



BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
HIGH PRESSURE BOILER PLANT
PURCHASE DEPARTMENT - FOSSIL BOILERS
THIRUCHIRAPALLI - 620014
TAMILNADU (INDIA)

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PHONE :2577331
GRAMS : BHARATELEC
FAX NO: 2520719
E-mail: srchandran@bheltry.co.in
Web:

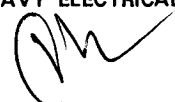
429-002/A

Enquiry No	Enquiry Date	Due Date for Quotation
2661400874 - 55	02.12.2014	27.12.2014
Please quote Enquiry No, Date and due date in all correspondences. This is only a request for quotation and not an order		

Item	Description	Unit	Quantity	Delivery Quantity	Schedule Date
10	7504B1700900 SPUR GEAR AS PER DRG. NO. 3M-04B-17-9845 NOTE: SL.NO. 10 AND 20 ARE MATING COMPONENTS. HENCE THESE ITEMS SHOULD BE PROCURED FROM SINGLE SOURCE ONLY. COMMON NOTE FOR SL NO 10 TO 230 (1) TEST CERTIFICATES (FOR HARDNESS, HEAT TREATMENT, CASE DEPTH ETC) SHOULD BE SEND ALONG WITH THE MATERIALS. (2) INSPECTION WILL BE CARRIED OUT AT BHEL WORKSPOT. VENDOR QUALIFYING CRITERIA Only those vendors who satisfy the following conditions will get qualified to participate in the tender: 1.,,Vendor should have minimum 3 years of experience in this field. 2.,,Previous PO details for supplying similar kind of items to BHEL and/or any-other Organisation should be submitted along with offer. Otherwise offer will be rejected. 3.,,Company profile details has to be provided along with offer. 4.,,BHEL reserves the right to visit the vendor's works for verifying the manufacturing facilities and any other credential furnished by the vendor. In case the information furnished with the offers found to be false /incorrect, the offer shall be rejected.	NO	10.000	10.00	16.02.15
20	7504B1706400 SPUR GEAR AS PER DRG NO. 4M-04B-17-19217	NO	10.000	10.00	16.02.15
30	7504B1705800 GEAR BOX AS PER DRG NO. 0M-04B-17-0511	NO	2.000	2.00	16.02.15
40	7504B1705900 HOUSING AS PER DRG NO. 2M-04B-17-03257	NO	6.000	6.00	16.02.15
50	7504B1706300	NO	10.000	10.00	16.02.15

The offers should reach us 30 minutes before the time of opening of tenders.
The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening.Late and delayed offers are liable to be rejected.

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**


MANAGER / PURCHASE
(FOSSIL BOILERS)
Yours faithfully,



BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
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SPUR GEAR AS PER DRG NO. 3M-04B-17-9846

60	7504B1701600 WORM WHEEL BOSS AS PER DRG.NO.3M-04B-17-6495 NOTE: SL.NO. 60 TO 80 ARE MATING COMPONENTS. HENCE THESE ITEMS SHOULD BE PROCURED FROM SINGLE SOURCE ONLY.	NO	10.000	10.00	16.02.15
70	7504B1701500 WORM WHEEL AS PER DRG.NO.3M-04B-17-6496	NO	10.000	10.00	16.02.15
80	7504B1701100 WORM AS PER DRG.NO. 3M-04B-17-6497	NO	10.000	10.00	16.02.15
90	7504B1702700 SPUR GEAR AS PER DRG:3M 04B-06/17-6811 NOTE: SL.NO. 90 AND 100 ARE MATING COMPONENTS. HENCE THESE ITEMS SHOULD BE PROCURED FROM SINGLE SOURCE ONLY.	NO	10.000	10.00	16.02.15
100	7504B1702600 SPUR GEAR AS PER DRG NO:4M 04B-05/06/17-17508-01	NO	10.000	10.00	16.02.15
110	7504B1706100 SLEEVE (8 SPLINES FOR DR 10) AS PER DRG NO. 3M-04B-17-7697	NO	10.000	10.00	16.02.15
120	7504B1706200 NUT HOUSING AS PER DRG NO. 3M-04B-17-8564	NO	10.000	10.00	16.02.15
130	7504B0601500 SPUR GEAR AS PER DRG NO: 3M-04B-17-9678 NOTE: SL.NO. 130 AND 140 ARE MATING COMPONENTS. HENCE THESE ITEMS SHOULD BE PROCURED FROM SINGLE SOURCE ONLY.	NO	10.000	10.00	16.02.15
140	7504B0601400 SPUR GEAR AS PER DRG NO: 3M-04B-17-9687	NO	10.000	10.00	16.02.15
150	7504B1704100 SPUR GEAR AS PER DRG NO: 3M-04B-17-9823 NOTE: SL.NO. 150 AND 160 ARE MATING COMPONENTS. HENCE THESE ITEMS SHOULD BE PROCURED FROM SINGLE SOURCE ONLY.	NO	10.000	10.00	16.02.15
160	7504B1704200	NO	10.000	10.00	16.02.15

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tenderers who have submitted their offer and who may like to be present for the tender
opening.Late and delayed offers are liable to be rejected.

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**


MANAGER / PURCHASE
(FOSSIL BOILERS)
Yours faithfully,



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2661400874 / 02.12.2014

SPUR GEAR AS PER DRG NO: 3M-04B-17-9824

170	7504B1703100 SPUR GEAR AS PER DRG NO: 3M 04B 06/17 9826 NOTE: SL.NO. 170 AND 180 ARE MATING COMPONENTS. HENCE THESE ITEMS SHOULD BE PROCURED FROM SINGLE SOURCE ONLY.	NO	10.000	10.00	16.02.15
180	7504B1703200 SPUR GEAR AS PER DRG. NO. 3M 04B 17 9827	NO	10.000	10.00	16.02.15
190	7504B1703500 SPUR GEAR AS PER DRG. NO. 3M 04B 17 9843 NOTE: SL.NO. 190 AND 200 ARE MATING COMPONENTS. HENCE THESE ITEMS SHOULD BE PROCURED FROM SINGLE SOURCE ONLY.	NO	10.000	10.00	16.02.15
200	7504B0500500 SPUR GEAR AS PER DRG.NO.4M-04B-05-17510	NO	10.000	10.00	16.02.15
210	7504B1704500 SPUR GEAR AS PER DRG. NO. 3M-04B-17-9844 NOTE: SL.NO. 210 AND 220 ARE MATING COMPONENTS. HENCE THESE ITEMS SHOULD BE PROCURED FROM SINGLE SOURCE ONLY.	NO	10.000	10.00	16.02.15
220	7504B0400400 SPUR GEAR AS PER DRG NO 4M 04B 05/17 17511-01	NO	10.000	10.00	16.02.15
230	7504B1706500 SPUR GEAR AS PER DRG NO. 3M-04B-17-07695-01	NO	10.000	10.00	16.02.15

General Note:


GENERAL NOTE:PLEASE SUBMIT YOUR OFFER IN "TWO PART BID SYSTEM" AS PER
THE ANNEXURES ENCLOSED.
ENCLOSURES:ANNEXURE II,III,IV,V,VI,VII.

Enclosures:

"LD clause has to be confirmed without fail."

The offers should reach us 30 minutes before the time of opening of tenders.
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tenderers who have submitted their offer and who may like to be present for the tender
opening.Late and delayed offers are liable to be rejected.

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**


MANAGER / PURCHASE
(FOSSIL BOILERS)
Yours faithfully,

CAPITAL PURCHASE
COMMERCIAL TERMS AND CONDITIONS

1.0 QUOTATIONS

The Bidders shall submit the offer in **TWO INNER ENVELOPES** as indicated below which shall be sealed in one outer envelope.

Envelope I This sealed envelope should contain all the copies of technical bid together with un-priced commercial bid & annexure III. This envelope should be clearly marked **'Part I - Technical and commercial bid'**,

Indicating Enquiry No., Due Date and Address & Reference of the Bidder.

Envelope II This sealed envelope should contain **price as per Annexure-IV format**. This envelope should be clearly marked **'Part II - Price bid'**, indicating **Enquiry No., Due Date and Address & Reference of the Bidder**.

Both the envelopes (Part I & II) shall be put in one cover (**Envelope III**), duly sealed, superscribing as Part I and Part II of Enquiry No., due date of opening and the address and reference of the Bidder

The above offer should reach this office on or before the due date by 14.00 hours (IST). Late offers will not be considered.

Tender should not be addressed to any individual's name but only by designation to

**SENIOR MANAGER /PURCHASE/ CP & SP/ MM / MFG
BHARAT HEAVY ELECTRICALS LIMITED
HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI - 620 014
TAMIL NADU**

Tenders should be free from **CORRECTION AND ERASURES**, Corrections if any, must be attested. All Amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

Offers should be in **ENGLISH** and accompanied by detailed technical literature, catalogue and detailed dimensional drawings in **ENGLISH** or otherwise, the offers will not be considered.

2.0 OPENING OF TENDERS

The Part I - Technical & commercial bid alone would be opened on the Tender opening date.

The Part II - Price bid of technically suitable Bidders alone would be opened. The Technically Suitable Bidders would be informed about the tender opening date through e-mail.

