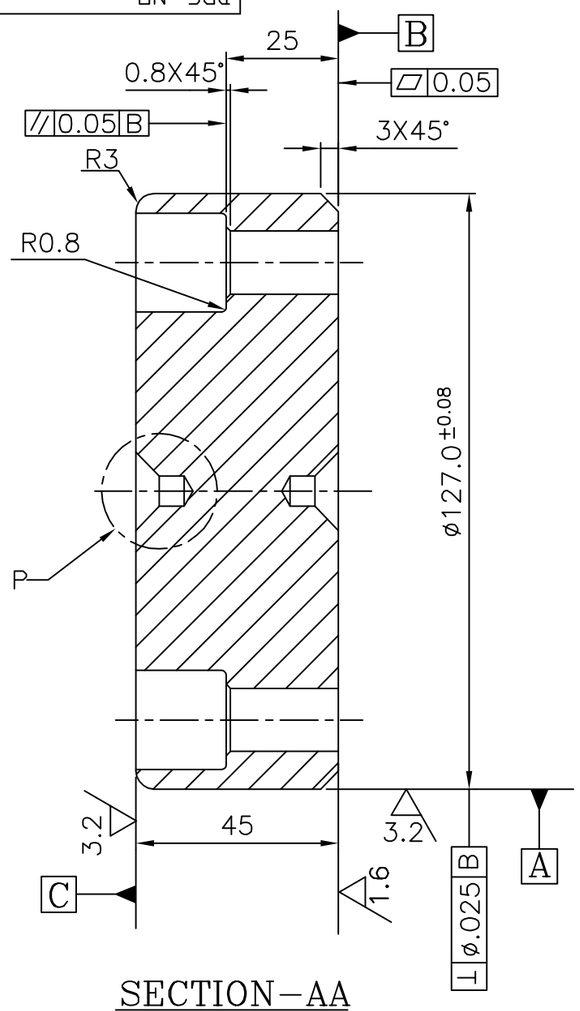
DRG. NO. 3-61-000-00628

COMPUTER FILE NAME 3610O628.DWG

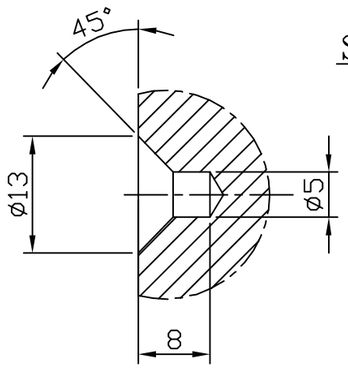
REF. DRG. NO.

SIGN. AND DATE

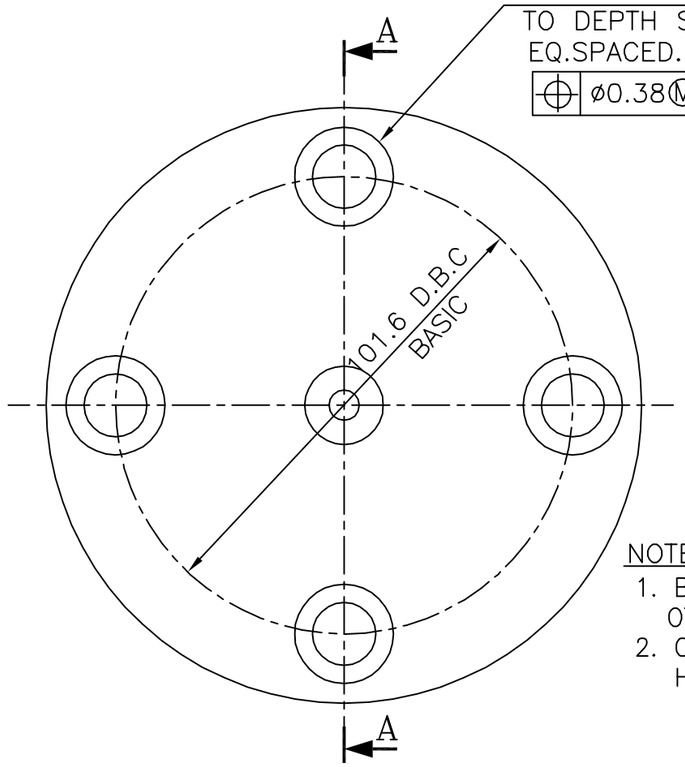
INVENTORY NO

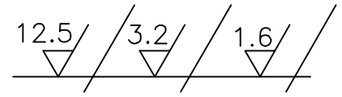


SECTION–AA



DETAIL P (BOTH ENDS)





NOTE:

1. BREAK ALL SHARP EDGES AND CORNERS UNLESS OTHERWISE NOTED.
2. CARBURISE TO A DEPTH OF 1.3±0.2 TO GET HARDNESS OF 58–62 RC ON SURFACE C

ITEM NO.	DESCRIPTION	STD.	DRAWING NO.	VAR. NO.	MATERIAL CODE	NET WT.	GROSS WT.
02	FORGING				BA9516624014	4.120	
					HY19366	1	
~~01~~	~~PL 63/DIA 135~~					~~4.120~~	
					~~AISI LG~~	1	

MATERIAL SPECN. / QUANTITY

REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD	05	8.3.03	CHD/APPD
ZONE			ZONE		DETAIL P FOR CENTER HOLE ON BOTH ENDS ADDED.

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 1003 XRP BOWL MILL

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	E.M.ASHOK		2.4.99	-NA-
CHD.	N.D.S		2.4.99	
APPD.	S.G		2.4.99	

DEPT.	UNTOL. DIMS.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
PULV ENGG. CODE 446	GR. ¢/M/F		NTS	4.120	B-101-01421-1 P/N 101-01421	-NA-	-NA-

TITLE: JOURNAL HEAD INSERT

DRAWING NO. 3-61-000-00628 REV. 05

SHT. No 01 NO. OF SHT. 01

FIRST ANGLE PROJECTION

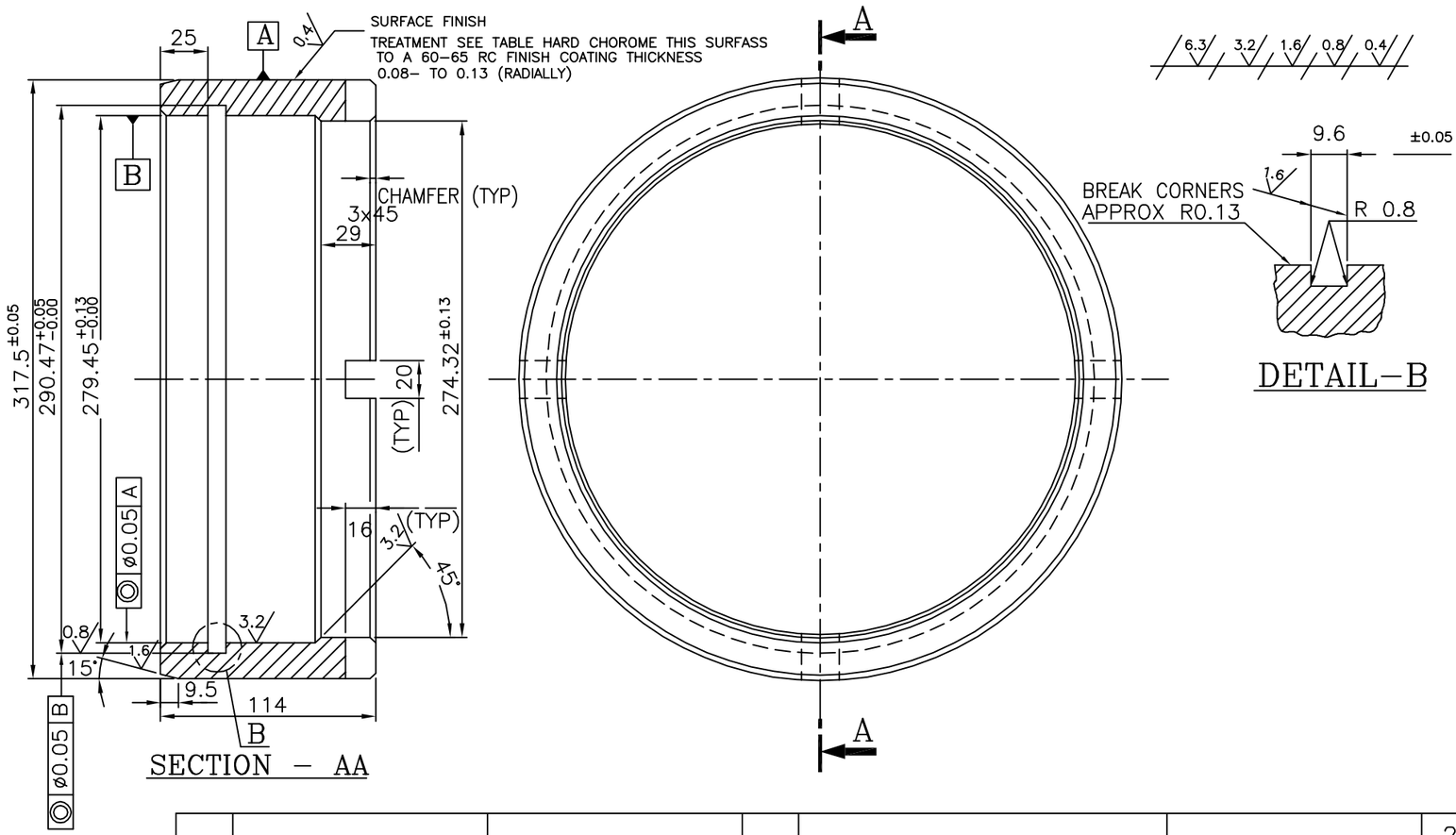
(ALL DIMENSIONS ARE IN mm)

DRG.NO.3-61-000-00668

36100668.DWG FILE NAME

REF.DRG.NO.

INVENTORY NO.



NOTES:-

01. MACHINE ALL SURFACES TO 6.3 UNLESS OTHERWISE NOTED.
02. STRESS RELIEVE BEFORE SURFACE FINISH TREATMENT & MACHINING IF FLAME CUT FROM TUBING OR PLATE.
03. BREAK ALL SHARP EDGES AND CORNERS UNLESS OTHERWISE NOTED.
04. CASTING (VAR 02) TO BE OF UT QUALITY. CARRY OUT UT AS PER AA0850104 ACCEPTANCE LEVEL II.
05. FOR CASTING (VAR 02) CARRY OUT LPI ON OUTER SURFACE BEFORE CHROME PLATING.

REV.	DATE	ALTERED		REV.	DATE	ALTERED	
		CHD.	APPD.			CHD.	APPD.
05	2.1.05			04			
ZONE	VARIANT NOS 01 & 02 SHOWN CORRECTLY.			ZONE	VARIANT 02 ADDED. NOTE 4 & 5 FOR ADDED. DRG REPLOTTED		

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
	R/M CASTING		02	OD 318 X ID264 -L120		20.00	
					AA19511	23.50	
	FORGING		01	4-61-000-90087	BA9516650074	20.00	
					HY19366		
					MATERIAL SPECN.	QUANTITY	

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 1003 XRP BOWL MILL

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	UNIC		03.08.96	
CHD.	B.M.R		30.08.97	
APPD.	K.M.R		30.08.97	NA

DEPT. PULV ENGG.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
CODE 446	1:2.5	20.00	B-101-01084 CE PART No.101-01084	NA	NA

TITLE: SEAL WEAR RING

DRAWING NO. 3-61-000-00668 REV. 05

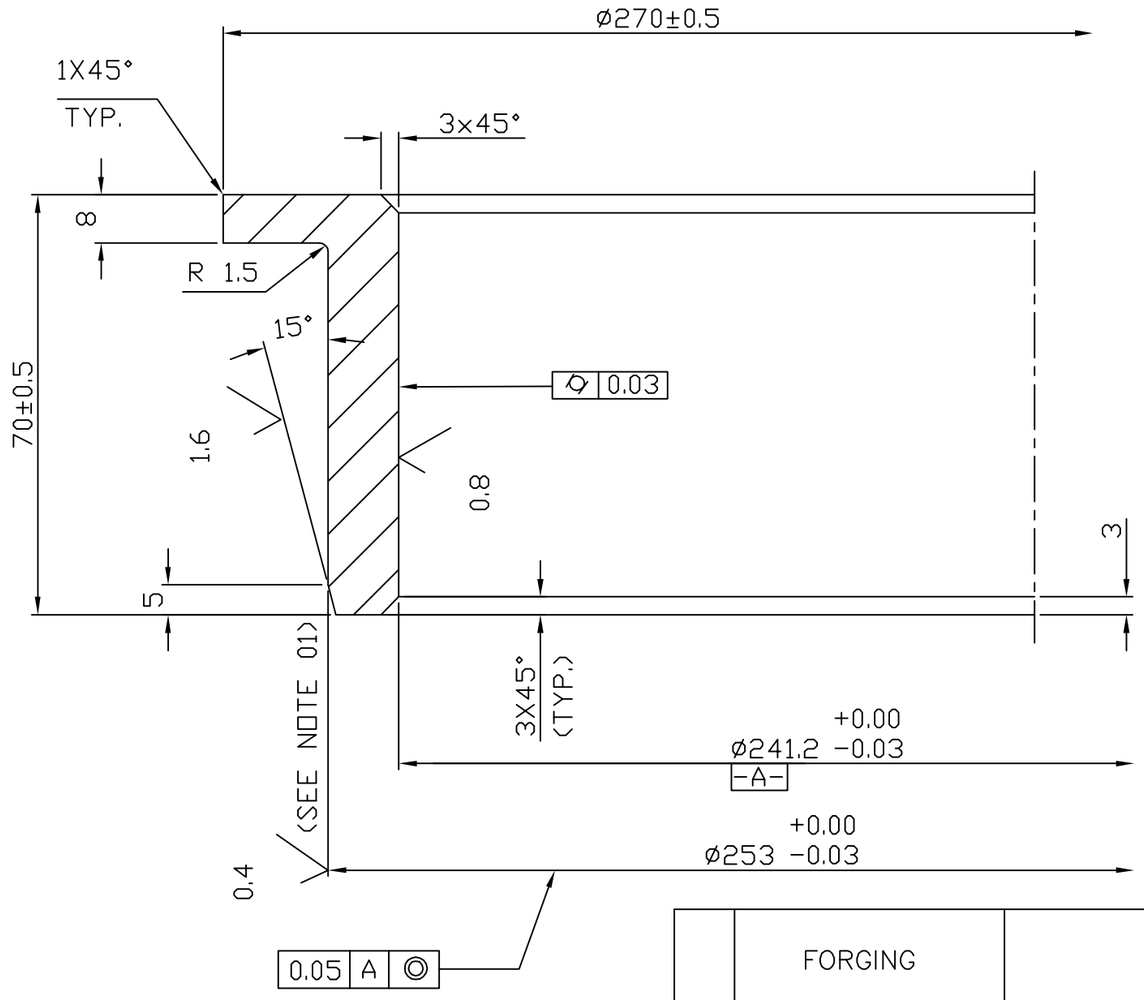
SHEET NO. 01 NO OF SHEETS 01

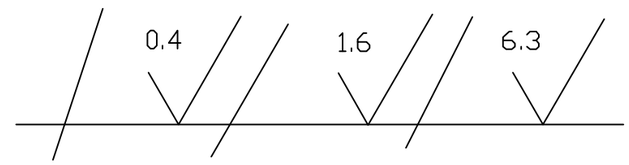
TD-151/REV. 03 SIZE A3

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG.NO. 3-61-080-02400





NOTES :

01. HARD CHROME PLATING IS TO BE DONE ON ø253 RADIALLY. DEPTH OF CHROME PLATING SHOULD BE 0.08 TO 0.13 mm MEASURED AFTER FINISH GRINDING. HARDNESS OF CHROME PLATED SURFCE SHOULD BE 60-65 RC.

02. THIS IS FINISH M/CD DRG.
FORGING IS TO BE PROCURED IN ROUGH M/CD CONDITION HAVING 5 mm ALLOWANCE ON ALL TOOL POINTS.

03. WEIGHT OF ROUGH M/CD FORGING IS 9.00 Kg,

	FORGING				BA9516650066	3.00	
					HY19366		
ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
					MATERIAL SPECN.	QUANTITY	

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

REV.	DATE	ALTERED	CHD.	APPD.
00	23.05.97			

REV.	DATE	ALTERED	CHD.	APPD.
ZONE			ZONE	

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 803 XRP BM

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	BMR		23.05.97	
CHD.	NDS		23.05.97	
APPD.	RAMANNA		23.05.97	

DEPT.	CODE	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
PULVE.ENGG	446	1:1	3.00	0-61-080-90006	53	53

TITLE: SEAL WEAR RING

DRAWING NO. 3-61-080-02400 REV. 00

SHEET NO. 01 NO OF SHEETS 01

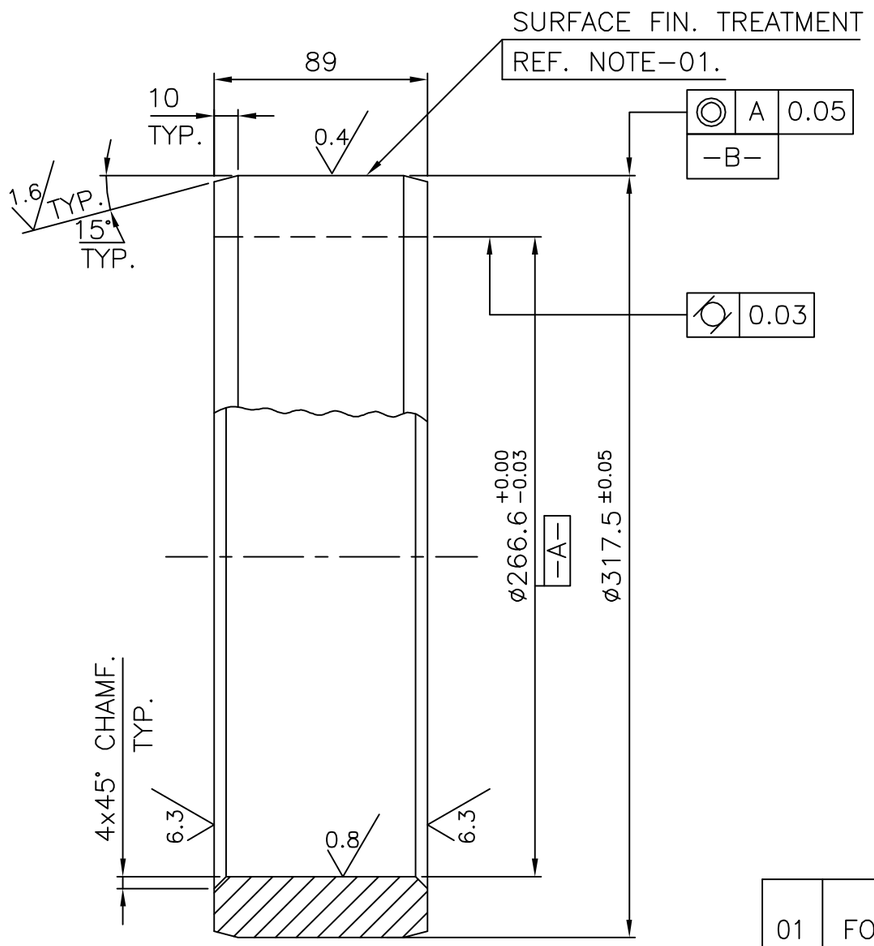
INVENTORY NO. | REF.DRG.NO. | FILE NAME: 36101091.DRG

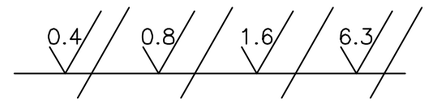
TD-151/REV. 03 SIZE A3

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG.NO. 3-61-088-02132





NOTES:-

01. CARBURISE 56 TO 60 RC 0.8mm MIN. DEPTH.
OR
HARD CHROME PLATE 0.08-0.13 THICK PER SIDE.

2. THIS IS A FINISH MACHINED DRAWING. FORGING SHALL BE SUPPLIED IN ROUGH MACHINED CONDITION WITH 5mm ALLOWANCE ON ALL MACHINED SURFACES.

