



**BHEL, R.C.PURAM, HYDERABAD.  
PUMPS PURCHASE  
ENQUIRY**

**ENQUIRY FOR BFP INNER CASING\_KHURJA**

**Supplier confirmations in each page to be filled in by the vendor and the document is to be submitted duly signed and stamped.**

Enquiry no: F5A2U98660	<b>NAME OF THE SUPPLIER</b>		<b>SUPPLIER OFFER NO</b>
	<b>CONTACT PERSON</b>		
	<b>E-MAIL ID</b>		<b>OFFER DATE</b>
	<b>PHONE NO:</b>		

**BHEL - Requirements**

**SUPPLIER CONFIRMATION**

Enq Sl no.	Material Code	Item Description	BHEL Spec- Var	BHEL Drg No- Var	Qty	Vendor confirmation to supply as per BHEL spec as applicable (YES/NO)
1	FP9219306107	INNER CASING, TOP & BOTTOM ,R-M/C,MDG346	HY19593	21804214970-00, Rev.03	2	
2	FP9219306182	INNER CASING TOP&BOTTOM,R-M/C,MDG406	HY19593	21804215078-00, Rev.01	4	

- Note:**
- Item shall be supplied as per BHEL drawings & Specifications.
  - The evaluation of the tender shall be set – wise L1.
  - Indigenous Vendor:** Please quote for FOR BHEL Hyderabad basis. **Foreign Vendor:** Please quote for CIP Chennai seaport basis.
  - The drawings / quality plans as applicable shall be submitted within 7 days from Purchase Order date.
  - Quoted Price shall be inclusive of pattern cost, if any.
  - Vendor to submit all the documents asked as per the Technical Pre-qualification requirements acceptance criteria. Non-submission of the same will lead to vendor disqualification.
  - In case of the offers of non-customer approved vendors, the credentials of technical suitable suppliers only will be sent to customer for their acceptance. The price bids of those vendors approved by customer shall be opened and price bids of those vendors not approved by customer shall not be opened
  - Vendor to accept the delivery period as stipulated by BHEL in the delivery requirement document.
  - This is a Global tender enquiry. The offers of all suppliers (except land sharing countries) are eligible for evaluation. However, suppliers from land sharing countries shall be eligible for evaluation of their offers only if they possess valid registration certificate with the competent authority of Govt of India.
  - BHEL shall be resorting to reverse auction (RA) for this tender. RA shall be conducted among all the techno-commercially qualified bidders shall be opened and shall be considered as intal bidders in RA. In case, any bidder does not participate in online reverse auction, their sealed envelop price bid along with applicable loading , if any shall be considered for ranking.

	<b>Signature</b>	
	<b>Name</b>	
	<b>Stamp /Seal</b>	

**DELIVERY REQUIREMENT DOCUMENT**

<b>S.NO</b>	<b>MAT CODE</b>	<b>DESCRIPTION</b>	<b>SPEC</b>	<b>DRG</b>	<b>QTY</b>	<b>Delivery Period from PO Date (In number of days)</b>
1	FP9219306107	INNER CASING, TOP & BOTTOM ,R-M/C,MDG346	HY19593	21804214970-00	1	120
2	FP9219306107	INNER CASING, TOP & BOTTOM ,R-M/C,MDG346	HY19593	21804214970-00	1	150
3	FP9219306182	INNER CASING TOP&BOTTOM,R-M/C,MDG406	HY19593	21804215078-00	1	120
4	FP9219306182	INNER CASING TOP&BOTTOM,R-M/C,MDG406	HY19593	21804215078-00	1	150
5	FP9219306182	INNER CASING TOP&BOTTOM,R-M/C,MDG406	HY19593	21804215078-00	1	180
6	FP9219306182	INNER CASING TOP&BOTTOM,R-M/C,MDG406	HY19593	21804215078-00	1	210



**BHEL, R.C.PURAM, HYDERABAD.**  
**PUMPS PURCHASE**  
**PRICE BID FORMAT**

**BFP INNER CASING\_KHURJA**

		<b>TWO PART BID:</b>	<b>NO.OF ENQUIRY ITEMS : as below</b>	
<b>ENQUIRY NO.</b>	<b>F5A2U98660</b>	<b>NAME OF THE SUPPLIER</b> <input type="checkbox"/>		<b>SUPPLIER'S OFFER NO</b>
		<b>CONTACT PERSON NAME</b> <input type="checkbox"/>		
		<b>E-MAIL ID</b> <input type="checkbox"/>		<b>OFFER DATE</b>
		<b>PHONE NO:</b>		

The date for the Price Bid opening shall be intimated to all the Techno-commercially qualified bidders before the Price Bid is opened

**BHEL - Requirements**

**SUPPLIER'S OFFER**

Enq SI no.	Material Code	Item Description	BHEL Spec- Var	BHEL Drg No- Var	Qty	PRICE / UNIT	CURRENCY	TOTAL PRICE
1	FP9219306107	INNER CASING, TOP & BOTTOM ,R-M/C,MDG346	HY19593	21804214970-00, Rev.03	2			
2	FP9219306182	INNER CASING TOP&BOTTOM,R-M/C,MDG406	HY19593	21804215078-00, Rev.01	4			
			<b>TOTAL QTY</b>		<b>6</b>	<b>Grand Total</b>		

**Note : 1. Quoted price shall be inclusive of pattern charges, if any.**  
**2. One Unit = 1 No.**

**Signature**

**Name**

**Stamp /Seal**

**BHARAT HEAVY ELECTRICALS LIMITED**  
**RAMACHANDRAPURAM:: HYDERABAD-502032**

**PUMPS ENGINEERING DEPARTMENT**

**TECHINCAL PRE-QUALIFICATION REQUIREMENTS**  
**ACCEPTANCE CRITERIA**

Item: Pump casting items:

SL. NO.	REQUIREMENT	ACCEPTANCE	REMARKS
1.	Material specifications of earlier supplied castings	BHEL specification or equivalent national or international standard.	Un-priced Purchase order indicating the material specification shall be furnished
2.	End users of the earlier produced castings	At least 1 pump manufacturer to whom the casting is supplied	Un-priced Purchase Order be furnished
3.	Shape and geometrical construction of earlier produced castings	At least one similar casting should have been supplied	Drawings of castings produced shall be furnished
4.	Weight of single piece casting supplied earlier	More than or equal to the required casting weight	Documents shall be furnished
5.	Size of single piece casting supplied earlier (LxBxH/Dia)	More than or equal to the required size of castings	Documents shall be furnished
6.	Pattern / Die design and manufacture	Shall be available in-house or tie-up with a third party having experience in similar work	Documents shall be furnished in case of tie-up with third party
7.	Heat treatment facilities	Shall have in-house or tie-up with third party for required heat treatment processes like hardening, tempering and stress relieving etc. for the required size of the casting. The HT furnaces shall have facility to generate HT charts on auto.	Documents for in-house or tie-up shall be furnished.
8.	Power back up for main furnaces, for melting and pouring	Shall have Power back up for the main furnace to ensure uninterrupted melting/pouring of required size of the casting (OR) Protections/precautions taken to ensure the casting properties in the event of power failure	Documents / Technical details shall be furnished
9.	Power back up for HT furnaces	Power back for the HT furnace required for the size of the casting. (OR) Protections/precautions taken to ensure the casting properties in the event of power failure	Documents / Technical details shall be furnished
10.	Machining facilities	Shall have in-house machining facilities or tie-up with a third party having required machinery for machining the castings as per drawing dimensions/PO requirement	Details of machinery in-house /or at the tied up party shall be furnished

*Kulddeep*  
(Kulddeep Kumar)

*ABJ*

अविनाश एस. जॉन कुजूर  
Avinash S John Kujur  
उप महाप्रबंधक / पम्पस अभियांत्रिकी  
Dy. General Manager / Pumps Engineering  
बी.एच.ई.एल. हैदराबाद, BHEL, HYD-32

11.	Quality Assurance facilities	Vendor must have quality assurance facilities / systems to check for conformance of its job work and raw materials with BHEL specification and standards.	Quality documents of past procurements to be furnished.
12.	a) Mechanical & Chemical testing facilities b) NDT facilities	Shall have in-house facilities Or tie-up with a third party having experience in similar jobs	Details of in house facilities/facilities at the tied up party including the certified inspectors shall be furnished
13.	Inspection agencies for earlier supplies	Lloyds / TUV/NTPC / BHEL or BHEL TPIA	Copies of certificates shall be furnished

### PROCEDURE FOR EVALUATION OF OFFERS

The offers will be submitted as two part bid system i.e., Techno –commercial offer including PQR and price offer. Initially, only techno – commercial offer will be opened for scrutiny.

Offers will be evaluated as follows:

**(A) Techno – commercial offer:**


- 1) The offers will be reviewed with respect to the Technical Pre-Qualification Requirements. The offers which do not meet the requirement will be disqualified and will not be processed further. The technically qualified offers will only be processed further.
- 2) The filled up Supplier Registration Forms of the technically qualified Suppliers will be evaluated as per the procedure stipulated in 'Supplier Evaluation, Approval & Review Procedure.
- 3) Technical scrutiny of Offers:

The offers meeting the PQR requirements are only considered for technical evaluation.

**(B) Price offer:**

- a) The price bids shall be opened of those vendors only who will be approved by BHEL as per above point (A) 3.

Kuldeep  
(Kuldeep Kumar)

  
अविनाश एस. जॉन कुजूर  
Avinash S John Kujur  
उप महाप्रबंधक / पम्पस अभियांत्रिकी  
Dy. General Manager / Pumps Engineering  
बी.एच.ई.एल. हैदराबाद, BHEL, HYD-37

DRG.NO. 2 180 42 1 4970

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**NOTE TO SUPPLIER:**

1. TECHNICAL DELIVERY CONDITIONS SHALL BE AS PER HY19593.
2. ADDITIONAL QUALITY REQUIREMENTS SHALL BE AS PER FP60291.
3. STRESS RELIEVING SHALL BE DONE AFTER ANY WELDING WITHIN -20°C OF TEMPERING TEMPERATURE.
4. MANUFACTURE THE CASING IN ACCORDANCE WITH THE FOLLOWING DRAWINGS.

**NOTE TO MACHINE SHOP:**

1. MACHINE THE CASING IN ACCORDANCE WITH THE FOLLOWING DRAWINGS.

DESCRIPTION	REF.DRG.No.	BHEL DRG.NO.
COUP SIDE DRAWING	P1-Q7574-R0	01804214626
END SIDE DRAWING	P1-Q7575-R0	01804214627
LONGITUDINAL SECTIONAL DRAWING	P1-Q7576-R0	01804214628
MATING FACE DRAWING	P1-Q7577-R2	01804214629
OUTLIN DRAWING	P1-Q7578-R0	01804214630
ADD'L MACHINING DRAWING	P1-Q7579-R0	01804214631
IMPELLER&INNER CASING POLISHING PROCEDURE THE WATER PASSAGE	P5-14080-R0	-

DESCRIPTION	REF.DRG.No.	BHEL DRG No.	
1ST VOLUTE AND CLOSSOVER DRAWING	P1-Q7569-R0	01804214621	CORE
STD. VOLUTE AND SHORT CLOSSOVER DRAWING	P1-Q7570-R0	01804214622	
LONG CLOSSOVER DRAWING	P1-Q7571-R0	01804214623	
END SIDE SUC. VOLUTE DRAWING	P1-Q7572-R0	01804214624	
DISCH. VOLUTE DRAWING	P1-Q7573-R0	01804214625	
COUP. SIDE DRAWING	P1-Q7574-R0	01804214626	OUTLINE MOLD
END SIDE DRAWING	P1-Q7575-R0	01804214627	
LONGITUDINAL SECTIONAL DRAWING	P1-Q7576-R0	01804214628	
MATING FACE DRAWING	P1-Q7577-R2	01804214629	
OUTLINE DRAWING	P1-Q7578-R0	01804214630	

2. STRESS RELIEVING SHALL BE DONE AFTER ROUGH MACHINING AND WELDING AS PER HY0640261, TEMPERATURE SHALL BE 590-650°C.
3. LPI SHALL BE DONE AFTER ROUGH MACHINING AND AFTER FINAL MACHINING, AS PER AA0850131, ACCEPTANCE AS PER AA0850132, LEVEL-II.

**VARIANT TABLE:**

VAR.NO.	VAR. DESCRIPTION	MATL NOs.
00	3rd stage tapping	18010-01801014635-00 18011-01801114635-00 18038-01803814605-00 18042-01804214632-00
01	2nd stage tapping	18010-01801014635-01 18011-01801114635-01 18038-01803814605-01 18042-01804214632-01

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
					FP9219306107	1368	1400
					HY19593		1 SET

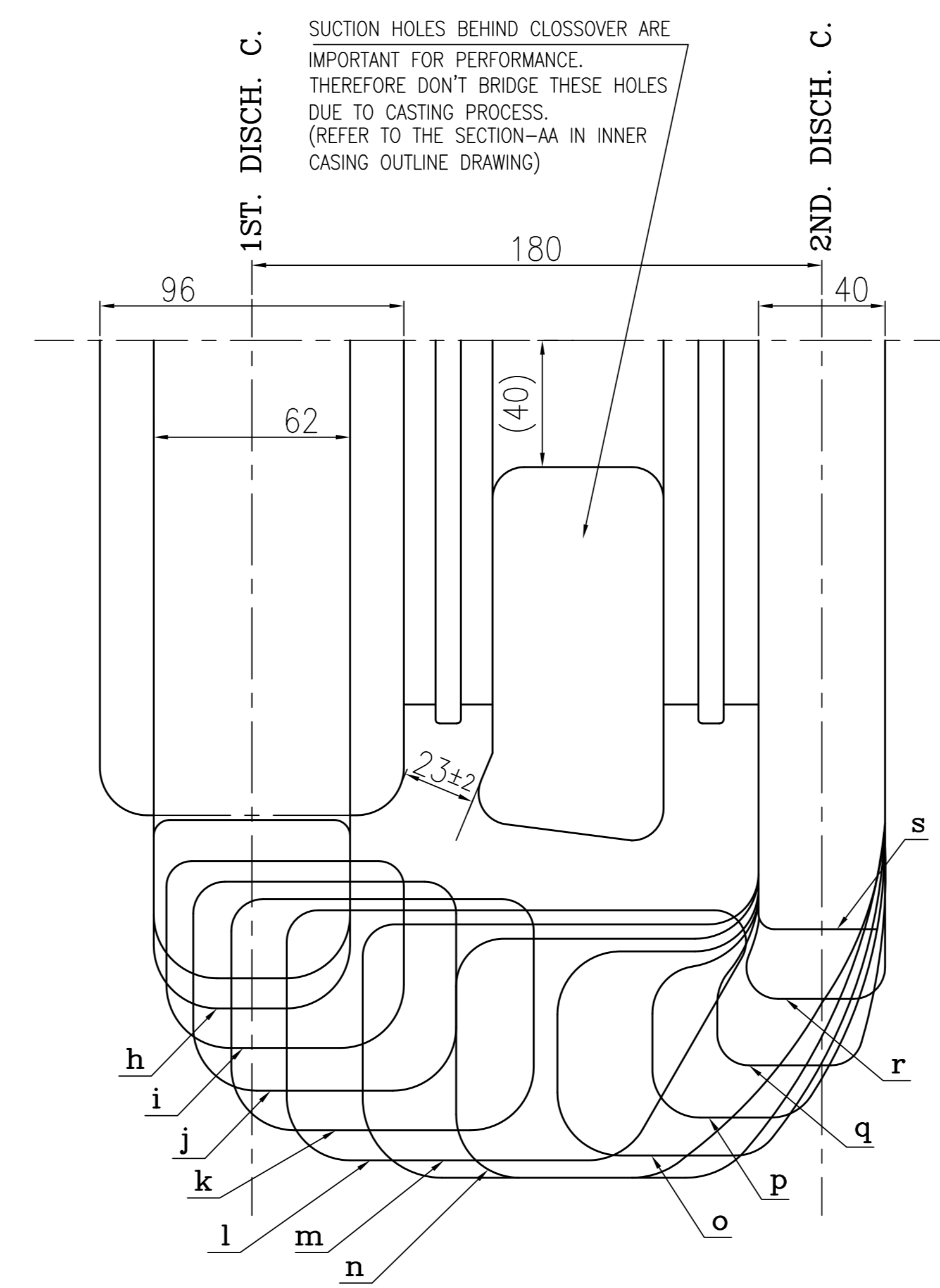
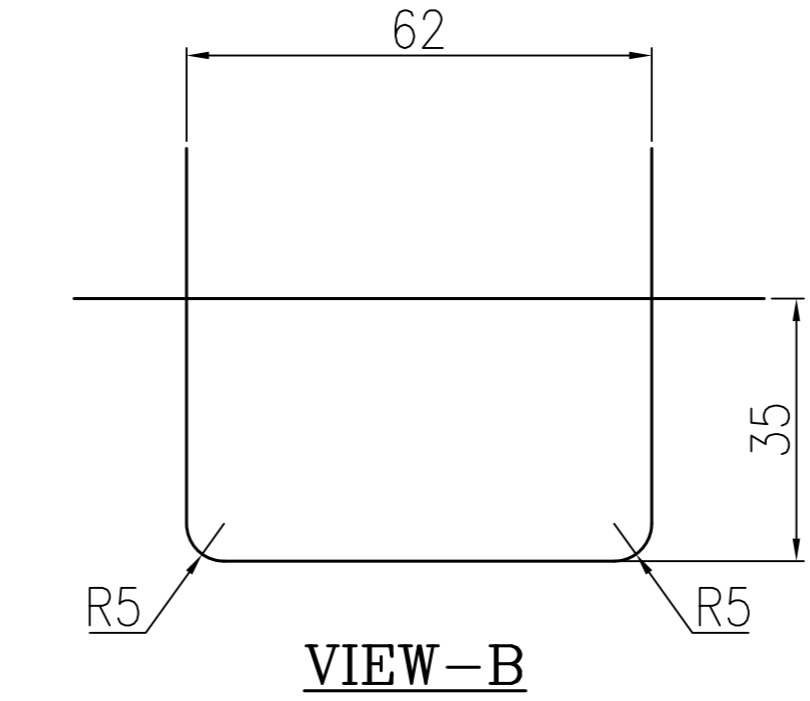
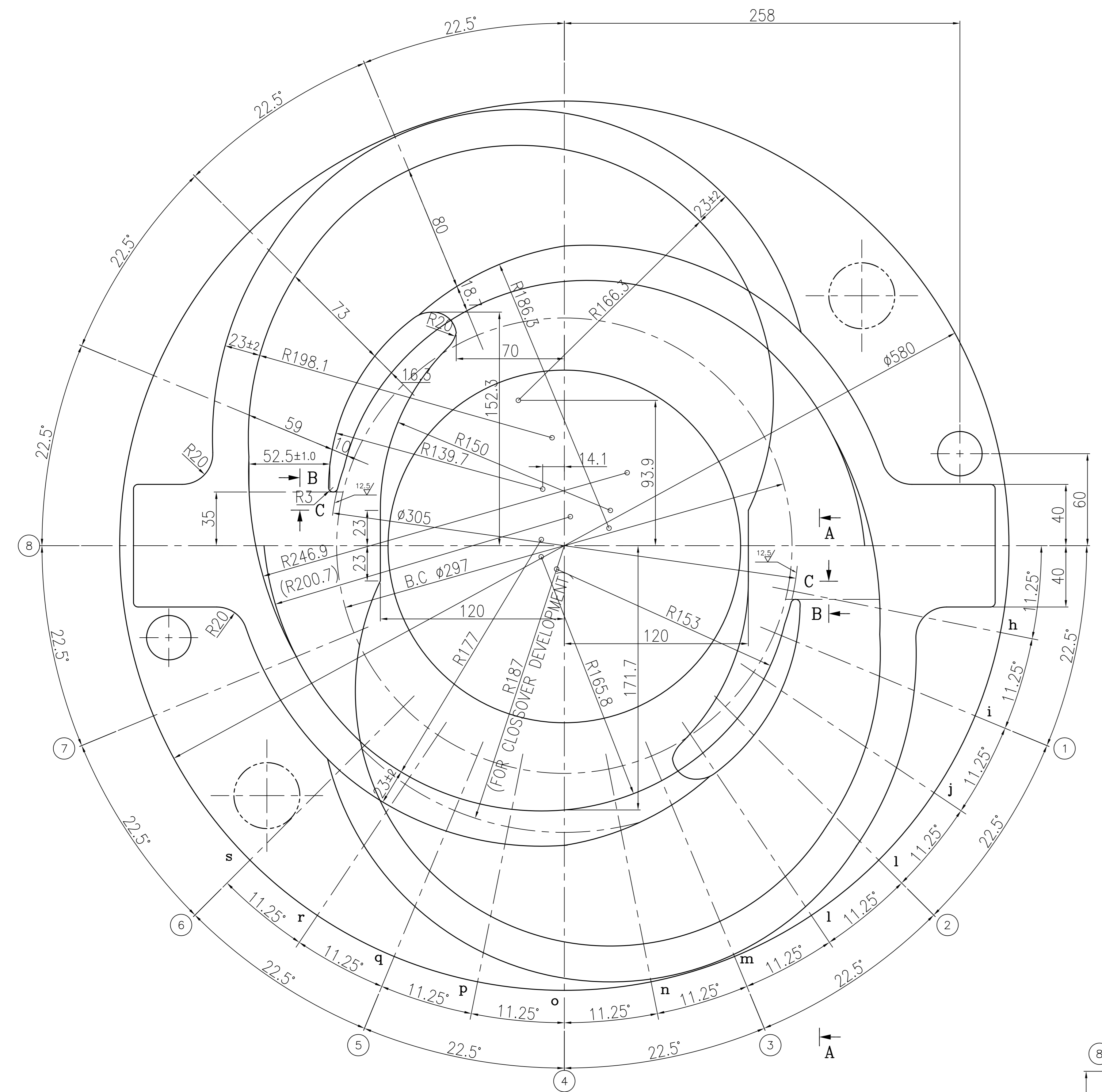
<p>THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...</p> <ol style="list-style-type: none"> <li>1. REF.TO HY0230261 FOR UNSPECIFIED TOLERANCES.</li> <li>2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.</li> <li>3. INTERNAL M/CD CORNER RADII 1 TO 0.7.</li> <li>4. THE SURFACE ROUGHNESS WHEREVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE BACK SLASHES GIVEN AT THE TOP MOST RIGHT CORNER OF THE DRG.</li> </ol>				<p>TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT</p> <p align="center"><b>MDG346</b></p>			
<p>DEPT. PUMPS</p> <p>CODE 410</p>				<p>SCALE NTS</p> <p>WEIGHT(Kg) NA</p>		<p>REF. TO ASSY DRG. NA</p> <p>ITEM NO. NA</p> <p>NO.OF ITEMS NA</p>	
<p>TITLE</p> <p align="center"><b>INNER CASING M/C (UPPER &amp; LOWER HALVES)</b></p>				<p>DRAWING NO.</p> <p align="center"><b>2 180 42 1 4970</b></p>		<p>REV.</p> <p align="center"><b>03</b></p>	
				<p>SHEET NO. 01</p>		<p>NO OF SHEETS 01</p>	

REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV
	03	16.05.19	CHECKED MSR APPD. MSR	02	17.01.19	CHECKED MSR APPD. MSR		01	31.8.18	CHECKED MSR APPD. MSR	
ZONE			Note revised.	ZONE			Variant table added for 2nd stage tapping variant for Bhusawal 660mw	ZONE			REFERENCE MHI DRG NO.s INDICATED.

DRG. NO. 180 42 1 4621

12.5

IMPELLER ROTATION



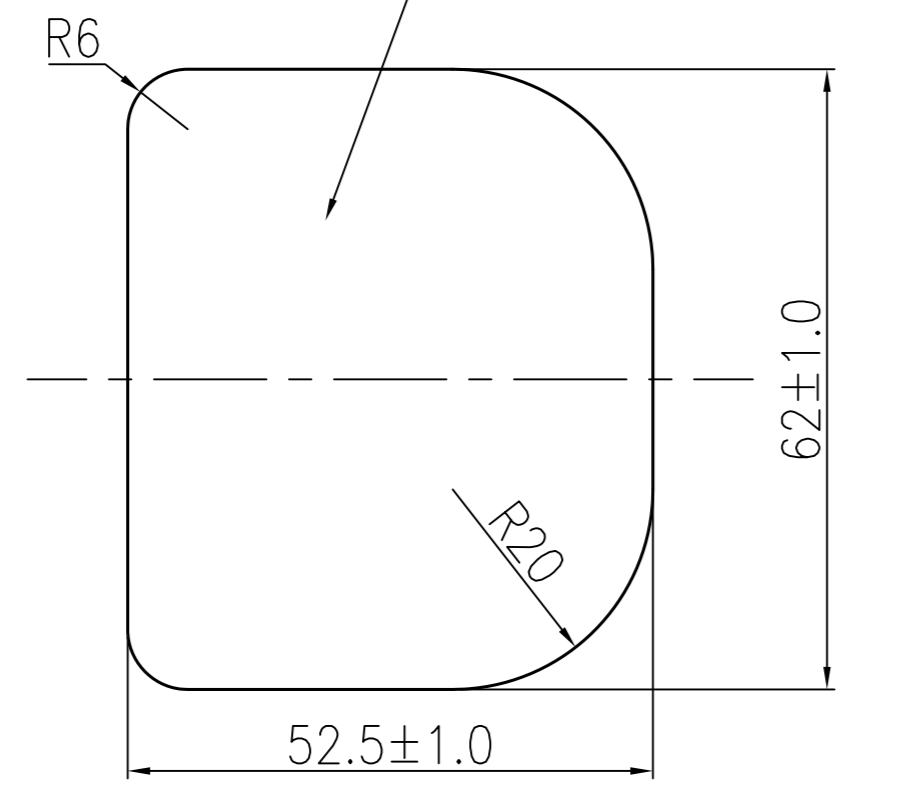
DIMENSION OF THE STRING R187

31	31		
30.9	31.8		h
26.7	47.2		i
18.1	63.7		j
6.5	88.5		k
10.8	115		l
34.1	137.7		m
63	136.9		n
95.9	104.1		o
125.9	74.1		p
147	53		q
155.5	44.5		r
160	40		s
180			

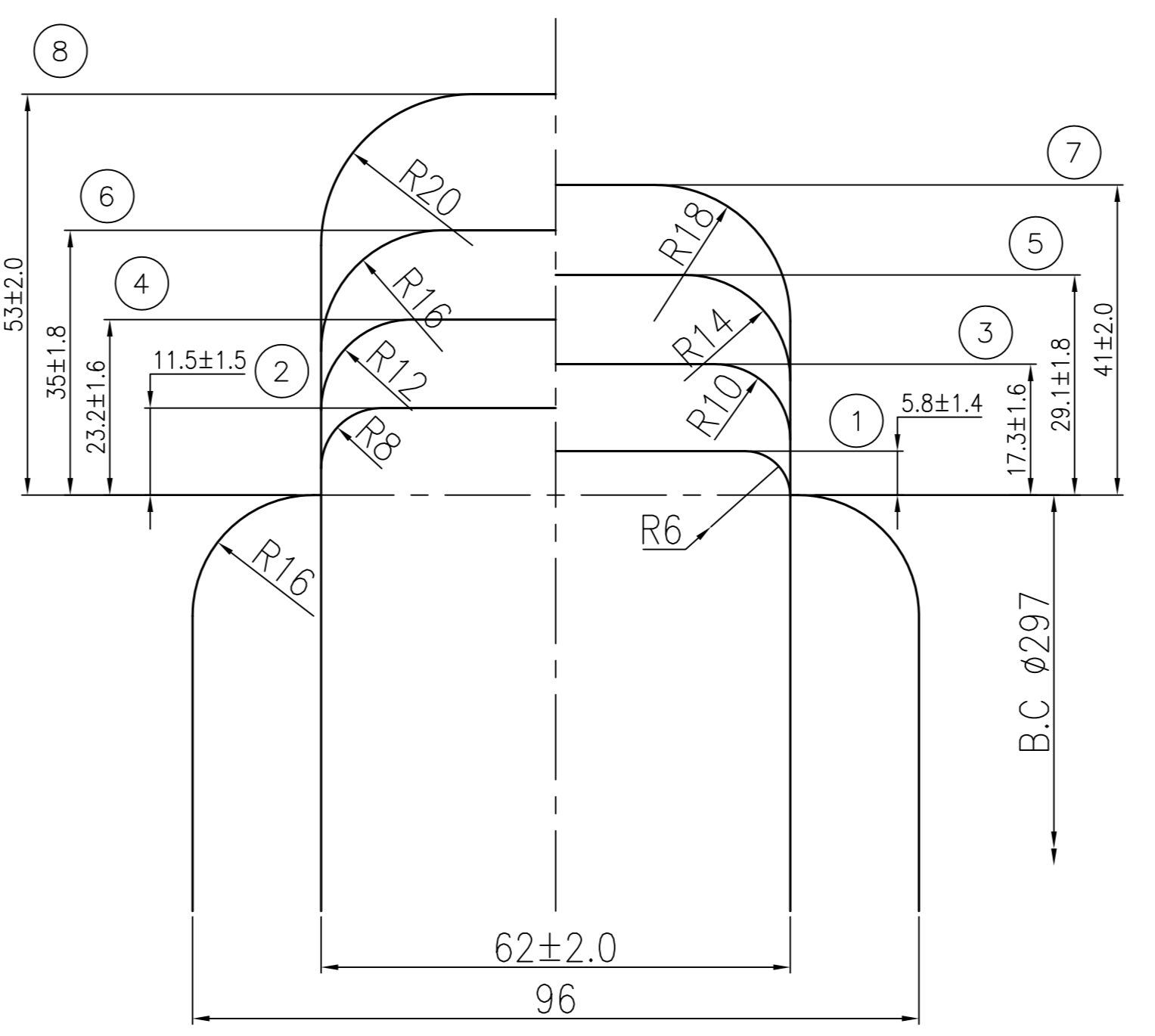
SECTION-AA  
THIS SECTION IS REFERENCE.  
THE DETAILS SHALL FOLLOW  
CROSSOVER DEVELOPMENT

CROSSOVER DEVELOPMENT

AREA OF VOLUTE THROAT  
3067.9mm<sup>2</sup> ± 153.4mm<sup>2</sup>



VIEW-C  
SCALE-1:2



DETAIL OF VOLUTE

ITEM NO.	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO.	MATERIAL CODE	NET WT.	GROSS WT.
						1400	1400
						1	1

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED				TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT																							
1. REF TO HY0230261 FOR UNSTATED TOLERANCES.				MDG346																							
2. CHAMFER W/CD SHARP EDGE 1.2 TO 1.0 AT 45°.																											
3. INTERNAL W/CD CORNER RADII 1 TO 0.7.				<table border="1"> <tr><th>ORL</th><th>NAME</th><th>SIGN.</th><th>DATE</th><th>NO. OF VAR.</th></tr> <tr><td></td><td>J. NAGANANDAS</td><td></td><td>12.06.12</td><td></td></tr> <tr><td></td><td>M. S. RAM</td><td></td><td>12.06.12</td><td></td></tr> <tr><td></td><td>M. S. RAM</td><td></td><td>12.06.12</td><td></td></tr> </table>				ORL	NAME	SIGN.	DATE	NO. OF VAR.		J. NAGANANDAS		12.06.12			M. S. RAM		12.06.12			M. S. RAM		12.06.12	
ORL	NAME	SIGN.	DATE	NO. OF VAR.																							
	J. NAGANANDAS		12.06.12																								
	M. S. RAM		12.06.12																								
	M. S. RAM		12.06.12																								
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.				<table border="1"> <tr><th>DEPT.</th><th>SCALE</th><th>WEIGHT (KG)</th><th>REF. TO ASSY DRG.</th><th>ITEM NO.</th><th>NO. OF ITEMS</th></tr> <tr><td>PUMPS</td><td>1:1</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> </table>				DEPT.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO. OF ITEMS	PUMPS	1:1	NA	NA	NA	NA								
DEPT.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO. OF ITEMS																						
PUMPS	1:1	NA	NA	NA	NA																						
TITLE INNER CASING 1ST VOLUTE AND Crossover DRAWING				DRAWING NO. 0 180 42 1 4621 REV. 01																							