Clarifications if any required by BHEL for Technical evaluation **would be** sought from Bidders before opening of Part II - price bid

For any queries clarifications the bidders may contact us through our FAX NO. +91 431 2520719 or through e-mail <mmcpmfg1@bheltry.co.in >&< chells@bheltry.co.in>

MM: CP & SP

Annexure For Techno Commercial Bid

Check List - to be filled and submitted along with Technical Bid

BHEL Commercial Terms and Conditions for Indigenous Supplies	Vendor's Confirmation / Comments
Technical confirmation to BHEL's Specification as called for in BHEL Format shall be furnished. If needed additional sheets shall be used.	
Prices shall be quoted item wise only as per the model format enclosed	
Prices shall be quoted on " FIRM PRICE " basis only The prices should be only on F.O.R / Despatching station basis with Packing & Forwarding charges if any. Applicable % of ED & Sales Tax, Freight & Insurance, installation & Commissioning Charges should be clearly Indicated	
Validity of offer shall be for a minimum period of 120 days from the date of Tender opening	
Delivery period from the date of Letter of Intent / Purchase order shall be clearly mentioned in the offer	
Liquidated damages @ '0.5% per week subject to a maximum of 10% of the order value shall be applicable for delay in deliveries For Details Refer Annexure- v	
Following Risk Purchase clause shall be applicable The purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or dispatch within the time stipulated or if the same were not available, the best and the nearest available substitute therefore The supplier shall be liable for any loss which the Purchaser may sustain by reason of such risk purchases	
Payment term for supply portion: Payment term is 100% direct payment after 45 days from the date of receipt and acceptance of materials For details Refer Annexure- v	
Erection / commissioning: (if applicable only) Erection / commissioning charges if any has been mentioned in the offer or else confirmation that Erection /commissioning shall be done at free of cost is available in the offer,	
The equipment shall be guaranteed for a period of 12 months from the date of commissioning	
Final inspection and acceptance of equipment will be after installation at BHEL, Trichy	
The vendor shall provide necessary drawings, Test Certificates and Operating Maintenance Manuals etc., as called for in the Technical Specification, in the required number of copies at no extra cost	
Any warranty replacement during warranty period shall be supplied free of charge on FOR BHEL, Trichy basis.	
Offers should be submitted only in sealed cover super-scribing clearly the Enquiry reference and due date.	
% of Excise Duty with cess	
% of TAX (CST/VAT) (INGST with FORM-17 or CST with C-FORM)	
Packing & Forwarding Charges (if any in % only)	
Percentage of Freight & transit insurance charges, if any Freight charges from Dispatching station to BHEL, Tiruchirappalli • Supplier should quote for F.O.R-BHEL Trichy Stores.	
As per Commercial terms and conditions, acceptance for participation in Reverse auction (RA). Yes/No to be indicated	
Name of the person for participating reverse auction	
Land Line Number	
Fax Number	
Mobile Number	
E-mail ID	

NOTE:-

- It is confirmed that all the terms and conditions stipulated in the Enquiry have been fully understood by us and all clarifications & details have been obtained.
- Your offer should be indicating applicable if any P&F Charges, % of ED, Sales Tax -CST or VAT, Service Tax), Freight, Insurance and Installation and Commissioning Charges etc., as per our Price Format
- Your specific acceptance to our Payment terms, LD & Risk Purchase Clause are essential for consideration of your offer. Other wise your offer is liable for rejection.
- No row shall be left blank. Please indicate NA, in case the item is "not applicable"

Payment Term (Indigenous)	
If materials are receivable at Stores/Trichy <u>without</u> PBG	Payment term is 100% direct payment after 45 days from the date of receipt and acceptance of materials.
If materials are receivable at Stores/Trichy <u>with</u> PBG	Payment term is 100% direct payment after 45 days from the date of receipt and acceptance of materials and against 10% PBG valid for the warranty period.
Any deviation in the above payment term will attract loading as mentioned below. “Base rate of SBI (as applicable on the date of bid opening. Techno-commercial bid opening in case of two part bids) + 6% shall be considered for loading for the period of relaxation sought by bidders.	

Payment through Bank is not preferred. In case of Payment through Bank is opted by Supplier, BHEL prefers documents submission through bank with copy of LR and door delivery of Goods to Site/Stores with Consignee copy attached. In this case Loading will be 3% on the offered value.

Offers of indigenous Suppliers with payment terms as LC/Advance Payment are liable for rejection.

Liquidated Damages / Penalty -

Liquidated damages shall be 0.5% of the total order value per week or part thereof subject to a maximum of 10% of the total order value.

For staggered delivery schedule, LD shall be 0.5% of the undelivered portion per week of the delay or part thereof subject to a maximum of 10% of the total order value.

Any deviation from the above LD clause, loading will be applied to the extent to which it is not agreed by the bidder (at offered value).

Guarantee / Warranty Period – (if applicable)

Normally No deviation permitted and the deviated offers are liable for rejection.

Ranking-

BHEL will consider the ranking after the loading is applied as referred above wherever deviations are observed.

Performance Bank Guarantee – (if applicable)

Normally No deviation permitted and the deviated offers are liable for rejection.

NOTE:-

1. If the due date of tender opening happens to be a holiday, the tenders will be opened on the next working day.
2. BHEL reserves the right to go for a reverse auction (RA) instead of opening the submitted sealed bid which will be decided after technical evaluation. Information and general terms and conditions covering RA are given in commercial terms and conditions.
3. Corrigendum if any, with respect to this tender will be hosted only in the website <http://www.bhel.com> or <http://tenders.gov.in>. You are requested to visit the website regularly for updates.

Special Provisions for Micro and Small Enterprises (MSE)

1. 20% of the tendered quantity is earmarked for MSE suppliers in this tender.
2. Out of the 20% tendered quantity reserved for MSE suppliers, 4% shall be earmarked for procurement from MSE owned by SC/ST entrepreneurs.
3. In case MSE vendor participating in the tender quotes within the price band of L1+15%, they will be allowed to supply the portion of the requirement subject to acceptance of L1 price by MSE vendor. In case of more than one such MSE, the supply shall be shared proportionately.
4. "MSE suppliers can avail the intended benefits only if they submit along with the 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 attested copy of a CA certificate (Format enclosed at Annexure -VII where deemed validity of EM II certificate of five Years has expired) applicable for the relevant financial year (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 officer."

Certificate by Chartered Accountant on letter head

This is to Certify that M/S
(hereinafter referred to as 'company') having its registered office at
..... is registered under MSMED Act 2006, (Entrepreneur
Memorandum No (Part-II) dtd:.....,
Category: (Micro/Small)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as on
date..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost
excluding land and building and the items specified by the Ministry of Small Scale Industries vide its
notification No.S.O.1722(E) dated October 5, 2006 :
Rs.....Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and
furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED
Act, 2006:
Rs.....Lacs

The above investment of Rs.....Lacs is within permissible limit of
Rs.....Lacs forMicro / Small (Strike off which is not applicable)
Category under MSMED Act 2006.

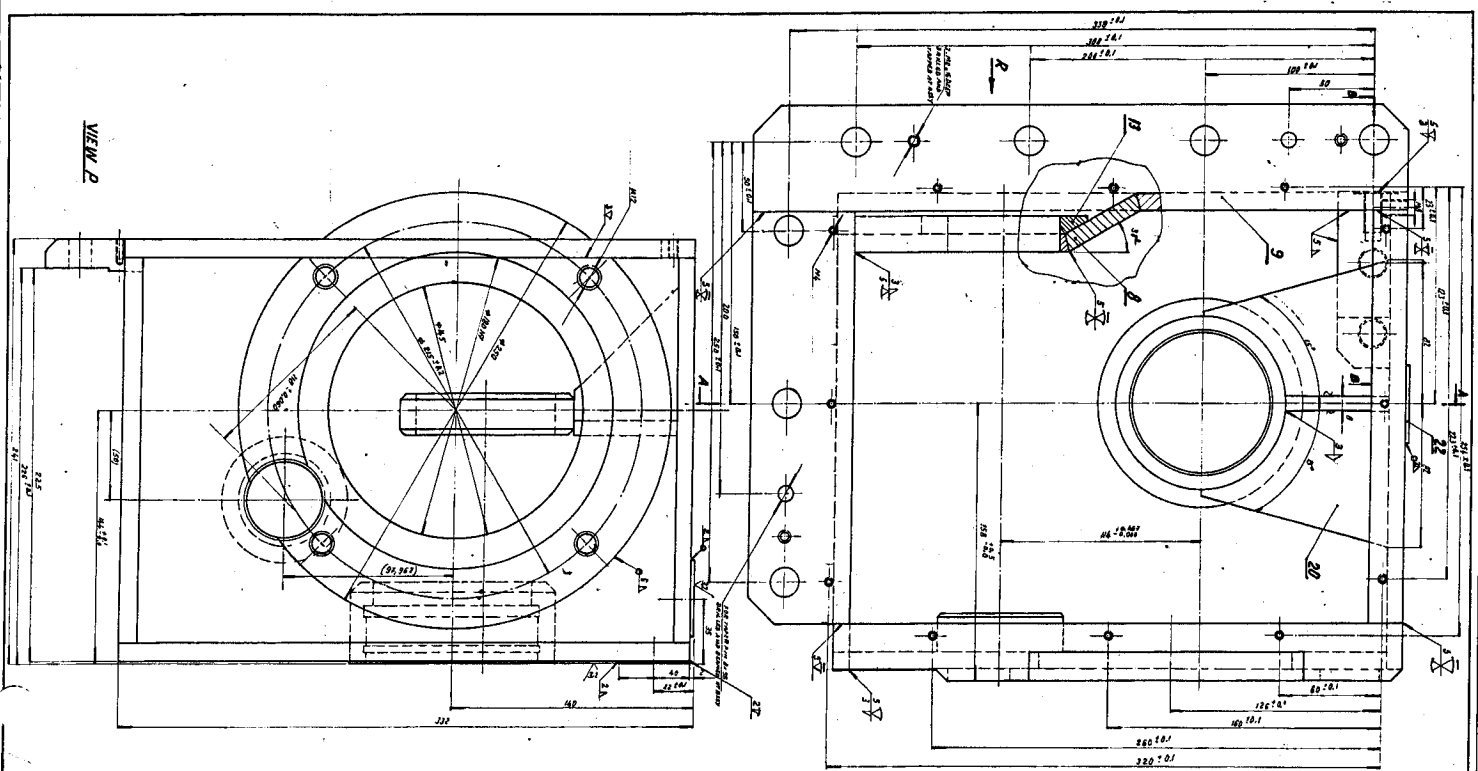
Date:

(Signature)

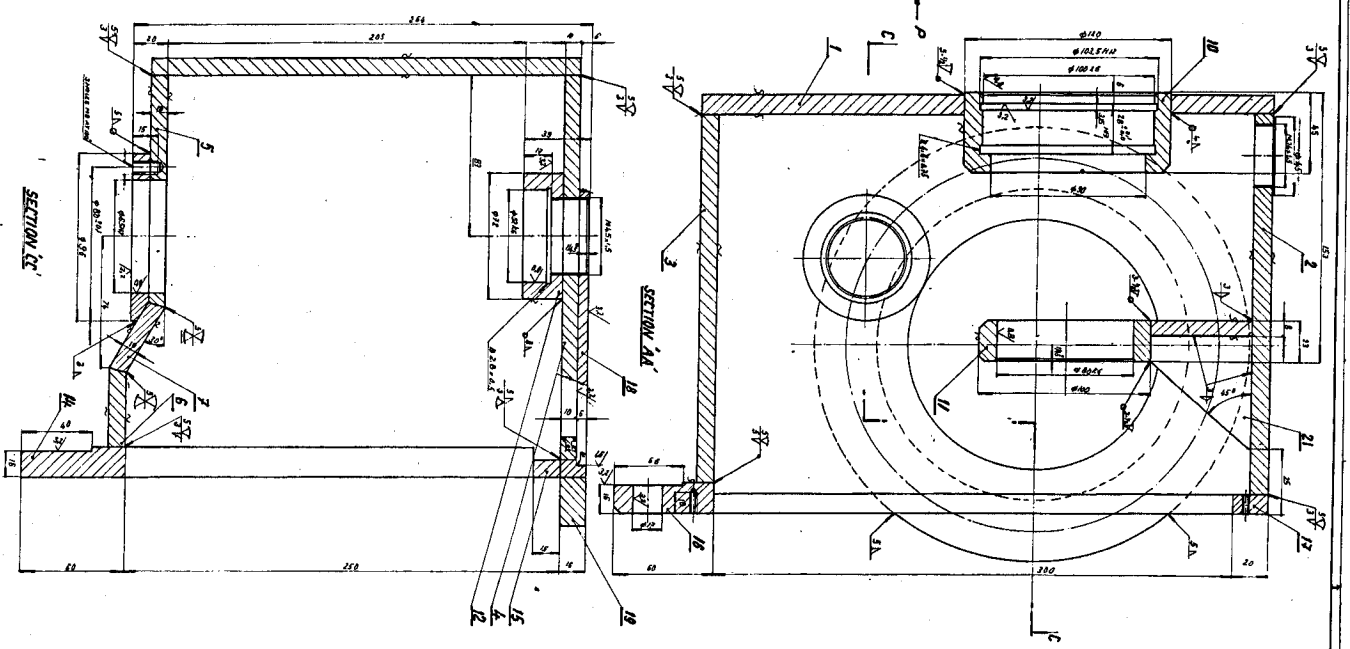
Name -

Membership number -

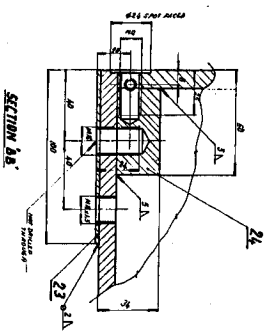
Seal of Chartered Accountant



VIEW D



VIEW B



NOTE

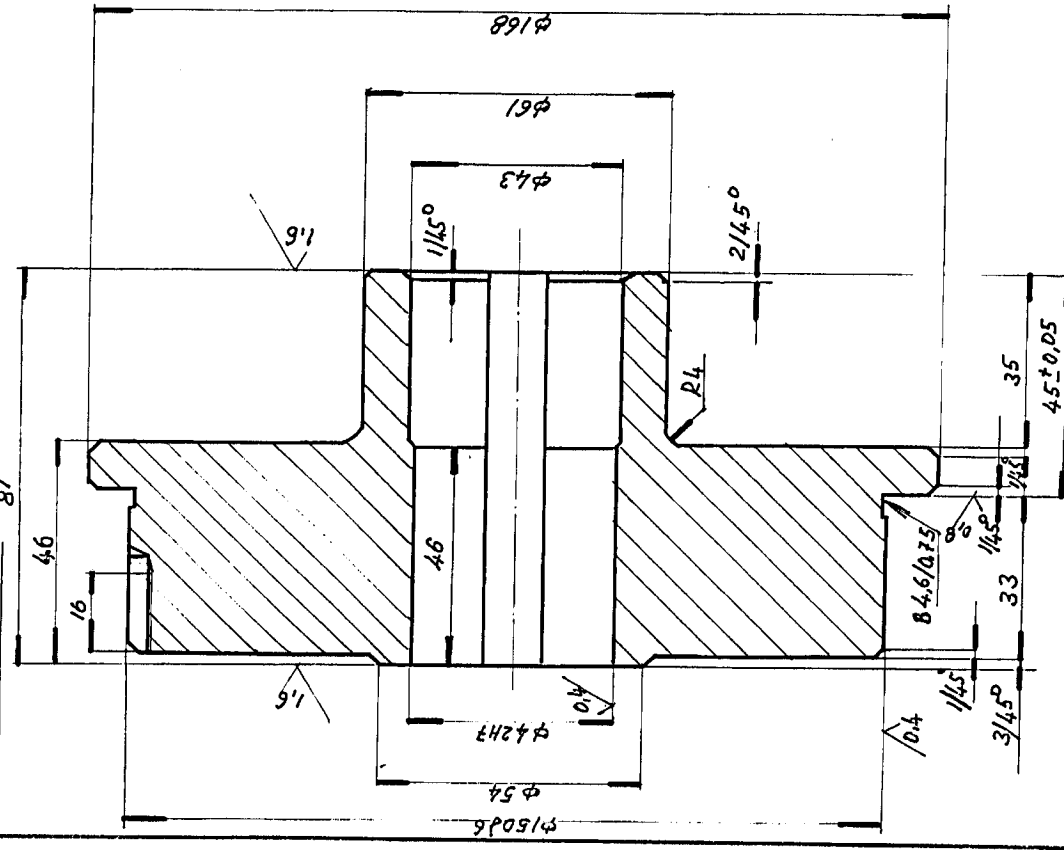
1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
2. ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE SHAFT UNLESS OTHERWISE SPECIFIED.
3. ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE GEAR UNLESS OTHERWISE SPECIFIED.
4. ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE HOUSING UNLESS OTHERWISE SPECIFIED.
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10. ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE HOUSING UNLESS OTHERWISE SPECIFIED.

NO.	DESCRIPTION	QTY.	UNIT	REMARKS
1	SHAFT	1	PC	
2	GEAR	1	PC	
3	HOUSING	1	PC	
4	BELT PULLEY	1	PC	
5	KEY	1	PC	
6	WASHER	1	PC	
7	NUT	1	PC	
8	SCREW	1	PC	
9	SCREW	1	PC	
10	SCREW	1	PC	
11	SCREW	1	PC	
12	SCREW	1	PC	
13	SCREW	1	PC	
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96	SCREW	1	PC	
97	SCREW	1	PC	
98	SCREW	1	PC	
99	SCREW	1	PC	
100	SCREW	1	PC	

NO.	DESCRIPTION	QTY.	UNIT	REMARKS
1	SHAFT	1	PC	
2	GEAR	1	PC	
3	HOUSING	1	PC	
4	BELT PULLEY	1	PC	
5	KEY	1	PC	
6	WASHER	1	PC	
7	NUT	1	PC	
8	SCREW	1	PC	
9	SCREW	1	PC	
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72	SCREW	1	PC	
73	SCREW	1	PC	
74	SCREW	1	PC	
75	SCREW	1	PC	
76	SCREW	1	PC	
77	SCREW	1	PC	
78	SCREW	1	PC	
79	SCREW	1	PC	
80	SCREW	1	PC	
81	SCREW	1	PC	
82	SCREW	1	PC	
83	SCREW	1	PC	
84	SCREW	1	PC	
85	SCREW	1	PC	
86	SCREW	1	PC	
87	SCREW	1	PC	
88	SCREW	1	PC	
89	SCREW	1	PC	
90	SCREW	1	PC	
91	SCREW	1	PC	
92	SCREW	1	PC	
93	SCREW	1	PC	
94	SCREW	1	PC	
95	SCREW	1	PC	
96	SCREW	1	PC	
97	SCREW	1	PC	
98	SCREW	1	PC	
99	SCREW	1	PC	
100	SCREW	1	PC	