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
					MATERIAL SPECN.	QUANTITY	
01	FORGING				BA9516650031	16.340	
					HY19366	1	

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 883 XRP BM

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	UNIC		14.04.97	
CHD.	G.S.N.M.RAO		25.11.03	
APPD.				

DEPT. PULV ENGG.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
CODE 446	1:2.5	16.340	1.61.088.01019	19	28

TITLE: SEAL WEAR RING

DRAWING NO. 3-61-088-02132 REV. 02

SHEET NO. 01 NO OF SHEETS 01

REV.	DATE	ALTERED	CHD.	APPD.
02	25.11.03	UC	G.S.N.M.RAO	

ZONE: DRG. REDRAWN BY INCORPORATING THE PREVIOUS REV.

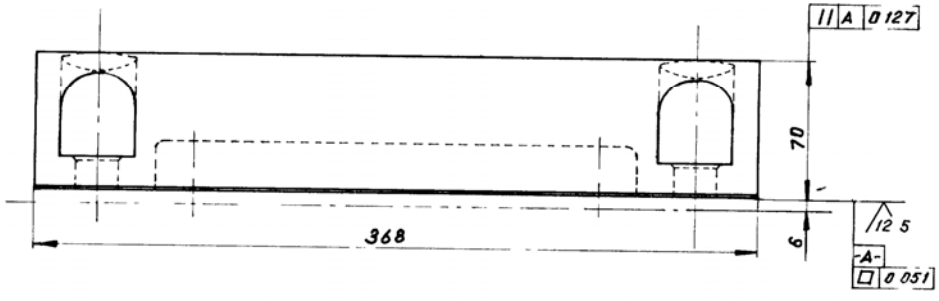
INVENTORY NO.
(B-94-853/1) REF.DRG.NO.
361021 32.DWG FILE NAME

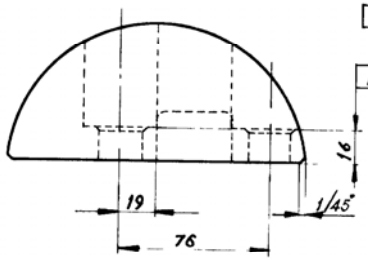
FIRST ANGLE PROJECTION (ALL DIMENSIONS IN MILLIMETRES)

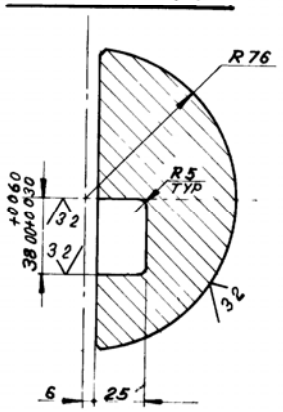
DRAWING NO 3-61-096-00297

~ 125 / 32 /

SECTION-AA





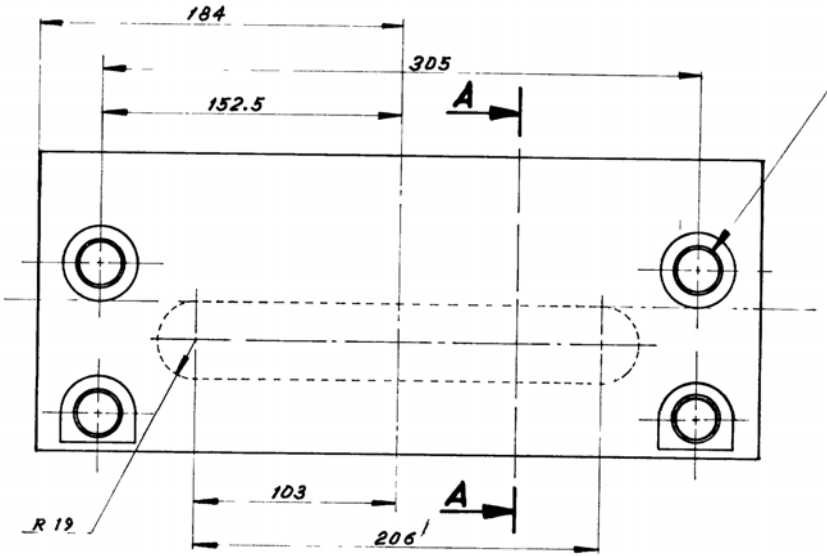


GENERAL TOLERANCES, LIMITS FITS & TOLERANCES AS PER PS. NY 0230261

1 CARBURIZE 3 mm MIN EFFECTIVE DEPTH

2. HEAT TREAT TO 58 TO 62 Rc

ALTERNATE MATL AISI 86L20



VARIANT NO	ITEM NO	DESCRIPTION	STD	DRAWING NO	ITEM NO / VAR NO	MATL CODE / MATL SPEC	A C	UNIT	UNIT WT / QTY	GS
	01					BA9516624006 / HY19366			21.30 / 1	

TYPE OF PRODUCT OR NAME OF CUSTOMER PROJECT: 100" BOWL MILL

Bharat Heavy Electricals Ltd.,
BOILER PLANT UNIT
TIRUCHIRAPALLI 620 014

	NAME	SIGN	DATE	NO OF VAR
DRN	S MANIVANNAN		15 3 82	
CHD	V SUBRAMANIAN		28-6-82	
APPD	S KRISHNAMURTHY			

REV	DATE	ALTERED / CHECKED
01		

DEPT: BMD (CODE 446) | GRADE OF UNTOL DIM: f M f | SCALE: 1:25 | WEIGHT (kg): 21 30 | REF TO ASSY / OCD DRG: D-GP-1872/1 | ITEM NO

TITLE: **JOURNAL HEAD INSERT**

CARD CODE: U 01

DRAWING NO: **3-61-096-00297**

REV: 0

PART NO.02071

Size A3

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 3-61-180-00554

SHT. 01 OF 01

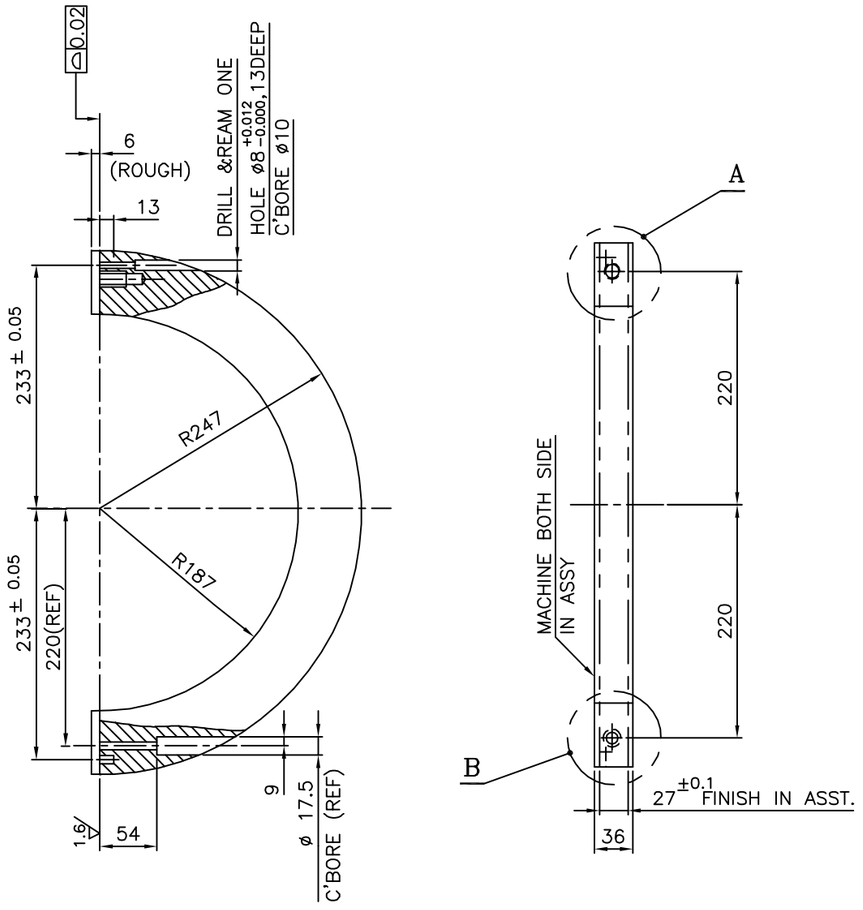
COMPUTER FILE NAME 36100554.DWG

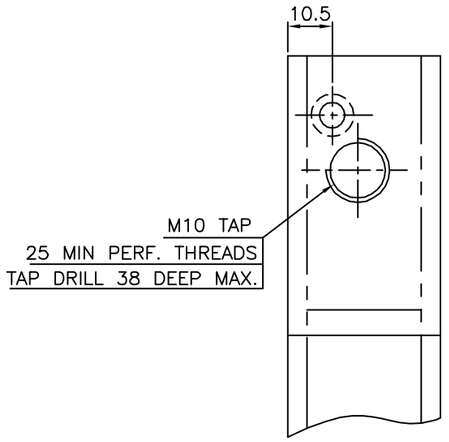
REF. DRG. NO.

SIGN. AND DATE

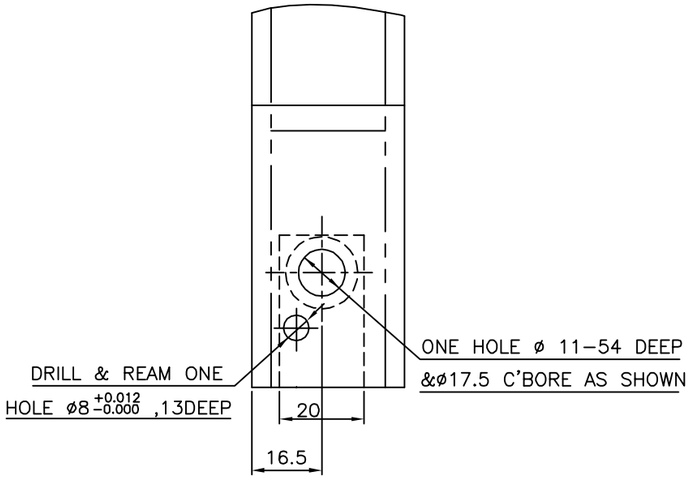
INVENTORY NO

1.6





DETAIL–A



DETAIL–B

NOTES:–

1. BREAK ALL SHARP EDGES & CORNERS
2. STRESS RELIEVE BEFORE MACHINING

01 * FINISHED WT.FOR THIS DRG. :11.56
* FINISHED W.T. IN ASSY (2–61–180–00611):5.33

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
	PLATE			36x253x494	AA1011819180	*	
					AA 10119		
					MATERIAL SPECN.	QUANTITY	

REV.	DATE	ALTERED	ZONE
03	27.07.98	CHD/APPD	DRG RETRACED ø8 +0.12 -0.000 WAS ø6 +0.12 -0.000
02	20.12.86	CHD/APPD	TOLERANCES ADDED ON DIMNS. 233 & 27 HOLE ø6 +0.012 -0.000 IN DETAIL-B WAS ø6.2.C BORE ø8 ADDED DOWEL HOLE WAS NOT THRO. NOTES ADDED. DIMNS 9,13 & 30 ADDED
01	7-12-85	CHD/APPD	MAT.SPEC.WAS BM-C16 MAT. CODE WAS 15-011-124 EAW MATERIAL DESCRIPTION WAS PL36x*253xø494
	DATE	CHD/APPD	

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: TARI 700–281

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

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

DEPT. BMO	UNTOL. DIMS. GR. f/M/f		SCALE 1:4 1:1	WEIGHT (KG) * 01	REF. TO ASSY. DRG. 2–61–180–00611	ITEM NO. 01	NO.OF ITEMS
CODE 446							

TITLE: SEAL RUNNER (HALF SECTION)

CARD CODE

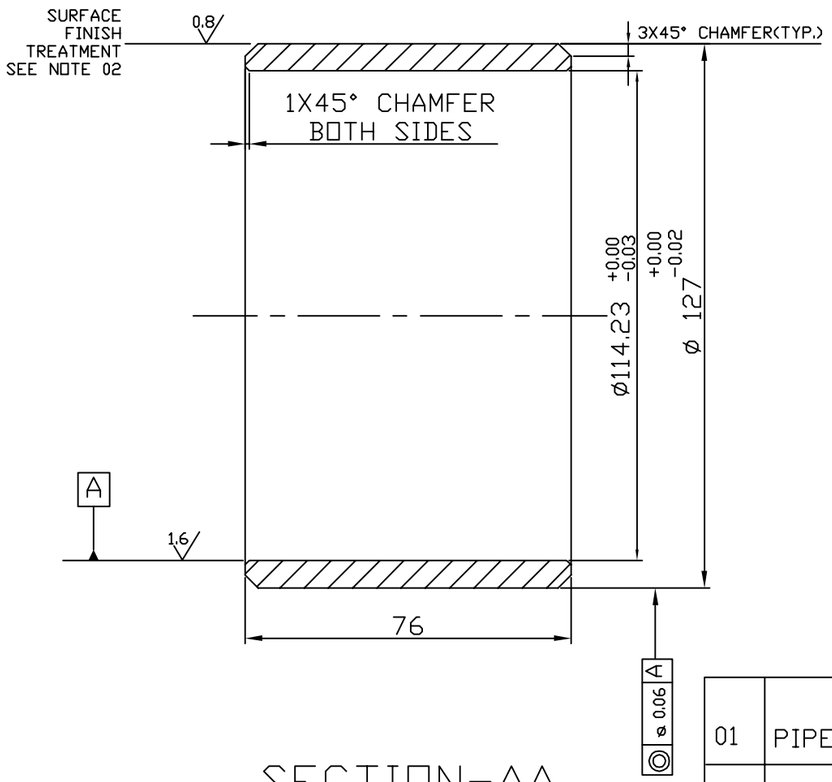
DRAWING NO. 3–61–180–00554 REV. 03

SHT. No 01 NO. OF SHT. 01

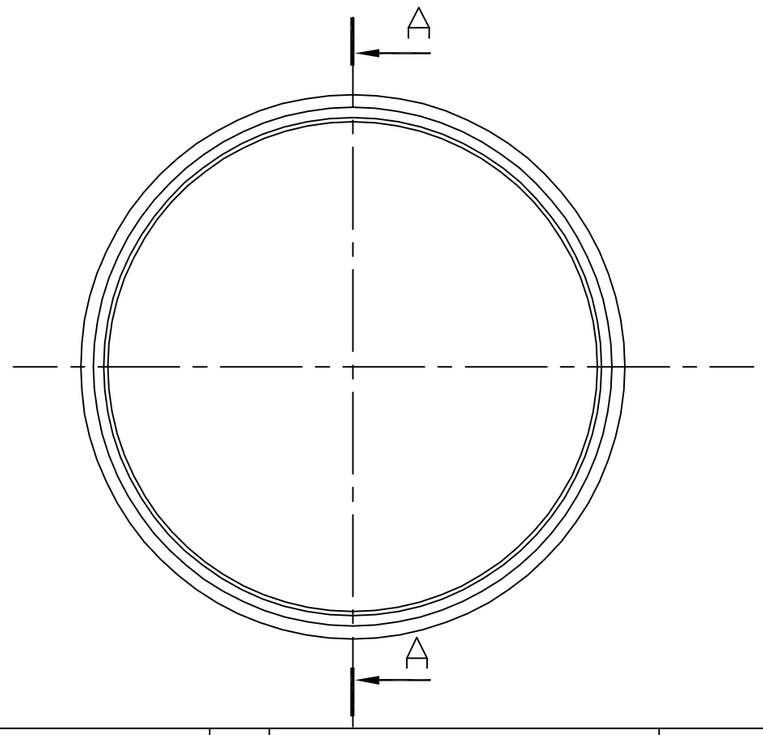
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG.NO. 3-61-180-00863



SECTION-AA



6.3 1.6 0.8

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
					MATERIAL SPECN.	QUANTITY	
01	PIPE		03	ø139.7X16-90L	HY1048655784	1.440	
					AA10455		
01	FORGING		02		BA9413254001	1.440	
					AA19332		
01	PLATE		01	PL 90Xø140	HY1051875277	1.440	
					HY10575		

NOTE:
01. MACHINE ALL SURFACES TO 6.3 UNLESS OTHERWISE SPECIFIED.
02. HARD CHROME PLATE THIS SURFACE TO A HARDNESS OF 60 TO 65 RC & RADIAL THICKNESS OF 0.08 TO 0.13.

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

REV.	DATE	ALTERED		REV.	DATE	ALTERED	
05	1.09.04	CHD. NDS	APPD. GK	04	11.07.03	CHD.	APPD.
ZONE	DIMN 114 +0.00 -0.03 WAS 114°0.025 ALL PREVIOUS REVISIONS			ZONE	DWG RETRACED INCORPORATING ALL PREVIOUS REVISIONS		

INVENTORY NO.
REF.DRG.NO.
FILE NAME 36100863.dwg

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 763 THRU-1003 XRP BOWL MILL

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	E.M.ASHOK		11.07.03	
CHD.	AMAN/NDS		11.07.03	
APPD.	S GHATGE		11.07.03	

DEPT.	PULVE.ENGG	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
CODE	446	1:1.2				

TITLE: WEAR SLEEVE

DRAWING NO. 3-61-180-00863 REV. 05

SHEET NO. 01 NO OF SHEETS 01

TD-151/REV. 03 SIZE A3

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

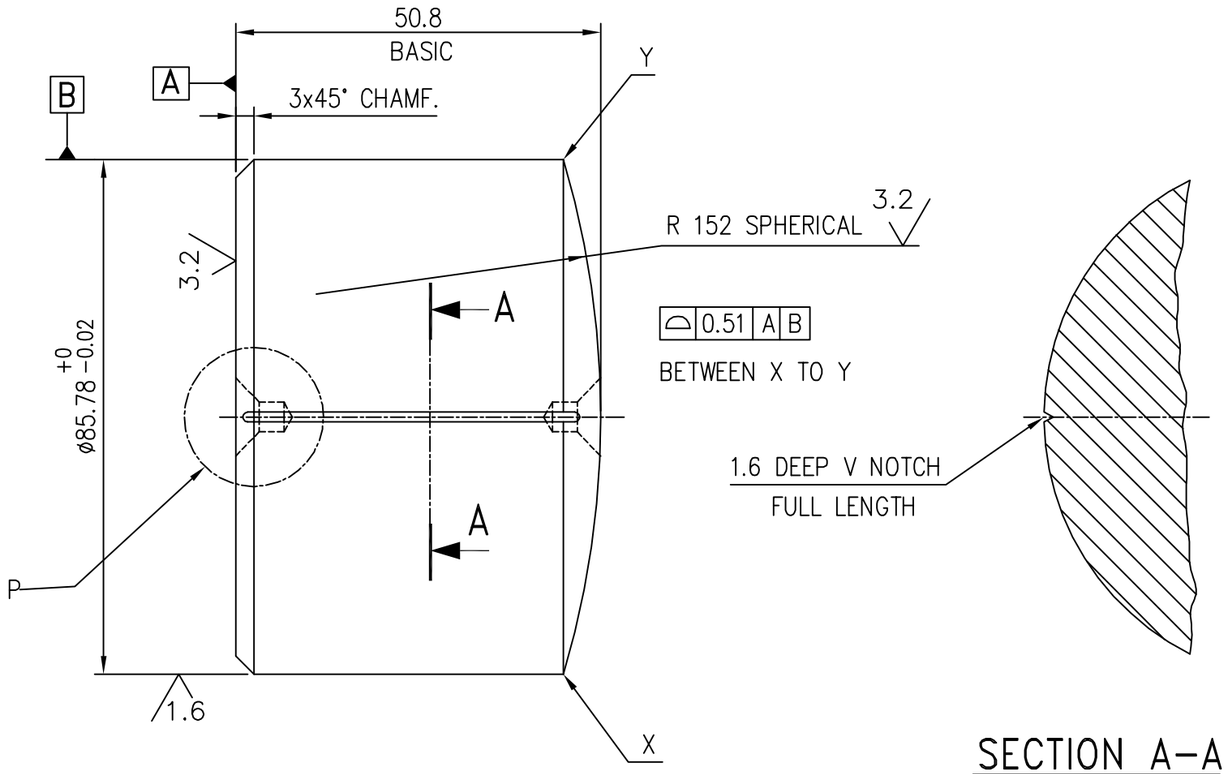
DJC

DRG.NO. 3-61-300-00694

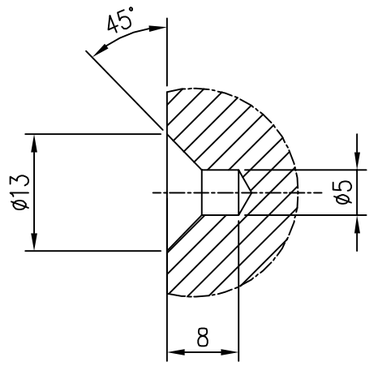
COMP. FILE NAME 36100694.DWG

REF.DRG.NO. B-101-01682-1

INVENTORY NO.