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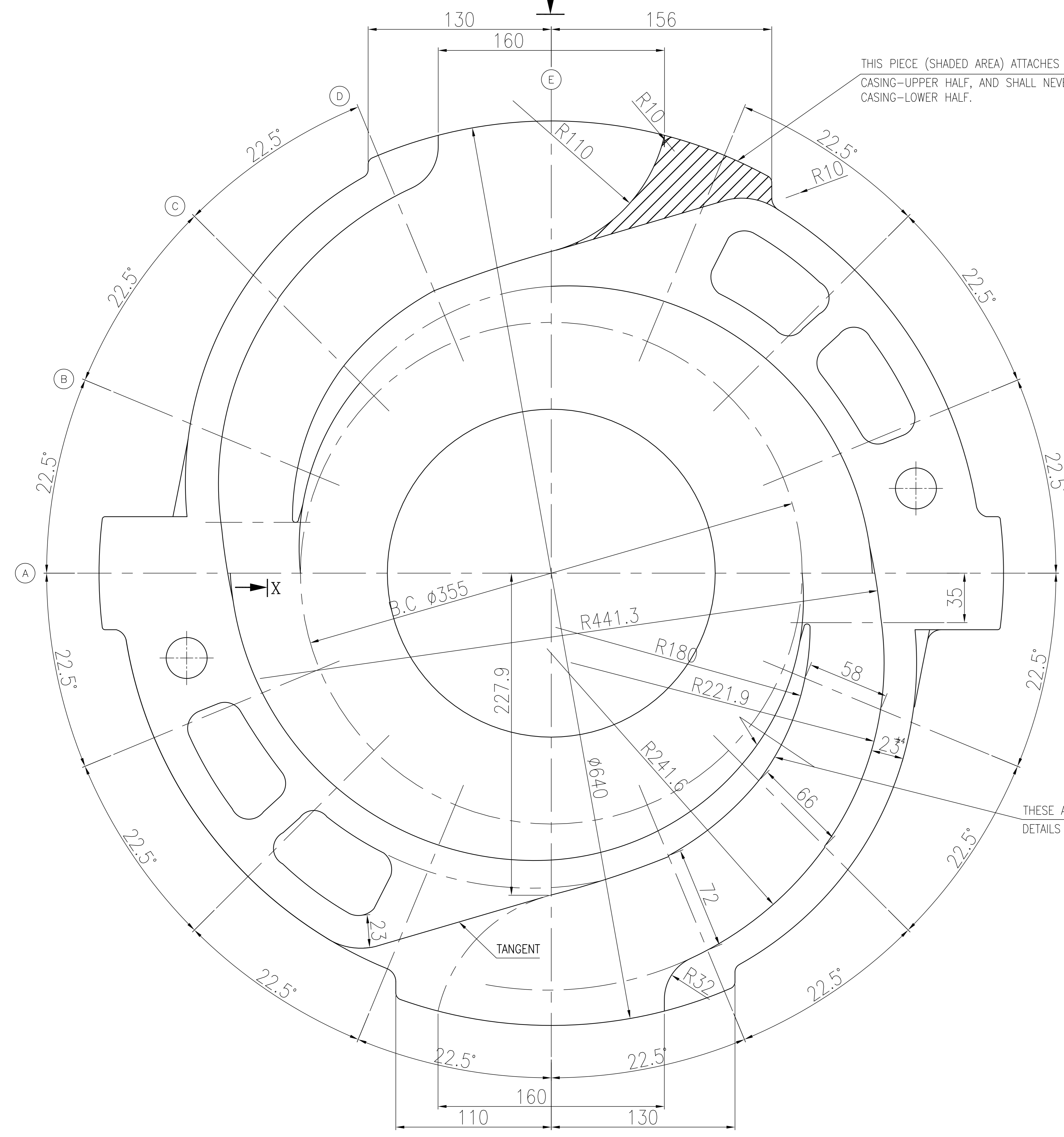
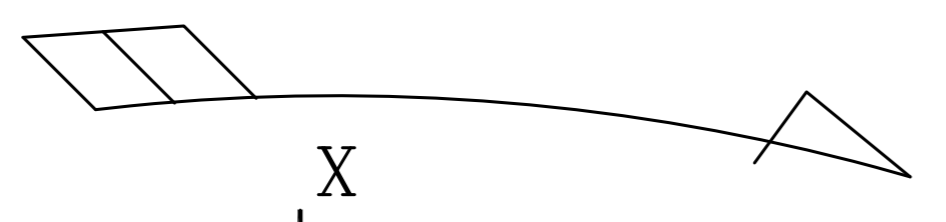
INVENTORY NO. 180 42 1 4621  
 SERIAL NO. 1  
 DATE 22.06.12  
 BY P. L. SURESH  
 CHECKED BY P. L. SURESH  
 APPROVED BY P. L. SURESH





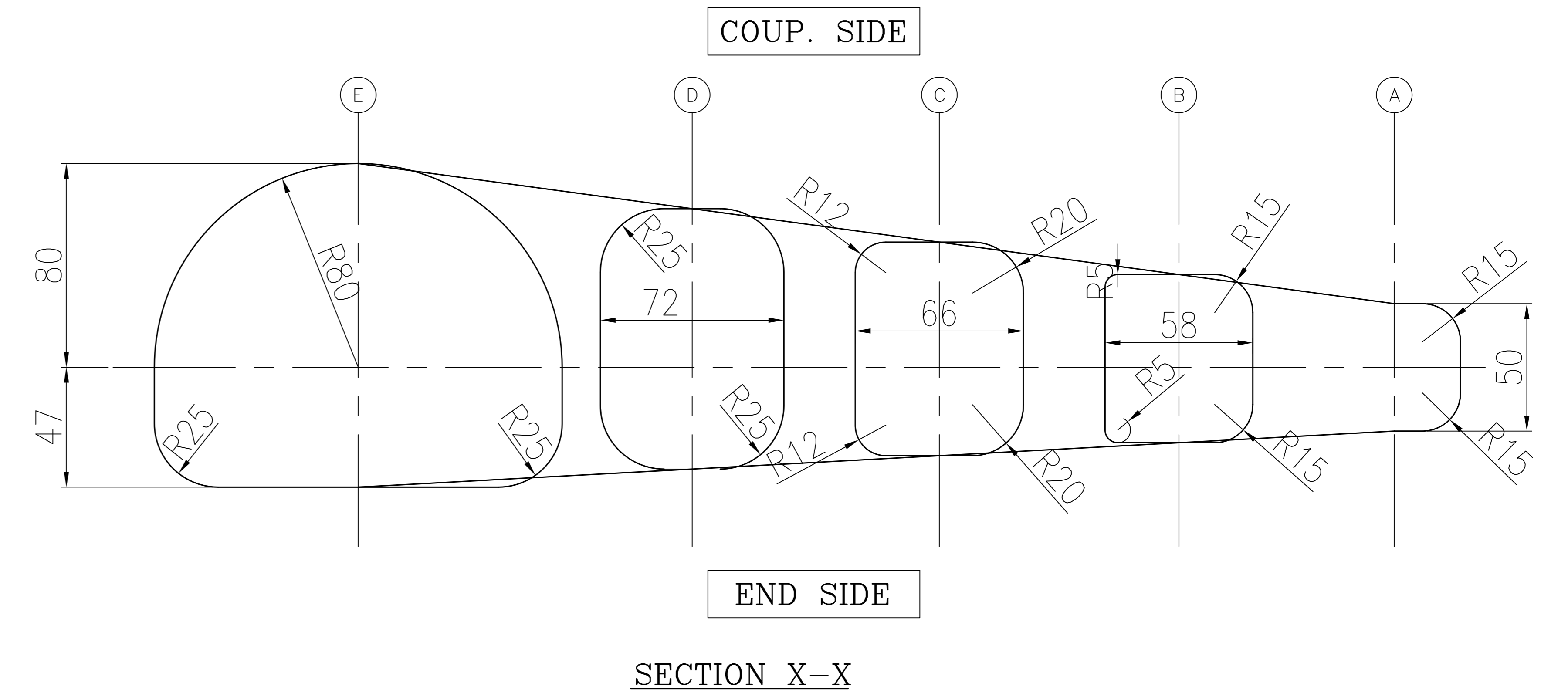


### IMPELLER ROTATION



THIS PIECE (SHADED AREA) ATTACHES ONLY TO CASING-UPPER HALF, AND SHALL NEVER ATTACH TO CASING-LOWER HALF.

THESE ARE THE SAME SHAPE AS THE DETAILS OF SHORT CROSSOVER



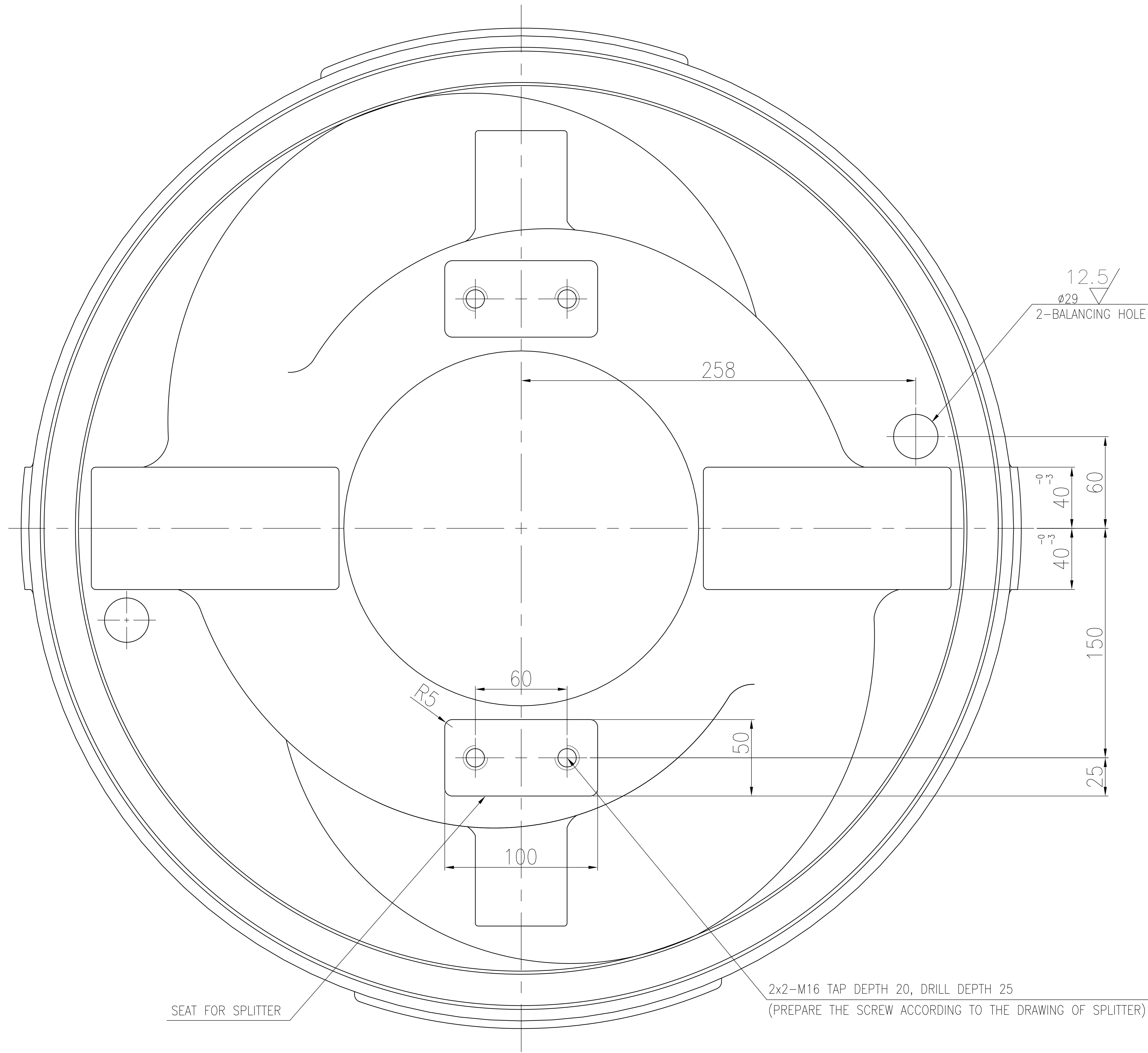
SECTION X-X

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.  
 TITL-0733-01 COMPUTER FILE NAME: FPD\084214625-00  
 DEPT. PUMPS  
 NO. 1  
 DATE 12.06.12  
 BY M.S.RAM  
 CHECKED BY M.S.RAM  
 APPD. BY M.S.RAM  
 SCALE 1:1  
 WEIGHT (KG) NA  
 REF. TO ASSY DRG. NA  
 ITEM NO. NA  
 NO. OF ITEMS NA  
 NO. OF SHEETS 01

INNER CASING				FP9219306107	1400	1400
				HY19593	1	
DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...				TYPE OF PRODUCT MDG346		
1. REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.				NAME OF CUSTOMER/PROJECT		
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.				BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.				DEPT. PUMPS		
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.				SCALE 1:1		
				WEIGHT (KG) NA		
				REF. TO ASSY DRG. NA		
				ITEM NO. NA		
				NO. OF ITEMS NA		
				DRAWING NO. 0 180 42 1 4625 00		
				DISCHARGE VOLUTE DRAWING		
				SHEET NO. 01 NO OF SHEETS 01		

IMPELLER ROTATION

12.5/



12.5/  
ø29  
2-BALANCING HOLE

258

60  
40  
40  
150  
25

R5  
60

50

100

SEAT FOR SPLITTER

2x2-M16 TAP DEPTH 20, DRILL DEPTH 25  
(PREPARE THE SCREW ACCORDING TO THE DRAWING OF SPLITTER)

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

REF. NO. 01804214626-00  
DATE 12.06.12  
DRAWN BY M.S.RAM  
CHECKED BY M.S.RAM  
APPROVED BY M.S.RAM

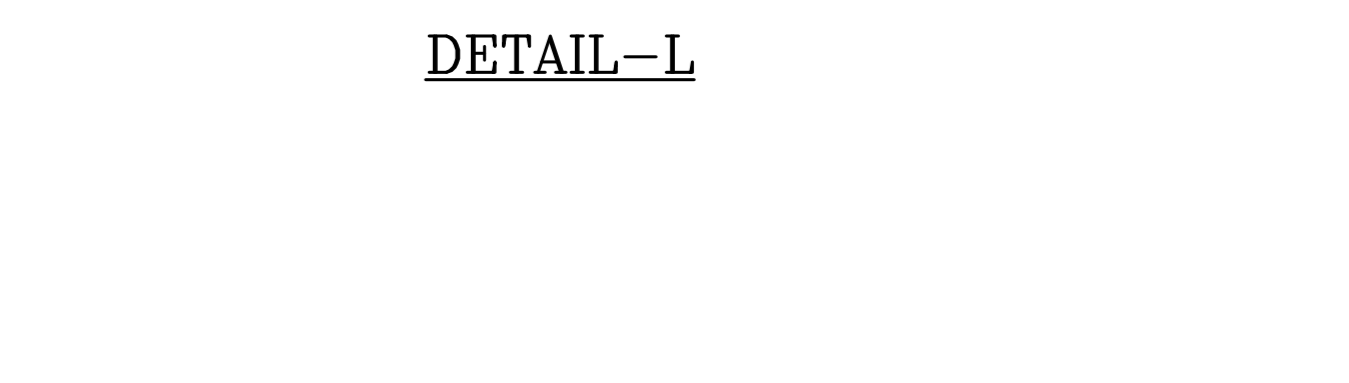
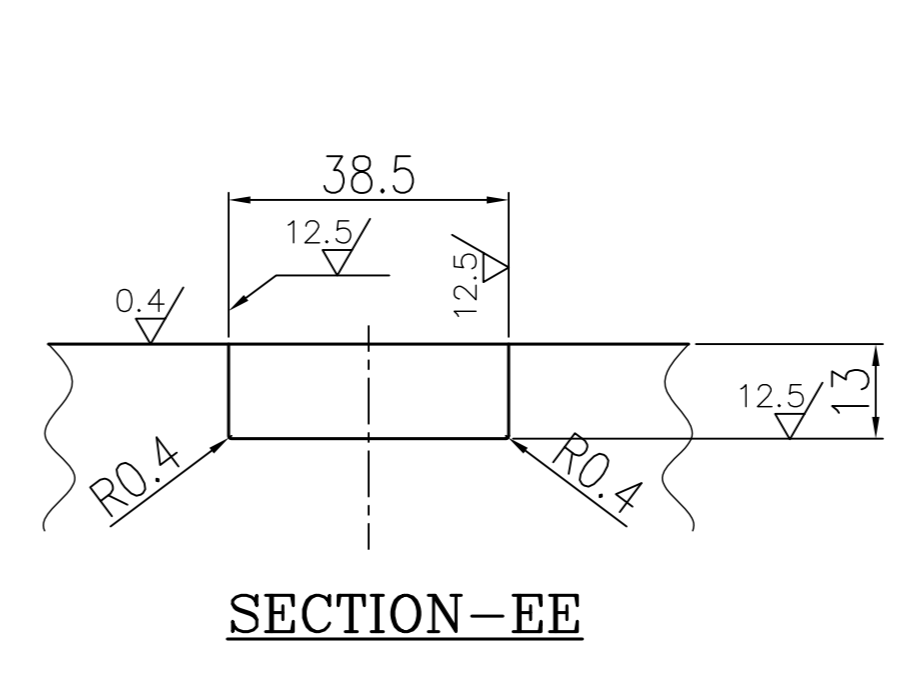
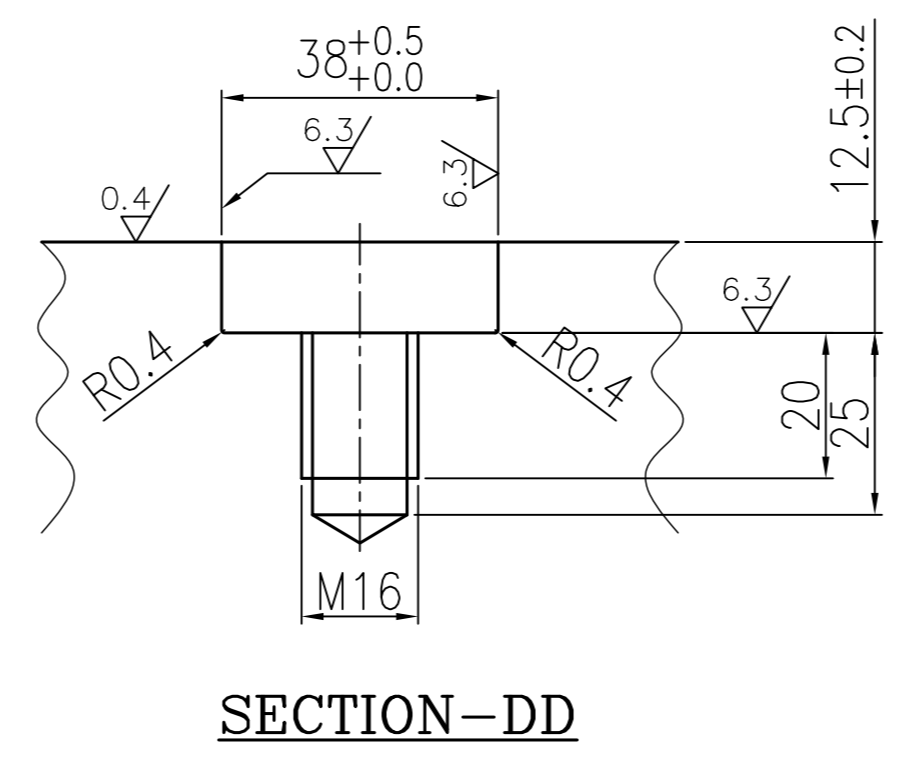
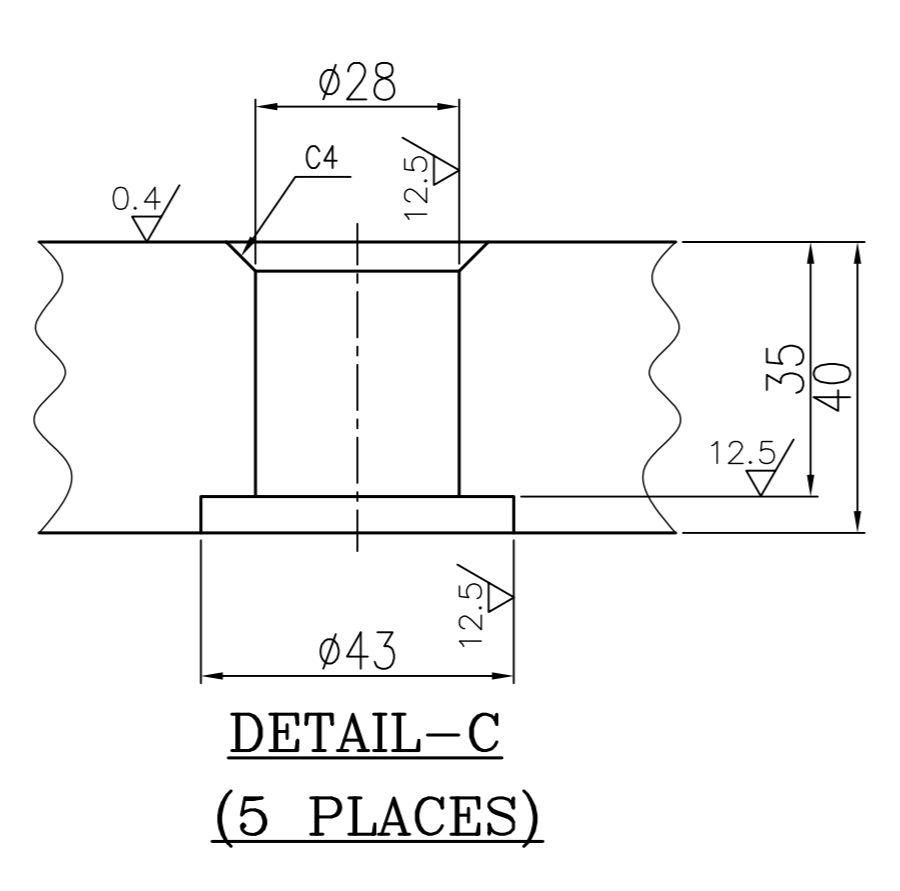
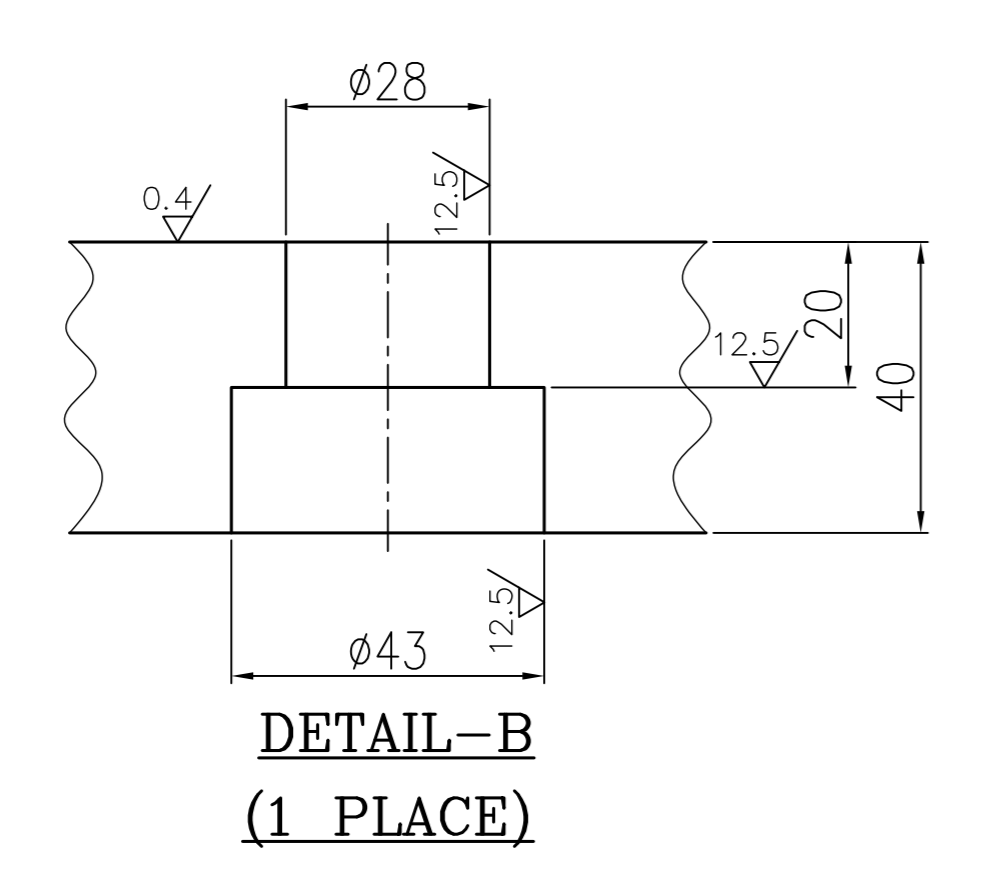
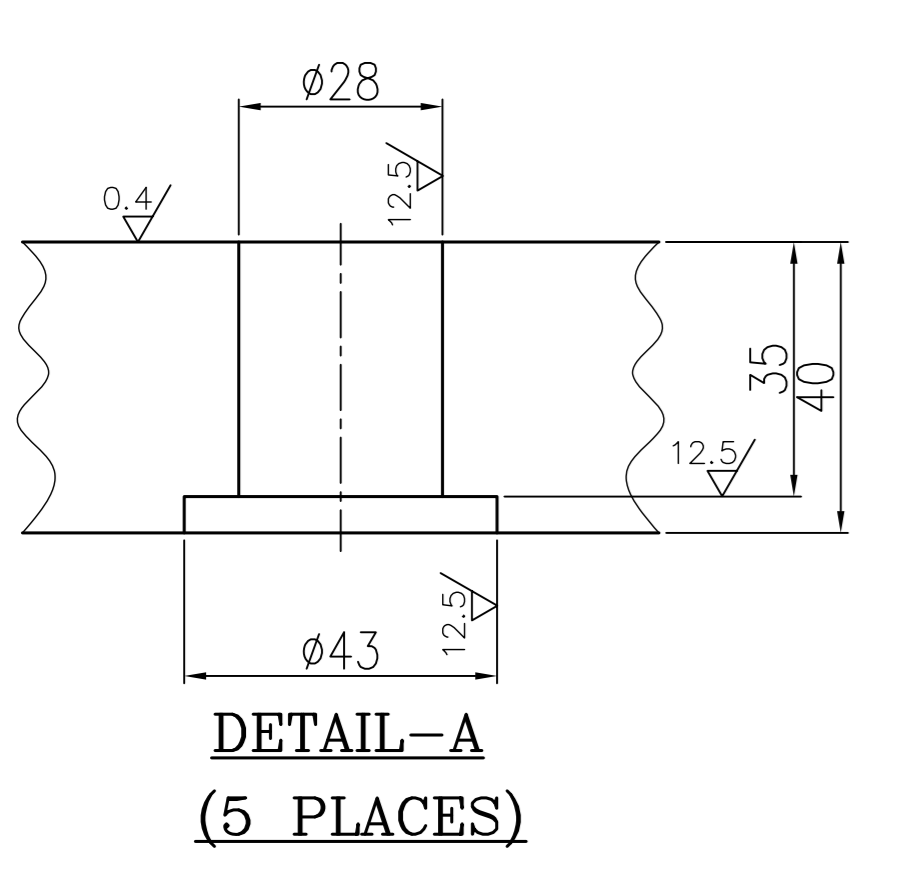
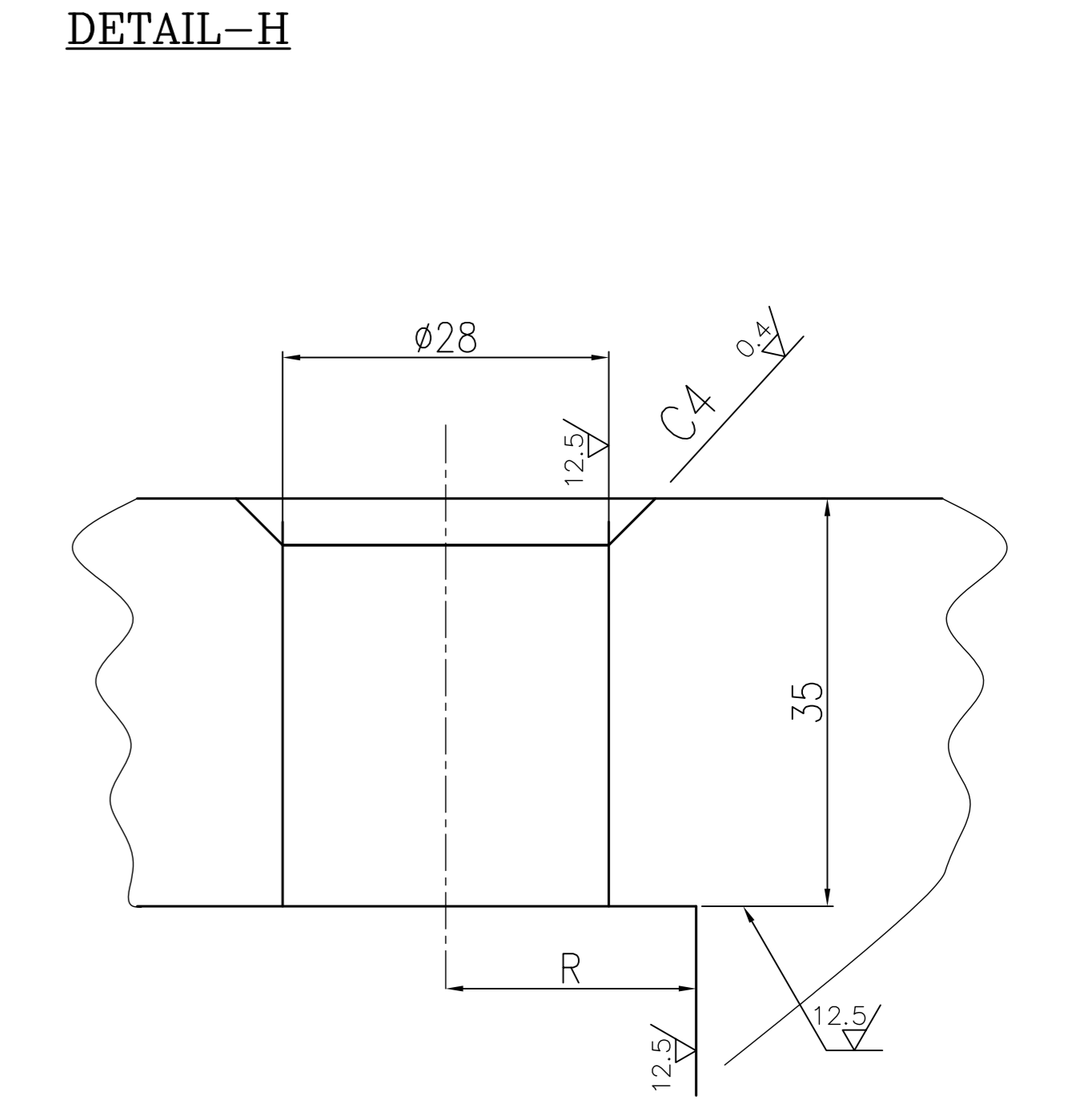
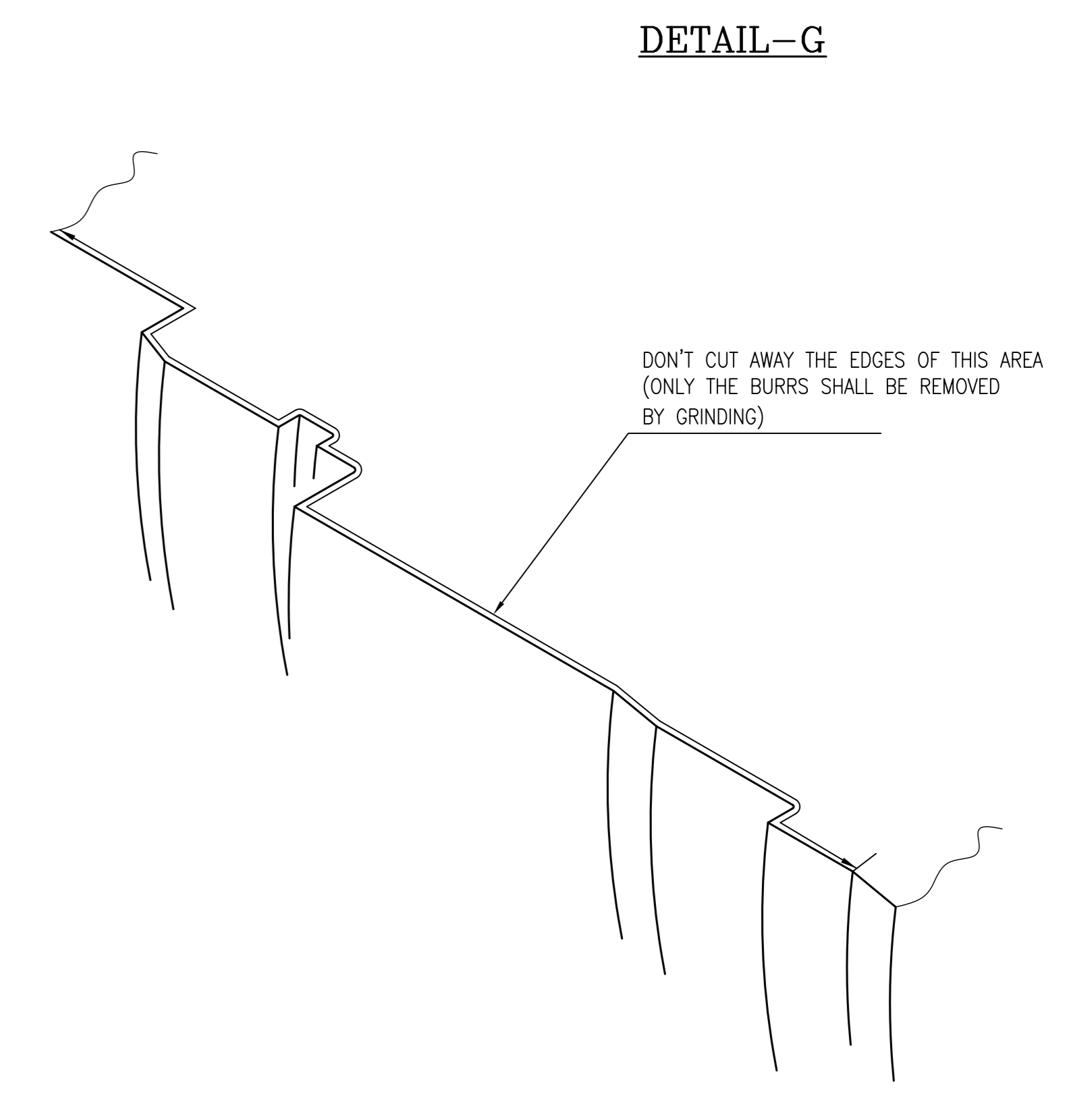
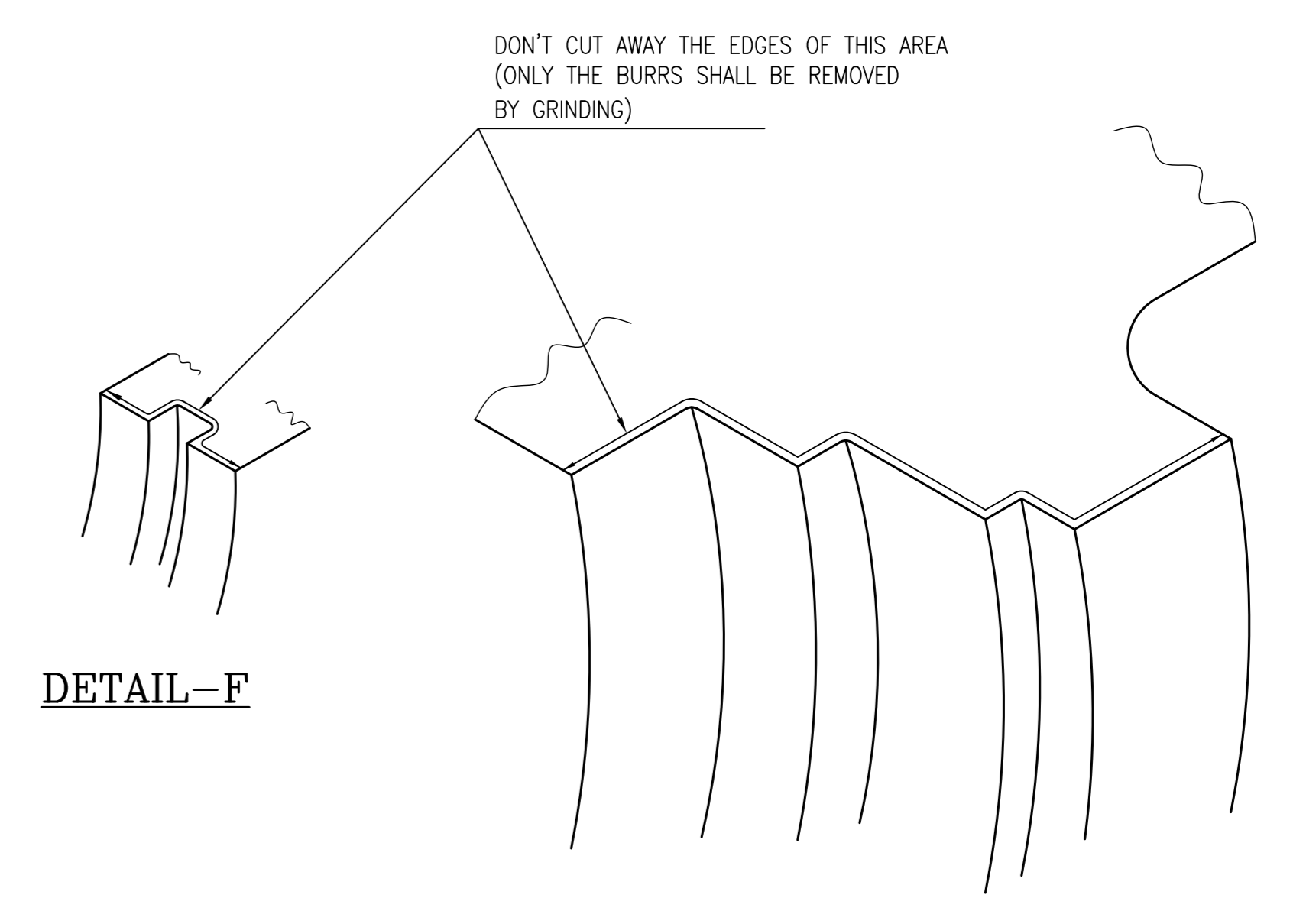
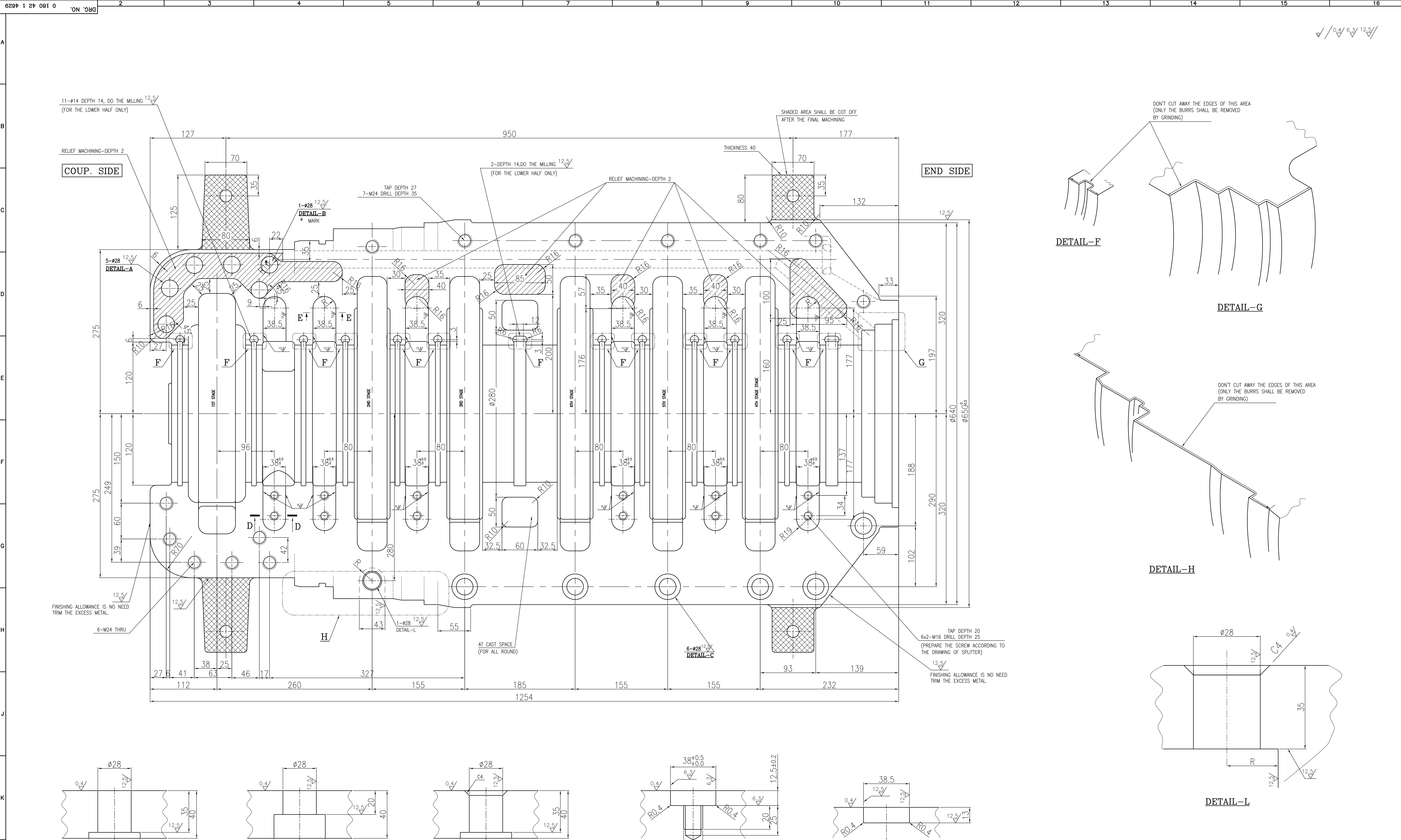
INNER CASING			FP9219306107	1400	1400			
			HY19593		1			
ITEM NO.	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL SPECN.	NET WT.	GROSS WT.	QUANTITY