GEAR BOX
G-M-QB-3511

CAUTION
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 BHARAT HEAVY ELECTRICALS LIMITED
 TRICHURAPALLI-628 016

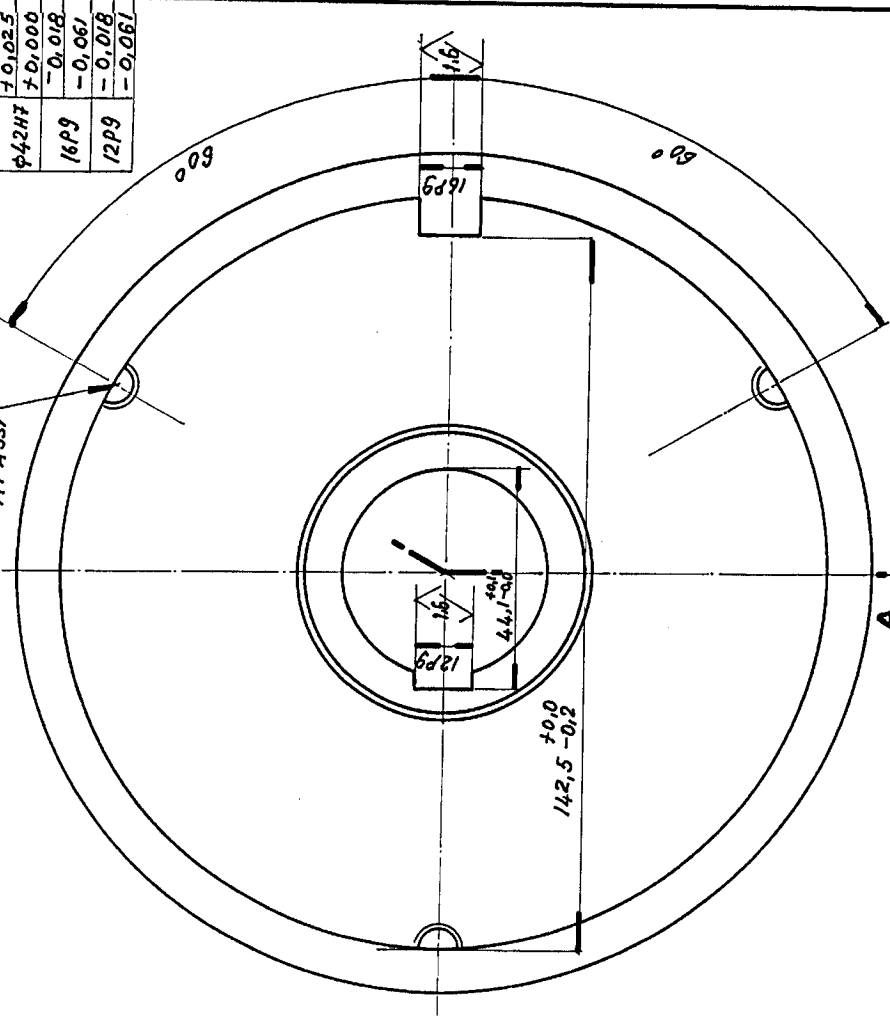


SECTION 'AA'

WORM WHEEL REF. DRG. NO. 3-M-04B-CASE

3-MB
 AT ASSY

φ150/16	+0.014
-0.011	
φ42H7	+0.025
+0.000	
16P9	-0.018
-0.061	
12P9	-0.018
-0.061	

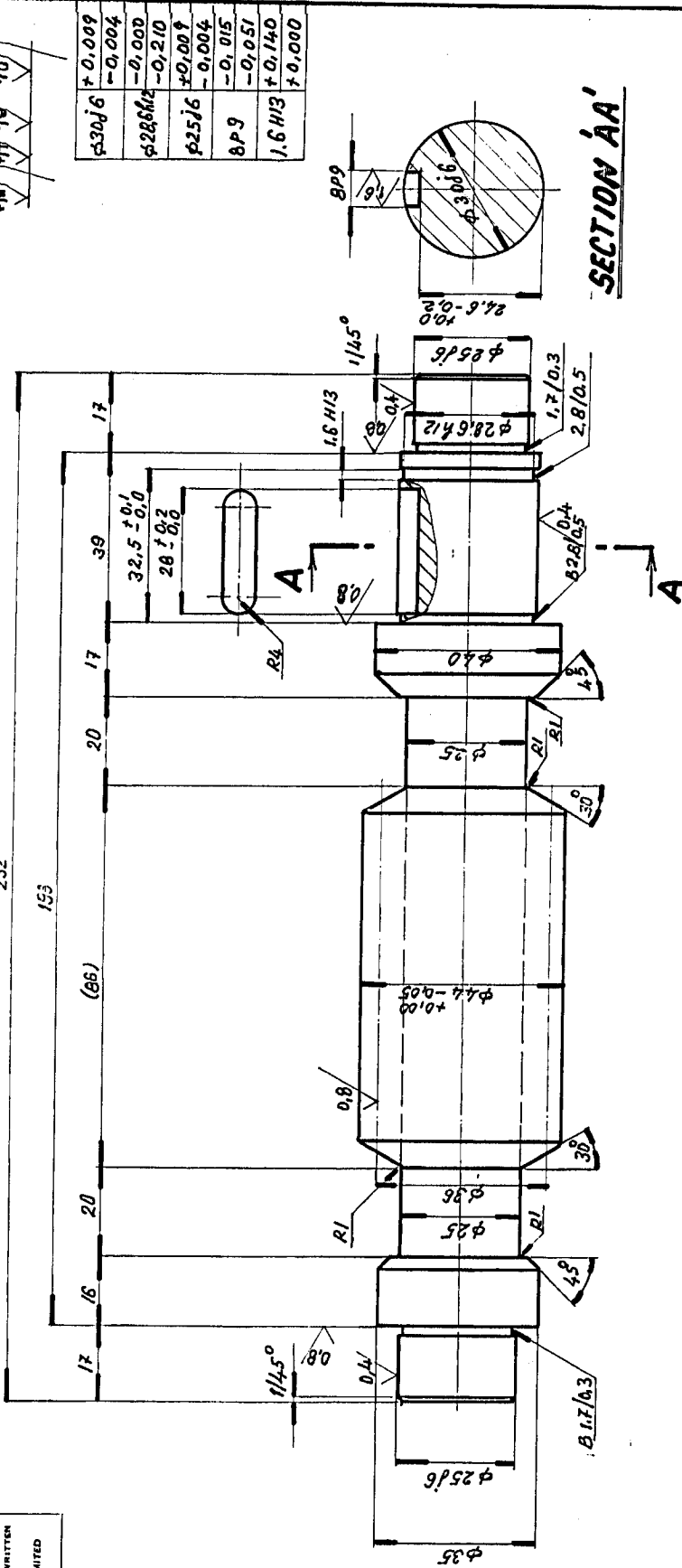


NO. OF SHEETS	DESCRIPTION	SERIAL PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	ASCB IS: T203	ITEM NO.
1/1	BIX OD ICE		BMLC65			
SCALE	DRAWN	CHECKED	APPROVED	BYDL OFFICER	DATE	REMARKS
1:1	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>		23.6.1977	
MACHINE: RADIAL DRILLING (PORTABLE)			TITLE: WORM WHEEL BOSS			
TYPE: DRT10			DRAWING NO. 3-M-04B-6495			
NO. OF SHEETS			NO. OF SHEETS			

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 BHARAT HEAVY ELECTRICALS LIMITED
 TIRUCHIRAPPALLI-620014

232

153



SECTION 'AA'

HEAT TREATED TO 85-85K9 PER SQ. MM.

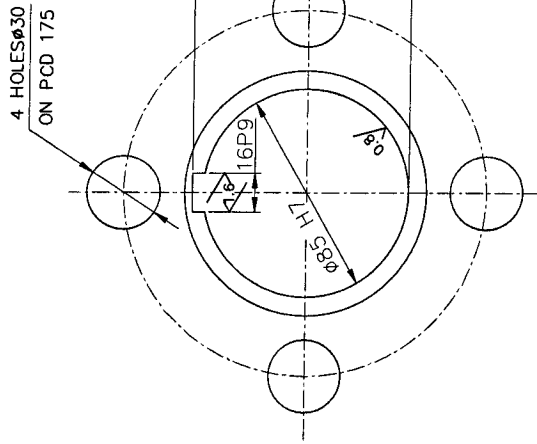
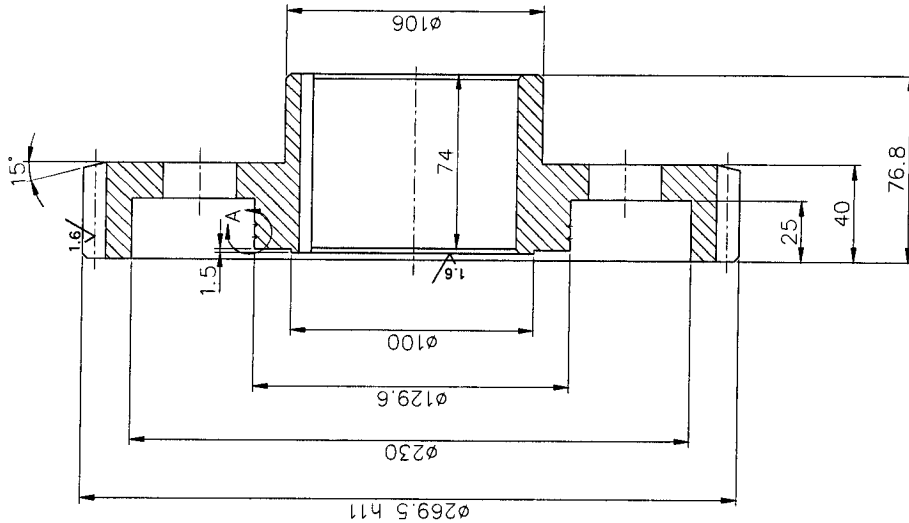
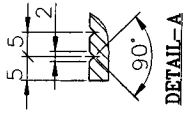
NO. OF STARTS	SINGLE
MODULE	4
PRESSURE ANGLE	20°
LEAD ANGLE	6° 21'
HAND OF HELIX	RIGHT
AXIAL PITCH	12.57
QUALITY AND TOLERANCE ZONE	
MATING GEAR NO. OF TEETH	48
MATING GEAR DRAWING NO.	3-M-04B-6496
CENTRE DISTANCE	114 ± 0.000