SECTION A-A



DETAIL P
BOTH ENDS

6.3 3.2 1.6

NOTE:

CASE CARBURISE TO A DEPTH OF 1.2±0.2 TO GET HARDNESS OF 58-62 RC.

ITEM No	DESCRIPTION	DRAWING No.	VAR. No.	RAW MATERIAL SIZE OR CASTING DRG.No. OR FORGING DRG. No.	MATERIAL CODE	NET WT.	GROSS WT.
					MATERIAL SPECN.	QUANTITY	
01	ROD ø100 – 70 LG				HY1050265262 HY10565	2.20 1	

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

REV.	DATE	ALTERED	CHECKED	APPD.
03	8.3.03	CASE CARBURISE NOTE,DETAIL P, CENTER HOLES ADDED. DIM 50.8 WAS 60.8.		
02	08.10.98	DRAWING REDRAWN ON CAD INCORPORATING ALL THE PREVIOUS REVISIONS.		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 883 XRP BOWL MILL

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE
DRN.	N.D.S		08.10.98
CHD.	S.G		08.10.98
APPD.	K.M.R		08.10.98

No.OF VAR. –

DEPT.	GRADE OF TOL. DIM.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM No.	No.OF ITEMS
PULV. ENGG. CODE 446	¢/M/f	1:1	2.20	1.61.388.01055	27	30

TITLE: SPRING STUD INSERT

DRAWING No. 3-61-300-00694 REV. 03

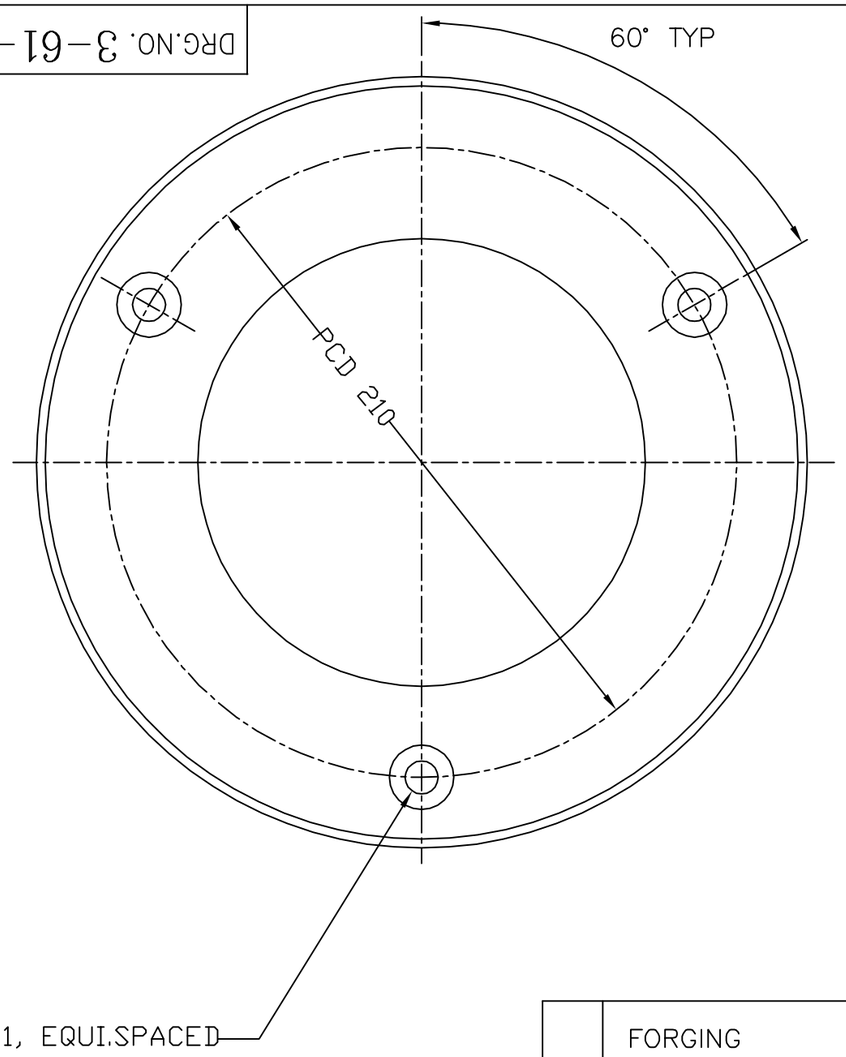
SHEET No. 1 No. OF SHEETS 1

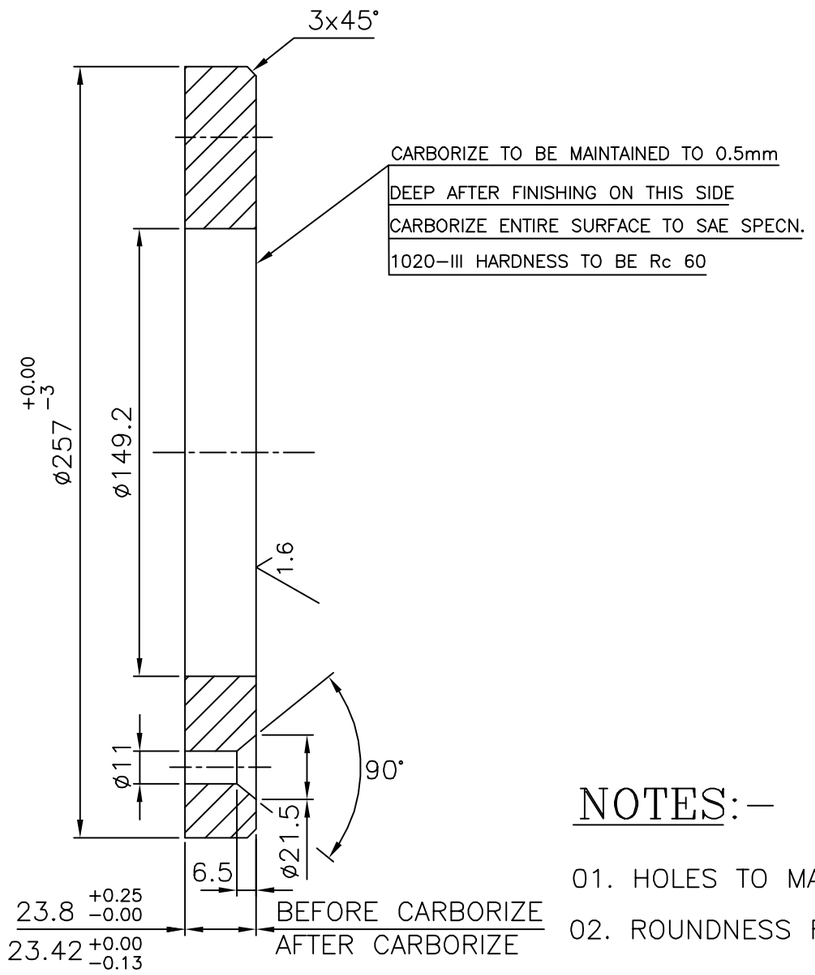
TD-151/REV. 03 SIZE A3

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG.NO. 3-61-376-00091





NOTES:-

01. HOLES TO MATCH WITH MATING PARTS.
02. ROUNDNESS RATING SHOWN ARE MAXIMUM.

	FORGING ø270x28				BA9516646000	6.90	
					HY19366		
ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
					MATERIAL SPECN.	QUANTITY	

REV.	DATE	ALTERED	CHD.	APPD.
ZONE				
05	971002	ALTERED UC	CHD.	APPD.
ZONE		DRG. REDRAWN BY INCORPORATING ALL THE PREVIOUS REV.		

INVENTORY NO.

REF.DRG.NO.

36100091.DWG
FILE NAME

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...

1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.
4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	UNIC		971002	
CHD.	B.M.R		971002	
APPD.	K.M.R		971002	

DEPT. PULV ENGG.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
CODE 446	1:2	6.90	40-F-002-029		

TITLE
THRUST PLATE
(THRUST END)

DRAWING NO. 3-61-376-00091 REV. 05

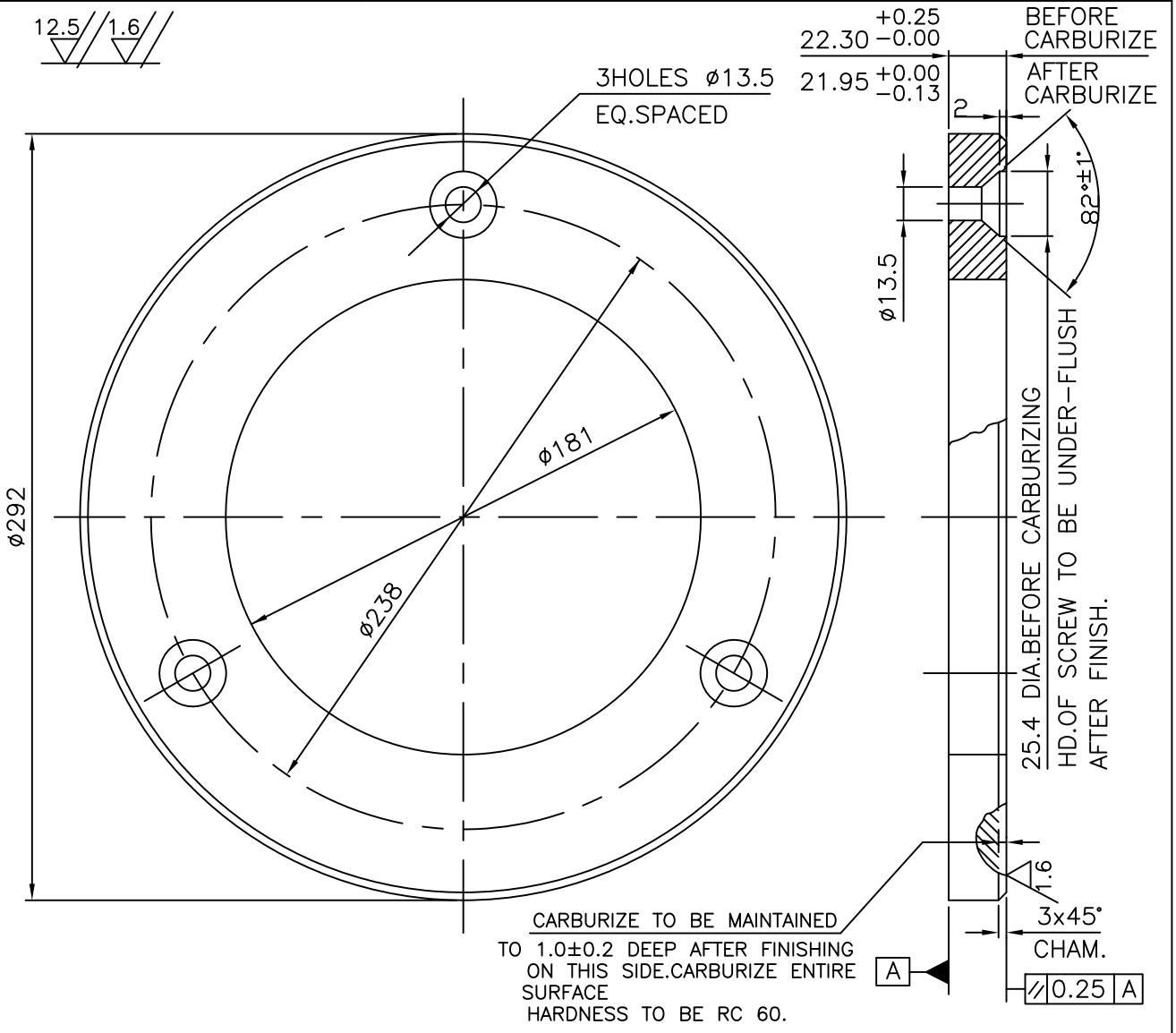
SHEET NO. 01 NO OF SHEETS 01

TD-151/REV. 03 SIZE A3

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN mm.

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED
02	1.4.99		03	27.02.02		04	10.09.02	CHECKED VGS / APPROVED
DRAWING REDRAWN INCORPORATING ALL PREVIOUS REVISIONS			1.0±0.2 WAS 0.5.			COUNTER BORE DEPTH 2.0 INDICATED		



FORGING 28xø300			BA9516646069	7.100
			HY19366	
DESCRIPTION & DRG.NO.	VAR NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATL. CODE	NET.WT. / GROSS WT
			MATL. SPECN.	QTY.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 1003 XRP BOWL MILL

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN	DATE
DRN.	VENKAT		10.9.02
CKD.	NDS		10.9.02
APPD.	SG		10.9.02

NO.OF VAR. −NA−

DEPT.	CODE	SCALE	WEIGHT(K.G.)	REF.TO ASSY.DRG.	ITEM NO.	NO.OF ITEM
PULV.ENGG.	446	1:2.5	7.100	(A−101−00163−2) 1−61−000−01233	−NA−	−NA−

TITLE: THRUST PLATE (THRUST END)

DRAWING NO. 4−61−000−00663 REV. 04

SHT.NO. 01 NO.OF SHT. 01

REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN mm.

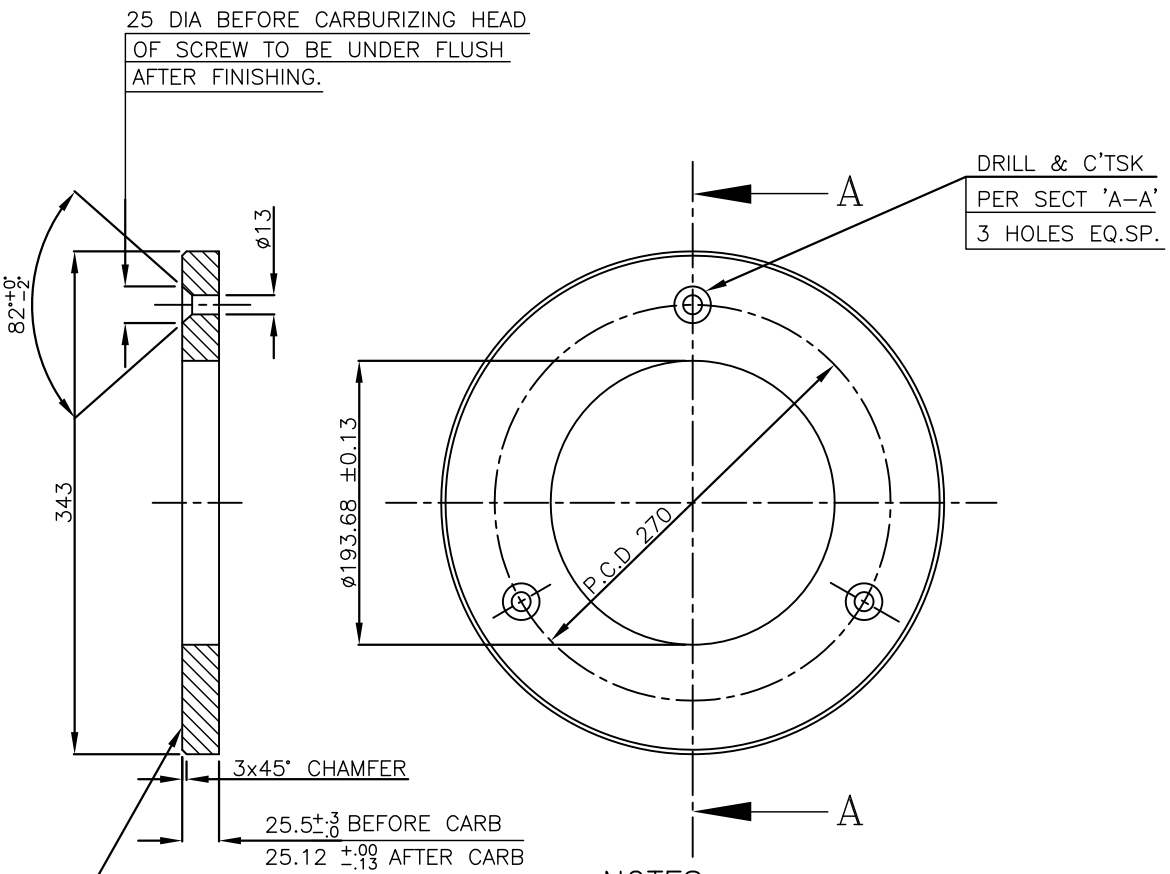
REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED

COMPUTER NO. 4610219O.DWG

REF. DRG. NO.

SIGN. & DATE

INVENTORY NO.