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...		TYPE OF PRODUCT	
1. REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.		MDG346	
2. CHAMFER M/CD SHARP EDGES 1.2 TO 1.0 AT 45°.		NAME OF CUSTOMER/PROJECT	
3. INTERNAL M/CD CORNER RADII 1 TO 0.7.		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD	
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.		DEPT. PUMPS	
		SCALE	WEIGHT (KG)
		1:1	NA
		REF. TO ASSY DRG.	ITEM NO.
		NA	NA
		DRAWING NO.	REV.
		0 180 42 1 4626 00	
		SHEET NO. 01	NO OF SHEETS 01







FP9219306107		1400	1400
HY19593		1	
DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO.
			MATERIAL SPECN.
			NET WT. GROSS WT. QUANTITY

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED...				TYPE OF PRODUCT MDG346			
1. REF. TO HY0230261 FOR UNS. TOLERANCES.				NAME OF CUSTOMER/PROJECT			
2. CHAMFER M/CD SHARP EDGE 1.2 TO 1.0 AT 45°.				MATERIAL CODE			
3. INTERNAL M/CD CORNER RADIUS 1 TO 0.7.				NET WT.			
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.				GROSS WT.			

REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV
1		CHECKED		2		CHECKED		3		CHECKED		4		CHECKED		5		CHECKED	

REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV	REV.	DATE	ALTERED	PRANAV
1		CHECKED		2		CHECKED		3		CHECKED		4		CHECKED		5		CHECKED	



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DRG.NO. 2 180 421 5078

**NOTE TO SUPPLIER:**

1. TECHNICAL DELIVERY CONDITIONS SHALL BE AS PER HY19593.
2. ADDITIONAL QUALITY REQUIREMENTS SHALL BE AS PER FP60291.
3. STRESS RELIEVING SHALL BE DONE AFTER ANY WELDING WITHIN -20°C OF TEMPERING TEMPERATURE.
4. MANUFACTURE THE CASING IN ACCORDANCE WITH THE FOLLOWING DRAWINGS.

DESCRIPTION	DRG. NO. (INTERNAL REF.)	BHEL DRG.NO.	
1ST VOLUTE AND CROSSOVER DRAWING	P1-Q9978-R0	01804214676	CORE
STD VOLUTE AND SHORT CROSSOVER DRAWING	P1-Q9979-R0	01804214677	
LONG CROSSOVER DRAWING	P1-Q9980-R0	01804214678	
SUC.VOLUTE DRAWING	P1-Q9981-R0	01804214679	
DISCH.VOLUTE DRAWING	P1-Q9982-R0	01804214680	
COUP SIDE DRAWING	P1-Q9983-R0	01804214681	
END SIDE DRAWING	P1-Q9984-R0	01804214682	OUTLINE MOULD
LONGITUDINAL SECTIONAL DRAWING	P1-Q9985-R1	01804214683	
MATING FACE DRAWING	P1-Q9986-R2	01804214684	
OUTLINE DRAWING	P1-Q9987-R1	01804214685	

**NOTE TO MACHINE SHOP:**

1. MACHINE THE CASING IN ACCORDANCE WITH THE FOLLOWING DRAWINGS.

DESCRIPTION	DRG. NO. (INTERNAL REF.)	BHEL DRG.NO.
COUP SIDE DRAWING	P1-Q9983-R0	01804214681
END SIDE DRAWING	P1-Q9984-R0	01804214682
LONGITUDINAL SECTIONAL DRAWING	P1-Q9985-R1	01804214683
MATING FACE DRAWING	P1-Q9986-R2	01804214684
OUTLINE DRAWING	P1-Q9987-R1	01804214685
ADDL MACHINING DRAWING (tapping)	P1-Q9988-R0	01804214686 Var-00 2nd stg tap Var-01 3rd stg tap
ADDL MACHINING DRAWING FOR VOLUTE EDGE(2ND TO 6TH STAGES)	P2-Q9989-R0	21804215076
IMPELLER&INNER CASING POLISHING PROCEDURE THE WATER PASSAGE	P5-19443-R0	FP60291
INNER CASING ASSY.	-	01804214687 Var-00 2nd stg tap Var-01 3rd stg tap

2. STRESS RELIEVING SHALL BE DONE AFTER ROUGH MACHINING AND WELDING AS PER HY0640261, TEMPERATURE SHALL BE 590-650°C
3. LPI SHALL BE DONE AFTER ROUGH MACHINING AND AFTER FINAL MACHINING, AS PER AA0850131, ACCEPTANCE AS PER AA0850132, LEVEL-II.

**VARIANT TABLE :**

VAR.NO.	DESCRIPTION	REMARKS	MATL.NO.
00	INNER CASING M/C	2nd STAGE TAP	21804215078-00
01	INNER CASING M/C	3rd STAGE TAP	21804215078-01

ITEM NO	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG.NO. OR FORGING DRG.NO.	MATERIAL CODE	NET WT.	GROSS WT.
					FP9219306182	1640	1720
					HY19593		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 <b>MDG406</b> भारत हेवी इलेक्ट्रिकल्स लिमिटेड HYDERABAD			
DEPT. PUMPS CODE 410		SCALE NTS WEIGHT(Kg) NA		REF. TO ASSY DRG. NA ITEM NO. NA		NO.OF ITEMS NA	
TITLE <b>INNER CASING M/C (UPPER &amp; LOWER HALVES)</b>				DRAWING NO. <b>2 180 42 1 5078</b>		REV. 01	
				SHEET NO. 01		NO OF SHEETS 01	

REV.	DATE	ALTERED	APPD.	REV.	DATE	ALTERED	APPD.	REV.	DATE	ALTERED	APPD.	REV.	DATE	ALTERED	APPD.
		CHECKED				CHECKED		01	27.04.21	CHECKED	msram	APPD.	msram		
ZONE				ZONE				ZONE				ZONE			



# AMENDMENT -- NOTIFICATION

AA 085 01 31 REV,02

PAGE 1 OF 1

## AA 085 01 31: PROCEDURE FOR LIQUID PENETRANT EXAMINATION

Cl.1.3: This clause should be modified as below:

"This standard confirms substantially with ASTM E165 and ASME code Section V, Article 6."

REF:	AMD. NO.	APPROVED	ISSUED	DATE	CUM.SR.NO.
Cl.8.12 of MOM OF WG(NDT)	01	WG(NDT)	Corp.R&D	June '93	A 1279



PROCEDURE FOR LIQUID PENETRANT EXAMINATION

1.0 SCOPE:

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

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

1.3 This standard conforms substantially with ASTM E 165 - 1980 (Reapproved 1983) and ASME code section V, Article 6.

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 DESCRIPTION:

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

4.0 APPROVED METHODS & MATERIALS:

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

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

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

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

5.0 PROCEDURE:

5.1 Surface Preparation:

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Revisions :  
Cl.7.10 of MOM of WG(NDT)

INTERPLANT  
STANDARDIZATION COMMITTEE - WG  
(NDT)

Rev. No.	Rev. Date	Revised:	Prepared	Issued	Date
02	NOV. '92	CORP. R&D	CORP. R&D	CORP. R&D	Issue: SEP. '79



- 5.1.1 Surface preparation by grinding or machining or other method may be employed where surface irregularities may mask indications of unacceptable discontinuities.
- 5.1.2 The surface to be examined and all adjacent areas within at least 25 mm shall be dry and free from any dirt, lint, scale, rust, welding flux, weld spatter, grease, oil or other extraneous matter that could obscure surface openings or otherwise interfere with examination.
- 5.1.3 The surface to be examined shall be cleaned with detergents, organic solvents, descaling solutions or paint removers. Degreasing and ultrasonic cleaning may be employed to increase cleaning efficiency. Cleaning method employed is an important part of the examination procedure. Cleaning solvents shall meet the requirements of Cl.4.2

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

#### 5.2 Drying:

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

#### 5.3 Application Of Penetrants:

- 5.3.1 The penetrant shall be applied by dipping, brushing or spraying. If the penetrant is applied by spraying using compressed air type apparatus, filters shall be placed at the air inlet to preclude contamination of penetrant by oil, water or dirt sediment that may have collected in the lines. Spraying should only be performed in a booth equipped with exhaust system.
- 5.3.2 The length of penetration time is critical and depends upon the material being inspected, the process through which it has passed and the type of discontinuities expected. The recommended penetration time is given in Table 1.
- 5.3.3 The temperature of the penetrant and the surface of the part to be examined shall not be below 10°C(50°F) nor above 50°C(125°F) throughout the examination period. Local heating or cooling is permitted provided the temperatures remain in the range of 10 to 50°C during the examination. Where it is not practical to comply with these temperature limitations, other temperatures and times shall be used provided the procedures are qualified as described in Annexure-I.

#### 5.4 Removal Of Excess Penetrant:

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



## 5.4.1 Postemulsifying Penetrants:

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

## 5.4.2 Solvent Removable Penetrants:

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

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

## 5.4.3 Water Washable Penetrants:

Excess water washable penetrant shall be removed with a water spray. The water pressure shall not exceed 0.35 N/mm<sup>2</sup> (50 Psi) and the water temperature shall not exceed 43.3°C (110°F).

## 5.5 Drying:

Surface shall be dried before the application of developer.

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

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

## 5.6 Application Of Developer:

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

### 5.6.1 Application Of Dry Developer:

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

### 5.6.2 Application Of Wet Developer

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

(a) Aqueous Developer Application:

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

(b) Non-aqueous Developer Application:

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

6.0 EXAMINATION:

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

6.1 Colour Contrast Penetrants (Visible Dye Penetrants):

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

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

6.2 Fluorescent Penetrants:

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



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

### 7.0 EVALUATION OF INDICATIONS & INTERPRETATION:

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

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

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

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

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

### 8.0 ACCEPTANCE STANDARDS:

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

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

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

### 9.0 POST EXAMINATION CLEANING:

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

TABLE - 1 (Clause 5.3.2)

Suggested Penetration Time For Post-emulsified And Solvent

Removable Penetrants

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

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TABLE - 1 (Clause 5.3.2) Contd.

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

\* For lower temperatures, penetration time should be increased.

#### ANNEXURE - 1 (Clause 5.3.3)

#### PROCEDURE FOR NON-STANDARD TEMPERATURES

##### A.1 General:

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



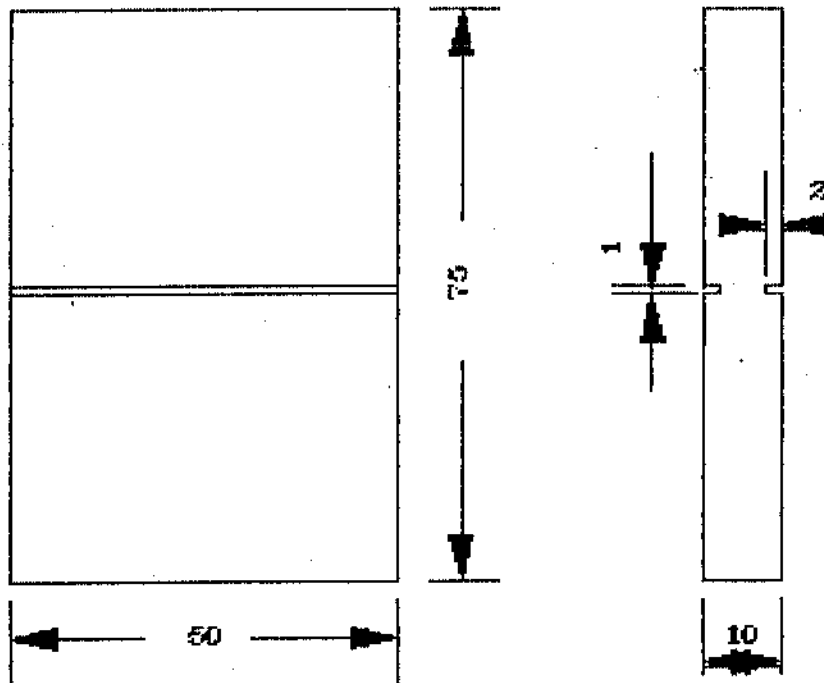
## A.2 Liquid Penetrant Comparator Block:

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

## A.3 Comparator Application:

- (a) If it is desired to qualify a liquid penetrant examination procedure at a temperature of less than 15.6°C (60°F) the proposed procedure shall be applied to block "B" after the block and all materials have been cooled and held at the proposed examination temperature until the comparison is completed. A standard procedure which has previously been demonstrated as suitable for use shall be applied to block "A" in the 15.6 to 51.6°C (60 to 125°F) temperature range. The indications of cracks shall be compared between blocks "A" and "B". If the indications obtained under the proposed condition on block "B" are essentially the same as obtained on block "A" during examination at 15.6 to 51.6°C (60 to 125°F), the proposed procedure shall be considered qualified for use.
- (b) If the proposed temperature for the examination is above 51.6°C (125°F), block "B" shall be held at this temperature throughout the examination. The indication of cracks shall be compared as described in T-647.3(a) while block "B" is at the proposed temperature and block "A" is at the 15.6 to 51.6°C (60 to 125°F) temperature range.
- (c) A procedure qualified at a temperature lower than 15.6°C (60°F) shall be qualified from that temperature to 15.6°C (60°F).
- (d) To qualify a Procedure for temperatures above 51.6°C (125°F), the upper and lower temperature limits shall be established and the procedure qualified at these temperatures.
- (e) As an alternate to the requirements of (a) and (b) when using color contrast penetrants, it is permissible to use a single comparator block for the standard and non-standard temperatures and to make the comparison by photography.

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



**FIGURE: 1-LIQUID PENETRANT COMPARATOR BLOCK**



# AMENDMENT - NOTIFICATION

AA085 01 32 - Rev.No.00

PAGE 1 OF 1

AA 085 01 32: EVALUATION AND ACCEPTANCE STANDARD FOR LIQUID  
PENETRANT EXAMINATION OF CASTINGS

PAGE 2 OF 2: Cl 4.0 ACCEPTANCE STANDARDS:

In the table, title of the column 3 (Unacceptable defects) is  
modified as "Linear defects"

Please see instructions on the reverse

Ref:	Amd.No.	Approved	Issued	Date:	Cur.Sr.No.
Cl: 12.8.7 OF MOM OF WG-NDT	01	WG-NDT	CORP.R&D	15-12-97	A 2258



**EVALUATION AND ACCEPTANCE STANDARD FOR LIQUID PENETRANT EXAMINATION OF CASTINGS**

**1.0 SCOPE:**

**1.1 This standard is applicable for Liquid Penetrant examination of castings.**

**1.2 The procedure adopted for this examination is as per Corporate Standard AA 085 01 31**

**2.0 DEFINITION OF INDICATIONS:**

**2.1 Circular indications are those, more or less elliptical with major axis not more than three times the minor axis.**

**2.2 Linear indications are those, having length in excess of three times the average width.**

**2.3 In-line indications are those, in group of three or more indications aligned side by side in line with intervening gaps of less than 2mm measured edge to edge.**

**3.0 EVALUATION OF INDICATIONS:**

**3.1 Defects which occur as mechanical discontinuities at the surface will be indicated by the bleeding out of the penetrant, however, localised surface imperfections such as may occur from machining marks or surface conditions may produce similar indications which are not relevant to the detection of defects.**

**3.2 Any indication which is suspected to be non-relevant is to be considered relevant till it is proved otherwise.**

**3.3 Relevant indications are those which result from mechanical discontinuities. Linear indications are those indications in which the length is more than three times the width. Rounded indications are those indications which are circular or elliptical with the length less than three times the width.**

**3.4 Indications measuring less than 1.5mm across shall not be taken into consideration unless they are clustered in group of more than 4 Nos. with intervening gap of less than the largest dimensions of adjacent flaws. Such clusters shall be evaluated as single defect.**

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Revised

Date

Approved:

**INTERPLANT NON-DESTRUCTIVE TESTING COMMITTEE**

Prepared

Issued

Date

Corp. R&D

COMP : R & D

10 SEP 1982

**4.0 ACCEPTANCE STANDARDS:**

Castings are classified into four levels, as details below, according to the size and number of flaws permissible.

<b>Level</b>	<b>No. of acceptable indications per 100 sq. cm. surface area of length not exceeding 25cm.</b>	<b>Unacceptable defects.</b>
<b>I</b>	2 Nos. of 3mm circular indication.	Crack and hot tears.
<b>II</b>	3 Nos. of 3mm circular indication. One 5mm circular or linear indication.	-do-
<b>III</b>	3 Nos. of 3mm circular indication. 2 Nos. of 4mm circular indication. One 6mm circular or linear indication. One in-line indication of 10mm maximum length.	-do-
<b>IV</b>	4 Nos. of 3mm circular indication. 3 Nos. of 4mm circular indication. 2 Nos. of 8mm circular or linear indication.  One in-line indication of 15mm maximum length.	-do-

**Note:** The minimum permissible distance between any two or more acceptable individual flaws shall not be less than the major dimension of the larger flaw.

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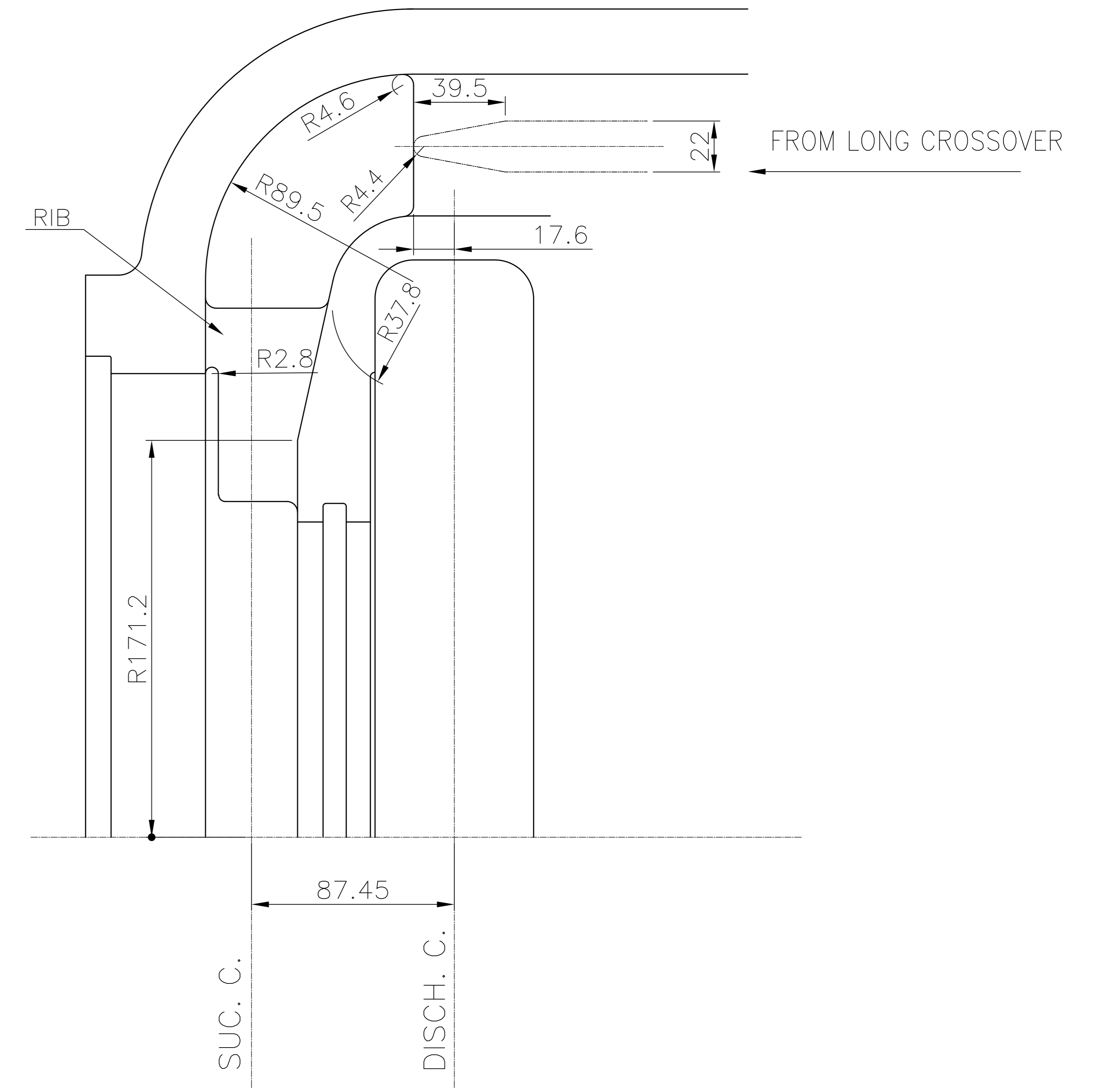
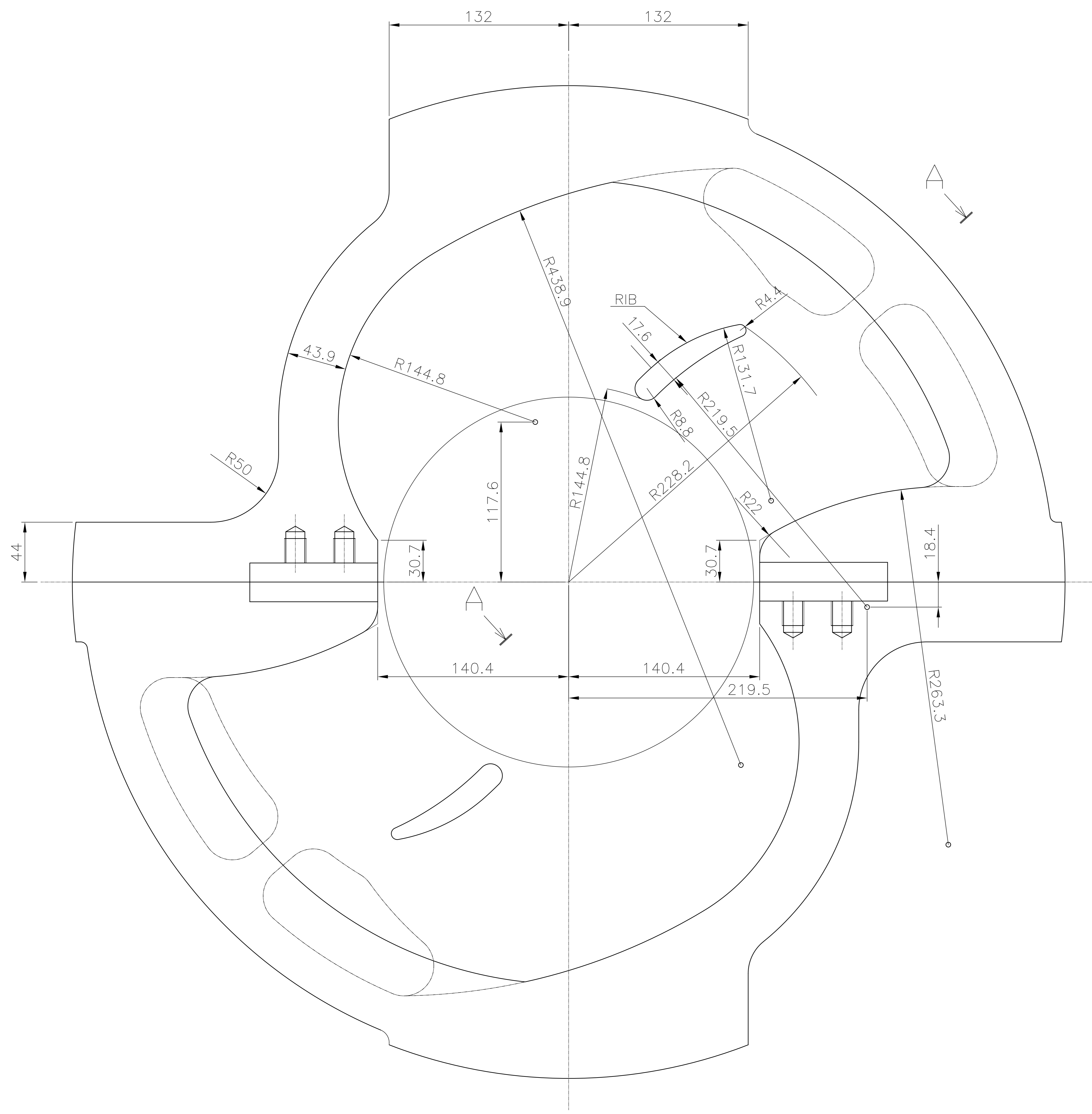
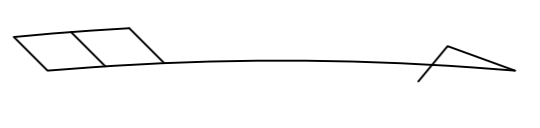
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### IMPELLER ROTATION



### SECTION-AA

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ITEM NO.	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO.	MATERIAL CODE	NET WT.	GROSS WT.
<p>THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED:</p> <ol style="list-style-type: none"> <li>REF. TO HY0230261 FOR UNS TOLERANCES.</li> <li>CHAMFER M/CD SHARP EDGE 1.2 TO 1.0 AT 45°.</li> <li>INTERNAL M/CD CORNER RADIUS 1 TO 0.7.</li> <li>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.</li> </ol>							
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		MDG406					
DEPT. PUMPS		SCALE NTS		WEIGHT (KG)		REF. TO ASSY DRG.	
CODE 410		NTS		-NA-		-NA-	
TITLE				DRAWING NO.			
INNER CASING SUCTION VOLUTE				0 180 42 1 4679			
SHEET NO. 01				NO OF SHEETS 01			