NO. OF PICES	44 X 232 L	INITIAL MATERIAL	1.81	ITEM NO.	
REMARKS	DESCRIPTION	FINISH MATERIAL	4508	DRAWING NO.	
SCALE	1:1	REFERENCE	15:5517	DATE	17
DRAWN		CHECKED		SIGNATURE	
CHECKED		APPROVED		DATE	
APPROVED		DATE	23.6.1977		
STDS. OFFICER					
MACHINE: RADIAL DRILLING (PORTABLE)					
TITLE: BED LONG TRAVEL GEAR					
BOX ASSY					
WORM					
SINGLE START φ 44					
DRAWING NO. 3-M-04B-6497					
NO. OF SHEETS					

ALL DIMENSIONS ARE IN MM

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TRICHRAPALI - 620 014



NOTE:--
CHAMFER ALL SHARP CORNERS TO 1/45°

NO. OF TEETH	60
MODULE	4.5
PRESSURE ANGLE	20°
WIDTH ACROSS 6 TEETH	86.88 ^{+0.200} _{-0.267}
CORRECTION FACTOR	-1.056
Q.L.T.Y. & TOL. ZONE	9c DIN 3967
MATING GEAR NO. OF TEETH	15
MATING GEAR DRAWING NO.	-
CENTRE DISTANCE	168.75

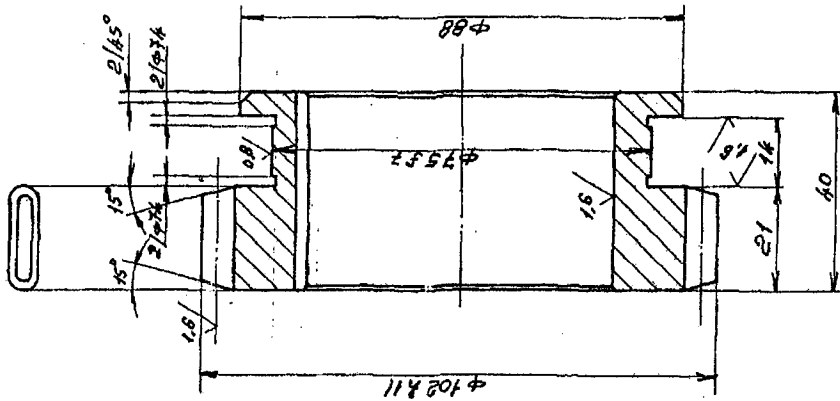
16 P9	-0.018	±0.000
	-0.061	-0.032
		+0.035
		0.000

32/16

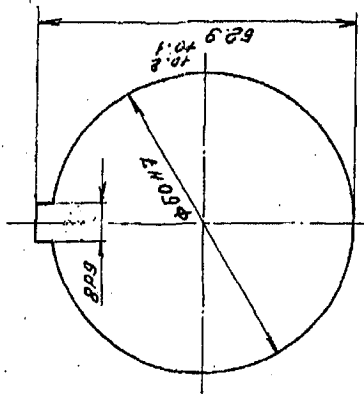
No. of Pieces	45 CB	IS: 7283			
DESCRIPTION	MATERIAL	STANDARD	NET WT. IN KGS.	DRAWING No.	ITEM No.
REFERENCE:			DCN REF	DATE	STEN
SCALE	DRG. TRACED				INDEX
1.2	P. Albert Raso			04.04.13	K.R
CHB. G. Govinda raj					01
APP. K. Ramanan					
(1.1)					
DATE 29-11-79/04-04-13					
MACHINE: RADIAL DRILLING					
TYPE: DRT 10					
TITLE:					
SPUR GEAR					
60T/269.5					
REV.					
3M04B170769501					
Sheet No.					
No. of Sheets					

CAUTION

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8 P9	-0.015
460H7	-0.051
4102H11	+0.030
475 f7	+0.000
	-0.000
	-0.220
	-0.030
	-0.060



NOTE:

CASE HARDENED TO HRC 52-52
CASE DEPTH 0.8 mm

NO. OF TEETH : 32
MODULE : 3
PRESSURE ANGLE : 20°
CORRECTION FACTOR : -
QUALITY TOLLERANCE ZONE : 9C DIN 3967
WIDTH ACROSS 4 TEETH : 32.84 -0.188
MATING GEAR NO. OF TEETH : 32
MATING GEAR BAG. NO. : 3-M-048-9687
CENTRE DISTANCE : 96

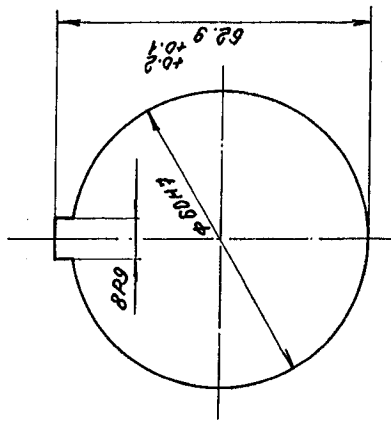
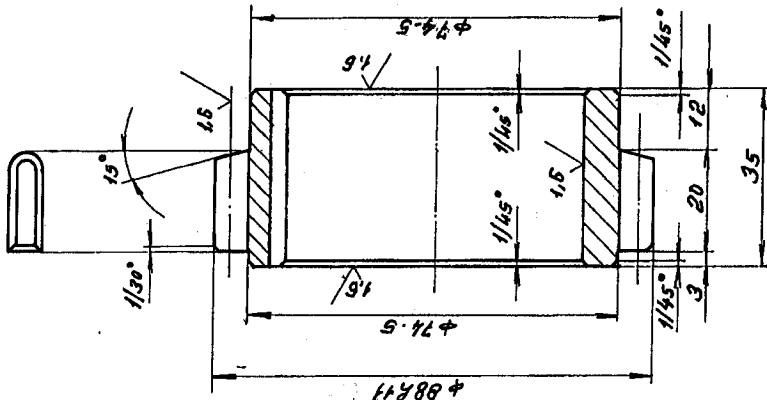
NO. OF PRECS	DESCRIPTION	SEM-PRODUCT	INITIAL MATERIAL	FINAL MATERIAL	ITEM No.	DRAWING No.	ITEM No.
			13 Ni3 Cr80	15-A432		0-M-048-0703	15
SCALE	DRWNR	CHECKED	APPROVED	STDS. OFFICER	DATE	ALTERATIONS	SIGNATURE INDEX
1:1	A. C. [Signature]	[Signature]	[Signature]	[Signature]	13.10.86		
MACHINE : RADIAL DRILLING		TITLE : SPUR GEAR		DRAWING No. : 3-M-048-96710		SHEET No. : 17	
						3-M-048-9678	

CAUTION

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3.2 / 1.6

8 P9	-0.015
+60 H7	+0.030
+88 H11	+0.000
	-0.000
	-0.220



NO. OF TEETH 26
 MODULE 3
 PRESSURE ANGLE 15°
 WIDTH ACROSS 3 TEETH 24.24 -0.188
 CORRECTION FACTOR +0.56
 QTY. & TOL. ZONE 9c DIM 987
 MATING GEAR NO. OF TEETH 37
 MATING GEAR DRG. NO. 3-M-046-9824
 CENTRE DISTANCE 95

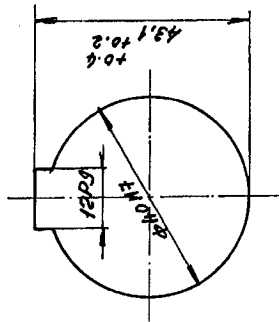
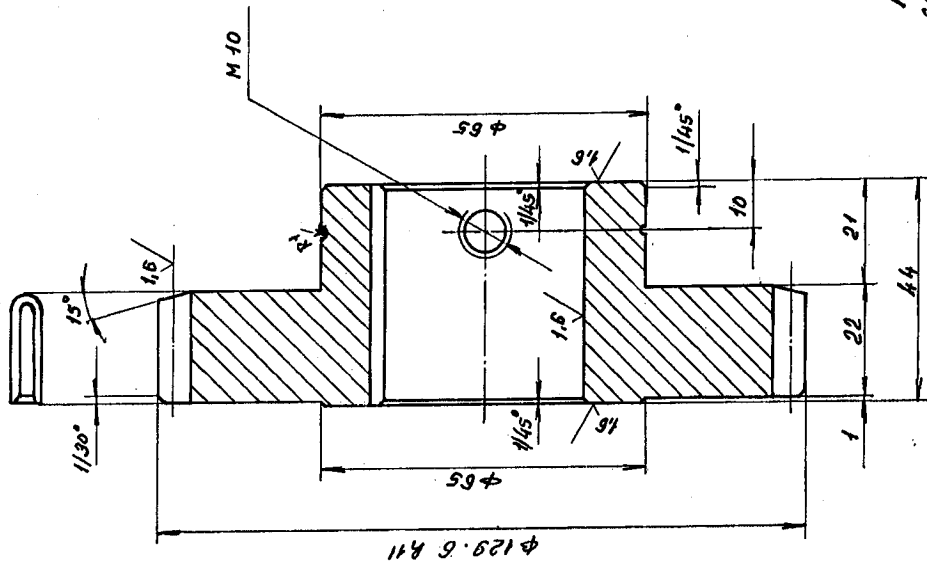
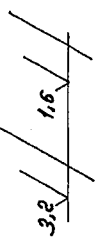
CASE HARDENED TO HRC 62±2
CASE DEPTH 0.8 TO 1.0

NO. OF PIECES	DESCRIPTION	SEM-PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	TOTAL NET WT. (KG)	CROSS AREA	DRAWING NO.	ITEM USE
			13N3Cr90 15: H432				0-M-046-9823 14	
SCALE	DRAWN	CHECKED	APPROVED	STDS. OFFICER	DATE	ALTERATIONS	DATE	SIGNATURE
1:1	K. U. A. Sanyal				20.04.87			
TITLE: SPUR GEAR (SHAFT III) MACHINE: RADIAL DRILLING TYPE: DRT-10, V R 10 DRAWING NO: 3-M-046-9823 No. OF SHEETS: 17								