SECTION A–A

NOTES:–

1. MACHINE ALL SURFACES TO $\sqrt{}^{6.3}$ UNLESS OTHER WISE SPECIFIED.
2. ROUGHNESS RATINGS SHOWN ARE.MAXIMUM.

GENERAL DIMINSIONS,LIMITS,FITS & TOLERANCES AS PER P.S HY0230261

		FORGING	BA9516646077	12.300
			HY19366	1
DESCRIPTION & DRG.NO.	VAR NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATL. CODE	NET.WT. / GROSS WT
			MATL. SPECN.	QTY.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

	NAME	SIGN	DATE	NO.OF VAR.
DRN.	VENKATESH		21.09.05	NA
CKD.	AMAN		21.09.05	
APPD.	RAMANNA		21.09.05	

DEPT.	CODE	SCALE	WEIGHT(K.G.)	REF.TO ASSY.DRG.	ITEM NO.	NO.OF ITEM
PULVE ENGG	446	1:5	12.300	0–61–004–00571	05	32

TITLE

THRUST PLATE THRUST END

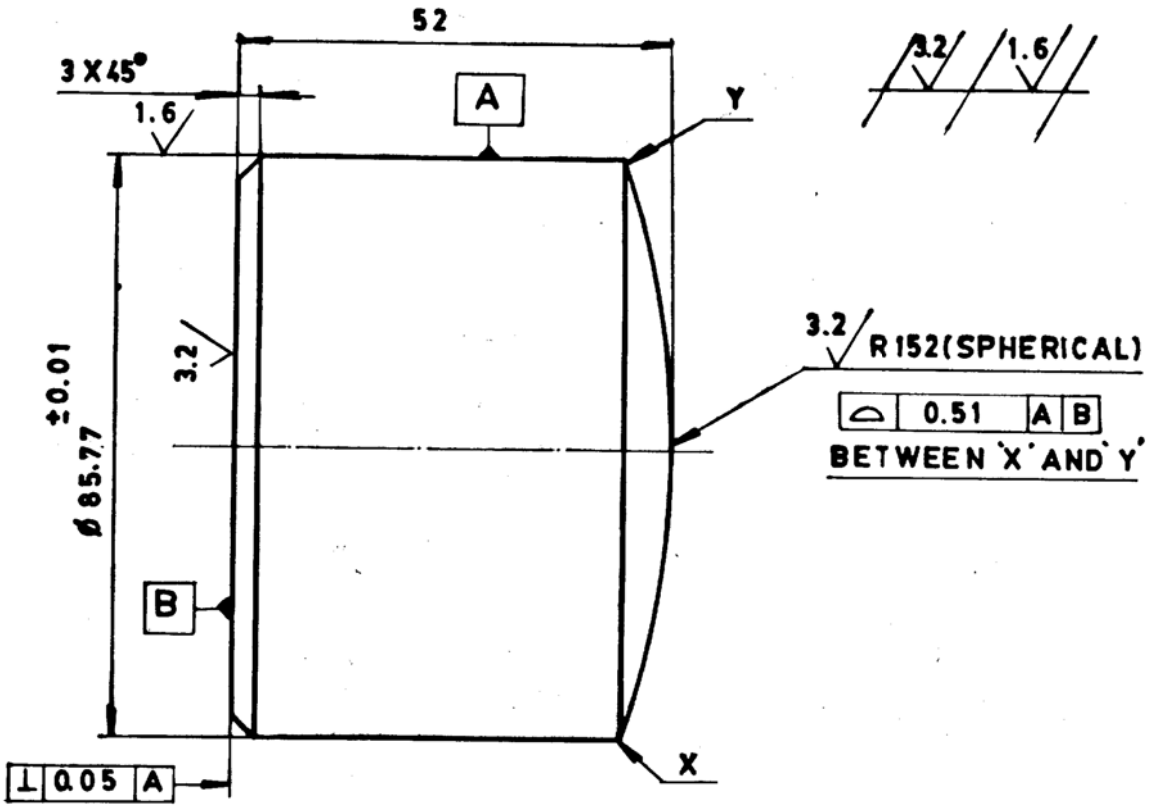
DRAWING NO. 4–61–004–02190

REV. 00

SHT.NO. 01 NO.OF SHT. 01

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

REV.	DATE	ALTERED / CHECKED	REV.	DATE	ALTERED / CHECKED	REV.	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE		



NOTES:

1. QUENCHED AND TEMPERED TO A SURFACE HARDNESS OF ROCKWELL C 58/62.
2. GEOMETRICAL TOLERANCES AS PER ANSI Y 14.5M

GENERAL DIMENSIONS, LIMITS, FITS & TOLERANCES AS PER P.S HY 0230261

REF. DRG. NO.					
	ROD Ø 90 X 60		HY 1050261259		2.180
			HY10561		1
REMARKS (65–75)	ITEM NO. (25–27)	DESCRIPTION (29–58)	STD. (59)	MATL. CODE (34–45)	UNIT WT. (58–65)
				MATL. SPCN. (46–54)	QTY. (66–71)
CARD TYPE-3 → 28		28 → CARD TYPE-2		28 → CARD TYPE-1	

SIGN. & DATE

	NAME	SIGN.	DATE
DRN.	EOL		
CHD.	N.D.S		24-7-93
APPD.	Y.S.B.L.RAO		24/7/93

BHARAT HEAVY ELECTRICALS LTD
HYDERABAD

NO. OF VAR. (73–74): -

INVENTORY NO.	DEPT.	GRADE OF TOL. DIM.		SCALE	WEIGHT (Kg)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS (75–77)
	BMD	¢/M/F		N.T.S	2.180	0-61-004-00571	19	32
	CODE 446							

TITLE
JOURNAL HEAD INSERT

CARD CODE (1–3)

DRAWING NO. (7–22): 4-61-004-02192

REV. (23–24): 00

SHEET NO. | NO. OF SHEETS

	AMENDMENT - NOTIFICATION	AA 085 01 18 REV. No. 01 PAGE 1 OF 1

AA 085 01 18:ULTRASONIC TESTING CLASSIFICATION AND ACCEPTANCE STANDARDS FOR STEEL FORGINGS, BILLETS AND BLOOMS

1.0 PAGE 1 OF 6; Cl 1.0 SCOPE:
Last sentence of the para is modified as follows:
"This standard does not apply to austenitic steel forgings for which AA 085 01 19 may be referred to."

2.0 Cl 3.2 Sensitivity:
Title of the left hand column of the table is modified as "Frequency, MHz" in place of Frequency range, MHz.

3.0 PAGE 2 OF 6; Cl 5.0 COUPLANT:
Last line is modified as "or water shall be used.

4.0 Cl 6.1: Eight line is modified as follows:
"shall not exceed 150mm/second. The following techniques"

Please see instructions on the reverse.

Ref:	Amd. No.	Approved	Issued	Date	Cum. Sr. No.
Cl:10.2.4 of MOM	01	WG-NDT	CORP. R&D	15.1.96	A 1822

ULTRASONIC TESTING, CLASSIFICATION AND ACCEPTANCE STANDARDS FOR STEEL FORGINGS, BILLETS AND BLOOMS

1.0 SCOPE:

This standard deals with the ultrasonic testing of steel forgings, billets and blooms. The procedure covers pulse echo direct contact manual ultrasonic flaw detection technique. This standard does not apply to austenitic steel forgings.

2.0 PERSONNEL REQUIREMENT:

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

3.0 EQUIPMENT CHARACTERISTICS:

3.1 Frequency range:

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

3.2 Sensitivity:

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

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

3.3 Resolution:

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

4.0 SURFACE CONDITION:

The test surface shall be free from loose scales, rust and such other extraneous material that would interfere with the ultrasonic energy transmission. In case of machined surface, it is desirable to have a surface finish of 6.25 microns or better. A gramophone record type of finish and tear produced by machining tools shall be avoided since these give rise to spurious echoes and cause probe wear.

5.0 COUPLANT:

To ensure adequate transmission of ultrasonic energy between the probe and the test object, a suitable couplant having good wetting characteristics such as oil, grease, water, glycerine or cellulose paste shall be used.

6.0 TESTING TECHNIQUE:

6.1 Selection of testing technique shall be made after giving due consideration to the method of manufacture and shape of the object tested. Testing technique should be such that each and every part of the object volume is scanned at least once. Successive scans shall overlap a minimum of 15% of the probe width. Uniform contact shall be maintained between probe and object and scanning speed shall not exceed 100 mm/ second. The following techniques are considered to be minimum for providing adequate coverage.

6.2 Scanning Scheme (Solid And Hollow Forgings):
Complete length of the forging shall be scanned radially from sides / cylindrical surface through 360° using longitudinal wave probe. Whenever practicable the forging shall be scanned in axial direction also. Hollow forgings, and when necessary, solid forgings also shall be scanned using appropriate shear wave probes to detect axial and radial cracks. Hollow forgings are the forgings made hollow on the press by punching or ring rolling operation.

6.3 Solid Rectangular Forgings, Billets And Blooms:
Complete length of the object shall be scanned from two adjacent faces and whenever practicable one end face using longitudinal wave probe.

6.4 Radial cracks on round sections which can not be detected by normal testing method may be subjected to other crack detection methods such as MPI.

7.0 SCANNING:

7.1 Probes and Frequency:
Overall scanning shall be done using 2 MHz nominal, 20-25 mm diameter probes except when large grain size and path length make it necessary to use a lower frequency. Smaller probes may be used when necessary. However, for forgings intended for backing material for white metal lined bearings, the examination shall be carried out by 4 MHz probes.

7.2 Time Base Calibration:
The time base shall be calibrated using a calibration block or a known dimension of forging under examination.

7.3 Sensitivity:

7.3.1 When Calibrated Attenuator Is Not Available:

Reference sensitivity of equipment shall be set such that the maximum acceptable defect equivalent flat bottomed hole in the test block is equal to 75% of the full screen height. Testing shall be carried out at the highest sensitivity possible.

7.3.2 When Calibrated Attenuator Is Available:

The sensitivity of the equipment during scanning shall be set 6 dB more than the sensitivity required to give a full screen height echo from the maximum acceptable size of defect.

Note: The above sensitivity level adjustment is purely for scanning purposes. Once a defect is encountered, the sensitivity shall be brought down to estimate the size of defect for evaluation of the material under test.

8.0 ESTIMATION OF FLAW SIZE:

8.1 Large Size Flaws:

The size of large flaws can be estimated by moving the probe in all directions and plotting the midpoint of the probe when echo falls to 50 percent or 6 dB.

8.2 Small Size Flaws:

8.2.1 When Calibrated Attenuator Is Not Available:

8.2.1.1 The size of the flaw may be estimated by comparing with the echoes of the flat bottomed holes at appropriate depths in a test block of ultrasonically similar material.

8.2.1.2 The size of the flaw may also be estimated by moving probe successively in all the four directions at right angles to each other and plotting the mid point of the probe when echo height falls to 50% or 6 dB. Due allowance shall also be made for beam spread, depth and orientation of flaw and diameter of the forging if the scanning is done from the curved surface.

8.2.2 When Calibrated Attenuator Is Provided With The Equipment:

The size of the flaw (smaller than the beam spread) can be estimated accurately in millimetres of equivalent circular flaw with the help of Krautkramer's DGS (Distance - gain - size) diagram. Method of estimating flaw size using a DGS diagram is given in Annexure - A.

9.0 CLASSIFICATION OF FORGINGS, BILLETS AND BLOOMS:

9.1 Forgings, billets and blooms are classified into the following five categories depending upon the defect size admissibility for the purpose of ultrasonic testing:

Category	Unacceptable defects
1	(i) Cracks, flakes, seams & laps. (ii) Defects giving indication larger than that from a 2 mm diameter equivalent flaw. (iii) Groups of defects with maximum indication less than that from a 2 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 70%. (iv) Defects giving indications of 1 to 2 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.
2	(i) Cracks, flakes, seams & laps. (ii) Defects giving indication larger than that from a 4 mm diameter equivalent flaw. (iii) Groups of defects with maximum indication less than that from a 4 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 50%. (iv) Defects giving indications of 2 to 4 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.
3	(i) Cracks, flakes, seams & laps. (ii) Defects giving indication larger than that from a 6 mm diameter equivalent flaw. (iii) Groups of defects with maximum indication less than that from a 6 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 40%. (iv) Defects giving indications of 3 to 6 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.
4	(i) Cracks, flakes, seams & laps. (ii) Defects giving indication larger than that from a 10 mm diameter equivalent flaw. (iii) Groups of defects with maximum indication less than that from a 10 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 20%.

(iv) Defects giving indications of 5 to 10 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.

5 (i) Cracks, flakes, seams & laps.
(ii) Defects giving indication larger than that from a 15 mm diameter equivalent flaw.
(iii) Groups of defects with maximum indication less than that from a 15 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 10%.

Note: Loss of back wall echo not attributable to the presence of defects or geometry and exceeding the limits mentioned in item (iii) of each category of unacceptable defects shall be a cause for rejection.

ANNEXURE - A

The equivalent flaw size curves of the DGS diagram is prepared by plotting the amplitude in decibels from a series of circular reflectors with increasing distance from the probe in water and so the graph incorporates only the loss in water. When it is found that the attenuation in the material under test is more (this can be checked using back echo curve of DGS diagram), this shall be taken into account while calculating the flaw size. Corrections will not be required for majority of heat treated forgings when tested with 2-4 MHz probes.
A step by step method of estimating flaw size using universal DGS diagram is given below:

(a) Adjust the depth range of the equipment to the required depth.

(b) Adjust the back echo to 70% of screen height from a defect free area parallel wall of the material under test or ultrasonically similar test block and note the dB value (A) on the calibrated gain control.

(c) Mark on the back echo curve of the diagram, the back wall of the distance in terms of near field in millimetres in the case of universal DGS diagram.

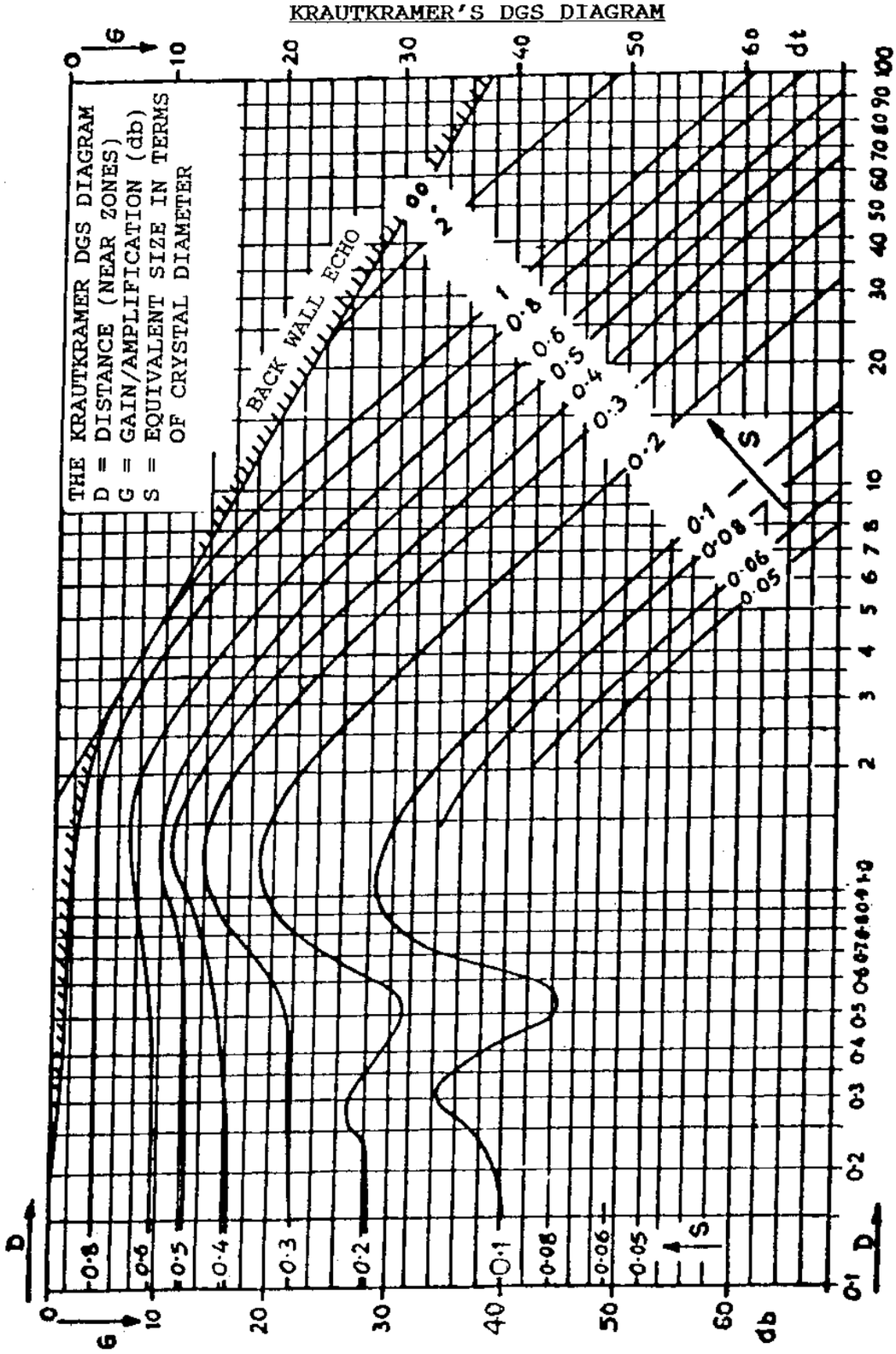
(d) Move the probe to the defective area and get the maximum defect echo. Read off the flaw depth. Increase the gain with the calibrated gain control until echo height reaches 70% of screen height. Note the attenuator reading in dB (B).

(e) Calculate the gain (G) in dB by subtracting 'A' from 'B'. Count off the gain 'G' downwards from the marked point on the back echo curve, and then move horizontally to intersect the vertical line from the base line corresponding to the flaw depth 'D' in terms of near field in the case of universal diagram.

(f) Note the equivalent flaw size curve passing through the above point. Multiply the reduced flaw dimension (S) of the curve by the probe diameter to give the equivalent flaw size in millimetres.

ANNEXURE - A

KRAUTKRAMER'S DGS DIAGRAM



BHEL	**AMENDMENT -- NOTIFICATION**	**AA 085 01 04 Rev. No. 01** **PAGE 1 OF 1**

1.0 TITLE: Title of the standard is changed as below:

"ULTRASONIC EXAMINATION, ACCEPTANCE STANDARDS AND CLASSIFICATION OF CARBON. LOW ALLOY AND MARTENSITIC STEEL CASTINGS"

(Change is underlined)

2.0 C1.1: SCOPE: Scope of the standard is modified as below:

"This standard details the ultrasonic testing procedure, acceptance standards and classification of carbon, low alloy and martensitic steel castings."

3.0 Cl.4: This clause is modified as below:

PERSONNEL REQUIREMENT:

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

REF: C1.8.7of MOM OF WG (NDT)	AMD. NO. 01	APPROVED WG (NDT)	Issued Corp. R&D	DATE June '93	CUM.SR.NO. A 1274

ULTRASONIC EXAMINATION, ACCEPTANCE STANDARD AND CLASSIFICATION OF STEEL CASTINGS

1. SCOPE:

This standard details the ultrasonic testing procedure* acceptance standard and classification of steel castings.

2. STAGE OF EXAMINATI ON:

Ultrasonic examination shall be generally carried out after heat treatment of the casting and rough machining, if called for in the order. Ultrasonic examination shall be repeated after weld rectification, if any.

3. SURFACE PREPARATION:

Smooth "as cast" surface, free from adhered or fused sand and irregularities is adequate for ultrasonic examination. Loose scales and excessive surface irregularities such as that caused by removal of runner and riser shall be ground off. While grinding care shall be taken to avoid surface undulations which would interfere with probe contact. . To improve coupling efficiency of as cast surfaces or to remove rust or paint, shot-blasting or sand-blasting may be carried out . Rough machined surfaces should have a minimum surface finish of 6.2 microns.

4. OPERATING PERSONNEL:

The operator performing the ultrasonic test shall be conversant with the ultrasonic techniques and the equipment.

5. EQUIPMENT CHARACTERISTICS:

5.1 Frequency Range:

The equipment shall be capable of operating over a frequency range of at least 0.5 to 12 MHz

5.2 CRT Screen Presentation:

"A" scope presentation shall be used. The trace shall be well defined, easy to read and associated with permanent graticule scale marking for both range and amplitude.

5.3 Linearity Of Amplification:

The amplifier shall be linear within + 2dB upto at least1/2full screen height and any deviation above this should be known to the operator. Suppression affects linearity and the effect of suppression over full range should be recorded.

5. 4 Linearity Of Time Base:

The time base shall be linear as far as possible and non- linearity should not exceed 1% of the full scale graticule reading.

5.5 Resolution:

The resolution of probe and flaw detection apparatus shall be such as to show separately the indications from two or more nearby reflecting surfaces separated by twice the wave length.

5.6 Sensitivity of The Equipment:

The sensitivity of the equipment shall be checked with the longitudinal wave probes used, by placing the probe on the metalised surface of the plastic insert of IS:4904/IIW test block. The minimum number of multiple echoes from the plastic insert at full gain setting shall be as given below:

Frequency range, MHz	Number of multiple echoes
1 2 4 2	5 4 to 6

6. COUPLANT:

To ensure adequate transmission of ultrasonic energy between probe and casting, a suitable couplant having good wetting characteristic shall be used. oil, glycerin or Polycell paste may be used. For better adoption of cast surfaces, a thin protective plastic cover over the longitudinal probe is recommended.

7. TESTABILITY OF CASTINGS:

The testability of a casting is expressed as the minimum equivalent flaw size discernible with sufficient accuracy. The echo height of largest allowable equivalent flaw at the back wall distance shall be at least 8 dB above grass level. The testability can be determined on a parallel wall area of the casting using either a DGS diagram or a test block containing the appropriate flat bottomed hole. The surface quality of the test block should correspond to that of the casting. Sufficient testability is proved when the following condition is fulfilled.