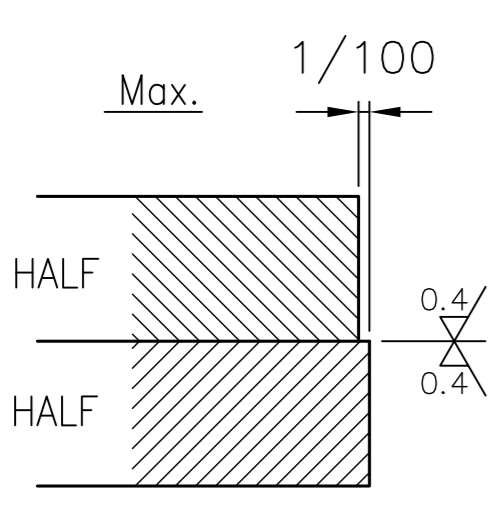
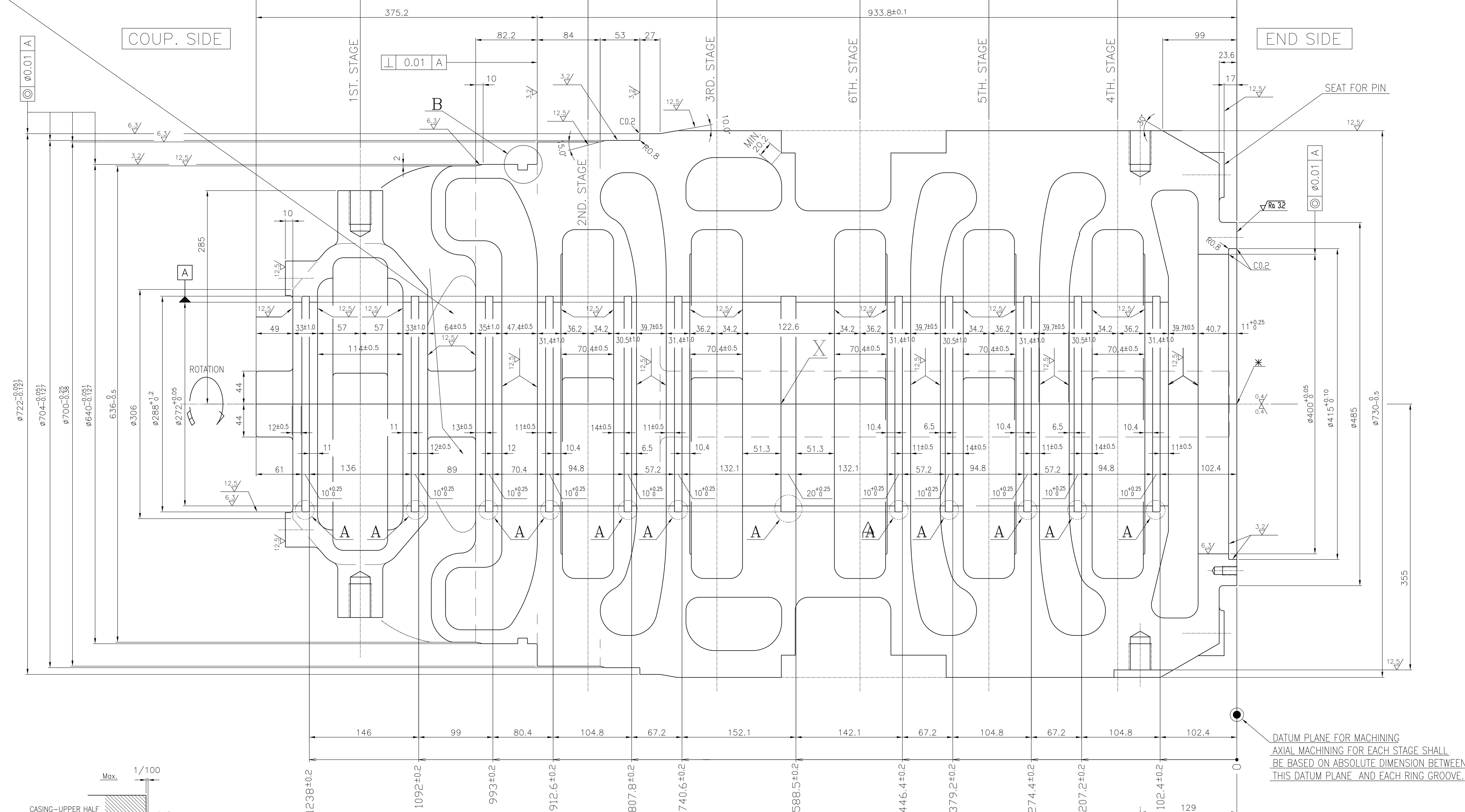




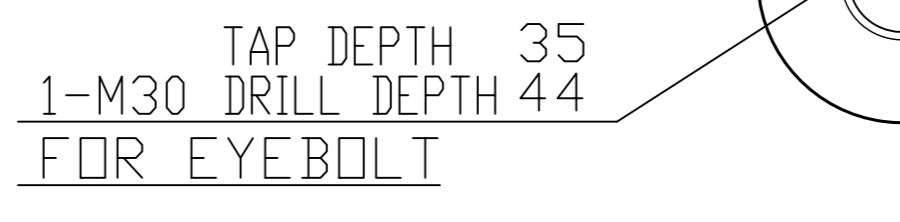
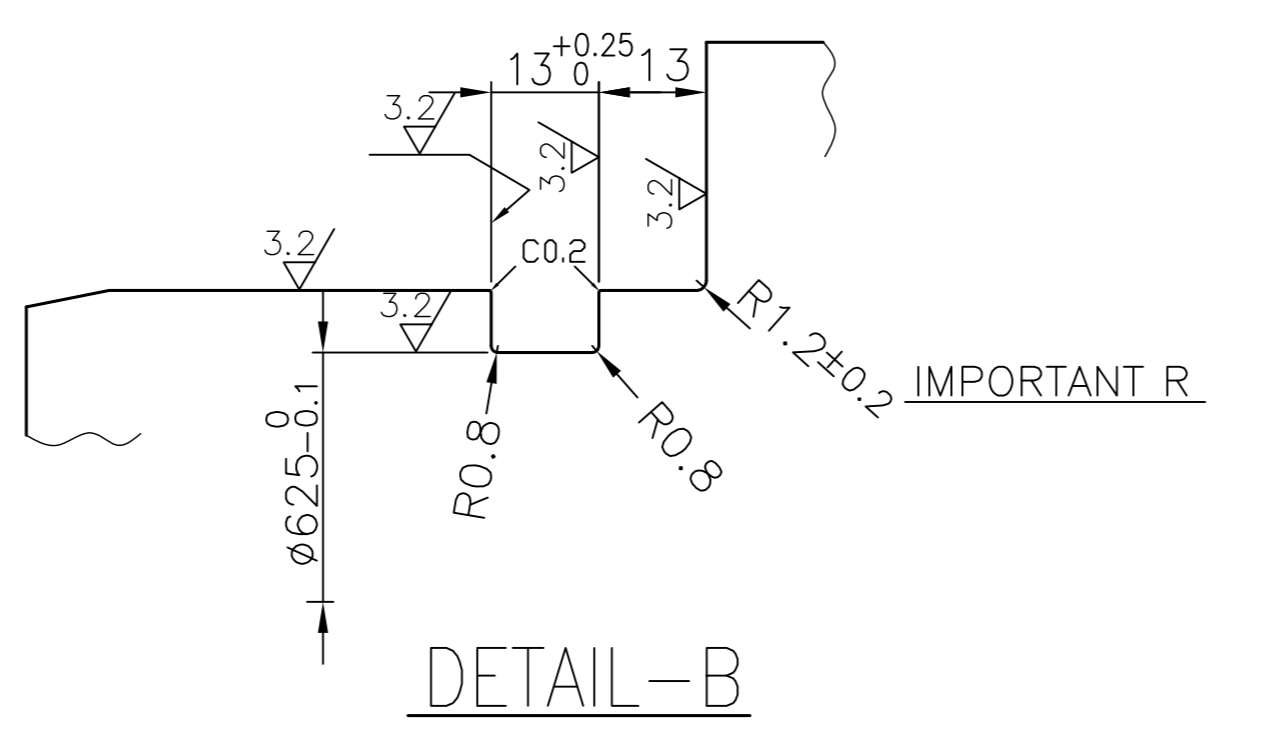
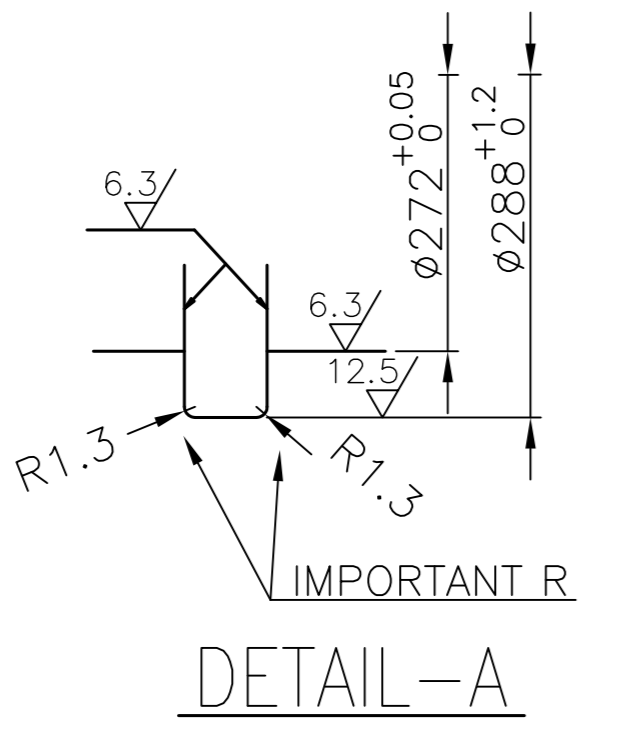
SUCTION HOLES BEHIND CROSSOVER ARE IMPORTANT FOR PERFORMANCE. THEREFORE DON'T BRIDGE THESE HOLES DUE TO CASTING PROCESS.

COUP. SIDE

END SIDE



GAP AT THE MATCHING FACE BETWEEN THE UPPER AND LOWER HALF, INDICATED BY THE MARK OF "X" SHALL BE LESS THAN 1/100. IF IT IS OVER, CORRECT IT BY THE OILSTONE.



DATUM PLANE FOR MACHINING AXIAL MACHINING FOR EACH STAGE SHALL BE BASED ON ABSOLUTE DIMENSION BETWEEN THIS DATUM PLANE AND EACH RING GROOVE.

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REV. NO.	DESCRIPTION	DRAWING NO.	VAR. NO.	RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO.	MATERIAL CODE	NET WT.	GROSS WT.

REV. NO.	DATE	ALTERED	APPROV.	REV. NO.	DATE	ALTERED	APPROV.	REV. NO.	DATE	ALTERED	APPROV.	REV. NO.	DATE	ALTERED	APPROV.	REV. NO.	DATE	ALTERED	APPROV.	REV. NO.	DATE	ALTERED	APPROV.	

ITEM NO.	DESCRIPTION	QUANTITY

NAME	DATE	NO. OF VAR.

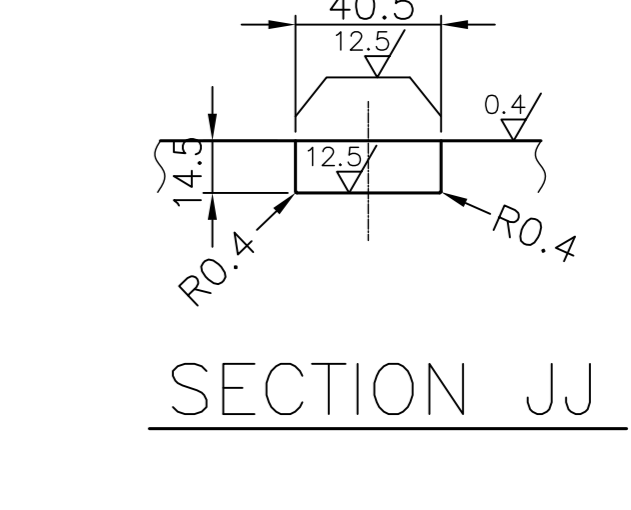
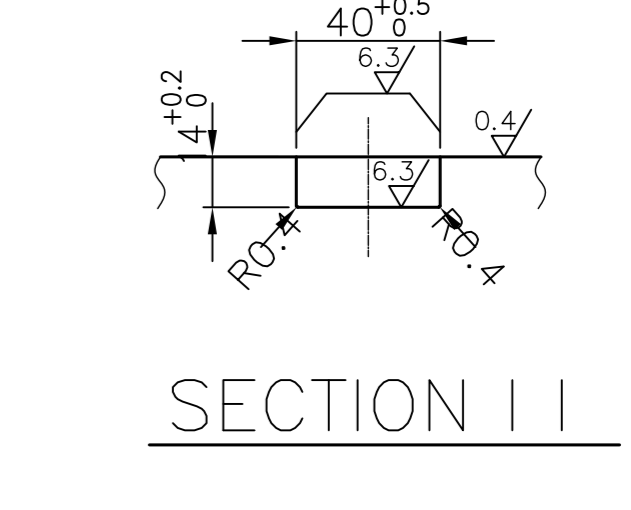
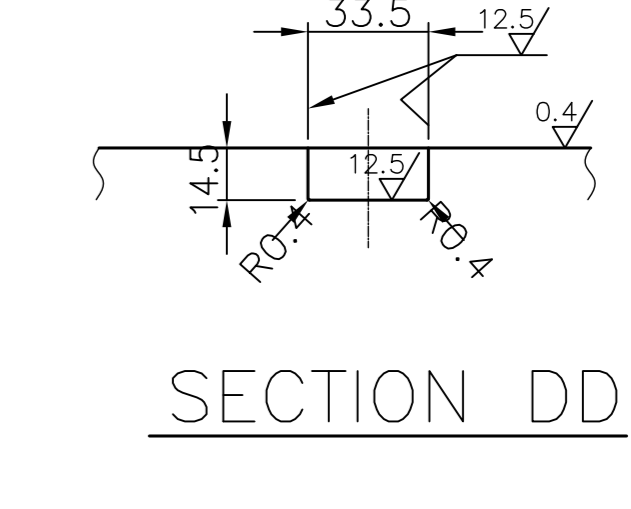
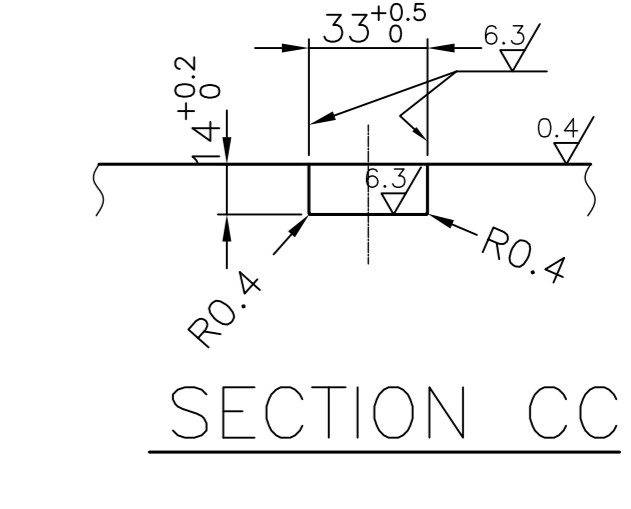
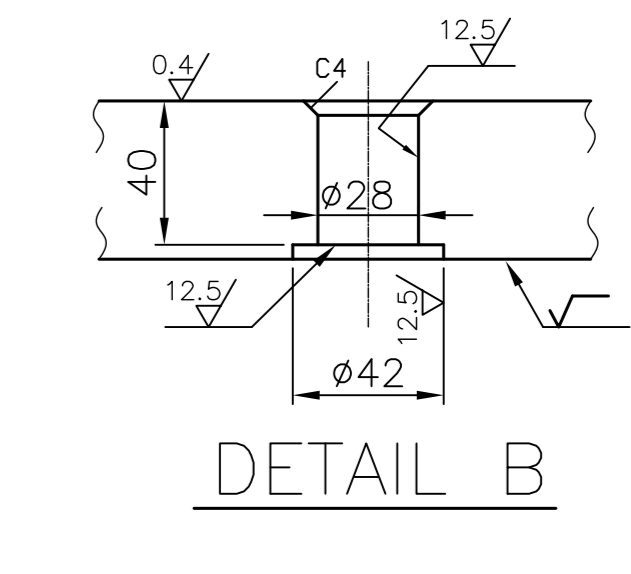
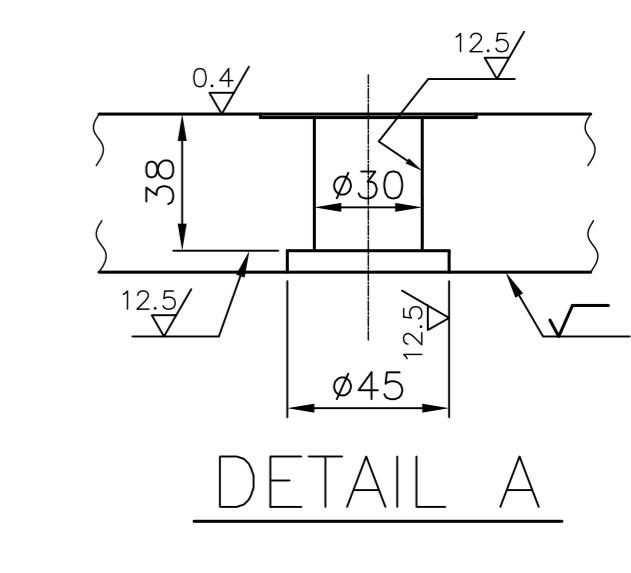
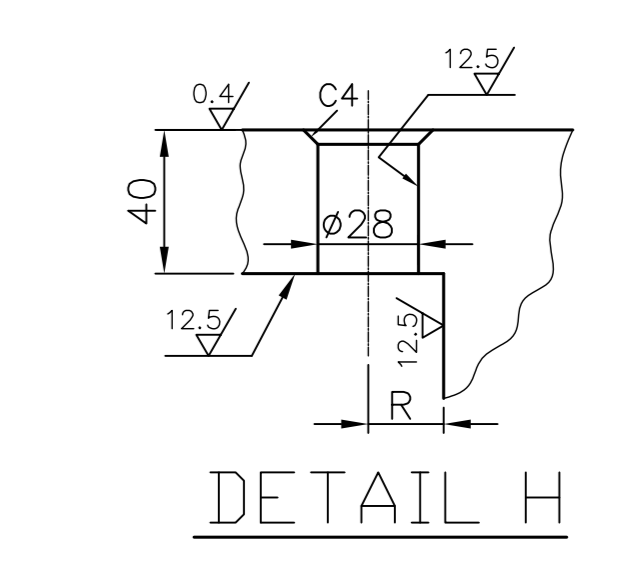
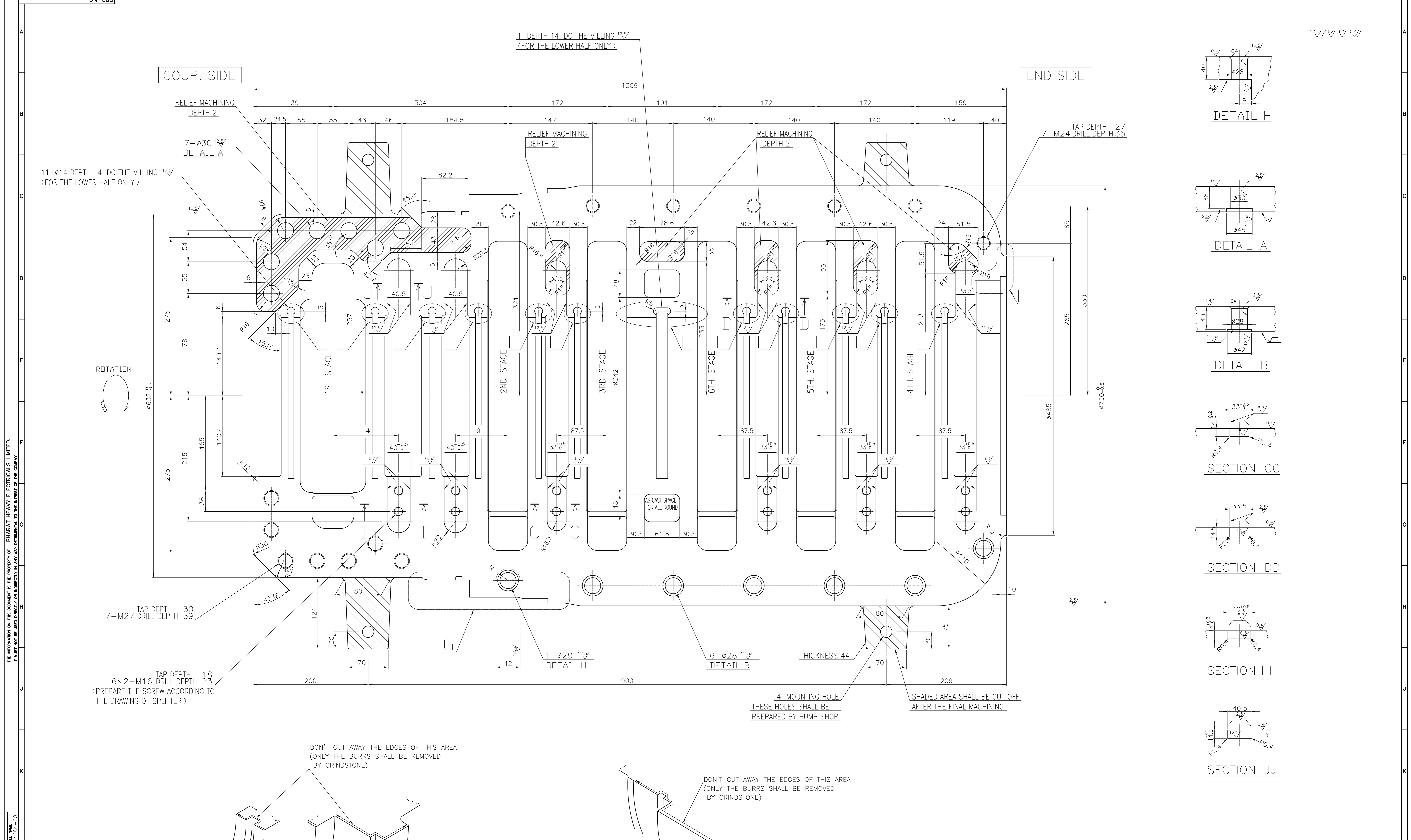
DEPT.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO. OF ITEMS

TITLE	DRAWING NO.	REV.

SHEET NO.	NO. OF SHEETS




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


  


THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED:				TYPE OF PRODUCT: MDG406			
1. REF. TO HY0230261 FOR UNSTATED TOLERANCES.				NAME OF CUSTOMER/PROJECT: BHARAT HEAVY ELECTRICALS LTD. HYDERABAD			
2. CHAMFER W/CD SHARP EDGE 1.2 TO 1.0 AT 45°.				DEPT: PUMPS			
3. INTERNAL W/CD CORNER RADIUS 1 TO 0.7.				SCALE: NTS			
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.				REF. TO ASSY DRG. NO. 01804214684			
				DRAWING NO. 01804214684			
				TITTLE: INNER CASING MATING FACE			
				REV. NO. 00			
				SHEET NO. 01 NO OF SHEETS 01			




TD-106-1 Rev No. 5	Form No.  HYDERABAD	<b>PRODUCT STANDARD PUMPS HYDERABAD</b>		<b>FP60291</b> Rev No. 02 Page 1 of 4																																																																									
<b><u>ADDL QUALITY REQUIREMENTS - MHI DESIGN BFPs &amp;, BPs</u></b>																																																																													
<p><b>1.0 SCOPE:</b></p> <p>This standard specifies additional quality requirements apart from the Plant Purchasing specifications HY19593-R03 and HY19569-R03. These additional quality requirements are as per purchase specifications of the Collaborator M/s. MHI, Japan.</p> <p><b>2.0 CASTINGS COVERED UNDER THIS STANDARD:</b></p> <table border="1" data-bbox="375 646 1435 1797"> <thead> <tr> <th>PUMP TYPE</th> <th>CASTING</th> <th>MATL CODE</th> <th>DRG.NO.-VAR NO</th> <th>JIS / MHI SPECN</th> </tr> </thead> <tbody> <tr> <td rowspan="2">MDG455</td> <td>Inner casing U&amp;L (RPCL)</td> <td>FP9219306093</td> <td>21804214960-00</td> <td rowspan="2">SCS6</td> </tr> <tr> <td>Inner casing U&amp;L (Gadarwara)</td> <td>FP9219306140</td> <td>21804215005-00</td> </tr> <tr> <td>MDG405</td> <td>Inner casing U&amp;L</td> <td>FP9219306034</td> <td>21804214959-00</td> <td>SCS6</td> </tr> <tr> <td>MDG366</td> <td>Inner casing U&amp;L</td> <td>FP9219321017</td> <td>21804215002-00</td> <td>SCS6</td> </tr> <tr> <td>MDG346</td> <td>Inner casing U&amp;L</td> <td>FP9219306107</td> <td>21804214970-00</td> <td>SCS6</td> </tr> <tr> <td rowspan="4">MLC450</td> <td>Casing-TD</td> <td>FP9219306115</td> <td>01891124504-00</td> <td rowspan="4">SCS6</td> </tr> <tr> <td>Casing cover-TD</td> <td>FP9219306506</td> <td>01891124507-00</td> </tr> <tr> <td>Casing-MD</td> <td>FP9219306131</td> <td>01891124505-00</td> </tr> <tr> <td>Casing cover-MD</td> <td>FP9219306530</td> <td>01891124524-00</td> </tr> <tr> <td rowspan="4">MLC400</td> <td>Casing-TD</td> <td>FP9219306026</td> <td>01891124488-00</td> <td rowspan="4">SCS6</td> </tr> <tr> <td>Casing cover-TD</td> <td>FP9219307006</td> <td>01891124491-00</td> </tr> <tr> <td>Casing-MD</td> <td>FP9219306123</td> <td>01891124489-00</td> </tr> <tr> <td>Casing cover-MD</td> <td>FP9219306514</td> <td>01891124514-00</td> </tr> <tr> <td rowspan="2">144RND</td> <td rowspan="2">1<sup>st</sup> stage casing Stage bowl &amp; Discharge bowl</td> <td>FP9216906073</td> <td>01812824576-00</td> <td rowspan="2">SCPH2</td> </tr> <tr> <td>FP9216907177</td> <td>01812924569-00</td> </tr> <tr> <td>MDG406</td> <td>Inner casing U&amp;L</td> <td>FP9219306182</td> <td>21804215078-00</td> <td>SCS6</td> </tr> <tr> <td>MDG436</td> <td>Inner casing U&amp;L</td> <td>FP9219306174</td> <td>21804215059-00</td> <td>SCS6</td> </tr> </tbody> </table>					PUMP TYPE	CASTING	MATL CODE	DRG.NO.-VAR NO	JIS / MHI SPECN	MDG455	Inner casing U&L (RPCL)	FP9219306093	21804214960-00	SCS6	Inner casing U&L (Gadarwara)	FP9219306140	21804215005-00	MDG405	Inner casing U&L	FP9219306034	21804214959-00	SCS6	MDG366	Inner casing U&L	FP9219321017	21804215002-00	SCS6	MDG346	Inner casing U&L	FP9219306107	21804214970-00	SCS6	MLC450	Casing-TD	FP9219306115	01891124504-00	SCS6	Casing cover-TD	FP9219306506	01891124507-00	Casing-MD	FP9219306131	01891124505-00	Casing cover-MD	FP9219306530	01891124524-00	MLC400	Casing-TD	FP9219306026	01891124488-00	SCS6	Casing cover-TD	FP9219307006	01891124491-00	Casing-MD	FP9219306123	01891124489-00	Casing cover-MD	FP9219306514	01891124514-00	144RND	1 <sup>st</sup> stage casing Stage bowl & Discharge bowl	FP9216906073	01812824576-00	SCPH2	FP9216907177	01812924569-00	MDG406	Inner casing U&L	FP9219306182	21804215078-00	SCS6	MDG436	Inner casing U&L	FP9219306174	21804215059-00	SCS6
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Ref. Doc	<b>Revisions :</b>  <b>Refer to record of revisions :</b>		<b>Prepared :</b>  <b>M.S.RAM</b>	<b>Approved :</b>  <b>K.H.R.K</b>	<b>Date :</b>  <b>22.04.16</b>																																																																								

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TD-106-1 Rev. No.5 Form No.	 HYDERABAD	<b>PRODUCT STANDARD</b> <b>PUMPS</b> <b>HYDERABAD</b>	<b>FP60291</b> Rev No. 02 Page 2 of 4
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.		<p><b>3.0 ADDL.REQUIREMENTS FOR CASTINGS WITH JIS SPECN <u>SCS6</u>:</b></p> <p>3.1 HEAT TREATMENT:</p> <p>Against Clause 6.0 of Specification HY19593-R03, Castings shall be heat treated as mentioned below.</p> <p>Quenching: 950 deg.C MINIMUM + Air cooling          Tempering: 570 - 620 deg.C + Air cooling or slow cooling</p> <p>3.2 MECHANICAL PROPERTIES:</p> <p>Over and above specification requirement of Clause 10.0 of HY19593-R03, castings shall confirm to the following tensile test requirement.</p> <p>Tensile test for reduction of area &gt; 35%</p> <p><b>4.0 ADDL.REQUIREMENTS FOR CASTINGS WITH JIS SPECN <u>SCPH2</u>:</b></p> <p>4.1 MECHANICAL PROPERTIES:</p> <p>Over and above specification requirement of Clause 11.0 of HY19569-R05, castings shall confirm to the following tensile test requirement.</p> <p>Yield strength &gt; 245 N/sq.mm          Tensile strength &gt; 480 N/sq.mm          Reduction of area &gt; 35%</p> <p><b>6.0 LIQUID PENETRANT TEST FOR ALL CASTINGS:</b></p> <p>Penetrant Test shall be conducted as per BHEL standard AA0850131.</p> <p>Acceptance standards: Both the following acceptance standards shall be met.</p> <p>6.1 As per MHI standard GPC-0280-R05:</p> <p>No crack indications          Size of indication shall be under 2 mm. Linear indication is the length not less than three the width.          Maximum 2 pieces of linear indications on the unit area (in a rectangle of 2500 sq.mm, maximum length of a side of the rectangle shall be 150mm)</p> <p>6.2 As per AA0850132:</p> <p>3 no. of 3 mm dia circular indications per unit rectangular area of 100 sq.cm. The maximum length of side of rectangle shall be 25cm.</p>	
	Ref. Doc		

ID-106-1 Rev.No.5 Form No.	 HYDERABAD	<b>PRODUCT STANDARD</b> <b>PUMPS</b> <b>HYDERABAD</b>	<b>FP60291</b> Rev No. 02 Page 3 of 4
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p><b>7.0 DIMENSIONAL CHECK FOR CASTINGS:</b></p> <p>All the castings shall be dimensionally checked as per the following applicable Formats, in addition to the regular dimensional check as per casting drawing.</p> <p><b>7.1 FOR INNER CASINGS OF BFPs:</b></p> <p>Applicable Format Nos.: Refer Annexure-1</p> <p><b>7.2 FOR CASING &amp; CASING COVERS OF BOOSTER PUMPS:</b></p> <p>Applicable Format Nos.: Refer Annexure-3</p> <p><b>7.3 FOR 1<sup>ST</sup> STAGE CASING, STAGE&amp;DISCHARGE BOWLS OF CEP:</b></p> <p>Applicable Format Nos.: Refer Annexure-4</p> <p><b>8.0 ALLOWANCES ON INNER CASING CASTINGS, BFP:</b></p> <p>Allowances on casting shall be as per Annexure-2.</p>		
Ref. Doc			

TD-106-3 Rev No. 5	Form No.		<b>PRODUCT STANDARD PUMPS HYDERABAD</b>		<b>FP60291</b> Rev No. 02 Page 4 of 4
<b>RECORD OF REVISIONS</b>					
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.					
Ref. Doc.					

**MEASUREMENT OF WALL THICKNESS OF  
SHORT CROSSOVER OF INNER CASING**

**Scope:**

The wall thickness of short crossover of inner casing shall be measured for the moulding and the raw material in order to prevent wall thickness of finished part from falling.

**Measurement Record:**

You shall measure and record the data in accordance with the attached record sheet, after writing the customer name, project name, measured stage name etc. as specified.

**Submittal Schedule:**

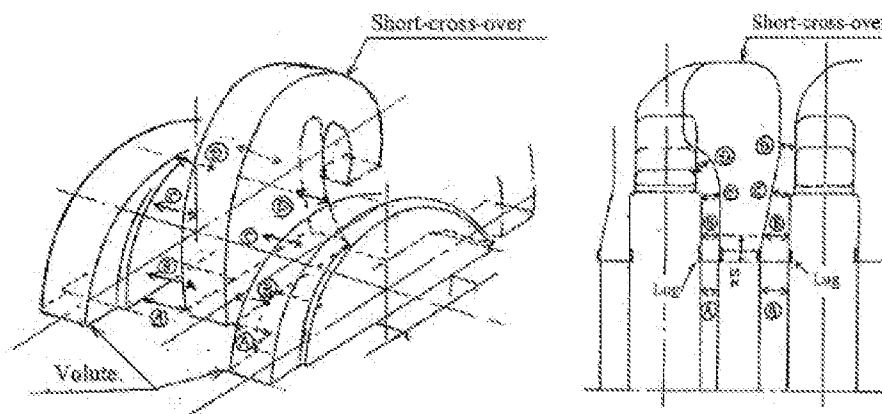
You shall submit the measurement records to the purchaser immediately after the measurement.