CAUTION

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12 P3	-0.018
	-0.061
40 H7	+0.025
129.6 H11	+0.000
	-0.000
	-0.050



NO. OF TEETH 42
 MODULE 3
 PRESSURE ANGLE 15° - 0.158
 WIDTH ACROSS 4 TEETH 31.99 ± 0.210
 CORRECTION FACTOR -0.4
 Q. QTY. & TOL. ZONE 9C DIN 9987
 MATING GEAR NO. OF TEETH 21
 MATING GEAR DRG. NO. 3-M-046-9826
 CENTRE DISTANCE 98

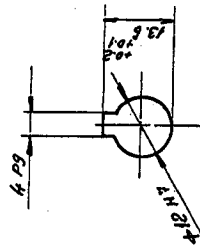
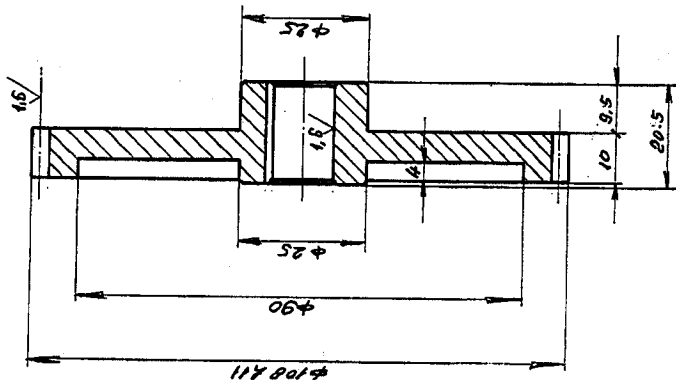
NOTE:
 CASE HARDENED TO HRC 62 12
 CASE DEPTH - 0.8 mm

NO. OF SHEETS	1	NO. OF SHEETS	1
REVISIONS		REVISIONS	
13 Ni3Cr80	15:4432	INITIAL MATERIAL	0-M-046-0763 18
DESCRIPTION	SHAFT-PRODUCT	FINAL MATERIAL	DRAWING NO.
SCALE	1:1	TOTAL NET WT. (G)	
CHECKED	<i>S. S. S. S.</i>	NO. OF ITERATIONS	
APPROVED	<i>S. S. S. S.</i>	DATE	
STDS. OFFICER		SIGNATURE	
DATE	02-05-87		
REFERENCE			
MACHINE	CARBIDE DRILLING	TYPE	DRT 10, V R 10
TITLE	SPUR GEAR 129.6 H11 - 42T	DRAWING NO.	3-M-046-9827
	PART NO. 515/140 SHAFT 1U	NO. OF SHEETS	1



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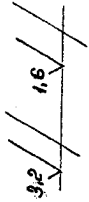


NOTE:-

EDGES TO BE CHAMFERED TO 1/45°
 CASE HARDENED TO HRC 62±2
 CASE DEPTH 0.8 mm

NO. OF TEETH	70
MODULE	1.5
PRESSURE ANGLE	20°
WIDTH ACROSS 8 TEETH	39.4 - 0.141
CORRECTION FACTOR	NIL
QUALITY & TOL. ZONE	3c-DIN 3987
MATING GEAR NO. OF TEETH	34
MATING GEAR DRG NO.	4-M-046 - 17510
CENTRE DISTANCE	78

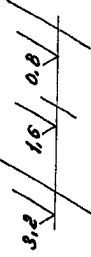
4 P9	-0.012
12 H7	-0.042
+108 H11	+0.018
	+0.000
	-0.000
	-0.220



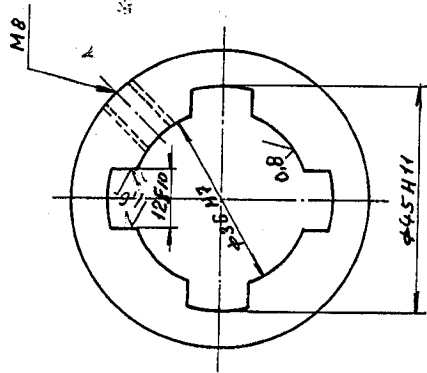
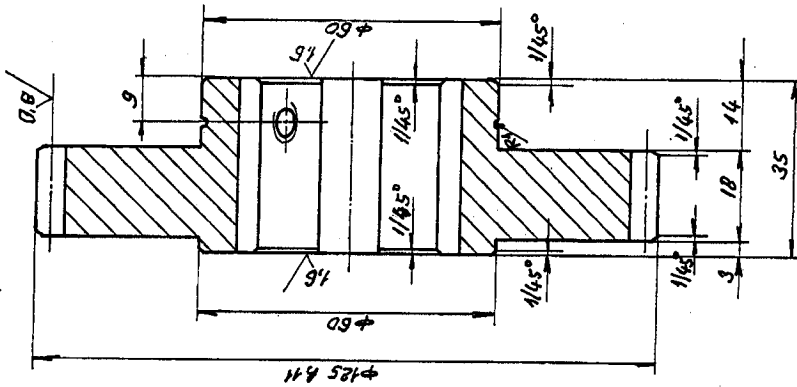
NO. OF TEETH	70	INITIALS		DATE	
DESCRIPTION	110 BX 20.5t.	SEM-PRODUCT	13M30.80	ALTERATIONS	
FINISH MATERIAL	15.4432	FINISH MATERIAL		DATE	
SCALE	1:1	REFERENCE		SIGNATURE	
DRAWN	A. Babby	CHECKED	K. W. Babby	DATE	
APPROVED		DATE	17.05.87		
TITLE	MACHINE: RADIAL DRILLING				
TYPE: 387 10 DRAWING No. 3-M-046-9843 No. OF SHEETS: 17					

CAUTION

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12 P10	+0.016
φ38 H7	+0.086
φ45 H11	+0.085
φ125 H11	+0.000
	+0.000
	-0.000
	-0.250

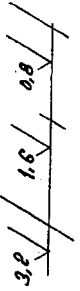
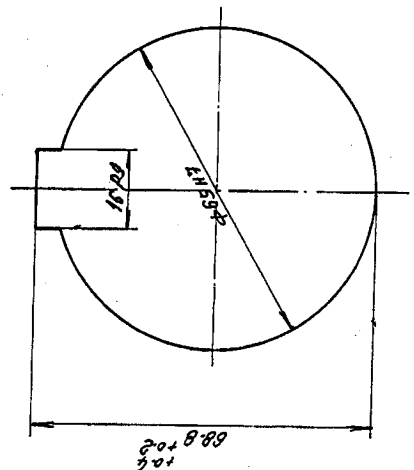
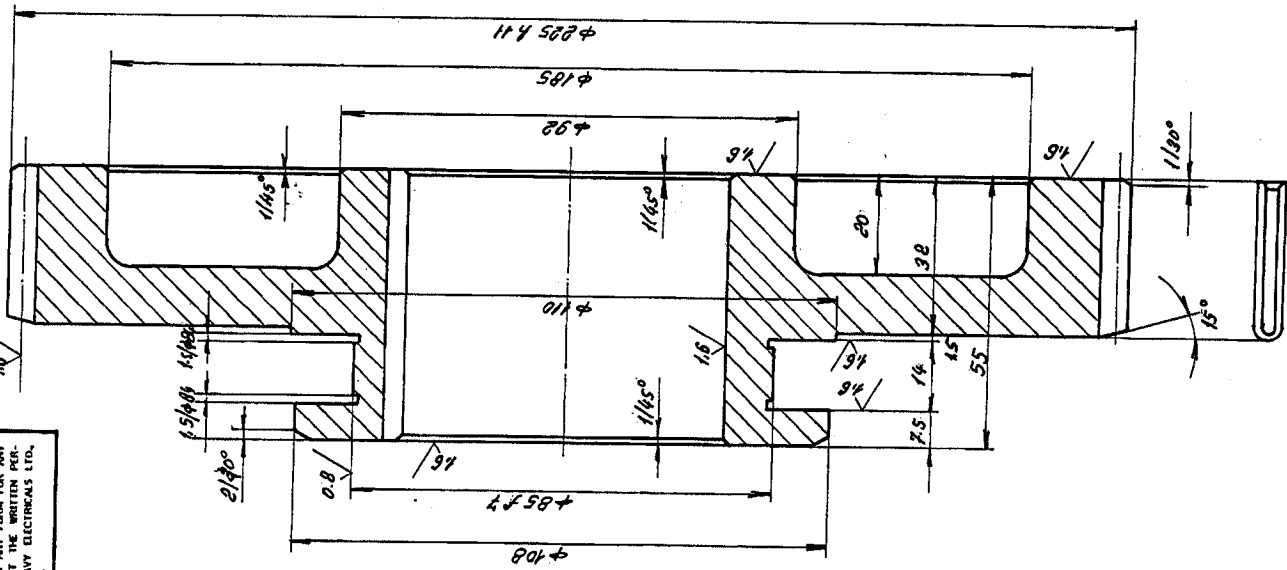


NO. OF TEETH 48
 MODULE 2.5
 PRESSURE ANGLE 20°
 WIDTH ACROSS 6 TEETH -0.056
 CORRECTION FACTOR 42.27-0.1094
 GLTY. & TOL. ZONE Ge DIN 3967
 MATING GEAR NO. OF TEETH 48
 MATING GEAR DRS. NO. 4-M-046-175M
 CENTRE DISTANCE 120