Type of probe	**Discernible defect size 8dB Above noise level, mm**
2-4 MHz Normal beam probe (Tested from one side)	3 or (Largest size allowable)

8. TESTING PROCEDURE:

8.1 Selection Of Probes:

For all ultrasonic examinations, the highest frequency compatible with the size, metallurgical condition and thickness of the casting shall be used.

8.2 Testing Technique:

While selecting testing technique the following factors must be taken into account.

(i) Type, orientation, position and incidence of defects likely to be encountered in the casting under consideration.

(ii) Thickness and profile of the section.

(iii) Structural condition.

All parts of the casting surface where a contact probe can be used, shall be tested by overlapping scans (20 - 25 mm) with normal beam probes, irrespective of casting geometry and availability of reference back echo. Normal beam probe of minimum 2 MHz frequency shall be used but shall be augmented by a thorough shear wave examination of location where the manufacturing method of the casting gives rise to features which may cause internal planer defects due to risers, chills, fillets, brackets, bosses and changes in section thickness, when examining areas of the casting which are to be further machined, a double crystal probe shall be used to reveal defects very near to the surface. This type of probes may also be used for the examination of thin sections and weld repaired areas, to determine depth of flaws, etc. Smaller diameter probes may be used for more critical examination of suspected areas. Testing shall be carried out from both sides of the wall wherever possible to assess the loss in wall thickness.

9. EQUIPEMNT CALIBRATION:

9.1 Depth Range:

The depth range of the equipment shall be adjusted for normal and shear wave probes Using known thickness of the casting or standard calibration block. When latter is Used, velocity difference, if any, should be taken into account.

9.2 Sensitivity:

The scanning sensitivity of the apparatus shall be adjusted using either DGS diagram or standard test block with flat bottomed hole so that maximum acceptable equivalent defect will give an indication height of 75% screen height +8 dB. When test block is used for sensitivity calibration, distance amplitude curve shall be plotted on CRT screen to facilitate .

Correct defect size assessment. While estimating the size of defect, compensation shall also be made for difference in surface condition and attenuation in the test block and casting

10. SIGNIFICANT ULTRASONIC INDICATIONS:

The following ultrasonic indications are significant and must be considered during testing of castings :

(a) All defect echoes beyond the acceptance level.
(b) All echo indications which suggest crack like planer defects perpendicular to/approximately Perpendicular to the test surface.
(c) Loss of back echoes occurring not due to the casting geometry. (If loss of back echo cannot Be attributed to the presence of a defect inspite of examining with different transducers, Then such loss shall not exceed 75%).

11. ACCEOTABCE STANDARD:

The casting wall is divided into four zones as shown below:

Zone 1 : Middle 1/3 wall thickness
Zone 2 : Outer 1/3 wall thickness but not less than 16mm
Zone 3 : Inner 1/3 wall thickness but not less than 16 mm
Zone 4 : 16 mm from surface of zone 2 if machined and 16 mm from surface of zone 3 whether machined or unmachined

The castings are categorised into three levels according to the size distribution and number of defects permissible .

Ultrasonic indications exceeding those shown in the table below as well as cracks, Hot tears and cold shuts are unacceptable.

DEFECT PARAMETER	CLASSC IFICATION LEVEL	ZONE 1	ZONE 2 & 3	ZONE 4
A. Equivalent flaw dia.	W*	3	3	3
As fraction of	I	1/5 WT** 10	1/8 WT 6	1/16 WT 3
Wall thickness in mm	II	1/5 WT 10	1/8 WT 6	1/16 WT 3
	III	1/4 WT 12	1/6 WT 8	1/12 WT 4
B. Decrease of back-echo in	W *	Not allowed	Not allowed	Not allowed
Percentage associated	I	90	75	“
With the defect	II	90	75	“
	III	95	85	”
C. Thickness of detect as	W *	5 3 mm	5 3mm	5 3mm
Percentage of	I	15	10	5
Wall thickness	II	15	10	5
	III	20	15	10
D. Length of defect in mm	W *	3	3	3
(See Note below)	I	100	75	12
	II	120	100	50
	III	150	120	75
E. Area of individual defect	W *			
In cm	I	120	10	0.25
	II	150	20	0.50
	III	200	30	10
F. Accumulated area of defect	W *			
In 1000 cm area	I	200 cm	10 cm	2.5 cm
	II	300 cm	40 cm	5 cm
	III	400 cm	60 cm	10 cm
G. Minimum distance between	W *	6L+	6L+	6L+
defects ‘X’ (See Fig. 1)	I	4L	4L	6L
	II	4L	4L	6L
	III	4L	4L	6L

***W=** Fabrication Weld Zone : 75 mm length from the edges shall constitute the fabrication weld zone which excludes the excess machining allowance. In the case of unacceptable defects beyond 30 mm from the edge^ they may be referred to BHEL for further evaluation with respect to'acctual weld preparation.

** **WT =** wall thickness

L+ = Length of defects

Note (For item D):

Close by defects will be treated as a single defect if the distance between the extremities of the adjacent defects is less than the length of the longest defect. The total length of the defect shall be considered as the length of the flaws plus the distance in between.

Minimum Distance Between Defects 'X' (For item G)

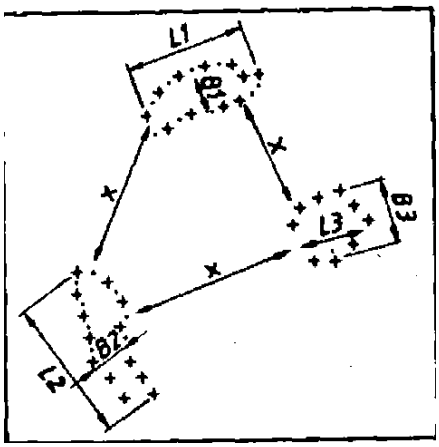


Fig – 1

L= Length of defect
B= Breadth of defect
X= Minimum distance between defects

ULTRASONIC TESTING, CLASSIFICATION AND ACCEPTANCE STANDARDS FOR STEEL FORGINGS, BILLETS AND BLOOMS

1.0 SCOPE:

This standard deals with the ultrasonic testing of steel forgings, billets and blooms. The procedure covers pulse echo direct contact manual ultrasonic flaw detection technique. This standard does not apply to austenitic steel forgings for which AA0850119 may be referred to.

2.0 PERSONNEL REQUIREMENT:

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

3.0 EQIPMENT CHARACTERISTICS:

3.1. Frequency range:

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

3.2. Sensitivity:

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

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

3.3. Resolution:

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

4.0 SURFACE CONDITION:

The test surface shall be free from loose scales, rust and such other extraneous material that would interfere with the ultrasonic energy transmission. In case of machined surface, it is desirable to have a surface finish of 6.25 microns or better. A gramophone record type

of finish and tear produced by machining tools shall be avoided since these give rise to spurious echoes and cause probe wear.

5.0 COUPLANT:

To ensure adequate transmission of ultrasonic energy between the probe and the test object, a suitable couplant having good wetting characteristics such as oil, grease, glycerine or water shall be used.

6.0 TESTING TECHNIQUE:

6.1. Selection of testing technique shall be made after giving due consideration to the method of manufacture and shape of the object tested. Testing technique should be such that each and every part of the object volume is scanned at least once. Successive scans shall overlap a minimum of 15% of the probe width. Uniform contact shall be maintained between probe and object and scanning speed shall not exceed 150 mm/ second. The following techniques are considered to be minimum for providing adequate coverage.

6.2. Scanning Scheme (Solid And Hollow Forgings):

Complete length of the forging shall be scanned radially from sides/cylindrical surface through 360° using longitudinal wave probe. Whenever practicable the forging shall be scanned in axial direction also. Hollow forgings, and when necessary, solid forgings also shall be scanned using appropriate shear wave probes to detect axial and radial cracks. Hollow forgings are the forgings made hollow on the press by punching or ring rolling operation.

6.3. Solid Rectangular Forgings, Billets and Blooms: Complete length of the object shall be scanned form two adjacent faces and whenever practicable one end face using longitudinal wave probe.

6.4. Radial cracks on round sections which cannot be detected by normal testing method may be subjected to other crack detection methods such as MPI.

7.0 SCANNING:

7.1. Probes and Frequency:

Overall scanning shall be done using 2 MHz nominal, 20-25 mm diameter probes expect when large grain size and path length make it necessary to use a lower frequency. Smaller probes may be used when necessary. However, for forgings intended for backing material for white metal lined bearings, the examination shall be carried out by 4 MHz probes.

7.2. Time Base Calibration:

The time base shall be calibrated using a calibration block or a known dimension of forging under examination.

7.3. Sensitivity:

7.3.1. When Calibrated Attenuator is Not Available:

Reference sensitivity of equipment shall be set such that the maximum acceptable defect equivalent flat bottomed hole in the test block is equal to 75% of the full screen height. Testing shall be carried out at the highest sensitivity possible.

7.3.2. When Calibrated Attenuator is Available:

The sensitivity of the equipment during scanning shall be set 6 dB more than the sensitivity required to give a full screen height echo from the maximum acceptable size of defect.

Note: The above sensitivity level adjustment is purely for scanning purposes. Once a defect is encountered, the sensitivity shall be brought down to estimate the size of defect for evaluation of the material under test.

8.0 ESTIMATION OF FLAW SIZE:

8.1. Large Size Flaws:

The size of large flaws can be estimated by moving the probe in all directions and plotting the midpoint of the probe when echo falls to 50 percent or 6 dB.

8.2. Small Size Flaws:

8.2.1. When Calibrated Attenuator is Not Available:

8.2.1.1. The size of the flaw may be estimated by comparing with the echoes of the flat bottomed holes at appropriate depths in a test block of ultrasonically similar material.

8.2.1.2. The size of the flaw may also be estimated by moving probe successively in all the four directions at right angles to each other and plotting the midpoint of the probe when echo height falls to 50% or 6 dB. Due allowance shall also be made for beam spread, depth and orientation of flaw and diameter of the forging if the scanning is done from the curved surface.

8.2.2. When Calibrated Attenuator is Provided With The Equipment:

The size of the flaw (smaller than the beam spread) can be estimated accurately in millimetres of equivalent circular flaw with the help of Krautkramer's DGS (Distance – Gain – Size) diagram. Method of estimating flaw size using a DGS diagram is given in Annexure - A.

9.0 CLASSIFICATION OF FORGINGS, BILLETS AND BLOOMS:

9.1. Forgings, billets and blooms are classified into the following five categories depending upon the defect size admissibility for the purpose of ultrasonic testing:

Category	Unacceptable defects
1	i) Cracks, flakes, seams & laps. ii) Defects giving indication larger than that from a 2 mm diameter equivalent flaw. iii) Groups of defects with maximum indication less than that from a 2 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 70%. iv) Defects giving indications of 1 to 2 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.

CORPORATE STANDARD

Category	Unacceptable defects
2	i) Cracks, flakes, seams & laps. ii) Defects giving indication larger than that from a 4 mm diameter equivalent flaw. iii) Groups of defects with maximum indication less than that from a 4 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 50%. iv) Defects giving indications of 2 to 4 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.
3	i) Cracks, flakes, seams & laps. ii) Defects giving indication larger than that from a 6 mm diameter equivalent flaw. iii) Groups of defects with maximum indication less than that from a 6 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 40%. iv) Defects giving indications of 3 to 6 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.
4	i) Cracks, flakes, seams & laps. ii) Defects giving indication larger than that from a 10 mm diameter equivalent flaw. iii) Groups of defects with maximum indication less than that from a 10 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 20%. iv) Defects giving indications of 5 to 10 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.
5	i) Cracks, flakes, seams & laps. ii) Defects giving indication larger than that from a 15 mm diameter equivalent flaw. iii) Groups of defects with maximum indication less than that from a 15 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 10%.

Note: Loss of back wall echo not attributable to the presence of defects or geometry and exceeding the limits mentioned in item (iii) of each category of unacceptable defects shall be a cause for rejection.

ANNEXURE - A

The equivalent flaw size curves of the DGS diagram is prepared by plotting the amplitude in decibels from a series of circular reflectors with increasing distance from the probe in water and so the graph incorporates only the loss in water. When it is found that the attenuation in the material under test is more (this can be checked using back echo curve of DGS diagram), this shall be taken into account while calculating the flaw size. Corrections will not be required for majority of heat treated forgings when tested with 2-4 MHz probes.

A step by step method of estimating flaw size using universal DGS diagram is given below:

(a) Adjust the depth range of the equipment to the required depth.

(b) Adjust the back echo to 70% of screen height from a defect free area parallel wall of the material under test or ultrasonically similar test block and note the dB value (A) on the calibrated gain control.

(c) Mark on the back echo curve of the diagram, the back wall of the distance in terms of near field in millimetres in the case of universal DGS diagram.

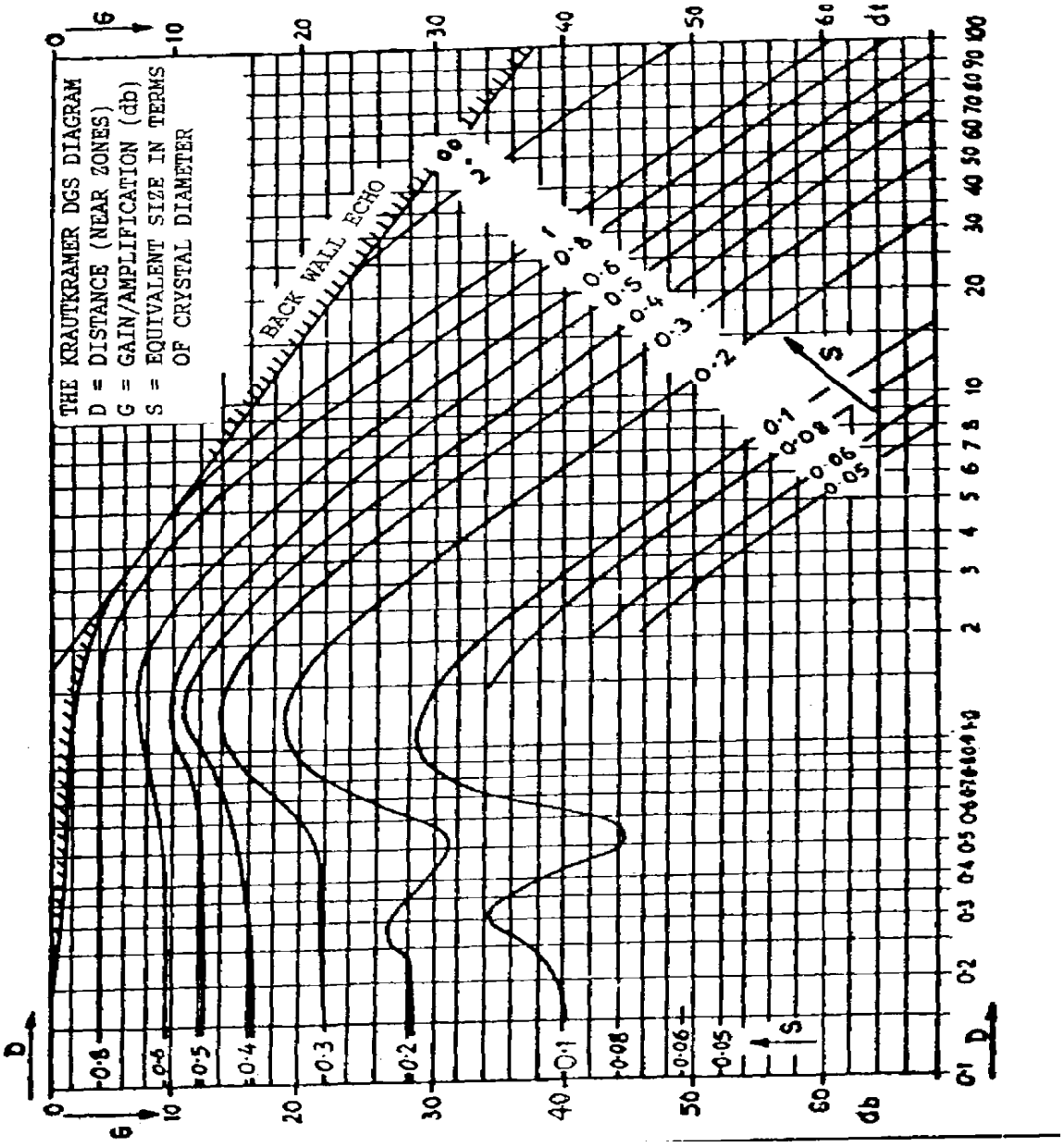
(d) Move the probe to the defective area and get the maximum defect echo. Read off the flaw depth. Increase the gain with the calibrated gain control until echo height reaches 70% of screen height. Note the attenuator reading in dB (B).

(e) Calculate the gain (G) in dB by subtracting 'A' from 'B'. Count off the gain 'G' downwards from the marked point on the back echo curve, and then move horizontally to intersect the vertical line from the base line corresponding to the flaw depth 'D* in terms of near field in the case of universal diagram.

(f) Note the equivalent flaw size curve passing through the above point. Multiply the reduced flaw dimension (S) of the curve by the probe diameter to give the equivalent flaw size in millimetres.

ANNXXURE - A

KRAUTKRAMER'S DGS DIAGRAM



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:	APPROVED:
Clause No. 1, 3, 5 & 8 revised (as per MOM of 38th MRC meeting), Clause 10 added	INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(S&GPS)

Rev No.15	Amd No.	Reaffirmed	Prepared	Issued	Dt. of 1st Issue
Dt:11-03-2014	Dt:	Year:	HPEP, Hyderabad	Corp.R&D	June, 1976

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	AA10455
		Rev No.10
		PREFACE SHEET

CARBON STEEL SEAMLESS PIPES FOR HIGH TEMPERATURE SERVICE

FOR INTERNAL USE ONLY
REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS

Equivalent/Comparable Standards:

1. AMERICAN : ASME SA106, Gr:B

Suggested/Probable Suppliers and Grades:
Refer User plant vendors list

User Plant References:

1. HEP, BHOPAL : PS10145 / PS10151 / PS10158
2. HEEP, HARDWAR : ---
3. HPEP, HYDERABAD : ASTM A106, Gr:B
4. HPBP, TRICHY : TDC:1-001/C
5. PC, CHENNAI : ASTM A106, Gr:B

21/12/18

CS-944

DRC-5211

Revisions: Cl.No.10 revised in line with latest IBR requirement			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(FCF+HTM)		
Rev No.10	Amd No.01	Reaffirmed	Prepared	Issued	Dt. of 1st Issue
Dt:08-12-2018	Dt:20-12-2018	Year:	HPBP, Trichy	Corp.R&D	June, 1978

	CORPORATE PURCHASING SPECIFICATION	AA10455
		Rev No. 10
		PAGE 1 of 2

CARBON STEEL SEAMLESS PIPES FOR HIGH TEMPERATURE SERVICE

(ORDERING DESCRIPTION FOR ASME SA106, Gr: B ATTESTED MATERIAL)

1 GENERAL:

The pipes shall conform to the latest version for ASME SA106, Gr:B and comply with the following additional requirements.

2 APPLICATION:

For high temperature service at stress levels and temperatures allowed by ASME Boiler & Pressure Vessel Code, Section I & Indian Boiler Regulations.

3 DIMENSIONS AND TOLERANCES:

3.1 Sizes

Pipe OD X Thickness shall be as specified on BHEL order. Unless otherwise specified, pipes shall be supplied in single random lengths of 4.8 to 6.7 meters.

3.2 Tolerances

As per ASME SA 530

4 MANUFACTURE

Either hot finished or cold drawn.

5 CHEMICAL COMPOSITION

Carbon content shall be restricted to 0.25%, max

6 MECHNICAL PROPERTIES

6.1 Bend Test

One pipe per melt / size upto 60.3mm OD (nominal size) shall be subjected to bend test as per ASME SA106.