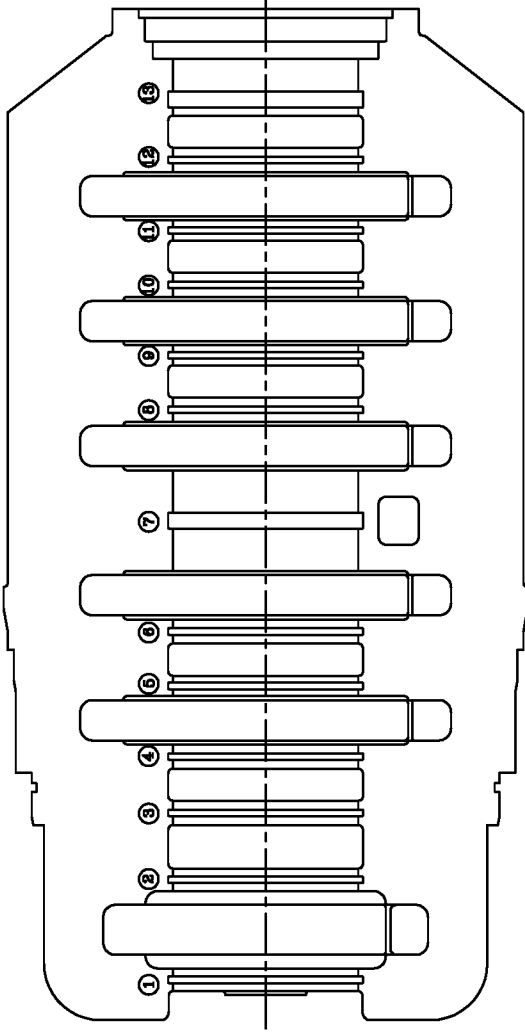
If the wall thickness is out of limit, the purchaser may require that the core shall be corrected and the contractor shall correct the core. Therefore please submit the record as soon as possible.

The contractor shall obtain purchaser's agreement prior to the casting. The purchase will confirm whether the core complied with the drawing or not.

**Measurement Procedure:**

The wall thickness shall be measured as follows. Although the each measurement position of A, B, C & D is rough position, the minimum rough thickness shall be found at the position of A, B, C & D and it shall be recorded in the attached sheet. For the moulding work, the space for the wall thickness shall be measured and recorded.





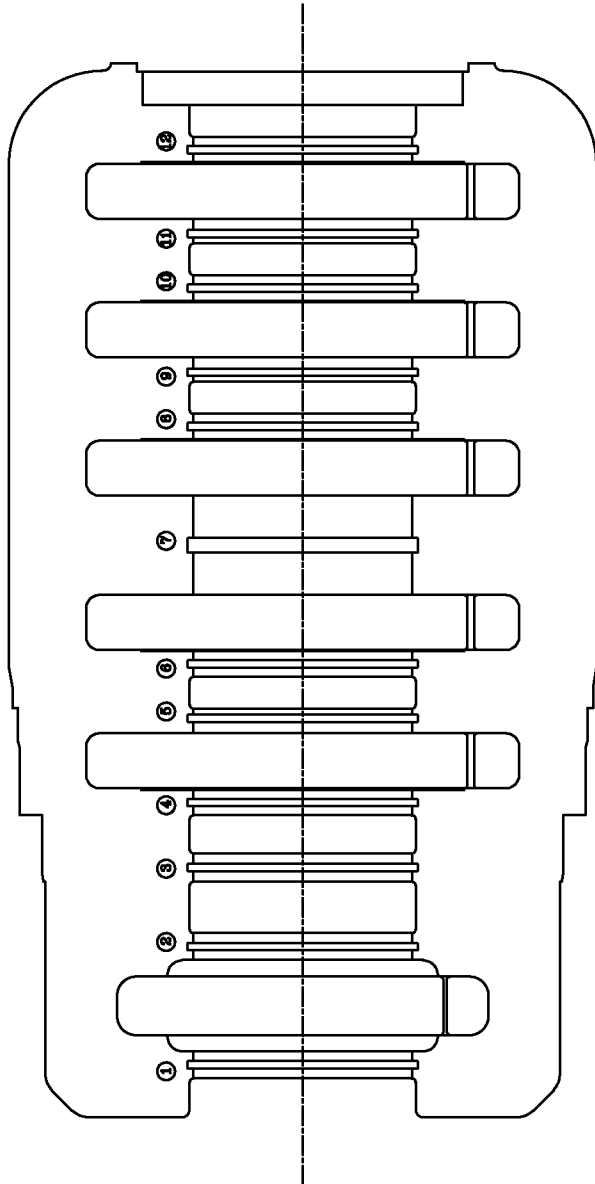
**ORDER NUMBER:**  
**CUSTOMER:**  
**PROJECT NAME:**  
**DRAWING NUMBER:**  
**SERIAL No.(Upper):**  
**SERIAL No.(Lower):**

## MEASUREMENT RECORD OF WALL THICKNESS OF INNER CASING MDG346

MINIMUM ALLOWABLE WALL THICKNESS(FROM DRAWING): \_\_\_\_\_ mm

STAGE NUMBER	1st		2nd		3rd		6th		5th		4th	
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
FOR MOLDING	UPPER HALF	A										
		B										
		C										
		D										
FOR ROUGH MATERIAL	UPPER HALF	A										
		B										
		C										
		D										

NOTE: DESIGNED WALL THICKNESS FOR POSITION C & D IS MINIMUM ALLOWABLE WALL THICKNESS INDICATED IN THE DRAWING.



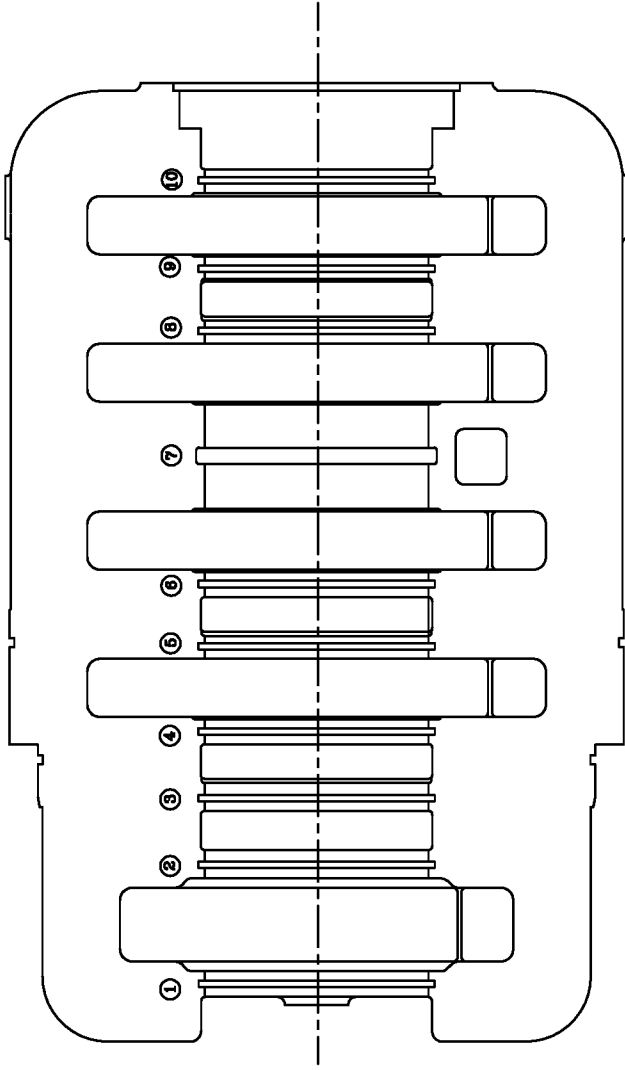
**ORDER NUMBER:**  
**CUSTOMER:**  
**PROJECT NAME:**  
**DRAWING NUMBER:**  
**SERIAL No. (Upper):**  
**SERIAL No. (Lower):**

**MEASUREMENT RECORD OF WALL THICKNESS OF INNER CASINGS MDG366, MDG406 & MDG436**

**MINIMUM ALLOWABLE WALL THICKNESS(FROM DRAWING):** \_\_\_\_\_ mm

STAGE NUMBER	1st		2nd	3rd	6th	5th	4th
	①	②					
DESIGNED VALUE AT A	A	③	④	⑤	⑥	⑦	⑧
	B						
	C						
	D						
MEASURED LOCATION	A	⑨	⑩	⑪	⑫	⑬	⑭
	B						
	C						
	D						
FOR MOLDING	A						
	B						
	C						
	D						
FOR ROUGH MATERIAL	A						
	B						
	C						
	D						

**NOTE: DESIGNED WALL THICKNESS FOR POSITION C & D IS MINIMUM ALLOWABLE WALL THICKNESS INDICATED IN THE DRAWING.**



**ORDER NUMBER:**  
**CUSTOMER:**  
**PROJECT NAME:**  
**DRAWING NUMBER:**  
**SERIAL No.(Upper):**  
**SERIAL No.(Lower):**

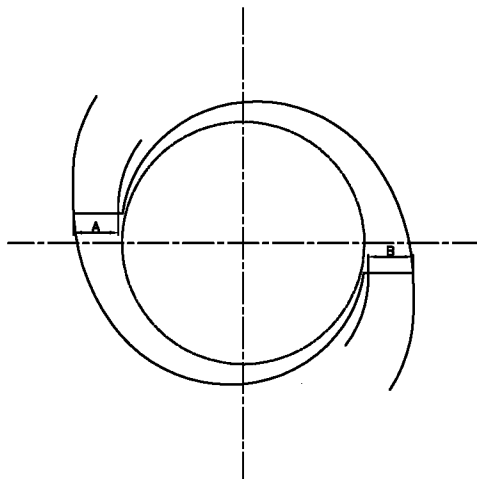
### MEASUREMENT RECORD OF WALL THICKNESS OF INNER CASINGS MDG405 & MDG455

MINIMUM ALLOWABLE WALL THICKNESS(FROM DRAWING): \_\_\_\_\_ mm

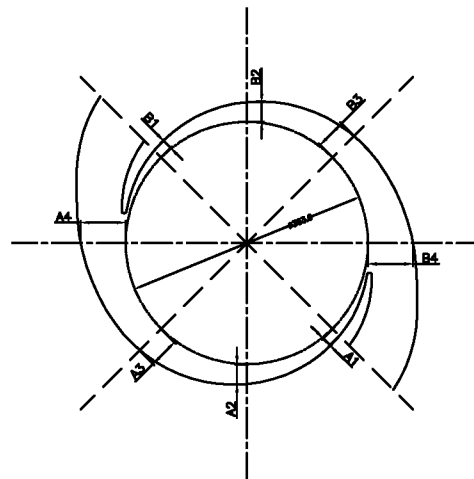
STAGE NUMBER	1st		2nd		3rd		5th		4th		
	DESIGNED VALUE AT A	MEASURED LOCATION	DESIGNED VALUE AT A	MEASURED LOCATION	DESIGNED VALUE AT A	MEASURED LOCATION	DESIGNED VALUE AT A	MEASURED LOCATION	DESIGNED VALUE AT A	MEASURED LOCATION	
FOR MOLDING	UPPER HALF	A	①	②	③	④	⑤	⑥	⑦	⑧	⑨
		B									
		C									
		D									
FOR ROUGH MATERIAL	UPPER HALF	A									
		B									
		C									
		D									

NOTE: DESIGNED WALL THICKNESS FOR POSITION C & D IS MINIMUM ALLOWABLE WALL THICKNESS INDICATED IN THE DRAWING.

# DIMENSIONAL INSPECTION REPORT



**CASING THROAT AREA**



**VOLUTE FORM**

## CASING THROAT AREA

		A	B	ACCEPTANCE
1ST STAGE	DESIGN VALUE			
	MEASURED VALUE			
2ND STAGE	DESIGN VALUE			
	MEASURED VALUE			
3RD STAGE	DESIGN VALUE			
	MEASURED VALUE			
4TH STAGE	DESIGN VALUE			
	MEASURED VALUE			
5TH STAGE	DESIGN VALUE			
	MEASURED VALUE			
6TH STAGE	DESIGN VALUE			
	MEASURED VALUE			

## VOLUTE FORM

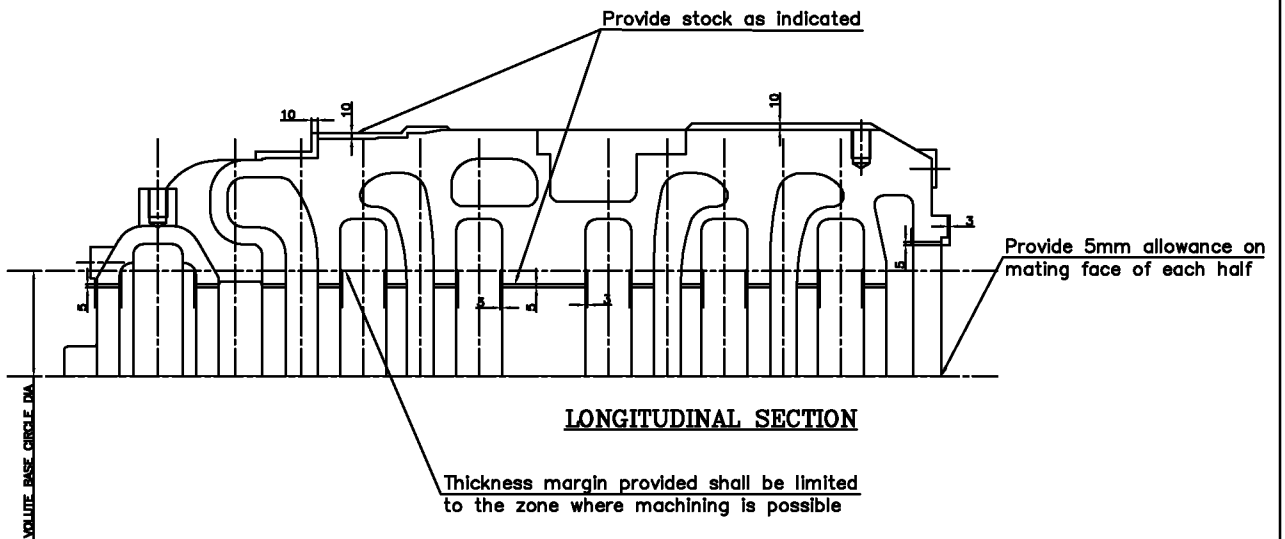
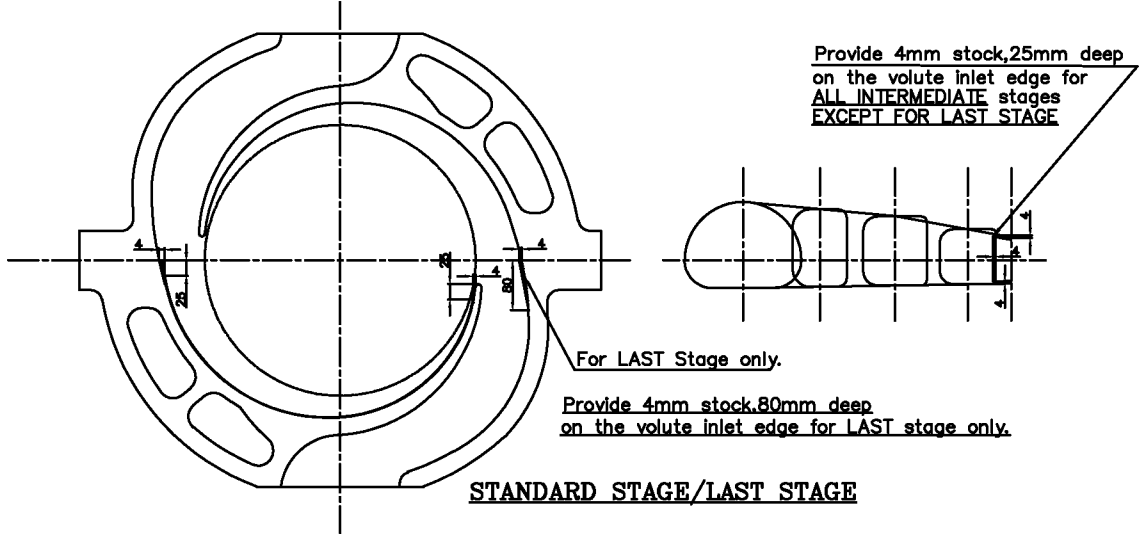
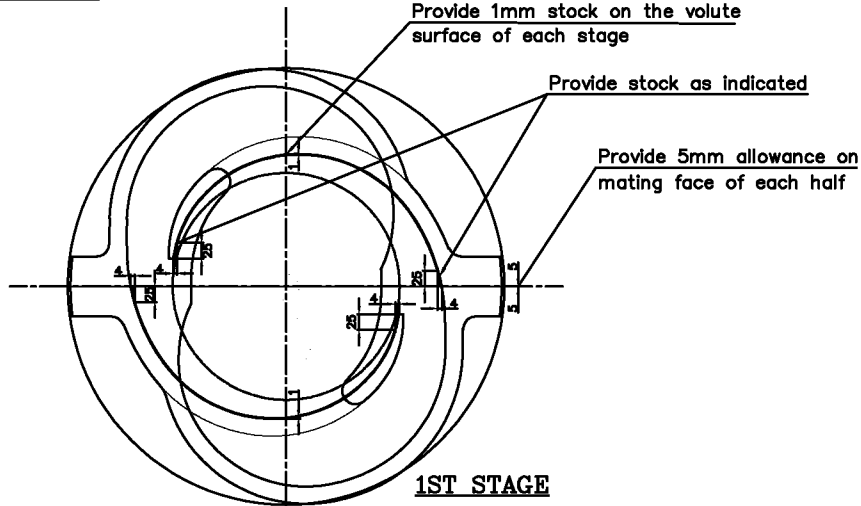
	DESIGN	POS	MEASURED	POS	MEASURED	B.C∅	ACCEPTANCE
1ST STAGE		A1		B1			
		A2		A2			
		A3		A3			
		A4		A4			
2ND STAGE		A1		B1			
		A2		A2			
		A3		A3			
		A4		A4			
3RD STAGE		A1		B1			
		A2		A2			
		A3		A3			
		A4		A4			
4TH STAGE		A1		B1			
		A2		A2			
		A3		A3			
		A4		A4			
5TH STAGE		A1		B1			
		A2		A2			
		A3		A3			
		A4		A4			
6TH STAGE		A1		B1			
		A2		A2			
		A3		A3			
		A4		A4			



PRODUCT STANDARD  
PUMPS  
HYDERABAD

ALLOWANCES ON INNER CASING CASTING

Annexure-2



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# PRODUCT STANDARD

## PUMPS HYDERABAD

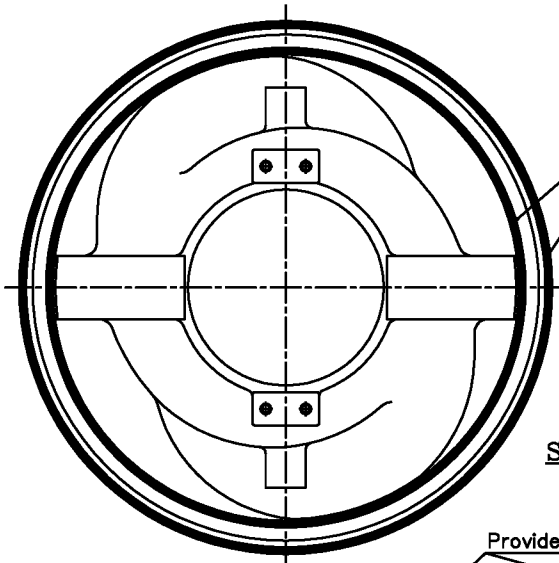
Annexure 2-FP60291

Rev No.

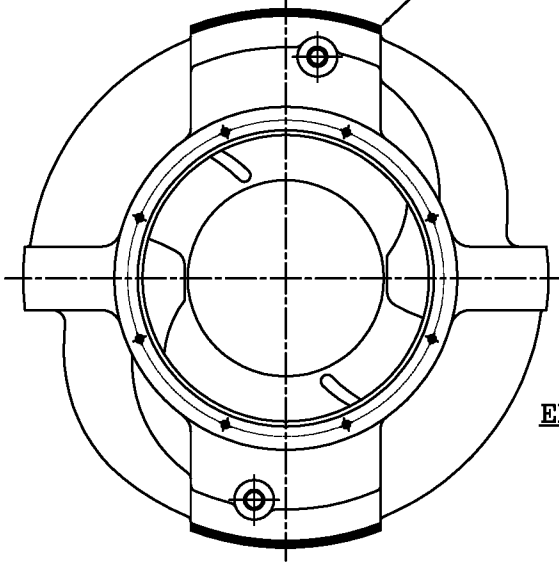
PAGE 02 OF 03

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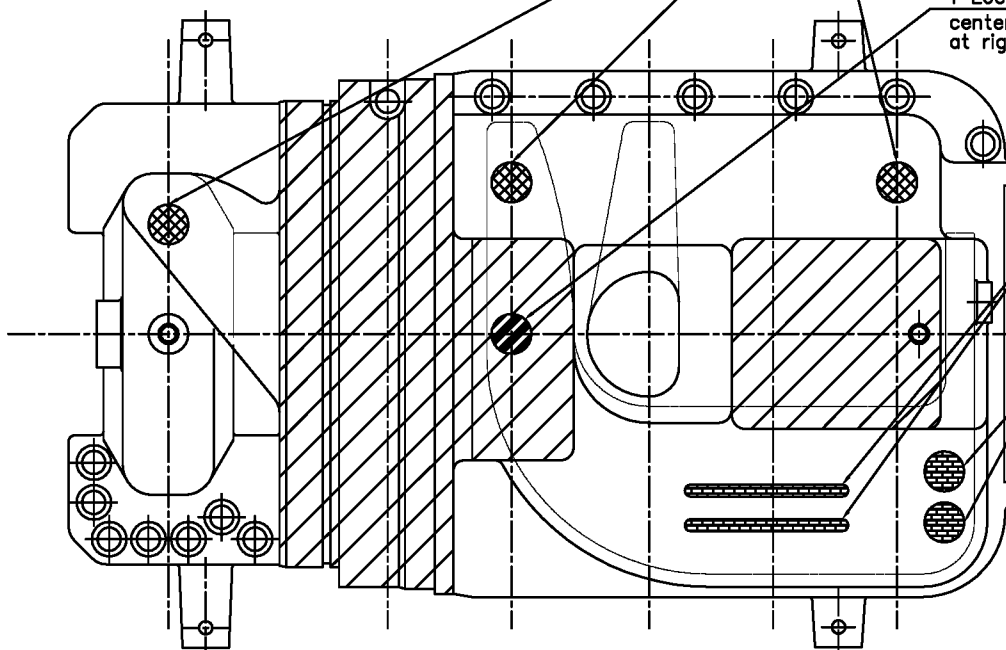
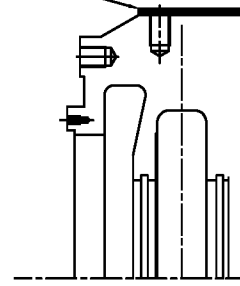
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SUCTION SIDE VIEW



END SIDE VIEW



OUTLINE OF INNER CASING

3 Locations:  $\phi 60 \pm 10$ mm, holes at  $45^\circ$  angle to split face. Hole side face should be at right angle to wall face.

1 Location:  $\phi 60 \pm 10$ mm, holes on centerline. Hole side face should be at right angle to wall face.

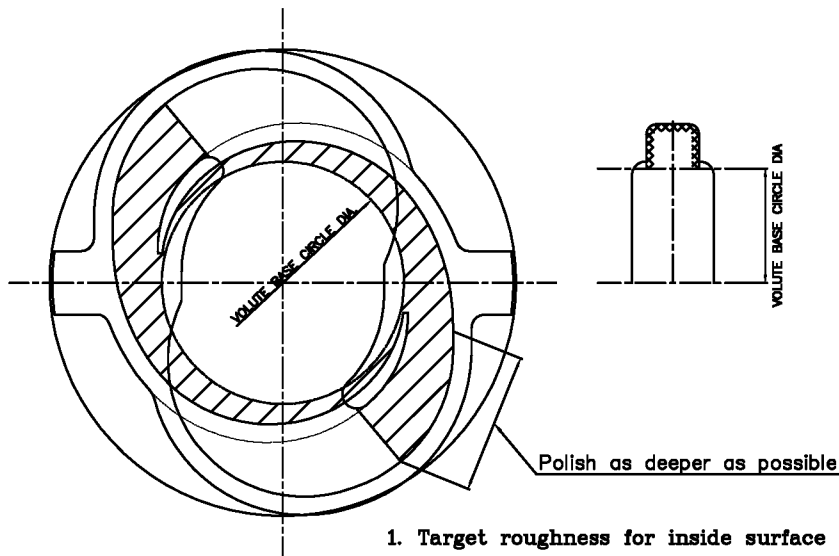
2 Locations: convenient for cleaning long classover

2 Locations:  $\phi 60 \pm 10$ mm  
Make hole at a position from where, passage can be cleaned properly.



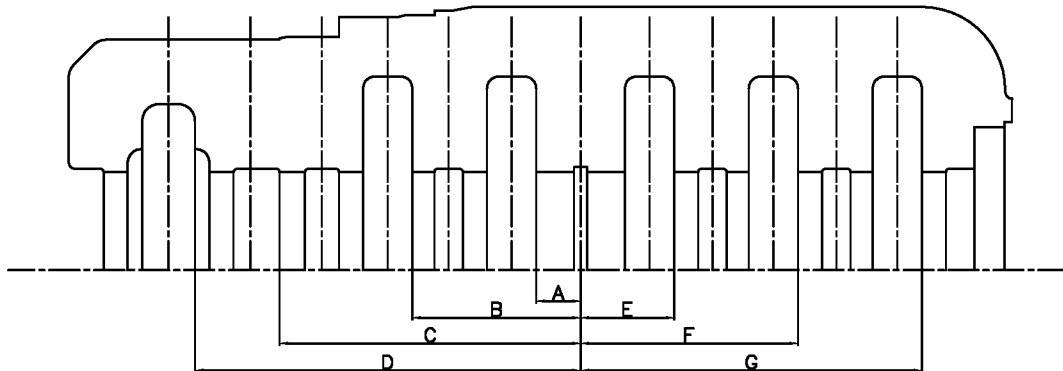
**PRODUCT STANDARD**  
**PUMPS**  
**HYDERABAD**

**SURFACE ROUGHNESS OF INNER CASING**



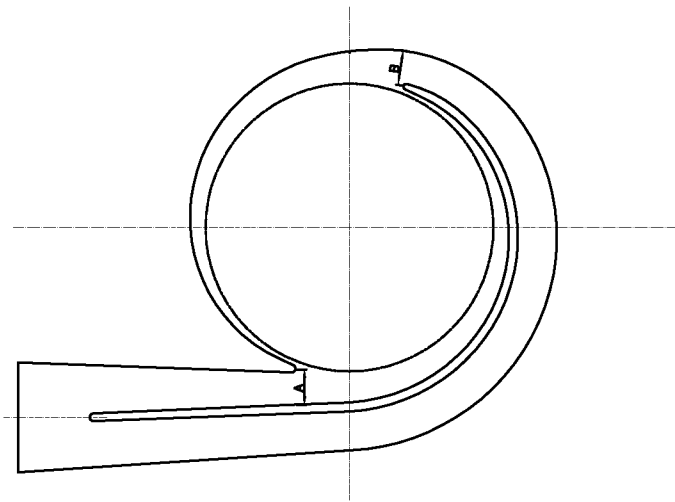
1. Target roughness for inside surface of volute of each stage:  $\sqrt{32}$
2. Inside surface shall include the shaded area and area marked by XXX in the above sketch
3. Polish the inside surface of Volute blade-tongue as deep as possible
4. Polish surfaces for the long-crossover and last stage are also same as indicated above.

**ALLOWABLE TOLERANCE IN INNER CASING STAGE PITCH**



Axial dimensions (from centerline of center stage bush to face to each stage) as shown above shall be measured, ensured within allowed tolerances indicated below.

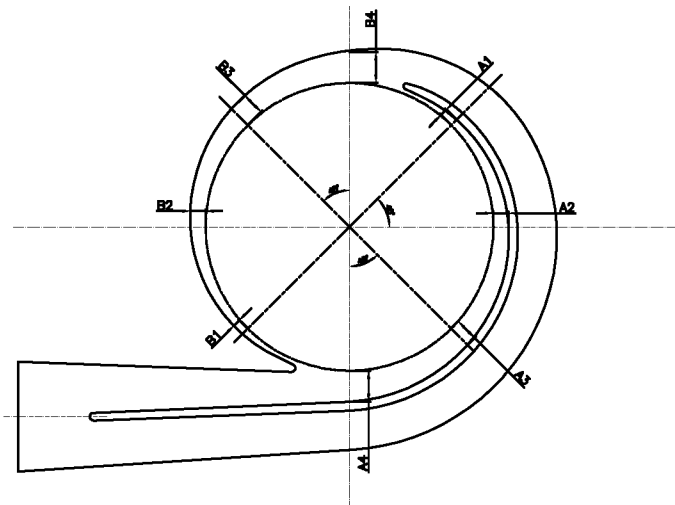
Standard Dimension	Allowed Tolerance
250mm and under	± 0.5mm
500mm and under	± 1.0mm
750mm and under	± 1.5mm
1000mm and under	± 2.0mm



CASING THROAT AREA

CASING THROAT AREA

	A	B	ACCEPTANCE
DESIGN VALUE			
MEASURED VALUE			



VOLUTE FORM

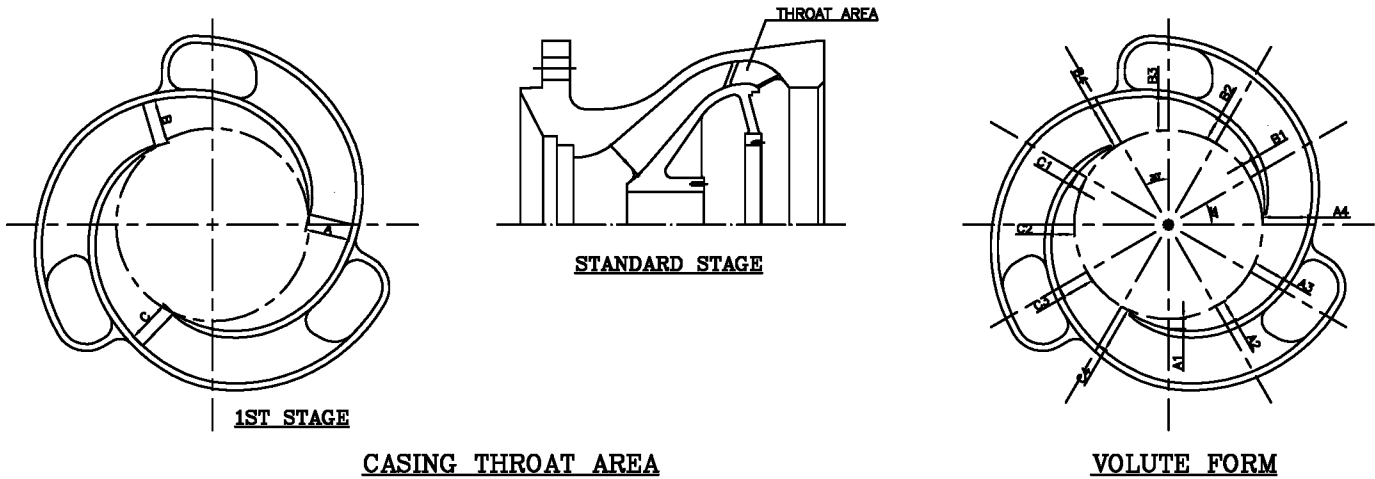
VOLUTE FORM

DESIGN	POS	MEASURED	POS	MEASURED	B.C∅	ACCEPTANCE
	A1		B1			
	A2		B2			
	A3		B3			
	A4		B4			

**DIMENSIONAL INSPECTION REPORT**

**Annexure 4–FP60291**

CEP,1st & Standard stage casings



**CASING THROAT AREA: 1ST STAGE**

	A	B	C	ACCEPTANCE
DESIGN VALUE				
MEASURED VALUE				

**CASING THROAT AREA: STANDARD STAGE**

	DESIGN VALUE	THROAT AREA							ACCEPTANCE
		1	2	3	4	5	6	7	
1ST									
2ND									
3RD									
4TH									
5TH									
6TH									
7TH									

**VOLUTE FORM**

DESIGN	POS	MEASURED	POS	MEASURED	POS	MEASURED	B.C∅	ACCEPTANCE
	A1		B1		C1			
	A2		B2		C2			
	A3		B3		C3			
	A4		B4		C4			



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**PLANT PURCHASING  
SPECIFICATION  
HYDERABAD**

**HY 195 93**

Rev. No. 04

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**STAINLESS STEEL CASTINGS (Gr. X4CrNi13-4)**

**1.0 GENERAL:**

This specification governs the quality requirements of 12 Chromium-4 Nickel Stainless Steel Castings.

**2.0 APPLICATION:**

These castings are required for pumps components like Impellers, diffusers etc.

**3.0 CONDITION OF DELIVERY:**

These castings shall be supplied in hardened & tempered, rough machined and finally stress relieved condition, unless otherwise specified in the drawing or purchase order.

**4.0 COMPLIANCE WITH NATIONAL STANDARD:**

The castings shall comply with EN10213 Gr. X4CrNi13-4 (in general) and all the additional requirements of this specification.

**5.0 MANUFACTURE:**

**5.1** The steel shall be made by electric arc or induction furnace process. Any other process of steel making shall be referred to BHEL for approval.

**5.2** The steel castings shall be made from fully killed steel.

**5.3** Depending on the surface finish requirements as per the ordering drawing, components like impellers and diffusers, etc. shall be made by investment casting process. Other castings can be manufactured by sand casting process.

**5.4** The castings shall not be peened, plugged or impregnated to stop leaks etc.

**5.5 Manufacturing Process Plan (MPP):**

Unless waive off for submission of MPP is provided by BHEL (in writing), the manufacturer shall submit a MPP for review & approval for each drawing.

The MPP shall include stage wise details of the process controls during manufacturing with the details of the facilities used for steel melting and refining and heat treatment, inspection sequence and testing plan for destructive and non- destructive testing (including NDT scan plans for UT, MPI etc.) as per the specification and ordering drawing.