CASE HARDENED TO HRC 62±2
CASE DEPTH - 0.8mm

NO. OF SHEETS	1	DESCRIPTION	SEM-PRODUCT	INITIAL MATERIAL	SCRAP NET WT.	CROSS WT.	DRAWING No.	ITEM No.
REMARKS		13M13CY80		15-4082			0-M-046-2763	13
SCALE	1:1	CHECKED	APPROVED	DATE	ALTERATIONS			
		<i>R. K. Abraham</i>	<i>R. K. Abraham</i>	17-05-87				
		SIGS. OFFICER	DATE					
		MACHINE: RADIAL DRILLING			TYPE: DAT 10			
		TITLE: SPUR GEAR φ125 H11 / 48T			DRAWING No. 3-M-046-9844			
		[SHAFT - II]			NO. OF SHEETS: 1			

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 SHOULD NOT BE USED IN ANY FORM FOR ANY
 OTHER PURPOSE WITHOUT THE WRITTEN PER-
 MITS OF THE UNITED STATES HEAVY ELECTRICALS LTD.
 TRUCKSVILLE - OHIO



16P9	-0.018
-0.067	
φ 63 H7	+0.030
+0.000	
φ 85 f7	-0.036
-0.071	
φ 225 H11	-0.000
-0.210	

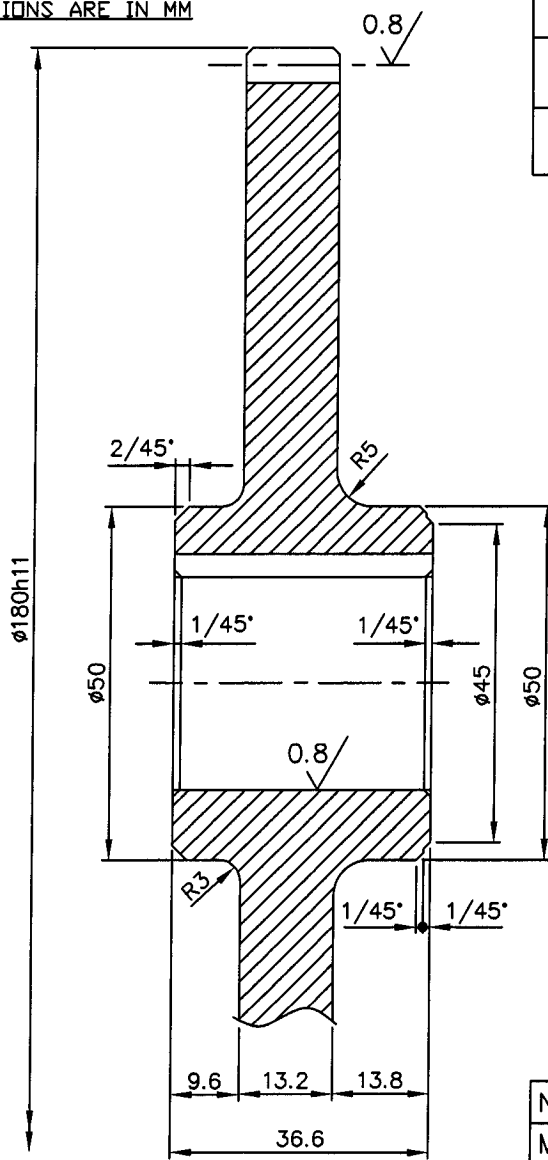
NO. OF TEETH 50
 MODULE 4.5
 PRESSURE ANGLE 20°
 WIDTH ACROSS B TEETH 73.16
 CORRECTION FACTOR -1.0
 QTY. & TOL. ZONE 36.2 IN 3967
 MATING GEAR NO. OF TEETH 25
 MATING GEAR DPG. NO. A-M-046 19217
 CENTRE DISTANCE 168.75

CASE HARDENED TO ARC 6032
 CASE DEPTH 0.8mm

NO. OF PIECES	DESCRIPTION	SEM-PRODUCT	INITIAL MATERIAL	FINAL MATERIAL	INITIAL MATERIAL	NET GROSS	DRAWING NO.	ITEM
REMARKS			13 M. 30780	15.44 82			0-M-046-0763	27
SCALE	DRAWN	CHECKED	APPROVED	DATE	TOTAL NET WT. (KG)			
1:1	11-05-87				ALTERATIONS			
					DATE	SIGNATURE	INDEX	
MACHINE: RADIAL DRILLING				TYPE: DPT 10				
TITLE: SPUR GEAR φ225AH/50T [SHAFT V1]				DRAWING NO. 3-M-046-9845				
				NO. OF SHEETS: 17				

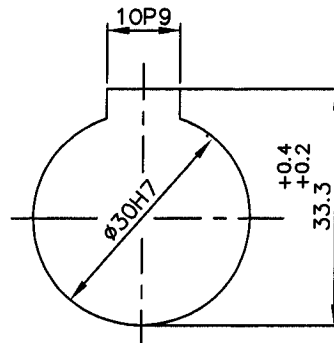
CAUTION: THIS DRAWING IS OUR SOLE PROPERTY AND SHOULD NOT BE USED IN ANY FORM FOR ANY PURPOSE WITHOUT THE WRITTEN PERMISSION OF BHARAT HEAVY ELECTRICALS LIMITED TRICHIRAPPALLI - 620 014.

ALL DIMENSIONS ARE IN MM



Ø180h11	-0.000
	-0.250
Ø30H7	+0.021
	+0.000
10P9	-0.015
	-0.051

1.6//0.8//



NOTE: -

CASE HARDEN TO HRC 62^{±2}
CASE DEPTH -0.8mm

NO.OF TEETH	70
MODULE	2.5
PRESSURE ANGLE	20°
WIDTH A/C 9 TEETH	65.184 ^{-0.158} _{-0.210}
QUAL.& TOL ZONE	9e DIN 3967
CORRECTION FACTOR	NIL
MATING GEAR NO.OF TEETH	35
MATING DRAWING NO:	3M04B0506811
CENTRE DISTANCE	131.25

No. of Pieces	Ø180x37L	13Ni3Cr80	IS: 4432	2.90	OM04B050763	10
	DESCRIPTION	MATERIAL	STANDARD	NET.WT.IN KGS.	DRAWING No.	ITEM No.
SCALE	DRAWN/TCD: V.KRISHNAPRISAD		ALTERATIONS:		DCN REF	DATE
	CHECKED: R.RAMAMURTHY					SIGN.
1:1	APPROVED: C.S.JAYASHEELAN					INDEX
	DATE: 14.02.8/22.09.08					
	MACHINE: RADIAL DRILLING MACHINE		TYPE: VR104 & DR10 & DRT10			
	TITLE: SPUR GEAR (Ø180x70T) (SHAFT-II)		DRAWING No: 05		REV.	
			4M04B0617508			
		Sheet No: 17		No. of Sheets:		

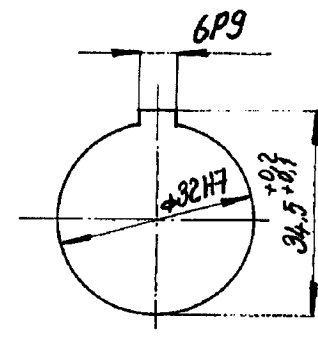
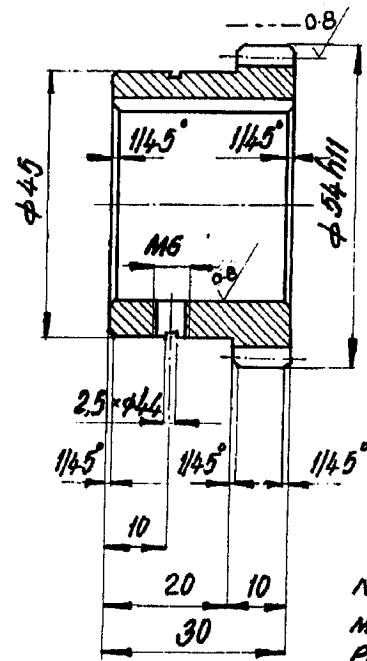
CAUTION

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 TIRUCHIRAPALLI-14

32 / 16 / 08

φ 32H7	+0,025	6P9	-0,012
	+0,000		-0,042
φ 54h11	-0,000		
	-0,130		

INDEX NO. 39 - 607



NO OF TEETH	34
MODULE	1,5
PRESSURE ANGLE	20°
CORRECTION FACTOR	NIL -0,127
WIDTH ACROSS 5 TEETH	20,641 -0,169
QUALITY AND TOL. ZONE	9c DIN 3967
MATING GEAR NO OF TEETH	70
MATING GEAR DRG. NO	J-M-04B-9843
CENTRE DISTANCE	78