6.2 Flattening

One pipe per melt / size over 60.3 mm OD (nominal size) shall be subjected to flattening test at one end of the pipe as per ASME SA106.

For pipes of sizes 10 inches and above (≥ 254 mm) may be bend tested as per ASME SA106.

7 HYDROSTATIC TEST / NDT

Each length of pipe shall be subjected to Hydrostatic test as per ASME SA530.

As an alternative to the Hydrostatic test, each length of pipe shall be subjected to NDT as given below:

a) For thickness upto 3.6mm, inclusive, Eddy current test as per ASME SE309 or for thickness upto 12mm, inclusive, Flux leakage test as per ASME SE570

or

Revisions: Cl.No.10 revised in line with latest IBR requirement			**APPROVED:** INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(FCF+HTM)		
Rev No.10	Amd No.	Reaffirmed	Prepared HPBP, Trichy	Issued Corp.R&D	Dt. of 1st Issue June, 1978
Dt:08-12-2018	Dt:	Year:			

CS-944 21/7/19

CORPORATE PURCHASING SPECIFICATION

b) Ultrasonic test as per ASME SE213.

Norms of acceptance shall be as specified in the respective standards mentioned above.

8 INSPECTION AT SUPPLIER'S WORKS

BHEL's representative shall have free access at all times to all parts of the manufacture's works, until the work on the contract of BHEL is being performed. The manufacturer shall offer BHEL's representative all reasonable facilities, without charge, to satisfy the latter that the material is being furnished in accordance with the specification.

9 REPAIRS

1) Repair involving fusion welding is prohibited.

2) When defects are repaired by mechanical means, the wall thickness requirements shall be satisfactorily met with and the surfaces shall be smoothly dressed up without any sharp edges.

10 CERTIFICATION:

Certification in IBR Form III-A for finished pipes from "IBR-Well Known Pipe Maker" or "Inspecting Authority", as applicable, shall be submitted to BHEL.

11 PACKING AND MARKING:

As per BHEL Standard AA0490001.

12 REJECTION & REPLACEMENT

If each length of pipe does not comply with the requirements of this specification during receipt inspection at BHEL or if any defect is found during further processing of pipes 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

13 REFERRED STANDARDS (Latest publications including amendments):

1) ASME SA530 2) ASTM A370 3) ASME SE309 4) ASME SE570

5) ASME SE213 6) AA0490001

CE-944 24/1/18

CARBON STEEL FORGINGS, CLASS-3 Î

1.0 GENERAL:

This specification governs the quality requirements of Carbon Steel Forgings, class 3. Î

2.0 APPLICATION:

Suitable for general engineering purposes.

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 forgings shall comply, in general with the requirement of the following National standards and also meet the requirements of this specification.

IS::2004: 1991 (RA-2006) } Carbon Steel Forgings For General Engineering

Gr: 3 (30C8), } Purposes. Î

5.0 DIMENSIONS AND TOLERANCES:

The dimensions and tolerances shall be as specified in 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

6.0 **MANUFACTURE:**

Forgings shall be manufactured from steel produced by the open hearth, electric or such other Î 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 HEAT TREATMENT:

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

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

8.0 FINISH:

As mentioned in the drawing.

9.0 FREEDOM FROM DEFECTS:

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

10.0 CHEMICAL COMPOSITION:

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

Element	Melt analysis, percent		Permissible variation, percent
	Min.	Max.	
Carbon	0.25	0.35	± 0.03
Silicon	0.15	0.35	± 0.03
Manganese	0.60	0.90	± 0.04
Sulphur	---	0.040	+ 0.005
Phosphorus	---	0.040	+ 0.005

Notes:

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:

Element	Percent, max.
Nickel	0.30
Chromium	0.30
Copper	0.25
Molybdenum	0.15
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 with in 0.02 to 0.05 percent.

3. Mo $\leq$ 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 form each melt and each heat treatment batch. Test samples should be cut from the heat treated forgings by cold process only and shall no further heat treatment.

Test samples shall be taken form locations indicted on the drawing, leaving enough material, if required for testing at BHEL's end, integral with forgings.

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

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 mainufacturer. Test methods are specified below:

12.1 Tensile test : IS:1608

12.2 Hardness test (Brinell) : IS:1500

12.3 Charpy Impact Value (2mm U-Notch) : IS:1499

This test applicable for forgings of sizes above 16mm only.

Property	Sample (See Cl.11.3)	Limiting ruiing section, mm			
		Upto & incl 100	>100 & upto 300	> 300 & upto 500	>500 & upto 800
Tensile strength N/mm^2	Longitudinal/ Transverse/ Radial/Tangential	490	470	450	450
		490	470	450	450
Yield strength min, N/mm^2	Longitudinal/ Transverse/ Radial/Tangential	270	245	230	220
Elongation on 5.65 √So gauge length percent, min	Longitudinal	21	19	18	17
	Transverse	10	9	8	7
	Radial	14	12	11	10
	Tangential	16	14	13	12
Reduction in area, percent min.	Longitudinal	42	40	35	32
	Transverse	25	24	22	20
	Radial	27	26	24	22
	Tangential	34	32	32	30
*Hardness, Brinell,HB	—	140-192	140-192	135-190	135-190
Charpy Impact Value (2mm, U-Notch) min.,Joules	Longitudinal	35	31	27	23
	Transverse	18	16	14	12
	Radial	21	19	17	15
	Tangential	26	23	20	17

Note: 1. Unless otherwise stated on the order/drawing, small forgings of non-critical nature weighing less than 300kg 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: Î

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.

3.13.2 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.

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 in 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 CERTIFICATE:

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

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

The following details shall be furnished in the test certificate:

i) Reduction ratio

ii) Dimensional Inspection.

iii) Chemical composition including trace elements.

iv) Results of mechanical tests.

v) Results of Ultrasonic test

vi) Details of heat treatment

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

17.0 PACKING & MARKING:

Forgings shall be suitably packed to prevent corrosion and 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 32 : Carbon Steel Forgings, Class 3 Î

BHEL Order No.

Suppliers Name

Consignment/ Identification No.

Batch No.

Weight.

18.0 REFERRED STANDARDS (Latest publications Including Amendments):

1) AA 085 01 18 2) IS:1499 3) IS:1500 4) IS:1599
5) IS: 1608 6) 2004

ANNEXURE-I: RECOMMENDED TEST CERTIFICATE FORMAT FOR FORGINGS

SUPPLIER'S NAME AND ADDRESS

TEST CERTIFICATE FOR FORGINGS

1. Customer:
2. TC No. & Date:
3. PO No.:
4. Process of Melting Ingot:
5. Deoxidisation Process:
6. Forging Method:
7. BHEL's Reference for Approval of Bloom
8. Discard: Top_____%; Bottom_____%
9. Reduction Ratio } Ingot to Bloom / Bloom to Blank
10. Batch No.:
11. Heat/Melt No.
12. Spec.No.
13. Test Bar Size & Nos.
14. Supplier of the ingot/billet/ Bloom and TC reference.

15. FORGINGS COVERED BY TEST CERTIFICATE

S.No.	Drawing No. & Item No.	Description	Quantity & Weight

16. CHEMICAL COMPOSITION (PERCENT)

Element		C	Si	Mn	S	P										
As Per Specn.	Min.															
	Max.															
Actual Values																

17. HEAT TREATMENT
(To be accompanied by Recorder Chart, Whenever called for)

Condition	Heating Rate, °C/hr.	Temp.°C	Soaking Time, Hrs.	Cooling Rate, °C/hr	Cooling Medium

18. MECHANICAL PROPERTIES

		T.S. N/mm²	Y.S. 0.5/0.2% Proof N/mm²	% Elongation $5.65\sqrt{So}$ GL	%R.A. Min.	Hardness BHN(Min.3 values)	Impact Value Joules	Bend Test: Angle of bend	Bend Test: Dia of mandrel	Bend Test: Result
As Per Specn.	Min.									
	Max.									
Actual Values										

19. SURFACE FINISH (When called for in the order/drg.)

20. DIMENSIONAL INSPECTION

21. NON-DESTRUCTIVE TESTS

Nature of Test	Acceptance level	Instrument used	Range	Results	Any other detail
Ultrasonic					
Radiographic					
Dye penetrant/ Magnetic Particle					

22. METALLOGRAPHIC EXAMINATION
(To be conducted if called for and photo micrographs to be attached along with a report)

Location of Sample	Etchant used	Magnification	Constituent observed	Relative %	
Microstructure	Macroetch	Inclusion Rating			

23. OTHER TESTS IF ANY (MICROSCOPIC, SULPHUR PRINTS, ETC)

24. IDENTIFICATION OF FORGINGS AS PER PURCHASE .SPEC.

We hereby certify that the items mentioned above have been tested and inspected in our presence and are found to be in accordance with drawings, specifications and purchase order.

SIGNATURE, NAME & SEAL OF THE INSPECTING OFFICER
DATE:

SIGNATURE, NAME & SEAL OF THE CHIEF OF QUALITY CONTROL/ CHIEF METALLURGIST OF THE SUPPLIER
DATE:

INSTRUCTIONS

a) Details of all heat treatment processes carried out should be furnished sequentially in 17.
b) Test certificates are to be furnished as per Purchase order and specification, in A4 size preferably in transparent paper.
c) All the entries including signature should be in block colour ink.
d) If testing is done by outside agencies, the original TCs shall be furnished.
e) The actual TC may run into more than one A4 size paper, if needed, to facilitate filling up of details.

CARBON STEEL CASTINGS-FUSION WELDING QUALITY

1.0 GENERAL

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

2.0 APPLICATION

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

3.0 CONDITION OF DELIVERY

Normalised / Normalised & tempered

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

Castings shall not be painted

4.0 COMPLIANCE WITH NATIONAL STANDARDS

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

5.0 DIMENSIONS AND TOLERANCES

The castings shall be true to the pattern/drawing.

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

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

6.0 MANUFACTURE

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

The steel shall be fully killed.

7.0 HEAT TREATMENT

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

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

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

8.0 FINISH

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

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

9.0 FREEDOM FROM DEFECTS

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

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

10.0 CHEMICAL COMPOSITIION

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

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

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

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

1. Total content of these unspecified elements 1.00

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

11.0 TEST SAMPLES

Manufacturers shall carryout mechanical testing as per following sampling plan.

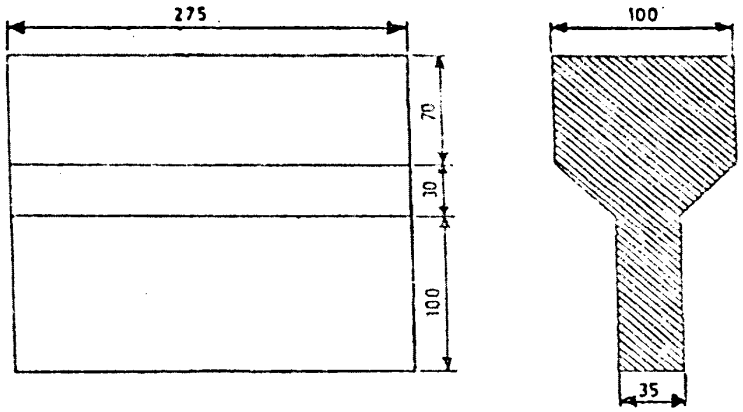
11.1 Unless otherwise specified for castings weighting up to 500 kg. piece weight one keel block, separately cast per melt per heat treatment batch shall be supplied according to the sketch given below:

11.2 Unless otherwise specified castings weighing more than 500 kg shall be provided with integrally cast keel block.

11.3 Retests shall be carried out as per IS : 8800

11.4 Keel blocks with proper identification and representative of the castings shall be supplied along with the consignment for testing at BHEL works.

DETAIL OF KEEL BLOCK



ALL DIMENSIONS IN mm

12.0 MECHANICAL PROPERTIES:

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

12.1 Tensile

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

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

12.2 Hardness (Brinell): for information only:

150 - 205 HB.

13.0 NON-DESTRUCTIVE TESTS:

The following tests shall be conducted:

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

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

14.0 REPAIR OF CASTINGS

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

15.0 SCOPE OF THIRD PARTY INSPECTION:

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

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

16.0 TEST CERTIFICATES

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

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

The test certificate shall bear the following information:

i) Dimensional inspection.

ii) Detail of heat treatment

iii) Chemical composition & unspecified alloying elements whenever called for

iv) Results of mechanical tests

v) Results of NDT tests.

17.0 PACKING AND MARKING

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

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

18.0 REFERRED STANDARDS (Latest Publications Including Amendments):

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

ANNEXURE 1 - RECOMMENDED TEST CERTIFICATE FORMAT FOR CASTINGS

SUPPLIERS'S NAME AND ADDRESS

1. Customer :
2. TC No. & Date :
3. PO No. :
4. Process of Melting :
5. Deoxidisation Process
6. Cast No. & Date :
7. Batch No. :
8. Heat Code :
9. Spec.. No. :
10. Test Bar Size

II. CASTING COVERED BY T.C.

Sl. No.	Drawing No. & Item No.	Description	Quantity & Weight

12. CHEMICAL COMPOSITION (PERCENT)

Element	C	Si	Mn	S	P										
As per Min.															
Spec. Max..															
Actual Values.															

13. HEAT TREATMENT
(To be accompanied by Recorder Chart, wherever called for)

Condition	Temp.°C	Soaking Time, Hrs..	Cooling Medium

14. MECHANICAL PROPERTIES

	T.S. N/mm2	Y.S. 0.5/0.2% Proof N/mm2	% E on GL 5.65 SO	% R.A. Min	Hardness BHN Min. 3 Values	Impact Value, Joules	Bend	
As per Min.								
Spec. Max.								
Actual Values.								

15. Surface Finish (When called for in the order/drg)	
16. DIMENSIONAL INSPECTION	

17.NON-DESTRUCTIVE TESTS

Nature of Test	Acceptance Level	Instrument used	Range	Results	Any other details
Ultrasonic					
Radiographic					
Dye Penetrant/ Magnetic Particle					

18. OTHER TESTS, IF ANY (MICRO-Scopic, Hydraulic, Etc.)	
19. IDENTIFICATION ON CASTING AS PER CPS.	

We hereby certify that the items mentioned above have been tested and inspected in our presence and are found to be in accordance with the drawings, specifications and purchase order.

Signature & Seal of the Inspecting Officer (Purchase Representative)

Date :

Signature and Seal of the Chief of Quality Control Chief Metallurgist of the Supplier.

Date :

INSTRUCTION:

a) If steel is produced by LD or Oxygen process, Nitrogen content should be furnished and shall not exceed 0.009%
b) Test Certificates are to be furnished as per Purchase Order and Specifications, in A4 Size transparent paper.
c) All the entries including signature should be in black ink.
d) If testing is done by outside agencies, the original TCs shall be furnished.
e) The actual Test Certificate may run into more than one A4 size paper, if needed, to facilitate filling up of details.

SCREWS, CAP, HEXAGON SOCKET HEAD, PRODUCT GR. A, COARSE PITCH, STEEL, PROPERTY CLASS 12.9 (M3 - M36)

1.0 DESIGNATION:

A hexagon socket head, cap screw of nominal size M10, length 30mm, coarse pitch, product grade A and of property clause 12.9 shall be designated as :

1.1 On drawings:

i) Material specification column: AA 712 31 23
ii) Description column: SCRU CAP SOCK A M10 X 30 – 12.9

1.2 On indents:

Screw Hex socket head, cap A M10 X 30 – 12.9: AA 712 31 23.

1.3 For issuing enquiries and on purchase orders:

While issuing enquiries and purchase orders, delete BHEL standard number from 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: 2269 - 2006.

2.2 Mechanical properties:

To conform to property Cl. 12.9, as specified in table 3 of IS: 1367, Part 3

2.3 Threads:

Pitch-coarse to IS: 4218, Part 2
Tolerance quality: Medium.
Tolerance class: 5g - 6g.

2.4 Identification Marking:

As stated in clause 9 of IS: 1367, Part 3 (except for sizes up to M10)

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

2.6 Finish: Plated as specified in BHEL order.

3.0 NOTE:

3.1 Length and diameter combination (refer Table 1 on page 3 of 4) between the bold lines should only be used.
3.2 Sizes to the left side of the dotted lines are threaded to the head within 3P.

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

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

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

3.6 Weights given in this standard are for general reference only and are not meant for commercial transaction.

3.7 The screws to this standard can also be supplied with diamond / straight knurling on the external side of head.

3.8 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) IS: 1367, Pt.3, 9 &17 2) IS: 2269 3) IS: 4218, Pt 2 4) AA 023 02 01

5) AA 023 18 00 6) AA 023 18 50

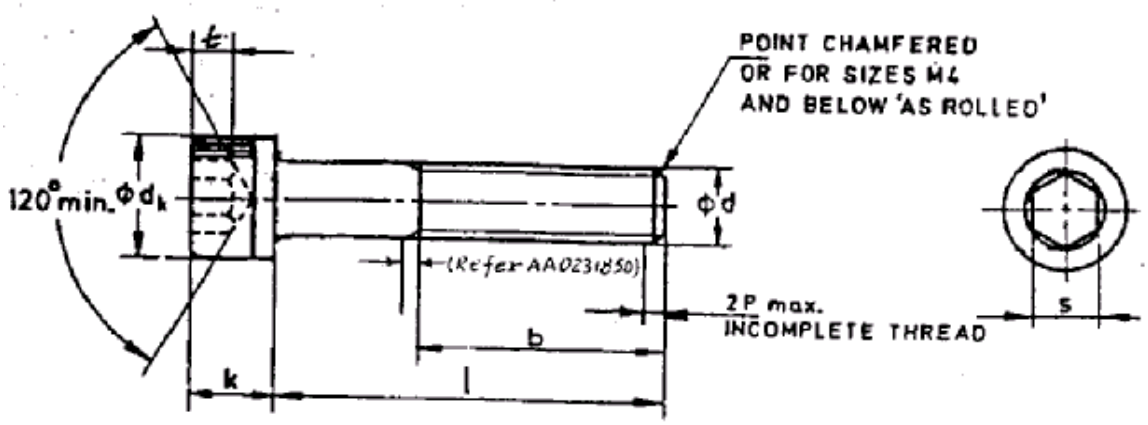


FIG . 1

NOTE

1. Corporate Sub-Code Numbers only are shown in Table 1.
2. Weights have been shown in kg per 1000 no.
3. For threaded runout refer AA 023 18 50.
4. Lengths above the thick dashed line are threaded to the head within 3P.

TABLE 1
All dimensions are in 'mm'

Size Nom ϕ d	Head		Socket		Thread length for ref. b		NOM LENGTH (L)																													
	Thk. Max. / Min K	Dia. Max. / Min a-d$_s$	Across Flats Max / Min S	Depth Min. t			5	6	8	10	12	16	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	110	120	130	140	150	160	180	200
M3	3 / 2.86	5.68 / 5.32	2.56 / 2.52	1.3	18	Sub-Code																													
						Weight																													
M4	4 / 3.86	7.22 / 6.78	3.08 / 3.02	2	20	Sub-Code							387																						
						Weight																													
M5	5 / 4.82	8.72 / 8.28	4.095 / 4.02	2.5	22	Sub-Code				405			417																						
						Weight																													
M6	6 / 5.70	10.22 / 9.78	5.095 / 5.02	3	24	Sub-Code					018	026	034	042	050		063		077																
						Weight					5.03	5.73	8.53	764	8.75		10.9		12.2																
M8	8 / 7.64	13.27 / 12.73	6.095 / 6.02	4	28	Sub-Code						395	085	093	373	107	115		123			131													
						Weight							13.1	15.1	17.1	190	21.0		24.9			30.9													
M10	10 / 9.64	16.27 / 15.73	8.115 / 8.025	5	32	Sub-Code							140	158	166	433	174	441	182	450	190	204		212	468										
						Weight							22.5	25.0	28.0	31.0	34.7	37.3	40.3	43.4	46.5	49.5		55.7	58.9										
M12	12 / 11.57	18.27 / 17.73	10.115 / 10.025	6	36	Sub-Code							476	220	239		247	255	263			271	484			492									
						Weight							32.1	36.0	39.6		48.5	52.9	57.4			70.7	73.7												
M16	16 / 15.57	24.33 / 23.67	14.142 / 14.032	8	44	Sub-Code									280		299		301					310			328							
						Weight									81.1		94.8		107					150			189							
M20	20 / 19.48	30.33 / 29.67	17.23 / 17.05	10	52	Sub-Code											336		344					352										
						Weight											186		188.4					250										
M24	24 / 23.48	36.39 / 35.61	19.275 / 19.065	12	60	Sub-Code													506		514		522			530	549				557			
						Weight															333		363			435	479							
M30	30 / 28.48	45.39 / 44.61	22.275 / 22.065	15.5	72	Sub-Code																			565	573			581					
						Weight																													
M36	36 / 35.30	54.46 / 53.54	27.275 / 27.065	19	84	Sub-Code																													
						Weight																													

CORPORATE STANDARD

EXPLANATORY NOTE :

The following changes have been made in this revision:
Cl 2.1, 2.2, 2.3 & 2.5 - modified.