This approved MPP can be used till there are no changes in the manufacturing process and the facilities used for the manufacture of the castings.

<b>Revision:</b> Modified Cl. 6.0, 7.2 and QAP.			<b>Issued :</b> <b>STANDARDS ENGINEERING &amp; IPR COORDINATION DEPARTMENT</b>		
<b>Rev. No. 04</b>	<b>Amd. No.</b>	<b>Reaffirmed:</b>	<b>Prepared:</b>	<b>Approved:</b>	<b>Date of 1<sup>st</sup> issue:</b>
Dt. 25-11-2020	Dt.	Year:	Sr.ENGINEER, (MATLS ENGG.)	AGM (R&D and EC)	DEC. 1983

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**6.0 HEAT TREATMENT:**

The castings shall be hardened & tempered as per EN10213 to achieve the mechanical properties as per Cl.10.0 of this specification. Subsequently after rough machining stress relieving shall be done at a temperature at least 20°C below tempering temperature. Actual heat treatment cycles followed shall be reported in test certificate.

All mechanical and NDT tests shall be carried out after rough machining in final dispatch condition.

**7.0 Quality of Castings :****7.1 For Sand Casting:**

Dimensions & Tolerances: The enclosed drawings are finish machined ones (unless otherwise specified). The castings shall be supplied in rough machined condition with an allowance of 4 to 6mm on the surfaces where machining symbols have been shown on the drawing. Small grooves, steps etc., up to 50 mm (width or size), need not be rough machined.

Finish: The castings shall be cleaned and fettled thoroughly ensuring complete removal of sand, slag, fins and scales from both internal and external surfaces.

Freedom from defects: Foundry defects like blow holes, shrinkage cavities porosity, non-metallic inclusions etc. appearing on the surfaces to be machined shall be opened out and smoothly ground provided the depth of any of these defects, when so ground, doesn't exceed 2/3 of the machining allowances. All as cast surfaces shall be free from harmful foundry defects like slag inclusions, sand spots, cold shuts, shrinkage, scabs etc.

**7.2 For Investment casting:**

Dimensions & tolerances: The dimensions and tolerances shall be as specified in the ordering drawing/ product standard. Additionally, shroud thickness at various locations for impeller castings at eye side and neck side shall be checked and reported in Dimensional Inspection Report.

Finish: The surface of the casting shall be free of adhering ceramic, scale, and hot tears. The surface finish of the casting shall be as per the ordering drawing.

Freedom from defects: Cracks are not permitted on any surface of the casting.

**7.3** In case where pressure tightness is called for (though the test may be required to be conducted at BHEL) the requisite quality must be ensured to guarantee the same.

**8.0 CHEMICAL COMPOSITION:**

The chemical analysis of the steel supplied shall confirm to the following chemical composition:

Elements (% wt)		C	Si	Mn	Cr	Ni	Mo	S	P
X4CrNi13-4*	Min.	-	-	-	12.0	3.50	-	-	-
	Max.	0.06	1.00	1.00	13.5	5.00	0.70	0.025	0.035

\*V- 0.08 max; Cu- 0.30 max



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**9.0 TEST SAMPLES:**

Unless otherwise specified in the drawing, the mechanical properties shall be determined on one separately cast test coupon for each heat and heat treatment batch (if the casting weight is less than or equal to 500 kg) or on one integral test coupon (castings having weight more than 500 kg) for each casting.

The size of the test coupon shall be selected as appropriate to the thickness of the actual castings and the extent of testing and to carryout repeat tests if required. After casting, the test coupons shall receive a stamp indicating the heat number. It is mandatory to keep the separately cast test coupon along with the castings from same heat during each subsequent heat treatments of the casting. The integral test piece shall not be removed prior to complete heat treatment and shall be suitably stamped & identified by BHEL representative before detaching it from the casting.

**10.0 MECHANICAL PROPERTIES:**

The mechanical properties tested on test coupons shall be as follows:

Tensile Strength N/mm <sup>2</sup> min.	0.2% Proof Stress, N/mm <sup>2</sup> min.	Elongation % L = 5.65 √So min.	Charpy Impact Strength (ISO-V) J min.	Hardness (BHN) (on casting)
760-960	550	15	27	235-285

**10.1** The tensile test shall be conducted as per IS: 1608 or any reputed National or International Standard.

**10.2** The impact test specimen shall be 10mm x 10mm 55mm with a 2mm ISO V-notch. The test shall be conducted as per IS: 1757 or any other reputed National or International Standard.

The minimum impact strength specified above is the average of three samples at the same location. Only one value can be lower than the minimum specified average value, but in no case lower than 2/3rd of the same. All the three values shall be reported.

**10.3** The Brinell hardness shall be tested on each casting after heat treatment. A minimum of 3 hardness values shall be taken at different locations as far as possible from each other (preferably of opposite faces of the casting) on each casting. The variation in the minimum and the maximum hardness values obtained on the casting shall not be more than 25BHN.

**10.4** The hardness values shall also be tested on the repair welded areas and the hardness variation of weldment to the parent material shall not be more than 35 BHN.

**11.0 HYDRAULIC TEST:**

The hydraulic test shall be carried out at BHEL if mentioned in the drawing. In case the supplier needs to carry out the test the same will be indicated in the drawing/order. The test pressure shall be maintained for a minimum of 30 minutes (unless otherwise mentioned) without leakage.

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**12.0 NON-DESTRUCTIVE TESTS :**

The following non-destructive tests shall be performed in the final delivery condition of the casting:

**12.1 Visual Inspection:**

- a. **For Sand casting:** The visual inspection on all the un-machined surfaces shall be as per MSS SP-55.
- b. **For investment castings:** The visual examination shall be carried out as per the requirements of ordering drawing.

**12.2 Magnetic Particle Inspection:**

Unless otherwise specified in the drawing, all the areas of the castings (or as per the approved MPP) shall be tested by magnetic particle test as per AA 0850133 and the acceptance norms (if not specified in the drawing) shall be as per AA 0850134, level-2.

**12.3 Ultrasonic Test (For Sand Casting):**

Unless otherwise specified in the drawing, ultrasonic examination shall be conducted on 100% volume of the castings (or as per the approved MPP) as per AA 085 01 04 and acceptance norms (if not specified in the drawing) shall be level 2 as per the AA0850104.

**13.0 ADDITIONAL TESTS:**

**13.1 Ultrasonic Test (For investment casting):** If specified in the drawing / product Standard, Ultrasonic Examination shall be conducted on the casting as per the drawing requirement.

**13.2 Radiographic Test:** If specified in the drawing / product Standard, Radiographic Examination shall be conducted on the casting as per the drawing requirement.

**13.3 Liquid Penetrant Examination:** If specified in the drawing / product Standard, LPI shall be conducted on the casting as per the drawing requirement.

**14.0 REPAIR WELDING:**

Before weld repair, all the defects in the castings shall be reported to BHEL by sending defectograms & repair welding procedure for the written approval by BHEL.

**15.0 FIRST PIECE QUALIFICATION TESTS:**

Whenever the supplies are made for the first time to BHEL for each and every ordering drawing, additional requirements for the supplies will be applicable. Depending on the past experience and references available to BHEL, supplier will be asked to carry out additional tests which will be duly incorporated in the manufacturing process plan (MPP)/ Quality plan, before placement of order for the first time supplies.

Note: In case of first time supplies of pump impeller and diffuser casting, RT on cut piece castings will be applicable as a mandatory requirement, for the first lot. This requirement will be incorporated in the MPP.





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**16.0 QUALITY PLAN:**

- 16.1** The supplier shall follow the quality plan Ref. BHEL/QP/HY 19593 Rev.04 as per annexure A, unless the conditions stipulated in Cl. 16.2 & 16.3 are applicable.
- 16.2** In case customer/project related additional requirements are applicable in the enquiry/tender, vendor may be asked to submit a separate QP including such requirements.
- 16.3** In case of new vendors or first time supplies according to drawings mentioned in BHEL enquiry, QP shall be submitted for approval by BHEL. The attached QAP will not be applicable.

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

- 17.1** BHEL representative shall have free entry and access to all areas where the manufacture of castings ordered is carried out. All reasonable facilities shall be provided to him including labour where necessary.
- 17.2** BHEL representative shall be given sufficient advance intimation to witness the various processes, tests etc. Punching and identification shall be done in the presence of BHEL representative.

**18.0 TEST CERTIFICATE:**

- 18.1** The supplier shall furnish five copies of certificates (in English) to BHEL. Each copy shall contain the following details.

- 1) HY19593 / Rev.04
- 2) BHEL Order No.
- 3) Item description and Drawing No. of the Casting.
- 4) Supplier's Name
- 5) Melt No. & Heat treatment Cycle
- 6) Casting Serial No. per melt.
- 7) Details of manufacturing process like sand or investment casting
- 8) Heat treatment charts/ details
- 9) Defectogram & Welding repair procedure (in case of weld repair)
- 10) Results of all tests as per this specification (including FPQ requirement as per order)
- 11) Dimensional inspection report including shroud thickness value at various locations
- 12) Copy of BHEL approved MPP (if applicable)

- 18.2** The certificate shall be attested by the chief of Inspection / Chief Metallurgist of the supplier and attested by BHEL Representative.

**19.0 MARKING & PACKING:**

- 19.1** The following details shall be hard punched clearly on the castings:

1. HY 19593 Rev.04
2. Melt No.
3. Drawing No.
4. BHEL Inspector's stamp
5. Supplier's mark

- 19.2** The castings shall be suitably packed and protected from damage and corrosion during transit.

**20.0 REJECTION AND REPLACEMENT:**



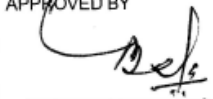
The final decision regarding acceptance or rejection rests with BHEL if the casting is not found as per this specification at any time during further operations on the castings. The supplier shall replace the rejected casting at his own cost and the rejected casting shall be returned after all commercial terms and conditions are satisfied.

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BHARAT HEAVY ELECTRICALS LIMITED R.C.PURAM, HYDERABAD		STANDARD QUALITY PLAN FOR VENDOR ITEMS						QP. NO: HYQA/PMP/SQP/079 REV. NO.: 01 DATE: 26-11-2020 VALID UPTO: 25-11-2022					
		ITEM: STAINLESS STEEL CASTINGS(GR. X4CrNi13-4) BHEL SPEC: HY19593 R04						PAGE 1 OF 6					
SI No	Component & Operations	Characteristics	Class	Type Of Check	Quantum Of Check	Ref Document	Acceptance Norms	Format Of Record	*	Agency			Remarks
										D	P	W	
<b>1.0 RAW MATERIAL STAGE</b>													
1.0	Incoming Material Inspection	Incoming Material Inspection	Major	As per Mfr practice	One Per GRIM	Mfr Internal Records	Mfr Internal Records	Inward Material Report	-	2			
<b>2.0 IN-PROCESS INSPECTION</b>													
2.1	Pattern / Die Inspection	Visual, Dimensional inspection	Major	Visual Measrt.	100%	Mfr Internal Records	Mfr Internal Records	Pattern Inspection Report		2		1	Verification of Pattern by TPIA to be reported in CQIR
2.2	Moulding	Visual, Dimensional inspection of Moulds & Cores	Major	Visual	100%	Mfr Internal Records	Mfr Internal Records	Moulding Records	√	2		1	
2.3	Melting & Pouring	Chemical composition.	Major	Chemical	Every Melt	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Test Certificate	√	2		1	Verification of melting log sheets


<p>LEGEND: P: - PERFORM, W: - WITNESS, V: - VERIFICATION, INDICATING 1: - BHEL / BHEL NOMMNATED INSPECTION AGENCY, 2: - VENDOR / SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT / CHARACTERISTICS UNDER THE COLUMNS P, W &amp; V. * D: RECORDS IDENTIFIED WITH TICK (√) SHALL BE ESSENTIALLY INCLUDED IN QA DOCUMENTATION.</p>	<p>PREPARED BY</p> 	<p>REVIEWED BY</p> 	<p>APPROVED BY</p> 
	<p>ISSUED BY QUALITY ASSURANCE DEPARTMENT</p>		


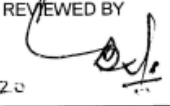

Format no. : HYQA/QP/VSQP Rev.02

Addl. General Manager / QA (Head)  
 Addl. General Manager / QA (Head)  
 Addl. General Manager / QA (Head)

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		ITEM: STAINLESS STEEL CASTINGS(GR. X4CrNi13-4) BHEL SPEC: HY19593 R04						PAGE 2 OF 6					
Sl No	Component & Operations	Characteristics	Class	Type Of Check	Quantum Of Check	Ref Document	Acceptance Norms	Format Of Record	* D	Agency			Remarks
										P	W	V	
2.4	Heat Treatment	Time & Temperature	Major	Time & Temp.	100%	HY 19593 Rev.04	HY 19593 Rev.04	HT Chart, TC	√	2		1	TPIA shall verify HT charts, furnace calibration certificates, temperature recorders, measuring instruments
2.5	Keel Block/ Test Piece Identification	Physical	Major	Physical	Each Heat/HT batch (≤ 500 Kg) or Test Piece/ Each Casting (> 500 Kg)	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Identification Report	√	2	1		
2.6a	WPS/PQR for repair welding, if any	Record review	Major	Review	100%	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Defectogram, WPS/PQR, Welding records	√	2		1	Defectogram shall be submitted to BHEL for written permission for any weld repair.
2.6b	Welder qualification records	Record review	Major	Review	100%	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Welding qualification records	√	2		1	

LEGEND: P: - PERFORM, W: - WITNESS, V: - VERIFICATION, INDICATING 1: - BHEL / BHEL NOMMNATED INSPECTION AGENCY, 2: - VENDOR / SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT / CHARACTERISTICS UNDER THE COLUMNS P, W & V. * D: RECORDS IDENTIFIED WITH TICK (√) SHALL BE ESSENTIALLY INCLUDED IN QA DOCUMENTATION.	PREPARED BY  26/11/2020	REVIEWED BY 	APPROVED BY 
	ISSUED BY QUALITY ASSURANCE DEPARTMENT		

Format no. : HYQA/QP/VSQP Rev.02

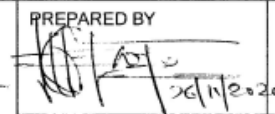
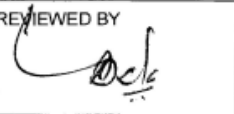
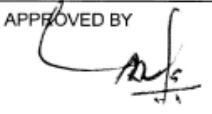
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26/11/2020  
 General Manager / QA (Head)  
 BHEL - HYDRABAD

SI No		Component & Operations	Characteristics	Class	Type Of Check	Quantum Of Check	Ref Document	Acceptance Norms	Format Of Record	* D	Agency			Remarks
											P	W	V	
2.7		Stress Relieving after Rough machining	Record review	Major	Review	100%	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	SR Chart, TC	√	2		1	
3.0		<b>FINAL INSPECTION &amp; TESTING</b>												
3.1a		Test Sample	Mechanical Properties. (checked on test samples identified/stamped by TPIA)	Major	Mech. Properties	As per SI No 1.5 above	HY19593 Rev04 & BHEL Drg.	HY19593 Rev03 & BHEL Drg.	Test Certificate	√	2	1		
3.1b		Test sample & casting	Hardness	Major	Hardness	Weld Repaired areas, casting & test coupon	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Test Report	√	2	1		Hardness values shall be reported for both on casting, test coupon & weld repaired areas
3.2		Casting	Final Dimension	Critical	Dimn. Measure	100%	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Dimn. Report	√	2	1		Shroud Thickness at Various locations for impeller casting at eye side and neck side shall be checked and reported in DIR (Dim. Inspection Report)

<p>LEGEND:                  P: - PERFORM, W: - WITNESS, V: - VERIFICATION,                  INDICATING 1: - BHEL / BHEL NOMMNATED INSPECTION AGENCY, 2: - VENDOR / SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT / CHARACTERISTICS UNDER THE COLUMNS P, W &amp; V.                  * D: RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED IN QA DOCUMENTATION.</p>	<p>PREPARED BY                    26/11/2020</p>	<p>REVIEWED BY  </p>	<p>APPROVED BY  </p>
ISSUED BY QUALITY ASSURANCE DEPARTMENT			


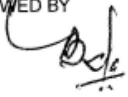
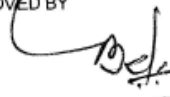
Format no. : HYQA/QP/VSQP Rev.02

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Addl. General Manager / QA  
 BHEL, Hyderabad


SI No	Component & Operations	Characteristics	Class	Type Of Check	Quantum Of Check	Ref Document	Acceptance Norms	Format Of Record	* D	Agency			Remarks
										P	W	V	
3.3	NDT on Final Delivery Condition of Casting	Surface finish, cleaning of internal surfaces, holes, opening etc.	Critical	Visual	Each Casting	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Inspection report	√	2	1		
		Soundness of Casting	Critical	MPI	BHEL Drg./ Spec/ approved MPP	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	MPI Report	√	2	1	1	
			Critical	LPI	BHEL Drg./ Spec/ approved MPP	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	LPI Report	√	2	1	1	
			Critical	UT	BHEL Drg./ Spec/ approved MPP	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	UT Report	√	2	1	1	
4.0	Marking & Stamping	Visual Inspection	Major	Visual	Each Casting	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Inspection Report	√	2	1	1	Marking by hard stamp method
5.0	Documentation & Certification	Verification	Major	Verify.	Each Casting	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Inspection Report	√	2		1	

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	ISSUED BY QUALITY ASSURANCE DEPARTMENT,		

Format no. : HYQA/QP/VSQP Rev.02


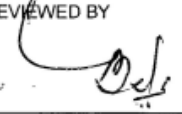
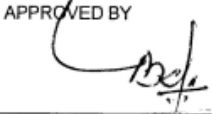
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 <b>BHARAT HEAVY ELECTRICALS LIMITED</b> R.C.PURAM, HYDERABAD		<b>STANDARD QUALITY PLAN FOR VENDOR ITEMS</b>						QP. NO: HYQA/PMP/SQP/079 REV. NO.: 01 DATE: 26-11-2020 VALID UPTO: 25-11-2022					
		ITEM: STAINLESS STEEL CASTINGS(GR. X4CrNi13-4) BHEL SPEC: HY19593 R04						PAGE 5 OF 6					
SI No	Component & Operations	Characteristics	Class	Type Of Check	Quantum Of Check	Ref Document	Acceptance Norms	Format Of Record	* D	Agency			Remarks
										P	W	V	
6.0	Preservation & Despatch	Visual Inspection	Major	Visual	Each Casting	HY19593 Rev04 & BHEL Drg.	HY19593 Rev04 & BHEL Drg.	Test Report	√	2		1	

**NOTES:**

- 1) BHEL specification and drawing shall prevail over quality plan in case of any mismatch.
- 2) This QAP is not applicable for vendors supplying these castings for the first time to BHEL
- 3) This QAP is not applicable in case of NTPC projects
- 4) This QAP is also not applicable for projects where customer approval of QP is involved
- 5) Vendor/Purchase shall consult QA for clarity on involvement of customer during QP approval and prior providing despatch clearance to vendors
- 6) PO specified version of standards/drawings /tolerances etc. to be mentioned in Quality Plan/Drawing
- 7) BHEL reserves the right for conducting repeat test, if required
- 8) BHEL approved inspection engineers to be deployed for inspection
- 9) Inspection to be offered only after ensuring that all documents (Quality Plan, Drawings, Data Sheet, Purchase Specifications, etc.) are available as per Purchase Order
- 10) Vendor to offer Original Test Certificates issued by Third Party Laboratories or Suppliers
- 11) Vendor to ensure with TPIA that a note ' Compared with Original Test Certificate. Reviewed, Verified and found in order ' shall contain with every Inspection Report
- 12) Only valid and calibrated measuring instruments and equipment shall be used
- 13) Vendor to ensure that Material Test Certificate & Traceability Records are available for use of correct material
- 14) Vendor to ensure that all certificates are endorsed by TPIA with comments (Witnessed or Verified), as applicable per quality plan
- 15) Vendor shall ensure to offer log sheets containing actual measured values instead of saying OK/Not OK to TPIA
- 16) Vendor shall submit complete Inspection and test documentation whichever is identified with (√) under column D of approved quality plan shall be enclosed with the Inspection Report
- 17) Vendor shall submit Original copies of all inspection and test documents authenticated by TPIA


LEGEND: P: - PERFORM, W: - WITNESS, V: - VERIFICATION, INDICATING 1: - BHEL / BHEL NOMMNATED INSPECTION AGENCY, 2: - VENDOR / SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT / CHARACTERISTICS UNDER THE COLUMNS P, W & V. * D: RECORDS IDENTIFIED WITH TICK (√) SHALL BE ESSENTIALLY INCLUDED IN QA DOCUMENTATION.	PREPARED BY 	REVIEWED BY 	APPROVED BY 
	ISSUED BY QUALITY ASSURANCE DEPARTMENT		

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Goutam Bala  
 General Manager / QA (Head)  
 HY19593, Rev. 04 (Pg. 11 of 12)


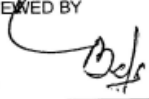
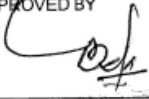
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	BHARAT HEAVY ELECTRICALS LIMITED R.C.PURAM, HYDERABAD	STANDARD QUALITY PLAN FOR VENDOR ITEMS					QP. NO: HYQA/PMP/SQP/079 REV. NO.: 01 DATE: 26-11-2020 VALID UPTO: 25-11-2022						
		ITEM: STAINLESS STEEL CASTINGS(GR. X4CrNi13-4) BHEL SPEC: HY19593 R04					PAGE 6 OF 6						
SI No	Component & Operations	Characteristics	Class	Type Of Check	Quantum Of Check	Ref Document	Acceptance Norms	Format Of Record	* D	Agency			Remarks
										P	W	V	

HISTORY OF REVISIONS:

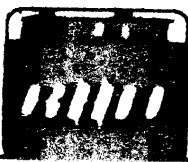
Sl. No	Revision details	Date of Revision	Prepared By	Reviewed By	Approved By
00	SQP prepared in line with procurement requirement	11.11.2014	ML RAJAM	KSN MURTHY	KSN MURTHY
01	'Measurement of Shroud thickness at various locations added for Impellers' added under CI 3.2	26.11.2020	ML RAJAM	G BALA	G BALA

<p>LEGEND: P: - PERFORM, W: - WITNESS, V: - VERIFICATION. INDICATING 1: - BHEL / BHEL NOMMNATED INSPECTION AGENCY, 2: - VENDOR / SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT / CHARACTERISTICS UNDER THE COLUMNS P, W &amp; V. * D: RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED IN QA DOCUMENTATION.</p>	PREPARED BY  26/11/2020	REVIEWED BY 	APPROVED BY 
	ISSUED BY QUALITY ASSURANCE DEPARTMENT		

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T D-218, Rev.00

# PLANT STANDARD

## HYDERABAD

HY 064 02 61

REV.No. 03

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### PROCESS SPECIFICATION FOR STRESS RELIEF ANNEALING OF FERROUS PARTS

#### 1.0 GENERAL:

The plant standard details the technology of stress relief annealing of various components made of steel or cast irons using furnaces. Stress caused by machining, forming, casting, gas cutting or straightening are relieved in the components by this treatment.

Stress relief annealing is done by slowly heating a component to a temperature below the lower critical point AC1, followed by slow cooling. By this treatment internal stresses present in the component are relieved significantly without modifying the mechanical properties. Dimensional stability of the component increases by stress relieving.

1.1 Stress relieving of components involving welding is not within the scope of this standard.

#### 2.0 APPLICATION:

Various components requiring stress relieving treatment are as classified below.

2.1 Components meant for nitriding are stress relieved for dimensional stability so that distortion after nitriding operation is minimised.

2.2 To increase the dimensional stability, many of the machined components such as casings, shafts, valve bodies, rings etc. are stress relieved after rough machining, with 3 to 5 mm allowance on surfaces.

2.3 Cold straightened components shall be stress relieved after straightening.

2.4 Grey iron castings are usually stress relieved for reducing internal stresses before they are subjected to machining.

#### 3.0 EQUIPMENT:

Heat treatment furnaces operating on electric power or gas or oil are suitable. Furnace condition shall be such that the uniformity of temperature in working zone is maintained within  $\pm 14^{\circ}\text{C}$  during the operation.

For components of length more than 1500 mm or 1 tonne weight and above, temperature uniformity shall be ensured by keeping thermocouples at intervals of 1 metre distance.

Revisions:  
Brought up-to-date.

Issued:  
STANDARDS ENGINEERING SECTION

Rev.No. 03	Amd.No.	Reaffirmed	Prepared	Approved	Dt. of 1st Issue
Dt. AUG. 99	Dt.	Year:	Matls. Engg. 08 - TECH.	DGM (QS)	NOV. 1983

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# PLANT STANDARD

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### 4.0 PROCESS:

4.1 **Loading:** Jobs shall be loaded in the furnace carefully with sufficient spacing between them for effective heating. Parts with thin sections shall be supported to minimise any distortions. There shall not be any direct impingement of flame. Jobs shall be heated to stress relieving temperature as per the Annexure-1. Initial furnace temperature before commencing heating can be upto 400°C maximum.

4.2 **Rate of heating:** Heating rate shall not exceed the limit given below:

Maximum ruling section/ thickness of the job (T) in mm	Maximum rate of heating in °C per hour
Upto 50	100
Above 50	5000/T or 50 whichever is Higher

During heating the temperature difference between any two temperature measuring points of job shall not exceed 100°C within any 4 metres interval of length.

4.3 **Soaking:** After the job is heated to the stress relieving temperature it is soaked there in accordance with the following table:

Maximum ruling section/thickness of the job (T) in mm	Soaking time in minutes (Minimum)	Soaking time in minutes (Maximum)
Upto 12 mm	30 minutes	60 minutes
13 to 100 mm	@ 2.5 minutes per mm	4 X T
Above 100 mm	250 minutes + 1 minute per every additional mm over 100 mm	4 X T

4.3.1 Stress relief annealing temperature shall be 40° less than tempering temperature for the components which are processed after hardening and tempering. This temperature difference is required to safeguard the mechanical properties in tempered condition.

4.3.2 For components soaking time shall be based on maximum thickness. In case materials of different thicknesses are to be clubbed and processed, soaking time for the lot. However, the soaking time for the thinnest item shall not generally exceed 4 x T minutes.



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# PLANT STANDARD HYDERABAD

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PAGE 3 OF 6

4.3.3 Stress relieving at a temperature upto 30°C less than the lower limit of the specified temperature shall be acceptable provided the soaking time is increased twice the normal time as given in 4.3.

4.4 **Cooling:** After required soaking is given at the stress relieving temperature furnace is put off and jobs are allowed to cool in the furnace upto 400°C slowly. The cooling rate shall not exceed the limits given below:

Maximum ruling section/ thickness of the job (T) in mm	Maximum rate of heating in °C per hour
Upto 50	125°C
Above 50	60°C

4.4.1 Cooling rate below 400°C to ambient temperature is not generally critical and can be done either in air or in furnace.

4.4.2 High Chromium and High Manganese steels are susceptible to temper embrittlement during slow cooling and hence shall be cooled in air from the stress relieving temperature.

4.5 Production shall maintain the following records for each batch of components stress relieved.

- Furnace identification and heat batch No.
- Work Order No., Name of Part, Part/Drg.No., No. of Parts loaded
- Material specs. And heat treatment/process specified.
- All temperature recording furnace charts

## 5.0 INSPECTION:

5.1 **Temperature – Time Record:** QC shall verify the process details as given in Clause 4.5

5.2 **Hardness Checking:** Generally hardness checking is not essential after stress relieving. However in case of any doubt random hardness checking may be carried out by QC.

## 6.0 STRESS RELIEVING TEMPERATURES:

The stress relieving temperatures for materials commonly used in Hyderabad plant are given in Annexure – 1 for general reference.



## ANNEXURE - 1

## STRESS RELIEVING

BHEL Specification	Steel Grade	Condition prior to SR	Stress Relieving Temp. °C
AA 10108	IS:226 Gr.Fe 410.5	N	600-650
AA 10119	IS:2062 Gr.St 42-W	N	600-650
AA 10122	IS:961 Gr.Fe 540n W-HT	N	600-650
AA 10152	IS:1239 (Pt.1) ERW	N	600-650
AA 10208	IS:2073 Gr.C 40	N	600-650
AA 10213	IS:1570 Pt.II Gr.30 C8	N	600-630
AA 10218	IS:5517 Gr.C 40	V	520-550
AA 10305	IS:2073 Gr.C55 Mn 75	N	600-650
AA 10407	ASME:SA 516 Gr.70	N	600-650
AA 10455	ASME:SA 106 Gr.B	N	600-650
**AA 10501	IS:5517 Gr.40 Ni 6 Cr 4 Mo3	V	510-530
AA 10502	IS:5517 Gr.40 Cr 7 Al 10 Mo2	V	550-580
AA 10620	DIN:17240 Gr.21 Cr Mo V57	V	580-650
AA 10630	ASME:SA 335 Gr.P 22	V	600-650
AA 10632	ASME:SA 335 Gr.P 11	N	590-620
AA 10721	IS:6603 Gr.20 Cr 13	V	600-630
AA 19306	Gr.14 Mo V63	V	690-730
AA 19308	DIN:17240 Gr.21 Cr Mo V57	V	580-650
AA19308	Gr.21 Cr Mo Ni V 47 V	V	580-650
AA 19320	BS:970 Gr.410 S 21	V	550-580
AA 19321	DIN:17440 Gr.X 20 Cr 13	V	600-630
AA 19331	IS:2004 Cl.2	N	600-650
AA 19332	IS:2004 Cl.3	N	600-650
AA 19333	IS:2004 Cl.4	N	600-650
AA 19334	IS:2004 Cl.4	V	500-530
AA 19341	IS:4367 Gr.20 Mn 2	N	600-650
AA 19352	DIN:17200 Gr.42 Cr Mo 4	V	500-530
AA 19511	ASTM:A216 Gr.WCB	N	600-650
AA 19512	Y 87-30 Type-H	N	600-650
AA 19521	IS:2708 Gr.2	N	600-650
AA 19522	DIN:17245 Gr.GS-17 CrMo V511	V	650-710
AA 19523	DIN:17245 Gr.GS-22 Mo 4	V	660-690
AA 19701	IS:210 Gr.FG 150	-	550-580
AA 19702	IS:210 Gr.FG 200	-	550-580
AA 19703	IS:210 Gr.FG 260	-	550-580
AA 19704	IS:210 Gr.FG 300	-	550-580
AA 19721	IS:1875 Gr.SG 400 12	-	530-560
AA 19731	IS:2108 Gr.4	-	520-550
HY 10199	IS:1570 Pt.II Gr.15 C8	N	600-630
HY 10461	CSN:411416.1	N	600-650

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HY 10498	ASME SA 516 Gr.70		600-630
**HY 10561	IS:5517 Gr.40 Ni 6 Cr 4 Mo 3	NV	500-530
**HY10566	ASME:SA 320 Gr.L 7	V	590-620
HY 10568	BS:970 Gr150 M 19	N	600-650
HY 10576	ASTM A 514	V	560-590
HY 10663	DIN:17240 Gr.24 Cr Mo 5	V	550-620
HY 10664	DIN:17200 Gr.42 Cr Mo 4	V	500-530
HY 10665	Gr.21 Cr Mo Ni V 47	V	580-650
HY 10666	Gr.10 Mo 910	V	650-680
HY 10675	Gr.14 Mo V 63	V	630-660
HY 10676	DIN:17175 Gr.15 Mo 3	N	600-650
HY 10763	Gr.X20 Cr 13	V	590-620
HY10764	Gr.X20 Cr 13	V	590-620
HY 10766	TLV 9248 Gr.X22 Cr Mo V121	V	600-650
HY 10767	TLV 9248 Gr.X22 Cr Mo V121	V	600-650
HY 10776	Gr.X22 Cr Mo V 121		600-650
HY 10778	DIN:17175 Gr.X20 Cr MoV 121	VV	670-700
HY 10788	ASTM A 565 Gr.616	V	560-590
HY 10791	Gr.X 5 Cr Ni 134	V	500-530
HY 10995	UNI 6900 Gr.X 12 Cr 13	V	540-570
HY 10997	ASTM A 473 Gr.403	V	620-650
HY 10998	ASTM A 473 Gr.403	V	620-650
HY 19360	Gr.X 20 Cr 13	V	590-620
HY 19361	ASME:SA 105 (C < 0.25)	N	600-650
HY 19362	Gr.X 20 Cr 13	V	590-620
HY 19364	ASME:350 Gr.LF 2	N	600-650
**HY 19365	UNI 7874 Gr.40 Ni Cr Mo7	V	520-550
HY 19368	DIN:17200 Gr.42 Cr Mo 4	V	500-530
**HY 19369	Gr.40 Ni Cr Mo 7	V	630 Max.
**HY 19370	BS:970 Gr.817 M 40	V	500-530
HY 19372	Gr.X8 Cr Mn 18	V	340-360 5hrs min
**HY 19373	Gr.26 Ni Cr Mo V 85	V	590-620
HY 19376	ASTM A 320 Gr L43	V	590-620
**HY 19382	Gr.26 Ni Cr Mo V 115	V	540-570
HY 19387	Gr.13 Cr Mo 44	V	600-700
HY 19388	DIN:17240, 24 Cr Mo5	V	550-620
HY 19390	DIN:17440 X 20 Cr 13	V	590-620
HY 19393	Gr.X 22 Cr Mo V121	V	600-680
HY 19394	Gr.X 22 Cr Mo V 121	V	600-650
HY 19399	UNI:6900 Gr.X 12 Cr 13	V	550-580
HY 19399	UNI 6900 Gr X 12 Cr 13	V	540-570
HY 19460	---	V	520-550
HY 19461	ASTM A 473 Gr.403	V	540-570
HY 19462	---	V	520-550
HY 19467	---	V	610-640
HY 19561	ASTM:A352 Gr.LCB	N	540-570
HY 19562	ASTM:A216 Gr.WCA	N	600-650
HY 19563	IS:2707 Gr.1	V	500-530