---CASE HARDEN TO HRC 60^{±2}
 CASE DEPTH - 0,8mm

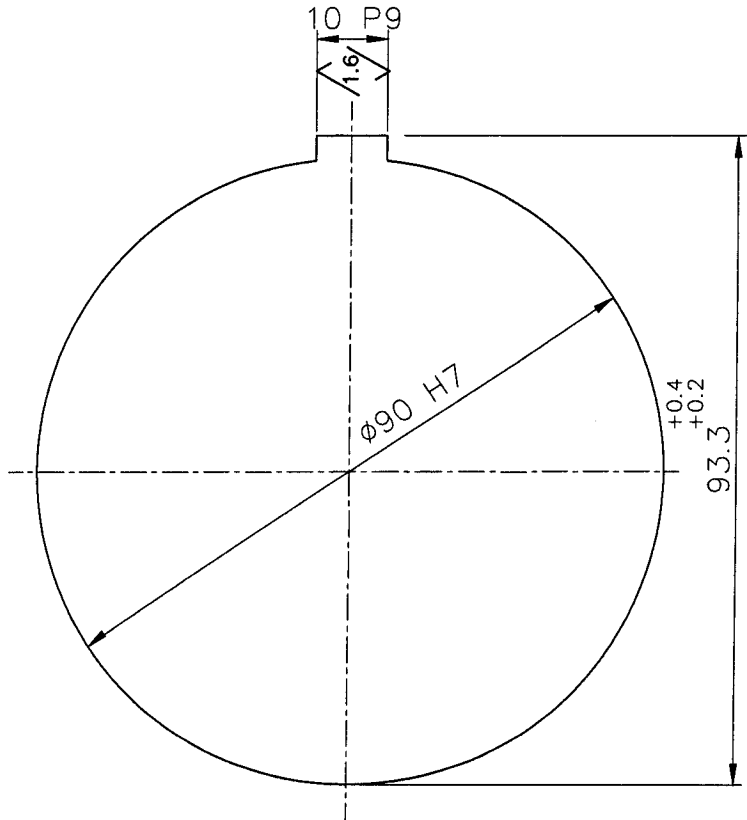
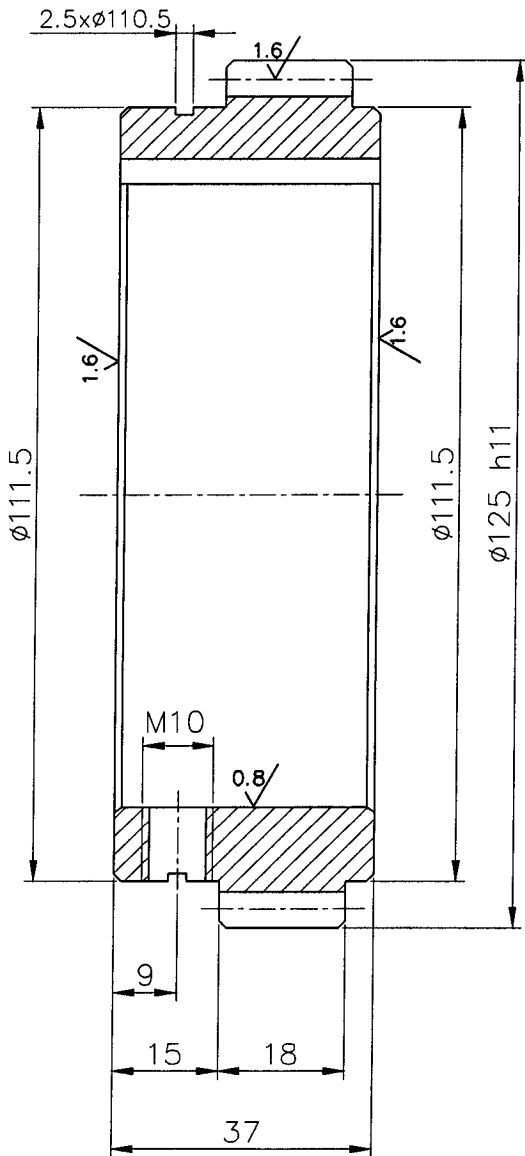
φ 54 X 30 E	13 Ni3Cr3 15:4432	D1B	D-M-04B-0763	8					
NO. OF PIECES	DESCRIPTION	SEMI-PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	SCRAP SCRT	NET WT (KG)	GROSS WT (KG)	DRAWING NO.	ITEM NO.
								EC:05 CC	
REMARKS					TOTAL NET WT (KG)				
SCALE	DRAWN	G. Subramaniam	REFERENCE	ALTERATIONS		DATE	SIGNATURE	INDEX	
1:1	CHECKED	Ramachandran							
	APPROVED	Ramachandran							
	STDS. OFFICER	Ramachandran							
	DATE	14-2-78							
MACHINE		RADIAL DRILLING MACHINE		TYPE: VR 104 & DRT 10		INV. NO.			
TITLE:		[SHAFT. I]		DRAWING NO.					
		SPUR GEAR 34T/φ54 PART NO 22508 1274 E1		4-M-04B-17510					
				NO. OF SHEETS		05 SHEET NO.			

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ALL DIMENSIONS ARE IN MM

10 P9	-0.015	ø125 h11	-0.000
	-0.051		-0.250
		ø90 H7	+0.035
			0.000

3.2/1.6/0.8/



NOTE: -

CHAMFER ALL SHARP CORNERS TO 1/45°
CASE HARDENED TO HRC.62 ±2
CASE DEPTH 0.8 mm.

NO.OF TEETH	48
MODULE	2.5
PRESSURE ANGLE	20°
WIDTH ACROSS 6 TEETH	42.27 ^{-0.156} _{-0.094}
CORRECTION FACTOR	-
QLTY.&TOL.ZONE	9e DIN 3967
MATING GEAR NO.OF TEETH	48
MATING GEAR DRAWING NO:	3M04B0509844
CENTRE DISTANCE	120

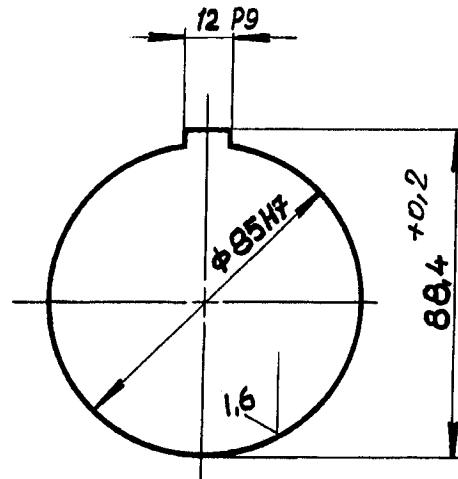
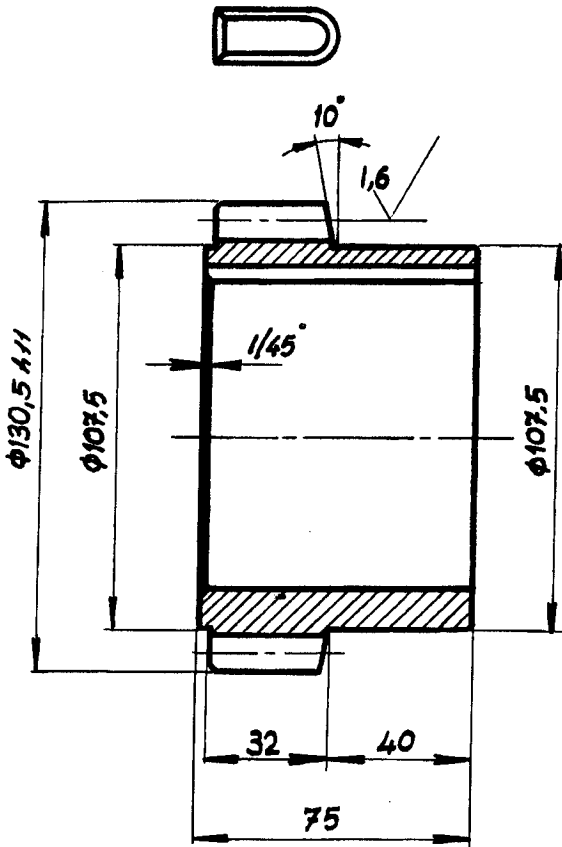
13 Ni.3Cr.80		IS: 4432	OM04B0500763		11	
No. of Pieces	DESCRIPTION	MATERIAL	STANDARD	NET.WT.IN KGS.	DRAWING No.	ITEM No.
	REFERENCE:	ALTERATIONS:		DCN REF	DATE	SIGN.
SCALE	DRN./TCD	P.Albert Ross	DRG. TRACED		20.03.13	K.R
1:1	CHD.	G.Govindaraj	MAT. GEAR DRG. No 3M04B0509844.		11.05.13	K.R
	APPD	K.Ramanan	WAS 3M04B01B0509844			
	DATE	14-02-78/20-03-13				
MACHINE: RADIAL DRILLING MACHINE			TYPE: VR 104 & DRT 10			
TITLE:		SPUR GEAR 48T/ø125		DRAWING No:		REV.
		(SHAFT-II)		4M04B0517511		02
PART No.22511 1248 E1						

CAUTION

THIS DRAWING IS OUR SOLE PROPERTY AND SHOULD NOT BE USED IN ANY FORM FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN PERMISSION OF
BHARAT HEAVY ELECTRICALS LTD.,
TIRUCHIRAPALLI-14

32 / 16

φ85 H7	+0.035 +0.000
12 P9	-0.018 -0.061
φ130.5 H11	-0.000 -0.250



NO. OF TEETH = 25 MATING GEAR NO. OF TEETH = 50
 MODULE = 4.5 MATING GEAR DRG. NO. = 3-M-046-9845
 PRESSURE ANGLE = 20° CENTRE DISTANCE = 168.75
 CORRECTION FACTOR = +1.0 -0.178
 WIDTH ACROSS 4 TEETH = 51.14 -0.237 CASE HARDENED TO HRC 62 ± 2
 QUALITY & TOL. ZONE = 9C DIN 3967 CASE DEPTH = 0.8 mm.

		13 Ni 3Cr 80 15: 44 32				D-M-046-0763		30
NO. OF PIECES	DESCRIPTION	SEMI-PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	SCRAP SORT	NET Wt (kg)	GROSS Wt (kg)	DRAWING NO.
REMARKS				TOTAL NET Wt (kg)				
SCALE 1:2	DRAWN	<i>P. Prasad Rao</i>		ALTERATIONS	DATE	SIGNATURE	INDEX	
	CHECKED	<i>K. U. B. Sanyal</i>						
	APPROVED	<i>[Signature]</i>						
	STDS. OFFICER							
	DATE	28-11-79						
MACHINE RADIAL DRILLING			TYPE: DRT10		INV. NO.			
TITLE: SPUR GEAR 25 T / φ130,5 H11 [SHARP V]			DRAWING NO. 4-M-046-19217					
NO. OF SHEETS			SHEET NO.					