PINS, CYLINDRICAL, STEEL, UNHARDENED (TOLERANCE m6)

1.0 DESIGNATION

A cylindrical pin of nominal diameter 8 mm, tolerance on diameter m6 and nominal length 65 mm shall be designated as:

1.1 On drawings:

i) Material specification column : AA7171001

ii) Description column : PIN CYL RND END 8 m 6 x 65-St

1.2 On indents:

Pin cylindrical 8 m 6 x 65: AA7171001

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: 2393-2010 Table-1.

2.2 Material:

Carbon steel with minimum tensile strength of 500 N/mm^2 as specified in IS: 5517.

2.3 Finish:

Free from burrs, scales and tool marks. The surface finish of the various surfaces shall be as shown in Table-1 of IS: 2393.

3.0 NOTE

3.1 Sizes (refer Table-1 on page 3 of 3) between the bold lines should only be used.

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

3.3 When the fasteners are to be tested within BHEL, the following sampling plan based on IS: 6821 (Table-1) shall be followed as detailed below 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

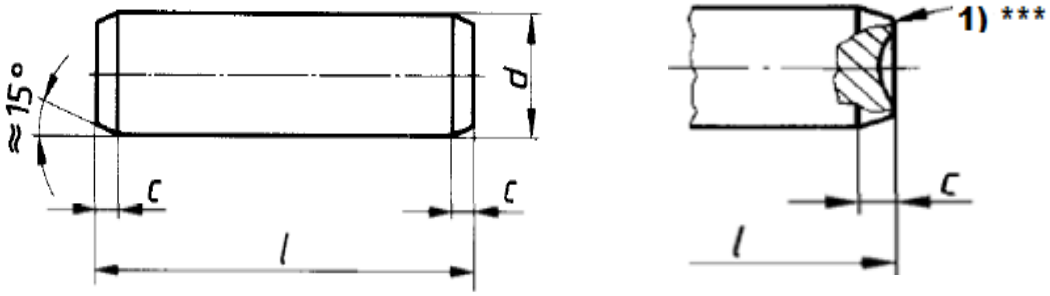
4.0 REFERRED STANDARDS (Latest publications including amendment):

1) IS: 5517 2) IS: 6821

EXPLANATORY NOTE:

The following changes have been made in this revision:

- In Clause 2.1, year of IS: 2393 is changed to 2010.
- In Clause 2.2, year of IS: 5517 is removed.
- Table-1 and figures modified



Note:

1) *** Radius and dimpled pin end permissible.
2) Corporate sub-code numbers are shown in Table-1.
3) Weights have been shown in kg per 1000 Nos.

TABLE-1

All dimensions are in mm

Note: 1) Corporate Sub-Code Nos. are shown below
2) Weights has been shown in kg / 1000 Nos.

d m6 Nom.	c ≈		Length (L js15)																																					
			4	5	6	8	10	12	14	16	18	20	22	24	25	26	28	30	32	35	40	45	50	55	60	65	70	75	80	85	90	95	100	120	140	160	180	200
1.5	0.3	Sub-code																																						
		weight																																						
2	0.35	Sub-code								130																														
		weight								0.39																														
2.5	0.4	Sub-code																																						
		weight																																						
3	0.5	Sub-code					148			156		164			172			180																						
		weight					0.55			0.88		1.10			1.38			1.66																						
4	0.63	Sub-code					016					199			202			210																						
		weight					0.98					1.96			2.45			2.95																						
5	0.8	Sub-code																237		245		253																	
		weight																4.60		5.37		6.91																	
6	1.2	Sub-code							024			032			091			040		105	059																		
		weight							3.05			4.38			5.49			6.60		7.71	8.82																		
8	1.6	Sub-code										270			288			296			300	318	326			067			334										
		weight										7.76			9.73			11.70			15.64	17.62	19.59			25.50			31.42										
10	2	Sub-code										075						342		083	350		369		121				377										
		weight										12.07						18.23		21.31	24.39		30.56		36.72				49.04										
12	2.5	Sub-code																																						
		weight																																						
16	3	Sub-code																									385												
		weight																									109.50												
20	3.5	Sub-code																																						
		weight																																						
25	4	Sub-code																																						
		weight																																						
30	5	Sub-code																																						
		weight																																						
40	6.3	Sub-code																																						
		weight																																						
50	8	Sub-code																																						
		weight																																						

CORPORATE STANDARD

AA7171001

Rev. No. 06

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LIST OF APPLICABLE STANDARDS ON LIMITS, FITS AND TOLERANCES

1.0 SCOPE:

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

2.0 LIST OF APPLICABLE STANDARDS:

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

NOTE:

1) AA 023 02 08

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

2) AA 023 04 02

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

3) AA 062 11 04

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

4) AA 062 11 05

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

LIST OF APPLICABLE STANDARDS ON LIMITS, FITS AND TOLERANCES

1.0 SCOPE:

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

2.0 LIST OF APPLICABLE STANDARDS:

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

NOTE:

1) AA 023 02 08

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

2) AA 023 04 02

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

3) AA 062 11 04

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

4) AA 062 11 05

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

1.5% NICKEL-CHROMIUM-MOLYBDENUM STEEL BARS - H & T

Gr : 34 Cr Ni Mo 6
(Old Grade : 817 M40 (En24))

1.0 GENERAL:

This specification governs the requirements of 1.5% Nickel-Chromium-Molybdenum Steel Bars in hardened and tempered condition.

2.0 APPLICATION :

For general engineering applications requiring high tensile strength combined with good ductility and resistance to shock.

3.0 CONDITION OF DELIVERY :

Hot Rolled/Forged, Hardened and Tempered.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

This specification complies with DIN EN 10083 : 1996 ; Quenched and tempered : Technical delivery conditions for special steels ; Grade 34 Cr Ni Mo 6.

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes: Bars shall be supplied to the dimensions specified on the order.

5.1.1 Length: Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 metres length or in multiples with maximum 10%, shorts down to 1 metre.

Forged bars shall be supplied in lengths of 1.5 to 3.0 metres.

5.2 Tolerance:

5.2.1 Hot rolled bars: The bars shall not vary from specified diameter or distance across flats by more than ± 2½ %.

5.2.2 Forged bars: The tolerance on the forged bars shall be as follows.

Diameter, mm	Tolerance, 8 mm
50 mm to 175 mm	+ 8.0 mm
Above 175 mm	+ 12.5 mm

Note: (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 tolerance on each size.

6.0 MANUFACTURE:

The method of steel manufacture is left to the discretion of the manufacturer. However air or mixed air and oxygen bottom blown converter process is not acceptable. The steel shall be fully killed.

7.0 FREEDOM FROM DEFECTS:

The bars shall be free from surface and internal defects such as piping, segregation etc.

8.0 HEAT TREATMENT:

The recommended heat treatment shall be as follows:

Hardening: 830 - 860° C followed by oil quenching.
Tempering: 660° C max.

Note (1) Tempering between 280 - 500°C shall be avoided.

(2) The cooling rate between the tempering temperature and 200° C shall be such as to avoid temper embrittlement.

(3) The actual heat treatment cycle followed shall be reported in the Test certificate.

9.0 SELECTION OF TEST SAMPLES:

9.1 Chemical Analysis: Each melt shall be analysed for chemical composition.

9.2 Hardness: Hardness shall be checked for 5% of the bars of same size, melt and heat treatment batch. In any case minimum two bars shall be tested for hardness.

9.3 Mechanical Properties: One sample per lot, comprising of bars of same size, melt and heat treatment batch shall be taken for mechanical tests.

10.0 CHEMICAL COMPOSITION:

The melt analysis of material shall be as follows:

Element		C	Si	Mn	Ni	Cr	Mo	S	P
Melt analysis	Min.	0.30	0.10	0.50	1.30	1.30	0.15	-	-
	Max.	0.38	0.40	0.80	1.70	1.70	0.30	0.035	0.035
Permissible variation in check Analysis		± 0.02	± 0.03	± 0.04	± 0.05	± 0.05	± 0.03	+ 0.005	+ 0.005

11.0 MECHANICAL PROPERTIES:

The mechanical properties shall be as follows:

Ruling Section, mm (d=dia, t=thickness)	Tensile strength N/mm^2	0.2% Proof stress, min. N/mm^2	Elongation min (L=5d)	Reduction in area % min.	Notch bar impact strength, min. (ISO -V notch)	Hardness BHN
$d \leq 16$ ($t \leq 8$)	1200-1400	1000	9	40	35	360-420
$16 < d \leq 40$ ($8 < t \leq 20$)	1100-1300	900	10	45	45	330-390
$40 < d \leq 100$ ($20 < t \leq 60$)	1000-1200	800	11	50	45	300-360
$100 < d \leq 160$ ($60 < t \leq 100$)	900-1100	700	12	55	45	270-300
$160 < d \leq 250$ ($100 < t \leq 160$)	800-950	600	13	55	45	240-285

NOTE: 1) The tensile test shall be carried out in accordance with IS:1608 or any other reputed national standard.

2) The charpy impact test shall be performed in accordance with IS:1757 or any other reputed national standard. The specimen size shall be 10x10x55mm with a 2 mm V-Notch.

An impact test shall consist of three specimens from a single test location, the average value of which shall be as specified above.

Only one value of the three can be below the specified minimum, but in no case below 2/3rd of the specified average value.

All the three test results shall be reported in test certificate.

11.1 **Hardness test:** The hardness shall be tested in accordance with IS 1500 or any other equivalent international standard.

12.0 **ULTRASONIC TEST:**

Each bar above 50 mm shall be tested ultrasonically in accordance with corporate 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.

13.0 **RETESTS:**

13.1 If any of the test specimen fails to meet the requirements specified in cl. 11, the sample bar from which the test specimen was cut shall be rejected and two further sample bars from the same lot shall be taken for retest.

13.2 If the retests also fail, manufacturer is at liberty to reheat treat the bars in question. Not more than two reheat treatments are allowed. However, retempering is not considered as reheat treatment.

13.3 If after reheat treatment, the mechanical properties are not complied with, the entire lot shall be rejected.

14.0 **INSPECTION AT SUPPLIER'S WORKS:**

14.1 BHEL representative/BHEL appointed Inspection Agency shall have free entry and access to all areas where the manufacture of the bars is carried out. All reasonable facilities shall be extended to him including labour wherever necessary.

14.2 BHEL representative/BHEL appointed Inspection Agency shall be given sufficient advance intimation to witness the various processes, tests, etc. Punching and identification of test coupons and execution of various tests shall be done in presence of BHEL representative/BHEL appointed Inspection Agency.

15.0 **TEST CERTIFICATE:**

Five copies of the test certificate shall be supplied bearing the following details.

BHEL Order No
BHEL Specification No: HY 10561/ Rev. 04
Supplier's Name:
Identification No:
Size
Cast No.
Details of Heat treatment.
Results of Chemical analysis, mechanical tests including hardness & NDT called for in this specification.

16.0 PACKING AND MARKING:

The bars shall be suitably packed in bundles to prevent corrosion and damage during transit.

Bars above 50mm in diameter or of equivalent cross-sectional area shall be stamped HY 10561/ Rev.04 and cast no. on the side near the end or on the end face.

A metal label shall be securely attached to each bundle and shall bear the following information for the sizes less than 50 mm diameter.

HY 105 61 Rev. 04
BHEL Order No.
Consignment or Identification No:
Cast No.
Size & Weight.
Supplier's Name.

17.0 REJECTION & REPLACEMENT:

In the event of the bar material proving defective in the course of further processing at BHEL, the same shall be rejected notwithstanding any previous acceptance.

The supplier shall replace the material forging at his own cost and the rejected bars shall be returned after all the commercial conditions are satisfied.

1% CHROMIUM CASE HARDENING STEEL BARS, ANNEALED

(GR : 16 Mn Cr 5)

1.0 GENERAL:

This specification governs the requirements of 1% chromium case hardening bars.

2.0 APPLICATION :

For the manufacture of case hardened components.

3.0 CONDITION OF DELIVERY :

The bars shall be supplied in the hot / cold rolled/ forged and Annealed condition

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

This specification complies with EN10084-1998 : Case hardening steels.
Gr : 16 Mn Cr5

5.0 DIMENSIONS AND TOLERANCES:

5.1 Dimensions : As specified in the order. Unless otherwise specified, the hot/cold rolled bars shall be supplied in random lengths of 3 to 6 meters. Forged bars shall be supplied in lengths of 1.5 to 3.0 metres.

5.2 Tolerance:

5.2.1 Rolled bars: The bars shall not vary from specified diameter or distance across flats by more than ± 2½ %.

5.2.2 Forged bars: The tolerance on the forged bars shall be as follows.

Diameter, mm	Tolerance, mm
50 mm to 175 mm	+ 8.0 mm
Above 175 mm	+ 12.5 mm

Note: (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 tolerance on each size.

6.0 MANUFACTURE:

The method of steel manufacture is left to the discretion of the manufacturer. However, air or mixed air and oxygen bottom blown converter process is not acceptable. The steel shall be fully killed.

7.0 FREEDOM FROM DEFECTS:

The bars shall be free from surface and internal defects such as piping, segregation etc.

8.0 **HEAT TREATMENT:**

8.1 The bars shall be soft annealed at 650 - 700° C and furnace cooled.

8.2 The recommended heat treatment for sample test pieces shall be as follows:
Blank Carburize at 880 - 980° C, followed by air cooling.
Hardening : At 860 - 900° C followed by quench in oil or water.

The tempering temperature shall be 150 - 200 ° C. The actual heat treatment cycle followed shall be reported in the Test certificate.

9. SELECTION OF TEST SAMPLES:

9.1 Chemical Analysis: Each melt shall be analysed for chemical composition

9.2 Mechanical Properties : One sample per melt per size shall be tested for mechanical properties after heat treatment as per clause 8.2. For the bars beyond 250 mm diameter, the test samples shall be forged to dia 250 mm then tested for mechanical properties after heat treatment as per clause 8.2.

9.3 Metallography tests : One sample per melt per size shall be tested for metallography tests.

10.0 CHEMICAL COMPOSITION:

The melt analysis of the material shall be as follows:

Element		C	Si	Mn	Cr	P	S
Melt analysis	Min .%	0.14	--	1.00	0.80	--	-
	Max. %	0.19	0.40	1.30	1.10	0.035	0.035
Permissible variation in product analysis		± 0.02	+0.03	±0.05	±0.05	+0.005	+0.005

11.0 MECHANICAL PROPERTIES:

11.1 **Tensile**: The mechanical properties of the hardened and tempered test bars of ruling section 30 mm shall be as follows:

Tensile Strength N/mm^2	0.2% Proof Stress min. N/mm^2	% Elongation min. (l = 5 d)
780 - 1080	590	10

11.2 **Hardness**: 5 % of the bars or minimum 2 numbers, in annealed condition shall be tested for Brinell Hardness and the value shall be 207 BHN max.

12.0 METALLOGRAPHY TEST :

12.1 **Grain size** : Grain size shall be 5 or finer when tested in accordance with ASTME 112.

12.2 **Cleanliness Rating** : Inclusion content shall be tested as per ASTME 45 and inclusion rating for all types shall not be more than 2.0 (thin series) and 1.5 (thick series). The inclusion of all types i.e. A, B, C & D may exist simultaneously.

13.0 ULTRASONIC TESTING :

Each bar above 50 mm dia/size shall be tested ultrasonically in accordance with corporate standard AA0850118 to ensure freedom from internal defects. The norms of acceptance shall be as per category 2 of the above standard.

14.0 INSPECTION AT SUPPLIER'S WORKS:

BHEL representative/BHEL appointed Inspection Agency shall have free entry and access to all areas where the manufacture of the bars is carried out. All reasonable facilities shall be extended to him including labour wherever necessary.

BHEL representative/BHEL appointed Inspection Agency shall be given sufficient advance intimation to witness the various processes, tests, etc. punching and identification of test coupons and execution of various tests shall be done in presence of BHEL representative/BHEL appointed Inspection Agency.

15.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied bearing the following details:

a) BHEL Order No.
b) BHEL Specification No: HY 10565 / Rev. 03
c) Supplier's name:
d) Identification No.
e) Size:
f) Cast No.
g) Details of heat treatment carried out on material and test samples.
h) Results of chemicals analysis and mechanical tests including hardness tests called for in this specification.
i) Results of ultrasonic tests and metallography tests.

16.0 PACKING AND MARKING:

The bars shall be suitably packed in bundles to prevent corrosion and damage during transit.

Bars above 50mm in diameter or of equivalent cross-sectional area shall be stamped HY10565 and Cast No. on the side near the end or on the end face.

A metal lable shall be securely attached to each bundle and shall bear the following information for bars of diameters less than 50 mm.

HY 105 65/Rev. 03
BHEL Order No.
Consignment or Identification No:
Cast No.
Size & Weight.
Supplier’s Name.

17.0 REJECTION AND REPLACEMENT:

In the event of the bar material proving defective in the course of further processing at BHEL, the same shall be rejected notwithstanding any previous acceptance.

The supplier shall replace the material forging at his own cost and the rejected bars shall be returned after all the commercial conditions are satisfied.

HIGH STRENGTH LOW ALLOY STRUCTURAL STEEL PLATES

1.0 GENERAL:

This Specification governs the requirements of High Strength Low-Alloy Structural Steel Plates.

2.0 APPLICATION :

For fabrication of Oil Rig Components which require good resistance to atmosphere corrosion.

3.0 CONDITION OF DELIVERY:

Hot / Cold rolled, Normalized condition.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The plates shall comply with the latest version of ASTM A588, Gr.A.

5.0 DIMENSIONS AND TOLERANCES :

5.1 Dimensions: Shall be as specified in the purchase order. Unless otherwise specified, plates shall be supplied in the standard dimension of 6' x 13' (1830mm x 3962mm).

5.2 Tolerances: Shall be as per ASTM:A6.

6.0 MANUFACTURE:

The steel shall be manufactured by one of the following process: Open hearth, basic oxygen or electric furnace. The steel shall be made to fine grain practice.

7.0 HEAT TREATMENT:

The material shall be supplied in the normalized condition.

8.0 CHEMICAL COMPOSITION:

The Melt analysis of material shall be as follows:

Element		C	Mn	Si	Ni	Cr	Cu	V	P	S
	Min	--	0.80	0.30	-	0.40	0.25	0.02	-	-
	Max	0.19	1.25	0.65	0.40	0.65	0.40	0.10	0.040	0.050
Permissible Variation in Product analysis		+ 0.04	+ 0.10 - 0.08	± 0.05	+ 0.03	± 0.04	± 0.03	± 0.01	+ 0.010	+ 0.010

9.0 MECHANICAL PROPERTIES:

The mechanical properties of the different groups of the sections shall be follows:

Thickness of the plate mm	Tensile Strength N/mm^2 Min.	Yield Strength, N/mm^2 Min	% Elongation Min.
			L=50 mm (L=4d)
Below 100	485	345	21
>100≤125	460	315	21
>125≤200.0	435	290	21

NOTE:

1) For plates wider than 610mm test specimen is taken in the transverse direction as per ASTM 6 Clause 11.2.