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# PLANT STANDARD

## HYDERABAD



HY 19564	IS:2644 Gr.1	V	500-530
HY 19565	---	V	500-530
HY 19569	DIN:17245 Gr.GS-C25	V	600-650
HY 19570	DIN:17245 Gr.GS-C25	V	600-650
HY 19571	DIN:17245 Gr.GS-22 Mo4	V	660-690
HY19572	DIN:17245 Gr.GS-17 Cr Mo 55	V	660-690
HY 19573	DIN:17245 Gr.GS-17 Cr MoV511	V	680-710
HY 19576	DIN:17245 Gr.GS-17 Cr Mo 55	V	660-690
HY19591	DIN:17445 Gr.G-X 12 Cr 14	V	600-630
HY 19592	DIN:17445 Gr.G-X 20 Cr 14	V	600-630
HY 19593	BS:1504 Gr.425 C 11	V	590-650
HY 19761	CSN:422455.2	-	520-560
HY 19763	Mechanite GD	-	510-560
HY 19766	Mechanite SF	-	620-650
HY 19767	ASTM:A536 Gr.80-60-03	-	510-560

N : Normalised

V : Hardened and tempered

SR : Stress relieving

\*\* These materials shall be air cooled from the stress relieving temperature

- Note :
- 1) Steel susceptible to temper embrittlement in the range 371-565°C
  - 2) Stress relieving temperature can be 40°C lower than the tempering temperature, where tempering temperature is clearly documented.
  - 3) For the material grades which are not included in this specification, stress relieving temperature shall be 40°C lower than the tempering temperature



( Attachment to Enquiry No. XXXXXXXXXXXX Due on Date XX.XX.XXXX for submission by 11.00 hrs to open from 14.00 hrs.)			
<b>INSTRUCTIONS TO BIDDER (ITB)</b>			
<b>NOTE: Bidder to confirm in affirmative by typing "YES" or "Applicable Data" in the response column. Deviations , if any shall be recorded in deviations/comments column (Separate sheet can be attached if needed). Non deviatable clauses are indicated as "NON DEVIATABLE".</b>			
Sl. No.	DETAILED TERMS & CONDITIONS	VENDOR RESPONSE (YES/NO)	DEVIATIONS / COMMENT
<b>1</b>	<b>SCOPE OF SUPPLY:</b>		
	Signed & Sealed offers are invited for the Scope of Supply of goods and Services or both as detailed in the enquiry. Relevant enclosures/supporting documents / catalogue, if any shall be enclosed to the technical offer. Bidder can also submit offer through email at their own risk. The offer is to be submitted in two parts. Technical offer to be submitted to mail ID <a href="mailto:technicalbid_hyd@bhel.in">technicalbid_hyd@bhel.in</a> , and price bid to be submitted to mail ID <a href="mailto:pricebid_hyd@bhel.in">pricebid_hyd@bhel.in</a> as an attachment only. Interchanging the information in the mails may lead to rejection of the offer. Supplier shall have no claim on e-mail offers sent on any other e-mail ID. In case of e-mail offers, the mail subject should contain Enquiry No. Due date and Supplier name, Supplier address including contact details shall be mentioned in the content of the mail. Without these details offer is liable for rejection.		
<b>2</b>	<b>GENERAL INSTRUCTIONS:</b>		
A	The quotation should be neatly typed and free from over writing/ erasures. Any correction or addition must be authenticated. The offer including annexures and brochures should be submitted in English / Hindi. All Pages of Techno Commercial Bids (Main Pages), ITB should be signed and Stamped. If there is a conflict in case of bilingual submission, the submission in English will be final.		<b>Non Deviatable</b>
B	In case of Single-Part bid Tender, the complete bid shall be submitted in a single sealed cover super subscribing the Tender number and due date. Incomplete offers are liable for rejection. E mail bids shall be sent to mail ID <a href="mailto:pricebid_hyd@bhel.in">pricebid_hyd@bhel.in</a> as an attachment only.		<b>Non Deviatable</b>
C	Bidders to please note that the Terms & conditions contained in this document and Special conditions, if any, are to be read fully before submission of quotations.		<b>Non Deviatable</b>
D	Vendors are advised to comply with specific conditions of the enquiry, Should there be any deviations (where deviations are permitted), it shall be entered in the deviation column. BHEL reserves the right to reject such offers or load the bid suitably for evaluation.		<b>Non Deviatable</b>
E	Offers shall be submitted directly, only by the vendor or by their authorized representative / agent and the offer should be in line with the regulatory guidelines (i.e A valid Agency agreement between principal vendor and agent / representative shall be attached and the agreement shall cover the scope of services rendered by Agent, Agency Commission and any other information called for as per the regulatory guidelines). OEM / Mill details shall be provided if supplier is not a manufacturer. Bid envelopes shall bear the name of Supplier. In case of submission through authorized representative/agent, the name of representative/agent should also be mentioned apart from supplier name.		<b>Non Deviatable</b>
F	Offer received after the specified time and date of submission shall be rejected. No further correspondence shall be entertained.		<b>Non Deviatable</b>
G	Unsolicited offers shall not be considered.		<b>Non Deviatable</b>
<b>3</b>	<b>OTHER PARTICULARS (Please indicate applicable data)</b>		
A	Name of the Bid currency (freely tradable foreign currency for imports and Indian Rupees for indigenous purchase).		
B	Name of the Port of loading and Port of Discharge (applicable to imports).		
<b>4</b>	<b>BID SUBMISSION PROCEDURE:</b>		
A.	<b>For Single Part Bids:</b> Offers addressed to DGM/CMM, Vendor Complex, BHEL, Hyderabad must be sent in a sealed cover on which tender enquiry number and the due date shall be super subscribed and sent by appropriate mode to above address or dropped in tender box located at vendor complex on or before the specified time and date of submission of offers, preferably in the bidder's envelope. For e-mail offers please follow the procedure mentioned in 2 (B).		<b>Non Deviatable</b>
B.	<b>For two-Part Bids:</b>		

i	<p>Two part bid consisting of</p> <p>i) Techno-commercial Bid - ( Part-I), with all technical specification &amp; scope including bill of material etc., EMD (where applicable) and unpriced bid with all applicable Commercial Terms and Conditions, rates of agency commission , duties, taxes and other charges, <u>except the price.</u> super scribing enquiry No. (Techno-Commercial Bid) and due date Signed and Stamped ITB and special conditions of contract, if any is required to be attached along with Techno-commercial Bid - (Part-1) AND</p> <p>ii) Price Bid (Part-II), containing ONLY the price (including agency commission, if any) and the applicable duties/taxes/other charges shall be kept in a separate sealed cover super subscribing Enquiry no. (Price bid) &amp; due date. Both these covers shall be kept in a Third cover super subscribing Enquiry no. &amp; due date. All techno commercial terms &amp; conditions mutually agreed prior to price bid opening shall prevail and supersede any terms and conditions specified otherwise in price bid.</p>		<b>Non Deviatable</b>
ii	Techno-commercial Bid will be opened on the assigned date .Only the price bids of vendors whose techno commercial bids are accepted will be opened later on a specified date.		<b>Non Deviatable</b>
iii	The bidders whose bids are techno commercially not accepted will be informed & EMD (Earnest Money Deposit) shall be returned wherever submitted.		
iv	Bidders will be allowed to submit the impact on their quoted prices due to changes in technical scope, specifications, and commercial terms/conditions as specified in NIT which in the opinion of BHEL warrant changes in prices.		<b>Non Deviatable</b>
v	Bids shall be opened on due time and date in the presence of bidders who may like to be present. Only one representative of each bidder shall be permitted to attend the bid opening.		<b>Non Deviatable</b>
<b>5</b>	<b>Delivery Instructions</b>		
A	Indigenous Purchase		
	Goods shall be delivered on FOR Destination basis to the named destination(s) or as specified in the enquiry, Insurance in the scope of supplier.		
B.	Imports		
	The goods shall be delivered on CIP-basis to port of discharge as mentioned in the purchase order.		
<b>6</b>	<b>Documentation:</b>		
A	Indigenous Purchase		
	<p>Seller shall arrange to send to BHEL, Hyderabad along with all the required documents as detailed in Purchase Order, such as, Tax Invoice (Original for Recipient, Duplicate for Transporter), consignee copy of LR, Packing list , Pre-dispatch Inspection report, Test/ Guarantee/ Warranty certificate/ O&amp;M manuals (as applicable) etc. immediately on dispatch of the goods. Any addition/ exclusion to such documents shall be as specified in the Purchase Order.</p> <p>In case of dispatches from vendor works to site, material receipt certified by site office / Customer shall be provided.</p> <p>Softcopies of the above documents shall be uploaded in Pradan portal <a href="https://web.bhelhyd.co.in/mm/">https://web.bhelhyd.co.in/mm/</a> immediately after dispatch of the material</p>		<b>Non Deviatable</b>
B	Imports		
	<p>i) Seller shall inform the purchaser the readiness of material along with packing details well in 30 days advance from the date of delivery. Seller shall also upload soft copy of the dispatch documents consisting of BL / AWB, Invoice, Shipping list &amp; Test certificates and other documents as specifically indicated in the Purchase Order in PRADAN Portal (<a href="https://web.bhelhyd.co.in/mm/">https://web.bhelhyd.co.in/mm/</a>) within 3 days from the B/L date for sea shipment and 1 day from AWB date for Air shipment.</p> <p>ii) In case of CIP shipments, seller shall also inform purchaser the information about discharge port agent details and ship arrival information within 7 working days from the date of Shipment.</p> <p>iii) In case the material shipped in Full Containers(FCL), Seller shall ensure that the Bill of Lading should clearly spell out the following</p> <ol style="list-style-type: none"> <li>1. Port of discharge -- "Nhavaseva"/chennai</li> <li>2. Place of Delivery / Final Destination - "ICD Sanath Nagar".</li> <li>3. For air consignment the port of discharge will be Hyderabad, India and consignee shall be BHEL.</li> </ol>		
	iv) In case of Air shipment, the following dimensions of single package may be noted.		
a).	Dimension of the cargo(ODC) -- > 125" x 88" x 63"		

b).Weight of the cargo -- >3.5 MT.

If any package dimension or weight crosses the above set limits, it will be treated as Over Dimension Cargo (ODC) or Over Weight Cargo and seller shall inform BHEL well in advance of 20 days prior to the delivery date to enable BHEL to finalize the freight forwarder

(v). Recovery charges for non-submission of documents : -

Seller shall submit all the required documents to BHEL as prescribed in the Purchase order and NIT.

If BHEL incurs any charges such as Penalty, demurrage, container detention, wharf age, storage, Ground rent etc., due to non - compliance / non - submission of documents prescribed in Purchase Order/Tender Document/Letter of credit , the same shall be recovered from the seller as under:

1. EUROPE/USA/Black Sea/ Far East/Middle East/South East sector

A. For EX-WORKS / FCA/ FAS / FOB Sea Consignments:-

Penalty for late submission / negotiation of documents beyond 14 days shall be as under:

Sl. no	Period (From Date of Bill of Lading)	Recoverable Charges	Recoverable Charges per day per container	
		LCL per week/ Break bulk cargo per day	20FT Container	40FT Container
i	Upto 14th day	Nil	Nil	Nil
ii	15th day onward	USD 10	USD 50	USD 105

B. For CIF / CFR / CIP / CPT Sea Shipments:-

For CIF / CFR / CIP / CPT Sea Shipments, Vendor shall provide rates for detention charges after free period at the time of offer itself in case of engagement of 20FT Container and 40FT category. In case of late presentation of documents to the bank recovery will be effected from the Vendor as per the rates quoted by the Vendor at the time of offer in this regard.

In case of Break bulk cargo and LCL Demurrage/storage charges shall be recovered at rate of USD 10 per day and storage charges rate of USD 10 per week respectively shall be charged as late presentation charges.

(vi) Description of items in invoice, packing list, BL / AWB or LR shall be same as PO item description. Vendors shall ensure that invoice shall contain PAN nos. of both seller and buyer along with other tax related numbers. BHEL PAN AAACB4146P and BHEL TAN HYDB00086C

Any other additional documents sought by the statutory authorities, the same shall be produced by the seller on priority basis.

(vii) Seller shall provide package details including number of packages, gross weight, net weight etc.

(viii) The seller shall provide the following documents at the time of submission of offer :-

- a) No Business Connection in India declaration issued by the seller as per the format specified. (or)
- b) (i) No Permanent Establishment in India declaration issued by the seller as per the format specified.  
(ii) Tax Residence Certificate issued by the seller's tax authorities.  
(iii) Form 10F issued by the supplier.
- c) In case the seller has a Business Connection in India as per Section 9 of Income Tax Act or

Permanent Establishment in India as per Article 5 of Double Taxation Avoidance Agreement between India and the seller's country, the seller shall provide a withholding tax order issued by the Indian Income Tax authority for recovery of applicable tax.

7	Delivery Schedule		
A	<p>The tendered goods shall be delivered within the period stipulated in PO . Delivery <b>at BHEL</b> can be accepted at the earliest, 30 days prior to delivery date as mentioned in the Purchase order. Delivery <b>earlier than 30</b> days of contractual delivery date may be accepted with the written permission of BHEL -Purchase department.</p> <p>Goods arriving after the delivery date will be accepted only with the prior written permission of BHEL otherwise they will not be allowed inside the factory. BHEL reserves the right to reject the material, if not delivered by scheduled Purchase Order Delivery Date.</p> <p>(In case of imports , the final entry date of Import General Manifest (IGM) will be reckoned as delivery completion date )</p>		<b>Non Deviated</b>
B	<p>Documents such as TC,GCs Inspection reports are to be submitted within 10 days of dispatch of these materials. C note date or Date of submission of documents whichever is later shall be considered as delivery date incase documents are not submitted within 10 days from the dispatch of the material. Supply of plant/ equipment/ stores shall not be considered complete until they have been inspected and accepted at the place and destination specified for delivery by the time stipulated under the terms &amp; conditions of the Order/ Contract. Mere payment by itself shall not constitute acceptance of the goods or materials in any manner, whatsoever.</p>		
8	<b>Pricing Terms</b>		
	Prices once quoted shall remain firm and valid during the execution of PO. Offers with PVC will be rejected outright except in cases where specifically called for in the NIT.		<b>Non Deviated</b>
9	<b>PRICE VALIDITY :</b>		
	<p>Unless otherwise specified, offer shall be valid for a period of 90 days from the date of bid opening (Technical bid /part-I in case of two part bid).</p> <p>However the prices quoted for spare parts of the Main equipment shall be kept valid for a period of 1 year from the date of Placement of PO for the main equipment.</p>		
10	<b>Taxes &amp; Duties (RATE TO BE INDICATED by the bidder against the space provided )</b>		
A	Indigenous Purchase		
	The Taxes as applicable shall be quoted in the following manner.		
i	Vendor to indicate HSN of Goods or SAC of Services.		
ii	IGST/CGST/SGST/UTGST: Rate of Tax to be quoted as extra in %		
	<p>NOTE: Bidders to ensure correct applicability of IGST/CGST/SGST/UTGST based on the Inter / Intra state movement of goods.</p> <p>Taxes prevalent on the contractual delivery date or the actual delivery date (in case of delay) which ever is lower shall be applicable paid. In case Bidder has opted for GST Composition Scheme, the same may be stated explicitly both in their technical and price bids.</p>		
iii	Any other taxes & duties not covered anywhere above may be indicated separately.		
iv	<p>Taxes deducted at source:</p> <p>TDS as per the extant statute shall be recovered. In case vendor does not provide PAN details/concessional certificates, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act.</p>		<b>Non Deviated</b>
B.	Foreign Purchase ( Imports )		
i	The offered price shall be inclusive of all the Taxes and duties as applicable in country of bidder / country of dispatch for the quoted CIP price.		<b>Non Deviated</b>
ii	<p>Taxes deducted at source:</p> <p>TDS as per the extant statute shall be recovered. In case vendor does not provide PAN details/concessional certificates, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act.</p>		<b>Non Deviated</b>
11	<b>Payment Terms: Unless otherwise specified in Special Conditions, following shall be the terms of Payment.</b>		

A	<p><b>Indigenous:</b>                  100% payment along with taxes, freight &amp; insurance will be made within 75 days from the date of receipt of complete documentation as per PO. However payment would be done only after receipt of original documents, including site/ Customer acknowledgement on LR (MRC - Material Receipt Certificate at site) / GR clearance at BHEL Stores.                  For MSEs (covered under MSME Act) which are registered and periodically renewed with BHEL, this period will be 45 days* as prescribed in the relevant act.                  Adherence to the above time schedule of payment is contingent upon Vendor complying with GST provisions and availment of Input Tax Credit by BHEL before the date of payment.                  *The taxes and duties that are reimbursed would be the ones applicable as on the contractual Purchase Order delivery date or the amount actually paid whichever is less.                  In case GST credit is delayed/ denied to BHEL, due to non/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 levied/ leviable on BHEL.</p>		
B	<p><b>Imports:-</b>                  i) 100% payment (less Indian Agency Commission, if any) shall be paid <b>through "Usance Letter of Credit / Cash Against Documents (CAD) / Wire Transfer" with a credit period of 60 days</b>                  ii) LC will be opened after successful completion of pre dispatch inspection prior to the scheduled / agreed delivery date <b>LC will be opened within 7 working days from the date of request.</b></p>		
C	<p>Note:                  1) No advance payment is acceptable. However, in exceptional/rare cases, BHEL at its discretion, may consider advance payment against Bank Guarantee valid up to receipt of material at BHEL for 110% of advance amount issued / confirmed by any of the BHEL consortium banks.                  2) Wherever EMD (Earnest Money Deposit) is applicable, it may be noted that no interest will be paid on EMD and the EMD will be paid back to unsuccessful bidders within <b>fifteen days</b> after award of the contract. Successful bidder's EMD will be converted to SD (Security Deposit).  <b>Tender Cost wherever applicable is not refundable.</b></p>		<b>Non Deviatable</b>
D	<p>No interest shall be payable by BHEL on earnest money or security deposit or any money due to the contractor by BHEL.</p>		
12	<p><b>Penalty clause:</b>                  In the event of delay in supply of goods, penalty of 0.5% per week or part there of shall be levied on the undelivered portion subject to a maximum of 10% of the order value. Penalty amount so determined along with applicable GST thereon shall be recovered.</p>		
13	<p><b>Excess materials</b> supplied beyond tolerance limit as specified in PO, will not be accounted for.</p>		<b>Non Deviatable</b>
14	<p><b>Rejected materials</b>, if any, shall be collected by the vendor within 90 days of such communication to the vendor .Beyond 90 days a ground rent of 0.25 %of the value of the material per week will be levied for a maximum period of two weeks.. Beyond this period the supplier forfeits their right to the materials.</p>		<b>Non Deviatable</b>
15	<p><b>Guarantee / Warranty Period :</b>                  (Deviation to this clause is not acceptable.)                  Wherever required, and so provided in the specifications/Purchase Order, the seller shall guarantee that the goods supplied shall comply with the specifications laid down, for materials, workmanship and performance. If within the guarantee period, the delivery is found to be non-complaint, the seller shall on his own account, replace repair, or re-execute the delivery at Purchaser's discretion on the purchaser's first request or within the mutually agreed period, without prejudice to Purchaser's other legal rights. If the seller continues to default on their obligations, purchaser has the right to proceed to replace, repair or re- execute the order at the seller's expense, with or without help from third parties. Purchaser shall notify the seller of the exercise of this right in advance where ever possible.                  Unless otherwise specified, guarantee period shall be 12 months from the date of commissioning or 18 months from the date of supply/replacement whichever is earlier. For bought out packages which are intended to be incorporated in installations or systems the guarantee period shall not start until the time the installations or systems are commissioned, provided always that the period ends not later than 30 months after the date of supply of the goods.  <b>The guarantee period shall be extended by the period during which the goods are not in compliance. A guarantee period as described above shall apply afresh to replaced, repaired or re-executed parts of a delivery.</b></p>		<b>Non Deviatable</b>

**NOTE: Deviations (Commercial as well as Technical) from the tender specifications and conditions are generally not acceptable. However, deviation if any, shall be brought out clearly with proper justification in the offer. The deviation, if considered by BHEL, shall be loaded for comparison, while evaluating the offer. If a bidder unconditionally withdraws any deviation before price bid opening, the same shall not be loaded. Loading criteria in respect of major commercial conditions where deviations if any are accepted shall be as per clause No.16.**

**The Vendors may specifically note the following.**

<b>16</b>	<b>Evaluation and Loading Criteria:</b>
A	Evaluation of prices shall be done item-wise unless otherwise specified in the enquiry. Evaluation shall be on the basis of delivered cost, i.e. "total cost to BHEL" w.r.t the finalized technical scope and commercial conditions (after considering incidence of applicable taxes and duties and loading). For evaluation, exchange rate (TT selling rate of State Bank of India) as on the date of bid opening (Part-I, in case of two-part bids) shall be considered. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.
B	In case of foreign bidders, the quoted CIP price shall be loaded by the following factors to arrive at the Delivered Cost:
i	- Import duty as applicable at the time of <b>Technical/ Part-I bid opening</b> .
ii	- Port handling/ clearing charges & inland freight and insurance: @ 5% of CIP value (10% for plates, pipes & structurals).
iii	In other cases subject to acceptance by BHEL, loading for various factors (in addition to above) as the case may be will be done as follows: 0.5% for unloading at Port of Destination Marine Freight 4% and Marine Insurance 1% (9% and 1% towards Freight and Insurance respectively for Plates, Pipes, Rounds & Structurals)
C	In case of Indigenous Bidders, Ex-works offers received (as against FOR Destination mentioned in enquiry) shall be loaded by 4% of Ex-works value (9% for plates, pipes, rounds & structurals) unless otherwise mentioned in enquiry.
D	Deviated Penalty: Any loading on penalty clause shall be 10% or to the extent to which the vendor has opted for deviation.
E	Deviated Payment Terms: Terms: In case BHEL considers any deviation in payment terms, the bids shall be loaded with 18% interest per annum to the extent of deviation.
<b>17</b>	Procurement directly from the manufacturers/ suppliers shall be preferred. However, no agent shall be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from both from the manufacturer/ supplier and the agent, bid received from the agent shall be ignored.
<b>18</b>	<b>RIGHT OF REJECTION /NON- PLACEMENT OF PO:</b> BHEL reserves the right to accept or reject any or all bid/s in full or part without assigning any reason whatsoever.
<b>19</b>	<b>INTEGRITY PACT</b> Vendors shall have to enter into Integrity Pact with BHEL as per attachment - for order value of rupees five crores and above and shall be signed by the competent authority before the issue of purchase order, failing which vendor's offer will be rejected.
<b>20</b>	<b>Public Procurement</b>
<b>A</b>	<b>Make in India</b> For this Procurement , the local content to categorize a supplier as a Class I local supplier / Class II local supplier / Non-Local supplier and purchase preference to Class I local supplier , is as defined in Public Procurement ( Preference to Make in India ) , Oct 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 Proforma for self certification for minimum local content and auditor's certification is given in Annexure III .
<b>B</b>	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 competent authority . <a href="https://www.mea.gov.in/">https://www.mea.gov.in/</a> to be referred for latest details of competent authority and exemptions . Proforma for self certification for compliance is given in Annexure IV
<b>21</b>	<b>Benefits earmarked for Purchase from Micro &amp; Small Enterprises (MSEs) – Indigenous Purchase</b>
<b>21</b>	All Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy are exempt from Paying earnest money deposit .
<b>A</b>	NSIC registered unit bidders shall submit NSIC Certificate along with bid documents. Date to be reckoned for determining the deemed validity will be the last date of Technical bid submission. Non- submission of such document will lead to consideration of their bid, at par with other bidders and MSE status of such bidders shall be shifted to Non- MSE Category till the supplier submits these documents
<b>21</b>	In tender,if MSEs quoting price within price band of L1+15% shall also be allowed to supply a portion of requirement by bringing down their price to L1 price in a situation where L1 price is from someone other than a MSE and such MSE shall be allowed to supply up to 25% of total tendered value. In case of more than one such MSE, the supply shall be shared proportionately. Out of these 25% minimum 3% shall be earmarked for MSEs owned by women and 6.25% for MSEs owned by SC/STs who submit the bid along with relevant documents . This is applicable in case of item-level evaluation tenders and divisible tenders .
<b>21</b>	If an enterprise falling under MSME category as defined in the Act, graduates to a higher category from its original category or beyond the purview of the Act, it shall continue to avail all non-tax benefits of its original category notified by the Ministry of Micro, Small and Medium Enterprise for a period of three years from the date of such graduation to the higher category.
<b>21</b>	BHEL HPEP is registered with RXIL (TReDS) platform. MSE bidders are requested to get registered with RXIL (TReDS) platform to avail the facility as per the GOI guidelines
<b>D</b>	



22	Startups : For Startups Medium Enterprises, Condition of prior turnover and prior experience in Public Procurement may be relaxed subject to meeting of Quality and Technical Specifications . Startups are exempt from paying earnest money deposit.
23	For Claiming Payments <b>for goods</b> received at BHEL works / Site from Vendors' Works) a. Original of Invoice marked as ORIGINAL FOR RECIPIENT b. Duplicate of Invoice marked as DUPLICATE FOR TRANSPORTER c. Packing List - clearly showing number of packages, gross weight and net weight. d. Warranty/Guarantee certificates (If applicable as per PO terms) e. Insurance certificate f. Third Party Inspection Certificates. g. LR Copy signed & stamped by Site incharge / Customer for site deliveries) (For material received at BHEL payment will be made against GR for accepted quantity)
24	Inspection Measuring and Test Equipment (IMTE) whether used by the Seller/ Contractor or sub-contractor shall be calibrated, maintained and controlled. Calibration shall be valid and IMTE maintained in sound condition during usage.
25	ISO-9001, ISO14001 and OHSAS 18001 shall be complied
26	Applicable Conditions :These General conditions of Contract for Purchase apply to all enquiries, tenders, request for quotations, orders and agreements concerning the supply of goods and the rendering of related services (hereinafter referred to as "deliverables") to Bharat Heavy Electricals Limited, Ramachandrapuram , Hyderabad (hereinafter referred to as "BHEL" or the Purchaser) or its projects/customers. Any deviations from or additions to these General conditions of contract for Purchase' require Purchaser's express written consent. The general terms of business or sale of the Seller shall not apply to Purchaser. Orders, agreements and amendments thereto shall be binding if made or confirmed by the Purchaser in writing. Only the Purchasing department of the Purchaser is authorized to issue the Purchase order or any amendment thereof.
27	Being PMD Vendor, if you are not quoting against this tender enquiry, please send your regret letter positively for our reference with valid reasons for not participating in the tender enquiry. Repeated lack of response on the part of bidder may lead to deletion such PMD vendor from BHEL's approved vendor list Vendor shall ensure that PAN details are available/updated with BHEL, else Vendor shall attach PAN details with enquiry failing which offer shall be liable for rejection.
28	Kindly quote your prices in figures and words both. In case of any discrepancy in value, the prices quoted in words shall be considered for evaluation and establishing L1 Status
29	Any discount / revised offer / bids submitted by a bidder on its own shall be considered, provided it is received on or before the due date and time of offer / bid submission (Part-1). Conditional discounts shall not be considered for evaluation of tenders.
30	The bidder whose bid is technically not accepted will be informed & EMD wherever submitted shall be returned after finalization of contract. EMD shall be forfeited in the event of bidder opting out after tender opening.
31	In case of abnormal delays (beyond the maximum late delivery period as per Penalty clause) in supplies / defective supplies or non-fulfillment of any other terms and conditions given in Purchase Order, BHEL may cancel the Purchase Order in full or part thereof, and may also make the purchase of such material from elsewhere / equivalent market price at the risk and cost of the supplier. BHEL will take all reasonable steps to get the material from alternate source at optimum cost. If bidder does not agree to the above Risk Purchase Clause, BHEL reserves the right to reject the offer. Nonperformance of contract attracts penal provisions inline with BHEL's Suspension of Business dealings.
32	Any other terms and conditions of the bidder attached / referred against the tender enquiry will not be considered.
33	All drawings as also all patterns and tool supplied by BHEL or made at BHEL's expense are BHEL's property. These cannot be used or referred to any other party and must only be used in the execution of BHEL's orders.
34	Any amount payable by the consignor / supplier under any of the condition of this contract shall be liable to be adjusted against any amount payable to the consignor / supplier under any other work / contract awarded to him. This is without prejudice to any other action as may be deemed fit by BHEL.
35	The bids of the bidders who are on the banned list and also the bids of the bidders, who engage the services of the banned firms, shall be rejected. The list of firms banned by BHEL is available on BHEL web site www.bhel.com
36	Definitions
Throughout these conditions and in the specifications, the following terms shall have the meanings assigned to them, unless the subject matter or the context requires otherwise.	
36 A	Purchaser' means BHEL-HPEP, Ramachandrapuram, Hyderabad-502 032 of Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the companies Act having its registered office at BHEL House, Siri fort, New Delhi-110049, India and shall be deemed to include its successors and assigns. It may also be referred to as BHEL.
36 B	'The seller' means the persons, firm, company or organization on whom the Purchase order is placed and shall be deemed to include the seller's successors, representatives, heirs, executors and administrator as the case may be. It may also be referred to as Contractor, supplier or vendor.