.2) For plates wider than 610mm, the elongation requirement is reduced by two percentage points.

10.0 INSPECTION AT SUPPLIER'S WORKS:

BHEL representative/BHEL appointed Inspection Agency shall have free entry and access to all areas where the manufacture of the bars is carried out. All reasonable facilities shall be extended to him including labour wherever necessary.

BHEL representative/BHEL appointed Inspection Agency shall be given sufficient advance intimation to witness the various processes, tests, etc. Punching and identification of test coupons and execution of various tests shall be done in presence of BHEL representative/BHEL appointed Inspection Agency.

11.0 TEST CERTIFICATE:

Five copies of the certificates giving the following details shall be furnished.

a) BHEL Order No.
b) BHEL Specification No. HY 105 75 / Rev.01
c) ASTM A588, Gr:A
d) Melt No.
e) Consignment/Identification No.
f) Size
g) Results of Chemical analysis.
h) Results of Mechanical tests.

12.0 MARKING:

Each plate shall be punched with the following details and encircled by paint.

a) Melt No.
b) Supplier's identification mark

In addition to the above, the following details shall also be marked legibly on each plate.

c) BHEL Order No.
d) HY 10575/Rev. 01
e) ASTM A588, Gr.A
f) Size & Weight
g) Supplier's Name

13.0 REJECTION AND REPLACEMENT:

In the event of the material proving defective in the course of further processing at BHEL, the same shall be rejected notwithstanding any previous acceptance.

The supplier shall replace the material forging at his own cost and the rejected material shall be returned after all the commercial conditions are satisfied.

Cr-Mn CASE HARDENING STEEL FORGINGS, ANNEALED
(GR : 16 Mn Cr 5G)

1.0 GENERAL :

This specification governs the requirements of alloy case hardening steel forgings of grade 16 Mn Cr 5G in annealed condition

2.0 APPLICATION :

For the manufacture of case hardened components of Steam Trubine, Switchgear Etc.

3.0 CONDITION OF DELIVERY :

The forgings shall be supplied in rough machined and annealed condition.

4.0 COMPLIANCE WITH NATIONAL STANDARDS :

The forgings shall comply with DIN: 17210 - 1986 Gr:16 Mn Cr 5G with the following specific/additional requirements.

5.0 DIMENSIONS AND TOLERANCES :

5.1 Dimensions: The dimensions shall be as specified on the drawings.

5.2 Tolerances:

a) For finish machined component drawings, the extra allowance of 3±1 mm per surface shall be provided for finish machining at BHEL.

b) For rough machined Forging drawings necessary finish machining allowance is included in the dimensions. Hence extra allowance is not required. The tolerance shall be ±1 mm on dimension, unless otherwise specified in the drawing.

6.0 MANUFACTURE :

The steel used shall be manufactured from basic oxygen or electric furnace process. The steel shall be fully killed. Sufficient discard shall be made from the ingot, if ingot is used as forging stock, to ensure freedom from piping, segregation and other harmful defects.

The amount of hot working shall be sufficient to ensure uniform working throughout the cross-section.

Reduction ratio shall be minimum 3:1 for ingot and 1.5:1 for rolled/forged stock.

7.0 HEAT TREATMENT : (For information only).

7.1 The forgings shall be soft annealed at 650-700^{0}C and furnace cooled..

7.2 The recommended heat-treatment for sample test pieces shall be as follow:

a) Blank carburizing at 880-980^{0}C.

b) Hardening at 860-900^{0}C and quenching in oil or water

c) Tempering at 150-200^0 C followed by air cooling.

Heat treatment cycle followed shall be reported in test certificate.

8.0 FINISH :

Surface finish of the rough machined forgings shall be 6.3 microns (r.m.s) wherever ultrasonic test is called for and 12.5 microns (r.m.s) for other surfaces

9.0 FREEDOM FROM DEFECTS :

The Forgings shall be free from cracks, flakes, seams, segregation and other defects which may affect the utility of the forgings.

10.0 CHEMICAL COMPOSITION :

The chemical analysis of the steel shall be as follows :.

Element		C	Si	Mn	Cr	S	P
Melt Analysis	%Min	0.14	-	1.00	0.80	-	-
	%Max.	0.19	0.40	1.30	1.10	0.035	0.035
Permissible Variation In product Analysis		±0.02	+0.03	±0.05	±0.05	+0.005	+0.005

11.0 END QUENCH TEST :

The raw material used for forging of the components shall have the following limiting values of Rockwell C hardness as determined by the end Quench Test. The values plotted on the graph shall be submitted along with the Test Certificate. Hardening temperature for end quench test shall be 870^0 C.

Hardness, in HRC
At a distance from the quenched end, in mm, of

	1	2	3	4	5	6	7	8	9	10	11	13	15
Max	47	46	44	41	37	35	44	33	31	30	29	28	27
Min	39	35	31	28	24	22	20	-	-	-	-	-	-

12.0 TEST SAMPLES:

Test samples shall be taken per melt and shall be blank carburisaed, hardened & tempered as per clause 7.2 to achieve the mechanical properties given in clause 13.1 (Forgings are to be supplied in soft annealed condition only)

13.0 MECHANICAL PROPERTIES :

The mechanical properties.of blank carburized hardened and tempered test bar of ruling section 30 mm shall be as follows:

13.1 Tensile:

Tensile strength N/mm^2 (Kgf/mm^2)	0.2% Proof Stress, min. N/mm^2 (Kgf/mm^2)	Elongation %min (l=5d)
780-1080 (80-110)	590 (60)	10

13.2 Hardness: 5% of the forgings or min. two nos. in annealed condition, shall be tested for Brinell Hardness and the value shall be 207 BHN max.

14.0 NON-DESTRUCTIVE TEST :

If specified in the drawing, the following tests shall be conducted.

14.1 **Magnetic particle Test:** Shall be performed as per ASTM 'A' 275 and acceptance criteria shall be as follows:

i) Cracks and porosity are not acceptable

ii) Presence of the following individual inclusions on the surfaces are acceptable. Maximum eight numbers having a length of Max. 1mm or 5 inclusions of max. 3mm length or one inclusion of 5mm max. length concentrated in the area 25 cm . sq.

14.2 **Ultrasonic Test:** shall be performed as per ASTM: A 388 (BHEL Standard AA 0850118) and following shall be unacceptable defects.

i) Cracks, flakes, seams and laps.

ii) Defects giving indications larger than that from a 4 mm diameter equivalent flaw.

iii) Groups of defects with maximum indication less than that from a 4mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back eacho is reduced to less than 50%

iv) Defects giving indication of 2 to 4 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.

The above acceptance criteria is equivalent to level 2 of AA 0850118.

15.0 INSPECTION AT SUPPLIER'S WORKS :

BHEL representative shall have free entry and access to all areas where the manufacture of the forging is carried out. All reasonable facilities shall be extended to him including labour where ever necessary, free of charge Sufficient advance intimation shall be given to the representative to witness the various processes, tests etc. Identification of test coupons & forgings and excution of various tests shall be done in his presence.

16.0 TEST CERTIFICATE :

16.1 The suppliers shall furnish five copies of the test certificate (in English) to BHEL with the following details.

a) BHEL Specification No. Hy 19366. Rev.01
b) Material Grade : 16 Mn Cr 5G
c) BHEL Order No:
d) Item Description.
e) Drawing NO:
f) Supplier's Name.
g) Melt No:
h) Serial NO. of the forging.

i) Heat Treatment details for forgings and Test Specimen.
j) Result of Chemical Analysis, Hardness test, Tensile tests for heat treated samples stipulated in this specification and any non-destructive tests as specified in the drawing/purchase order.
k) End quench test report.

16.2 The test certificates shall be attested by the Chief of Inspection/Chief Metallurgist of the supplier and also by BHEL representative.

17.0 MARKING AND PACKING :

17.1 **Marking:** The following details shall be punched clearly on each forging and the same shall be encircled by paint:

a) BHEL Specification No. Hy 19366. Rev.01
b) Material Grade : 16 Mn Cr 5G
c) BHEL Order No.
d) Melt No.
e) Serial No. of the forging
f) Drawing No.
g) BHEL Inspectors Stamp.

17.2 **Packing:** The forgings shall be suitably packed & prevented from damage and corrosion during transit. In the case of overseas supplies, the packing shall be seaworthy.

18.0 REJECTION AND REPLACEMENT :

In the event of the forging proving defective in the course of further processing at BHEL, the same shall be rejected notwithstanding any previous acceptance.

The supplier shall replace the rejected forging at his own cost and the rejected forging shall be returned after all the commercial conditions are satisfied.

Cr-Mn CASE HARDENING STEEL FORGINGS, ANNEALED
(GR : 16 Mn Cr 5G)

1.0 GENERAL :

This specification governs the requirements of alloy case hardening steel forgings of grade 16 Mn Cr 5G in annealed condition

2.0 APPLICATION :

For the manufacture of case hardened components of Steam Trubine, Switchgear Etc.

3.0 CONDITION OF DELIVERY :

The forgings shall be supplied in rough machined and annealed condition.

4.0 COMPLIANCE WITH NATIONAL STANDARDS :

The forgings shall comply with DIN: 17210 - 1986 Gr:16 Mn Cr 5G with the following specific/additional requirements.

5.0 DIMENSIONS AND TOLERANCES :

5.1 Dimensions: The dimensions shall be as specified on the drawings.

5.2 Tolerances:

a) For finish machined component drawings, the extra allowance of 3±1 mm per surface shall be provided for finish machining at BHEL.

b) For rough machined Forging drawings necessary finish machining allowance is included in the dimensions. Hence extra allowance is not required. The tolerance shall be ±1 mm on dimension, unless otherwise specified in the drawing.

6.0 MANUFACTURE :

The steel used shall be manufactured from basic oxygen or electric furnace process. The steel shall be fully killed. Sufficient discard shall be made from the ingot, if ingot is used as forging stock, to ensure freedom from piping, segregation and other harmful defects.

The amount of hot working shall be sufficient to ensure uniform working throughout the cross-section.

Reduction ratio shall be minimum 3:1 for ingot and 1.5:1 for rolled/forged stock.

7.0 HEAT TREATMENT : (For information only).

7.1 The forgings shall be soft annealed at 650-700^{0}C and furnace cooled..

7.2 The recommended heat-treatment for sample test pieces shall be as follow:

a) Blank carburizing at 880-980^{0}C.

b) Hardening at 860-900^{0}C and quenching in oil or water

c) Tempering at 150-200^0 C followed by air cooling.

Heat treatment cycle followed shall be reported in test certificate.

8.0 FINISH :

Surface finish of the rough machined forgings shall be 6.3 microns (r.m.s) wherever ultrasonic test is called for and 12.5 microns (r.m.s) for other surfaces

9.0 FREEDOM FROM DEFECTS :

The Forgings shall be free from cracks, flakes, seams, segregation and other defects which may affect the utility of the forgings.

10.0 CHEMICAL COMPOSITION :

The chemical analysis of the steel shall be as follows :.

Element		C	Si	Mn	Cr	S	P
Melt Analysis	%Min	0.14	-	1.00	0.80	-	-
	%Max.	0.19	0.40	1.30	1.10	0.035	0.035
Permissible Variation In product Analysis		±0.02	+0.03	±0.05	±0.05	+0.005	+0.005

11.0 END QUENCH TEST :

The raw material used for forging of the components shall have the following limiting values of Rockwell C hardness as determined by the end Quench Test. The values plotted on the graph shall be submitted along with the Test Certificate. Hardening temperature for end quench test shall be 870^0 C.

Hardness, in HRC
At a distance from the quenched end, in mm, of

	1	2	3	4	5	6	7	8	9	10	11	13	15
Max	47	46	44	41	37	35	44	33	31	30	29	28	27
Min	39	35	31	28	24	22	20	-	-	-	-	-	-

12.0 TEST SAMPLES:

Test samples shall be taken per melt and shall be blank carburisaed, hardened & tempered as per clause 7.2 to achieve the mechanical properties given in clause 13.1 (Forgings are to be supplied in soft annealed condition only)

13.0 MECHANICAL PROPERTIES :

The mechanical properties.of blank carburized hardened and tempered test bar of ruling section 30 mm shall be as follows:

13.1 Tensile:

Tensile strength N/mm^2 (Kgf/mm^2)	0.2% Proof Stress, min. N/mm^2 (Kgf/mm^2)	Elongation %min (l=5d)
780-1080 (80-110)	590 (60)	10

13.2 Hardness: 5% of the forgings or min. two nos. in annealed condition, shall be tested for Brinell Hardness and the value shall be 207 BHN max.

14.0 NON-DESTRUCTIVE TEST :

If specified in the drawing, the following tests shall be conducted.

14.1 **Magnetic particle Test:** Shall be performed as per ASTM 'A' 275 and acceptance criteria shall be as follows:

i) Cracks and porosity are not acceptable

ii) Presence of the following individual inclusions on the surfaces are acceptable. Maximum eight numbers having a length of Max. 1mm or 5 inclusions of max. 3mm length or one inclusion of 5mm max. length concentrated in the area 25 cm . sq.

14.2 **Ultrasonic Test:** shall be performed as per ASTM: A 388 (BHEL Standard AA 0850118) and following shall be unacceptable defects.

i) Cracks, flakes, seams and laps.

ii) Defects giving indications larger than that from a 4 mm diameter equivalent flaw.

iii) Groups of defects with maximum indication less than that from a 4mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back eacho is reduced to less than 50%

iv) Defects giving indication of 2 to 4 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.

The above acceptance criteria is equivalent to level 2 of AA 0850118.

15.0 INSPECTION AT SUPPLIER'S WORKS :

BHEL representative shall have free entry and access to all areas where the manufacture of the forging is carried out. All reasonable facilities shall be extended to him including labour where ever necessary, free of charge Sufficient advance intimation shall be given to the representative to witness the various processes, tests etc. Identification of test coupons & forgings and excution of various tests shall be done in his presence.

16.0 TEST CERTIFICATE :

16.1 The suppliers shall furnish five copies of the test certificate (in English) to BHEL with the following details.

a) BHEL Specification No. Hy 19366. Rev.01
b) Material Grade : 16 Mn Cr 5G
c) BHEL Order No:
d) Item Description.
e) Drawing NO:
f) Supplier's Name.
g) Melt No:
h) Serial NO. of the forging.

i) Heat Treatment details for forgings and Test Specimen.
j) Result of Chemical Analysis, Hardness test, Tensile tests for heat treated samples stipulated in this specification and any non-destructive tests as specified in the drawing/purchase order.
k) End quench test report.

16.2 The test certificates shall be attested by the Chief of Inspection/Chief Metallurgist of the supplier and also by BHEL representative.

17.0 MARKING AND PACKING :

17.1 **Marking:** The following details shall be punched clearly on each forging and the same shall be encircled by paint:

a) BHEL Specification No. Hy 19366. Rev.01
b) Material Grade : 16 Mn Cr 5G
c) BHEL Order No.
d) Melt No.
e) Serial No. of the forging
f) Drawing No.
g) BHEL Inspectors Stamp.

17.2 **Packing:** The forgings shall be suitably packed & prevented from damage and corrosion during transit. In the case of overseas supplies, the packing shall be seaworthy.

18.0 REJECTION AND REPLACEMENT :

In the event of the forging proving defective in the course of further processing at BHEL, the same shall be rejected notwithstanding any previous acceptance.

The supplier shall replace the rejected forging at his own cost and the rejected forging shall be returned after all the commercial conditions are satisfied.

BHEL-HERP,VARANASI

QUALITY PLAN

hy-19366

FULLY M/CD

Sl.No.	Component/ Operation	Characteristic Checked	Type/Method of Check	Extent of Check	Reference Documents	Acceptance Norm	Format of Record	Agency P	Agency W	Agency V	Remarks
1.0	Raw Material/ Forging	i. Composition	Chemical Analysis	1 Sample per melt.	As per Spec.	As per Spec.	T.C.	3	-	2	
		ii Heat Treatment	H.T. Chart	1 Sample per H.T.Batch	-do-	-do-	H.T.Chart	3	-	2	
		iii. Mechanical Properties	Mechanical Test	-do-	-do-	-do-	T.C.	3	-	2	
2.0	In Process (After Rough Machining of Forging)	i. Soundness of Forging	Ultrasonic Testing	100%	AA0850118	AA0850118	U.T.Report	3/2	2	-	100% UT as per Cat.2 to be witnessed by BHEL
3.0	Final Inspection	i. Dimensions	Measurement	100%by Vend. Random 10% by BHEL	Drawing	Drawing	Dimension Report	3/2	2-	-	
		ii. Hardness of sample after Carburizing	Hardness Test	-do-	As per Drg	60 HRC Min	T.C.	3	-	2	Hardness of sample is to be measured on Micro Hardness tester in a NABL/ Govt approved Lab. Sample will be designated with unqiue number and same will be appeared in TC.
		iii. Surface Defects	visual	100%	Free from defects	Free from defects	Inspection Report	3	2	-	
		iv. Cleanliness	Visual	100%	----	----	Inspection Report	3	2	-	
		v. Identification & Marking	Punching Heat No,PO No.& Inspector seal	100%	----	----	Inspection Report	3	2	-	
		vi. Prevention (from rust)	Visual	100%	----	----	Inspection Report	3	2	-	

Q.P.No.	RV/C&F/23 Rev.02	Approved by		Prepared by		Legend	P=Perform W=Witness V=Verify 2=BHEL 3=Vendor/Supplier
Date	11.03.2022	Signature & Date	12/3/22	Signature & Date	12.3.22		TC=Test Certificate HT=Heat Tratment DR=Dimension Report IR=Inspection Report
Page No.	1 of 1	BHEL		BHEL			

Rev-01 Extent of check for dimensions after machining was 100%.
Rev-02 Hardness measurement through Micro Hardness tester has been included.

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हर्प, वाराणसी / HERP, Varanasi

BHEL HERP VARANASI
QUALITY PLAN

COMPONENT : SEAL WEAR RING

SL.NO.	COMPONENT/DESCRIPTION	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	1.1) Composition	Chemical Analysis	Review of document	Specn. as per PO	Specn. as per PO	T.C.	3	-	2	
		1.2) Mechanical Properties	Mechanical test	Review of document	Specn. as per PO	Specn. as per PO	T.C.	3	-	2	
2.0	FINAL INSPECTION AFTER ASSEMBLY	2.1) Dimension after machining	Measurement	100% by Vendor, Random 10% by BHEL	Drawing as per PO	Drawing as per PO	DIMENSION REPORT	3	2	-	
		2.2) Hardness	Measurement	Review of document	Drawing as per PO	Drawing as per PO	Insp.Report	3	-	2	
		2.3) Case Depth of Hard Chromium Plating	Measurement (DFT)	100% by Vendor, Random 10% by BHEL	Drawing as per PO	Drawing as per PO	Insp.Report	3	2	-	1.) In case of Hard Chrome Plating case depth to be witnessed by portable digital DFT/Elcometer 2.) In case of flame hardening, case depth to be verified.
		2.4)IDENTIFICATION & MARKING	Write Sl NO., P.O No. on the tag and tie with them	100%	-	-	Insp.Report	3	2	-	
QP. NO.	RV/MCD/23.A Rev-02		Prepared by	Approved By		LEGEND:					
DATE	13-04-23	Sign	Abhishek Shah 13/4/23	C.K. Prajapati 13/4/23							
PG. NO.	1 OF 1	Name	Abhishek Shah	CK Prajapati							

P = PERFORM
T.C. = TEST CERTIFICATE
W = WITNESS
V = VERIFY
3 = VENDOR/SUPPLIER
2 = BHEL