36 c	<p>'Contract' shall mean and include the Purchase order incorporating various documents viz., tender/offer, letter of intent/acceptance, the General Conditions of contract and special conditions of contract for Purchase, specifications, inspection/quality plan, schedule of prices and quantities, drawings, if any enclosed are to be provided by the Purchaser or his authorized nominee and the samples or patterns if any to be provided under the provision of the contract.</p> <p>In case of any inconsistency or contradiction between any of the documents, the order of precedence shall be Purchase Order, LOI/LOA followed by specific conditions, special conditions of contract and general conditions of contract for commercial conditions; and specific agreement on technical conditions, special technical conditions and general technical conditions, tender/offer.</p>
37	<p>'Parties to the contract' shall mean the seller and the purchaser as named in the main body of the Purchase Order.</p>
38	<p>Ordering and confirmation of order</p>
	<p>The seller shall send the order acceptance in Toto within one week from the date of LOI/Purchase order or such other period as specified/agreed by the Purchaser. Purchaser reserves the right to revoke the order placed if the order confirmation differs from the original order placed. Purchaser shall only be legally bound if agreed explicitly in writing to be in agreement with the deviation. The acceptance of deliverables or supplies by Purchaser as well as payments made in this regard shall not imply acceptance of any deviations.</p> <p>The Purchaser order will be deemed to have been accepted if no communication to the contrary is received within one week (or the time limit as specified /agreed by the Purchaser) from the date of P.O.</p> <p>Purchaser, is at liberty to send signed P.O. through electronic media such as e-mail and the receipt of which shall be treated as receipt of order.</p>
39	<p>Execution</p>
	<p>The whole contract is to be executed in the most workman like manner, substantial and approved as per the contracted terms.</p>
40	<p>Progress Report</p>
	<p>The seller shall render such report as to the progress of work and in such form as may be called for by the Purchaser from time to time. The submission and acceptance of such reports shall not prejudice the rights of the purchaser in any manner. Seller shall communicate to BHEL immediately, change of address, ownership, contact person(s), the mobile numbers and e-mail of the dealing person concerned.</p> <p>Milestones shall be periodically updated by vendor/subcontractor through PRADAN Portal (<a href="https://web.bhelhyd.co.in/mm/">https://web.bhelhyd.co.in/mm/</a> ).Non updation will adversely affect service rating of vendor performance.</p>
41	<p>Product information, Drawings and documents / Non-disclosure and Information Obligations</p>
	<p>Drawings, technical documents or other technical information received by one party shall not without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the submitting party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are confidential and binding only to the extent that they are by reference expressly included in the contract.</p> <p>The seller shall, as per agreed date/s but not later than the date of delivery, provide free of charge any information and/or drawings which are necessary to permit the Purchaser to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in the number of copies agreed upon or at least three copies of each.</p> <p>All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the contract shall continue to be the property of the submitting party.</p> <p>The seller shall provide Purchaser with all information pertaining to the delivery in so far as it could be of importance to Purchaser. The seller shall not reveal confidential information to its own employees not involved with the tender/contract and its execution and delivery or to third parties, unless Purchaser has agreed to this in writing beforehand. The seller shall not be entitled to use the Purchaser's name in advertisements and other commercial publications including website without prior written permission from Purchaser.</p> <p>In the event of violation of the confidentiality as agreed, BHEL will take legal action as deemed fit. Non disclosure agreement to be entered as per <b>Annexure- II</b> wherever applicable.</p>
42	<p>Inspection and Testing</p>
42 A	<p>The goods and stores shall be manufactured by approved quality system and each part/component may be inspected and tested by the Purchaser prior to shipment and shall fully comply with relevant requirements of Purchaser.</p> <p>Purchaser has the right to inspect at any stage during manufacture/ delivery. In the event of rejection, Purchaser shall inform the seller accordingly and Purchaser shall be entitled to replacement or repair at his discretion or may proceed to terminate or cancel the agreement. All this, does not affect Purchaser's right to recover compensation.</p>

<b>42 B</b>	<p>Purchaser or his authorized representative shall be entitled at all reasonable times during execution to inspect, examine and test at the seller's premises the material and workmanship of all stores to be supplied under the contract, and if the part of the stores are being manufactured at other premises, the seller shall obtain for purchaser or his authorized representative permission to inspect, examine and test as if the said stores are being manufactured at the seller's premises. Such inspection, examination and testing, if made shall not release the seller from any obligation under the contract.</p> <p>For indigenous suppliers all costs related to first inspection request shall be borne by the purchaser and the cost of subsequent inspections due to non-readiness of material/rework/ rejections shall be borne by the seller. In case of imports all inspection charges including third party inspections if any shall be borne by the seller. The cost of inspection staff/third party specified by the Purchaser shall be borne by seller unless otherwise specifically agreed. Whether the contract provides for tests on the premises of the seller or any of his sub-contractor/s, seller shall be responsible to provide such assistance, labor, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently.</p> <p>Cost of any type test or such other special tests shall be borne by the seller unless otherwise specifically agreed in the contract. The Seller shall give the authorized representative of the purchaser reasonable notice in writing of the date on and the place at which any stores will be ready for inspection/ testing as provided in the Contract. Annexure - I may be strictly be complied with for the time lines. Any delay in submission of the documents by the vendor will not alter the delivery date.</p>
<b>43</b>	<b>Quality and Condition of the Deliverables</b>
	The seller shall be responsible for compliance with applicable technical, safety, quality, environmental requirements and other regulations in relation to his products, packaging and raw and ancillary materials.
<b>44</b>	<b>Packaging and Dispatch</b>
	<p>The seller shall package the deliverables safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by sea/air/rail/road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures/hooks and sling marks as may be required for easy and safe handling by mechanical means. Special packaging conditions/ environmental conditions as defined in the enquiry shall be fully complied.</p> <p>Each package must be marked with consignee name, P.O. number Package No. gross weight &amp; net weight, dimensions (LxBxH) and seller's name. The packing shall allow for easy removal and checking of goods on receipt and comply with carrier's conditions of packing or established trade practices. Packing list of goods inside each package with P.O. item No. &amp; quantity must also be fixed securely outside the box to indicate the contents. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols/instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.</p>
<b>45</b>	<b>Delivery:</b>
	Except as otherwise indicated in the Purchase order, delivery shall be FOR (Destination) for indigenous orders and CIP for imported orders. The delivery date (s) or delivery period (s) as stipulated in the agreement shall be firm and binding and shall apply to the entire delivery for each P.O. item. Partial shipments may however, be permitted by the purchaser on prior intimation from the Seller. Unless specifically agreed otherwise, transit insurance coverage will only be within India for imported consignments by BHEL. Accordingly, the seller shall send an intimation to the Purchase officer/Manager giving Purchase Order No., shipping particulars, Invoice value etc., immediately on dispatch of goods.
<b>46</b>	<b>Penalty</b>
	<p>The time or period of delivery as stipulated in the schedule of delivery shall be deemed to be the essence of the contract. Should circumstances arise whereby the deadline for an agreed delivery date(s) or period(s) is expected to be exceeded, the seller shall inform Purchaser hereof without delay. If delay in delivery is caused by any of the circumstances mentioned in clause 54 (Force Majeure) or which are caused exclusively by the acts of Purchaser, the Purchaser shall extend the time for delivery by a period which is reasonable having regard to all the circumstances in the case.</p> <p>If the Seller delays beyond any agreed delivery date(s) or period(s), Purchaser shall levy penalty for such delay @ 0.5% per week (7 days) or part thereof on delayed portion of the order value subject to a maximum of 10% of the value of the Purchase Order. However, penalty for delayed delivery will be calculated on 100% of the purchase order value if the material supplied cannot be put to intended use.</p> <p>The penalty will be charged on the value of the purchase order excluding statutory levies, freight and insurance wherever not included in the price. Penalty amount so determined along with applicable GST thereon shall be recovered.</p> <p>Imposition, recovery or settlement of this penalty shall not affect Purchaser's right to performance, compensation and termination of the agreement.</p> <p>For delay analysis, period referred in Annexure-I will be considered as standard time lines for various major activities.</p>
<b>47</b>	<b>Transfer of Ownership and Risk</b>
	The risk for the delivery remains with the seller until the goods are delivered at the agreed place. However ownership shall get transferred as per terms of purchase order in line with INCOTERMS.
<b>48</b>	<b>Price, invoicing and payment</b>
	<p>The agreed prices are fixed prices in the currency as specified in the Purchase Order. They shall include packing, forwarding , loading and carriage to the place specified by the purchaser and are exclusive of all applicable taxes, duties etc., except for those specifically agreed by the Purchaser. Invoices shall be submitted bearing the Purchase Order number &amp; date, item number/s and supporting documents as called for in the Purchaser order.</p> <p>The direct payments (including LC/documents through Bank on collection basis), shall be made by E-payment mode and not by cheque /bank drafts except in special circumstances. Vendors shall furnish the E-payment particulars in the prescribed formats duly authenticated by their respective Bankers, If not got registered earlier with the Buyer.</p> <p>- Invoice has to be raised quoting HSN Code of Goods or Accounting Code of Services. Invoice should mention BHEL-HPEP-HYDERABAD GSTIN: 36AAACB4146P1ZG or GSTIN of BHEL Nodal Agency as mentioned in PO.</p>

	<p>Indian Agency commission if payable and so specified in the Purchase order shall be paid in Indian Rupees, considering the SBI TT selling exchange rate prevailing on the date of tender opening (part 1 in case of two part bid), after successful completion of the contract.</p> <p>If so stipulated in the order, the seller shall furnish, on receipt of the Purchase Order or along with order acknowledgement, the billing break-up of prices (BBU) for approval by the purchaser in respect of the major items/components going into the equipment. This BBU is required by the Purchaser for admitting the claims of the seller if part shipments are contemplated and also to facilitate custom clearance after payment of duties in case of imports.</p> <p>In case of delay in receipt of supporting document details, consequential demurrage/wharf age /detention charges shall be to the account of the seller.</p> <p>Payment does not imply in any respect whatsoever a waiver of Purchaser's right to performance of the agreement. Purchaser is entitled to set off claimable debts against claimable liabilities with the seller by means of a setoff Note.</p>
<b>49</b>	<p>Contract variations; Increase or decrease in the scope of supply</p>
	<p>Purchaser may vary the contracted scope during execution due to exigencies of project requirement.</p> <p>If the seller is of the opinion that the variation has an effect on the agreed price or delivery period, Purchaser shall be informed of this immediately in writing along with technical details, and in the event of additional work, submit a quotation with regards to the price and period involved, as well as the effect this additional work will have on the other work to be performed by the seller. Provided, that if unit rates are available in the contract, the same shall be applied to such additional work. The seller shall not perform additional work before purchaser has issued written instructions/amendment to the purchase order to that effect. The work which the seller should have or could have anticipated in terms of delivering the service (s) and functionality (ies) as described in this agreement should be executed by the vendor without any price implication.</p>
<b>50</b>	<p>Short shipments/ warranty/guarantee replacements</p>
	<p>In case of any short shipment during initial supply which is subsequently dispatched by the seller or any guarantee / warranty replacements shall be dispatched on "DDP-Delivered duty paid BHEL stores" basis for imported items and "FOR-BHEL Stores/designated destination" basis for indigenous items. Taxes, if any paid by indigenous vendor for short supply, guarantee /warranty replacement, repair activity shall be to vendor's account only. Vendor has to raise a credit note for short supplied quantity as per GST provisions.</p>
<b>51</b>	<p>Rejection/Replacement</p>
	<p>The seller shall arrange replacement / repair under its obligation under the contract within one month from the date of intimation or mutually agreed period. The rejected goods shall be taken away by the seller and replaced on DDP/FOR-BHEL Stores/designated destination basis within such period. In the event of the seller's failure to comply. Purchaser may take appropriate action including disposal of rejections, at the cost and risk of the seller. Vendor has to raise a credit note for rejected quantity as per GST provisions.</p> <p>In case defects attributable to seller are detected during processing of the goods at purchaser's / his subcontractor works, the seller shall be responsible for replacement /repair of the goods as required by the purchaser at seller's cost.</p>
<b>52</b>	<p>Export Administration Regulations</p>
	<p>If a delivery includes such technology and / or supply that is subjected to the export regulations the seller shall obtain due permissions, approvals, license etc.</p>
<b>53</b>	<p>Cancellation / Termination of contract and risk purchase</p>
	<p>Purchaser shall have the right to completely or partially terminate the agreement by means of written notice to that effect without prejudicing their other rights in the event that :</p> <ul style="list-style-type: none"> <li>-The seller is declared bankrupt, its business has been shut down or liquidated, a substantial part of its assets have been attached/destroyed, or the business has been transferred to a third party.</li> <li>-Any misrepresentation or hiding of material fact if detected at a later stage.</li> <li>-The delivery is rejected after inspection or re-inspection.</li> <li>-In the event of termination, the risk of the items already delivered but not of use to Purchaser, as determined by purchaser, remains with the seller. The items shall then be at the seller's disposal and they are to be collected by the seller. The seller shall refund any payments made by purchaser in terms of the terminated agreement immediately, not later than 30 days,</li> <li>- In the event of Cancellation/ termination of contract, BHEL reserves the right to procure the items which are not delivered as per PO and charge the excess cost from the defaulting seller. Incase the excess cost is not repaid by or recovered from the defaulting seller within 30 days, apart from legal recourse for effecting such recoveries, Penal action in line with BHEL's Suspension of Business dealings will be taken.</li> </ul>
<b>54</b>	<p><b>Force Majeure</b></p>
	<p>The supplier shall not be considered in default if delay occurs due to causes beyond their control such as Acts of God, Natural calamities, Fire, Frost, Flood, Civil War, civil commotion, riot, Government Restrictions.</p> <p>Only those causes that have duration of more than seven days shall be considered cause of force majeure. Notification to this effect duly certified by local chamber of commerce/statutory authorities with supporting documents shall be given by the supplier to BHEL by registered letter/courier service immediately without loss of time.</p> <p>In the event of delay due to such causes the delivery schedule shall be extended for a length of time equal to the period of Force Majeure or at the option of BHEL the order may be cancelled. Such cancellation would be without any liability whatsoever on the part of BHEL.</p> <p>In the event of such cancellation the supplier shall refund any amount advanced or paid to the supplier by BHEL and deliver back any material issued to him by BHEL and release facilities, if any provided by BHEL.</p>
<b>55</b>	<p>Non-waiver of Defaults</p>
	<p>If any individual provision of the contract is invalid, the other provisions shall not be affected.</p>

<b>56</b>	<b>Settlement of Disputes</b>
	<p>(i) Except as otherwise specifically provided in the contract, all disputes concerning questions of the facts arising under the contract, shall be decided by the Purchaser, subject to written appeal by the seller to the purchaser, whose decision shall be final.</p> <p>(ii) Any disputes of differences shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration</p> <p>(iii) The seller shall continue to perform the contract, pending settlement of disputes(s).</p>
<b>57</b>	<b>Conciliation clause</b>
	<p>CONCILIATION CLAUSE FOR CONDUCTING CONCILIATION PROCEEDINGS UNDER THE BHEL CONCILIATION SCHEME, 2018: The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract or the Memorandum of Understanding, penalty deduction, time extension), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.</p> <p>The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Procedure in <a href="http://www.bhel.com/index.php/story_details?story=2454">http://www.bhel.com/index.php/story_details?story=2454</a> . The Procedure together with its Formats will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this ITB</p>
	<b>ARBITRATION (WITH SOLE ARBITRATOR)</b>
	<p>Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the Parties, in respect of any dispute or difference; arising out of the formation, breach, termination, penalty deduction, validity or execution of the Contract; time extension, or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, then, either Party may, by a notice in writing to the other Party refer such dispute or difference to the sole arbitration . Sole arbitrator to be appointed by Head of the Unit - BHEL , HPEP .</p>
	<p>The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the Parties.</p>
	<p>Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause.</p> <p>The seat of arbitration shall be Sangareddy / Hyderabad, Telangana. The language of arbitration shall be English and the documents shall be submitted in English.</p>
	<p>The cost of arbitration shall initially be borne equally by the Parties subject to the final apportionment of the cost of the arbitration in the award of the Arbitrator.</p>
	<p>Subject to the arbitration in terms of clause 57, the courts at Sangareddy, Telangana State shall have exclusive jurisdiction over any matter arising out of or in connection with this contract.</p> <p>Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.</p>
	<b>ARBITRATION FOR CONTRACT WITH PUBLIC SECTOR ENTERPRISE (PSE) OR A GOVERNMENT DEPARTMENT</b>
	<p>In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs &amp; Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in DPE 0M No 4(1)/2013-DPE(GM/FTS 1835 dated 22-05-2018</p>
<b>58</b>	<b>Applicable Laws and jurisdiction of Courts</b>
	<p>This agreement shall be construed and interpreted in accordance with the laws of India and shall have exclusive jurisdiction of Sangareddy/Hyderabad courts, Telangana, India.</p>
<b>59</b>	<b>BHEL-Fraud prevention policy shall be adhered to.</b>
	<p>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 <a href="http://www.bhel.com">http://www.bhel.com</a> and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice.</p>
	<p>Fraud prevention policy and list of nodal officers is hosted on BHEL Hyderabad website <a href="http://web.bhelhyd.co.in">web.bhelhyd.co.in</a></p>
<b>60</b>	<b>Suspected Cartel Formation</b>
	<p>The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding , whether formal or informal with other Bidder(s) . This applies in particular to prices , specifications ,certifications ,subsidiary contracts,submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case , the Bidder is found having indulged in above activities , suitable action shall be taken by BHEL as per extant policies / guidelines .</p>

Note: Purchase officer has to fill Annexure-I while sending enquiry

Annexure-I			
Major Activity timelines shall be considered for indigenous purchases			
S No	Activity	Agency	Timeline
1	PO acknowledgement	Vendor	_____ days from PO
2	Submission of Drawings and QP	Vendor	_____ days from PO
3	Approval of Drawings and QP	BHEL/Customer	_____ days from PO
4	Raising of Inspection Call	Vendor	_____ days from PO
5	Inspection completion	Self/BHEL/Third party inspection agency	_____ days from inspection call date
6	Despatch Instructions	BHEL	_____ days from inspection report
7	Receipt of Material	Vendor	_____ days from Despatch instructions

Above is illustrative only. Purchase department can add more activities depending on nature of product/contracts

However absence of this annexure in NIT will entail non processing of delivery extension cases in case of delay in supplies of goods owing to reason attributable to BHEL.

(To be executed on Non- Judicial Stamp Paper for an appropriate value.  
To be stamped as an agreement)

(For Suppliers on Unit's / Division's PMD)

**ANNEXURE-II**

**Framework Confidentiality Agreement Cum Undertaking**

This Agreement made on this the \_\_\_\_\_ day of (month) \_\_\_\_\_ 20 \_\_\_\_ (“Effective Date”) by and between M/s. BHARAT HEAVY ELECTRICALS LIMITED, having registered office at “BHEL House”, Siri Fort, New Delhi – 110049 (India), acting through its \_\_\_\_\_ Unit (hereinafter may be referred to as “BHEL” or “the company”).

And

M/s. \_\_\_\_\_ (address) \_\_\_\_\_  
represented by authorized representative Sri \_\_\_\_\_ (herein after referred to as the “Supplier”).

The supplier and the company may, unless the context otherwise requires, hereinafter be collectively referred to as “Parties” or singly as the “Party”.

**RECITALS**

Whereas, BHEL is engaged in the design, engineering, manufacturing, construction, testing, commissioning and servicing of a wide range of products, systems and services for the core sectors of the economy, viz. Power, Transmission, Industry, Transportation, Renewable energy, Oil & Gas and Defence and providing associated services to varied customers in relation to which BHEL / its affiliates own valuable information of a secret and confidential nature.

Whereas the Company may, in connection with contract(s) (as defined hereunder) placed or to be placed upon the supplier, or otherwise, from time to time, make available, Technical Information as is defined hereunder.

And Whereas BHEL is willing to provide such Technical Information to the Supplier from time to time and the Supplier understands and acknowledges that such Technical Information is valuable for the Company and as such is willing to protect confidentiality of such information, subject to the terms and conditions set out hereunder.

Now therefore, in view of the foregoing premises and in consideration of the mutual covenants and agreements hereinafter set forth, the parties agree as under:

**1. Definitions:**

Unless the context so requires, in this Agreement, the following terms will bear the meaning ascribed to the said term in this clause.

- A. **“Contract”** means the contract entered into with a supplier and includes a Purchase Order, or a Work Order for procurement of any goods or for provision of any services.
- B. **“Effective Date”** means the date of this Agreement as mentioned in the preamble of this Agreement.
- C. **“Supplier”** includes a Contractor or a Vendor of the Company whether for supplying of goods or for providing any services under a Contract or both.
- D. **“Technical Information”** includes Drawings, and / or Product Standards and / or Specifications and / or Corporate / Plant Specifications and / or Technological Process Sheets and / or Technical Data Sheets and / or Jigs & Fixtures and / or Pattern & Dies and / or Special Gauges and / or Tools etc. Belonging to or wherein the Company has acquired from a third party a right of user and includes any improvement thereto from time to time whether carried out by the Company or by the Suppliers.
- E. **“Intended Purpose”** means the purpose for which the Technical Information is provided to the supplier under or in connection with a contract.
- F. **“Improvement”** includes any modification made to, or adaptation of, the Technical Information which enhances or is calculated to enhance the performance (Whether in terms of effectiveness or in terms of efficiency or both) of the product and / or the service to be provided by the Supplier under a Contract.

2. This Agreement shall come into force / deemed to have come into force, as the case may be, on the Effective Date; or, on the first date when the Technical Information or any part thereof is provided by BHEL to the supplier; whichever is earlier.

3. **Agreement deemed to be incorporated in each contract:** Unless and to the extent otherwise stipulated in the Contract, the conditions of this Agreement are deemed to be incorporated in all Contracts which may be entered into between the Company and the Supplier. Further, unless otherwise stipulated, the obligations under this Agreement are and will be independent of the obligations under the Contracts and such obligations of the Supplier hereunder will remain of full effect and validity notwithstanding that the period of validity of the Contract has expired by efflux of time stipulated therein; or, the contract has been discharged by performance or breach; or, the termination of the Contracts for any reason whatsoever.

#### 4. **Ownership:**

4.1 The Company may, from time to time, make available to the Supplier, Technical Information on a non-exclusive basis by way of loan.

4.2 The Supplier acknowledges and agrees that all Technical Information and copies thereof that are or may be provided by the Company to the Supplier, are and shall remain the property of

BHEL or that of the concerned entity from whom BHEL has obtained the Technical Information and such Technical Information are and shall constitute trade secrets of the BHEL. Nothing in this Agreement or in any disclosures made hereunder by or on behalf of the Company shall be construed as granting upon the Supplier any patent, copyright or design or any other intellectual property rights of whatsoever description that subsists or may hereinafter exist in the Technical Information. Furthermore, nothing in this Agreement or in any disclosures made hereunder by or on behalf of the Company shall be construed as granting upon the supplier any license or right of use of such patent, copyright or design or any other intellectual property rights of whatsoever description which may now or hereafter exist in the Technical Information except for use of the Technical Information strictly in accordance with this Agreement and the contract and / or as directed in writing by the Company, solely for the Intended Purpose under the Contract.

4.3 Neither party is obligated by or under this Agreement to purchase from or provide to the other party any service or product and that any such purchase / sale of any product and / or service by one party to the other party will be governed by the Contract if any, that may be entered into by and between the Company and the Supplier.

4.4 The Supplier is / has been made well aware and acknowledges that the Technical Information being / which may be shared with it by the Company has been either generated by the Company by incurring huge investment and cost or obtained from foreign collaborators under Technical Collaboration Agreement (TCA) with stringent confidentiality conditions.

4.5 The supplier agrees and undertakes to adhere to confidentiality requirements as applicable to BHEL under a TCA and also ensure that the confidentiality requirements are adhered to by all its concerned employees or sub-contractors /suppliers (where permitted to be engaged by BHEL). Any damages, losses, expenses of any description whatsoever, arising out of or in connection with a breach of the confidentiality requirements under a TCA owing to any act or omission on the part of the supplier or its employees or sub-contractors / suppliers that is claimed by a foreign collaborator from the Company shall be wholly borne by the Supplier and it shall keep BHEL fully indemnified in this behalf. The demand by the Company shall be conclusive upon the Supplier who shall thereupon forthwith pay to the Company without demur, dispute or delay the amount as demanded without demanding any further proof thereof.

4.6 The Supplier agrees and undertakes that unless so decided and advised by the Company in writing all rights / title to any Improvement to the Technical Information shall vest in the Company. The Supplier undertakes and agrees to inform forthwith to the Company of any such Improvement made to the Technical Information and transfer all drawings / documents or other materials connected with such Improvement to the Company and also agrees to fully cooperate with the Company for protecting the Company's interests in such Improvements

in the Technical Information including but not limited to obtaining necessary protection for the intellectual property rights in such improvement, if so desired by the Company. If a question arises whether a modification amounts to improvement to the Technical Information, the same shall be decided by the Company and such decision shall be final and binding upon the supplier.

## **5. Use and Non – Disclosure:**

5.1 Unless otherwise stipulated by the Company, all Technical Information made available to the supplier, by the Company shall be treated as Confidential irrespective of whether the same is marked or otherwise denoted to be Confidential or not.

5.2 The Supplier undertakes and agrees that the Technical Information in its possession shall be held in strict confidence and will be used strictly in accordance with this Agreement and solely for the Intended Purpose under the Contract. Use of the Technical Information for any other purpose other than Intended Purpose is prohibited.

5.3 In particular, the Supplier shall not use Technical Information or any Improvement in its possession for the manufacture or procurement of the product(s) or components or parts thereof or use the Technical Information or any portion thereof or any modification or adaptation thereof in any form to provide any product and / or service to any third party, without the prior written consent of the Company.

5.4 The Supplier shall not disclose any of such Technical Information to any third party without the prior written consent of the Company. The Supplier agrees that without prior written consent of the Company, the supplier shall not disclose to a third party about the existence of this Agreement, or of the fact that it is / was in possession of or has experience in the use of any Technical Information nor shall the Supplier share in any manner whatsoever, with a third party, the name or details of any Contract(s) awarded by the Company to it or performed by the Supplier or the scope of work thereof or share any document or correspondence by and between the Company and the supplier in or in connection with this Agreement or such Contract(s). Notwithstanding what is stated elsewhere, the overall responsibility of any breach of the confidentiality provisions under this Agreement shall rest with the Supplier.

5.5 This Supplier undertakes and agrees not to make copies or extracts of and not to disclose to other any or all of the Technical Information in its possession, except as follows:

(a) The Supplier may disclose the Technical Information to such of its officers and employees strictly to the extent as is necessary for such officer or employee for the Intended Purpose, provided that the Confidential Information (or copies thereof) disclosed shall be marked

clearly as the confidential and proprietary information of Company and that such officers and employees shall similarly be bound by undertakings of confidence, restricted use and non-disclosure in respect of the Technical Information. The Supplier shall be responsible for any breach of such confidentiality provisions by such officers and employees.

- (b) With the prior written consent of Company, the supplier may disclose for the Intended Purpose such Technical Information as is provided for in such consent to such of its professional advisers: consultants, insurers and subcontractors who shall be similarly bound by undertakings of confidence, restricted use and non-disclosure in respect of such Technical Information.
- (c) The Supplier shall not be prevented to make any disclosure required by (i) order of a court of competent jurisdiction or (ii) any competent regulatory authority or agency where such disclosure is required by law, provided that where the supplier intends to make such disclosure, it shall first consult Company and take all reasonable steps requested by it to minimize the extent of the Technical Information disclosed and to make such disclosure in confidence and also shall cooperate with the Company in seeking any protective order or any other remedy from proper authority in this matter.

## **6. Exceptions:**

The Obligations of the Supplier pursuant to the provisions of this agreement shall not apply to any Confidential Information that:

- a) was / is known to, or in the possession of the Supplier prior to disclosure thereof by the Company;
- b) is or becomes publicly known, otherwise than as a result of a breach of this agreement by the Supplier.
- c) is developed independently of the Disclosing party by the Supplier in circumstances that do not amount to a breach of the provisions of this Agreement or the Contract;
- d) is received from a third party in circumstances that do not result in a breach of the provisions of this Agreement.

- 7. The Obligation of maintaining confidentiality of the Technical Information on each occasion, shall subsist for the entire duration during which the Technical Information / equipment is in possession of the Supplier and shall thereafter subsist for a further period of \_\_\_\_\_ years from the date when the complete Technical Information has been returned in portions on different dates, the period of \_\_\_\_ years will be reckoned from the date when the last portion of the Technical Information has been returned. Notwithstanding the expiry of the confidentiality obligation, the obligation of the Supplier under clause 5.4 shall continue to subsist for a further period of \_\_\_\_\_ years.

## **8. Warranties & Undertakings:**

- a) The Supplier undertakes to ensure the due observance of the undertakings of confidence, restricted use and non-disclosure by its persons to whom it discloses or releases copies or extracts of the Technical Information.
- b) The Supplier shall keep the Technical Information or improvement made therein properly segregated and not mix up the same with any other material / documents belonging to him / it or to any other third party.
- c) The Supplier further undertakes that he / it shall not hypothecate or give on lease or otherwise alienate or do away with any of the Technical Information and / or equipment of the Company, made available to him / it, and undertakes that he / it shall hold the same as a trustee, in capacity of custodian thereof and use / utilise the same solely for the purpose of executing the contract awarded by the Company.
- d) The Supplier further undertakes that he / it shall return all the equipment and / or Technical Information as far as practicable in the same condition in which the same was made available to him / it by the Company together with any Improvement thereon and the documents connected with such Improvement, to the Company forthwith upon completion of the scope of work or contract for which such Technical Information was provided by the Company to it or as directed by the Company together with a confirmation by way of an affidavit or in such manner as directed by the Company that it has not retained any equipment and / or Technical Information / improvement thereof. In case any such equipment and / or Technical Information or thereof shall remain in his possession or is not capable of being returned, the retention and use of such Technical Information or improvement thereto shall continue to be governed by this Agreement.
- e) The Supplier undertakes to indemnify the Company for all the direct, indirect and / or consequential losses, damages, expenses whatsoever including any consequential loss of business, profits suffered by the Company owing to breach by the Supplier of its obligations under this Agreement and / or the confidentiality requirements, if any, contained in the Contract and that the Supplier hereby agrees that the decision of the Company in all such or any such matter/s shall be final and binding on the Supplier. On mere written demand of the Company, the Supplier shall forthwith and without demur or delay pay to the Company any such sum as determined by the Company as the amount of loss or damage or expense which has been suffered by the Company. The Supplier agrees that the Company shall be entitled to withhold and appropriate any amount payable to the Supplier under any Contract then existing between the Company and the Supplier, in case the Supplier fails to make payment, in terms of the written demand, within 7 days thereof. Without prejudice to the forgoing actions, in respect to any breach of this Agreement, the Company shall be entitled to take

any other action against the Supplier as per applicable laws, the Contract, Company's applicable policies, guidelines rules, procedures, etc.

9. Without prejudice to any other mode of recovery as may be available to the Company for recovery of the amount determined as due as per Clause 9 (f) hereinabove, the Company shall have a right to withhold, recovery and appropriate the amount due towards such losses, damages, expenses, from any amount due to the Supplier in respect of any other Contract (s) placed on him / it by any department / office / unit/ division of the said Company.

#### **10. Arbitration & Conciliation:**

1. Except as provided elsewhere in this contract, in case amicable settlement is not reached between the parties, in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the contract; or, the respective rights and liabilities of the parties; or, in relation to interpretation of any provision of the contract; or, in any manner touching upon the contract, then, either party may, by a notice in writing to the other party refer such dispute or difference to the sole arbitration of an arbitrator appointed by head of the BHEL unit issuing the contract.

The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the parties.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause, the seat of arbitration shall be at Hyderabad.

The cost of arbitration shall be borne as per the award of the Arbitrator.

Subject to the arbitration in terms of clause 55, the courts at Sangareddy, Telangana State shall have exclusive jurisdiction over any matter arising out of or in connection with this contract.

Notwithstanding the existence or any dispute or differences and / or reference for the arbitration, the contractor shall proceed with and continue without hindrance the performance of its obligations under this contract with due diligence and expedition in a professional manner except where the contract has been terminated by either party in terms of this contract.

**In case of contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:**

In the event of any dispute or difference relating to the interpretation and application of the provisions of the contract, such dispute or difference shall be referred by either party for arbitration to the sole arbitrator in the Department of Public Enterprises to be nominated by the secretary to the Government of India in-charge of the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to arbitration under this clause. The award of the arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law and

justice, Government of India. Upon such reference the dispute shall be decided by the Law secretary or the special Secretary or Additional secretary when so authorized by the Law secretary, whose decision shall bind the parties hereto finally and conclusively. The parties to the dispute will share equally the cost of arbitration as intimated by the arbitrator.

2. INTEREST CLAUSE:

In order to bring uniformity in all the contracts / agreements entered between BHEL and its contractors / vendors / suppliers / service providers etc., it is hereby advised to incorporate the following clause in all tenders and agreements.

**“No interest shall be payable by BHEL on earnest money or security deposit or any money due to the contractor by BHEL.”**

**11. Governing Law & Jurisdiction:**

This agreement shall be construed and interpreted in accordance with the laws of India and shall have exclusive jurisdiction of Sangareddy/Hyderabad courts, Telangana, India.

**SIGNATURE**

**WITNESSES**

**1**

**Name:**

**Address:**

**2**

**Name:**

**Address:**

## Annexure - III

### **Proforma for self-certification by Supplier for minimum local content on their letter head for tender value less than Rs 10 Crore**

"We \_\_\_\_\_ (Name of Manufacturer) undertake that we meet the mandatory minimum Local Content (LC) requirement i.e. \_\_\_\_\_ (to be filled as notified in the policy) for claiming Purchase Preference linked with Local Contents under the Govt. policy against tender no. \_\_\_\_\_."

**Auditor's certification with respect to minimum local content on the letter head of Statutory Auditor for tender value above Rs.10 crore**

"We \_\_\_\_\_ the statutory auditor of M/s \_\_\_\_\_ (name of the bidder) hereby certify that M/s \_\_\_\_\_ (name of manufacturer) meet the mandatory Local Content requirements of the Goods and/or Services i.e. \_\_\_\_\_ (to be filled as notified in the policy) quoted vide offer No. \_\_\_\_\_ dated \_\_\_\_\_ against BHEL's tender No. \_\_\_\_\_ by M/s \_\_\_\_\_ (Name of the bidder)."

## Annexure - IV

### **Proforma for self-certification by Supplier for Compliance to Clause No 20 (B)**

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and I certify that M/s.... (Name of firm) is **not from such a country/is from such a country** (delete whichever is NOT applicable) and has been duly registered with the Competent authority (delete if NOT applicable) . I hereby certify M/s ..... fulfills all requirements in this regard and is eligible to be considered . ( where applicable , valid registration by the competent authority shall be attached )

Sd/-

Authorised Signatory with Stamp

(On Company Letter Head)

FORM NO. 10F

[See sub-rule (1) of rule 21AB]

Information to be provided under sub-section (5) of section 90 or sub-section (5) of section 90A of the Income-tax Act, 1961

I..... son/daughter of Mr ..... in the capacity of.....  
(Designation) do provide the following information, relevant to the previous year 2019-20 in case of ..... for the purposes of sub-section (5) of section 90/section 90A:-

Sl.No.	Nature of information	Details
(i)	Status (individual; company, firm etc.) of the assessee	Company
(ii)	Permanent Account Number (PAN) of the assessee if allotted	
(iii)	Nationality (in the case of an individual) or Country or specified territory of incorporation or registration (in the case of others)	.....
(iv)	Assessee's tax identification number in the country or specified territory of residence and if there is no such number, then, a unique number on the basis of which the person is identified by the Government of the country or the specified territory of which the assessee claims to be a resident	.....

(v)	Period for which the residential status as mentioned in the certificate referred to in sub-section (4) of section 90 or sub-section (4) of section 90A is applicable	2019-20
(vi)	Address of the assessee in the country or territory outside India during the period for which the certificate, mentioned in (v) above, is applicable	..... ..... .....

I have obtained a certificate to in sub-section (4) of section 90 of sub-section (4) of section 90A from the Government of..... (name of country or specified territory outside India)

Signature:.....  
Name:.....  
Address:.....  
Email ID:.....  
Contact Number.....  
Permanent Account Number:.....

Verification

I..... do hereby declare that to the best of my knowledge and belief what is stated above is correct complete and is truly stated. Verified today the..... day of.....

Signature of the person providing the information

Place:.....

(On Company Letter Head)

No Business Connection or Permanent Establishment Certificate

Date

To

Bharat Heavy Electricals Limited  
Ramachandrapuram, Hyderabad  
India - 502032

Sir,

Sub: No Business Connection or Permanent Establishment declaration for FY 2019-20

This is to certify that ..... (Name of the supplier) is a company incorporated in .....(country ) and does not have any business connection in India as per the provision of Section 9 of the Income Tax Act 1961 or any Permanent Establishment as defined in Article 5 of the India and .....(country) DTAA.

We hereby certify that we will notify BHEL in case of any change in the status as certified above.

For .....

Authorised Signatory


*(Note – Please refer definition of the Business Connection on reverse and Permanent Establishment in the relevant DTAA)*

"Business connection" as defined in Section 9 of the Income Tax Act shall include any business activity carried out through a person who, acting on behalf of the non-resident,—



- (a) has and habitually exercises in India, an authority to conclude contracts on behalf of the non-resident, unless his activities are limited to the purchase of goods or merchandise for the non-resident; or
- (b) has no such authority, but habitually maintains in India a stock of goods or merchandise from which he regularly delivers goods or merchandise on behalf of the non-resident; or
- (c) habitually secures orders in India, mainly or wholly for the non-resident or for that non-resident and other non-residents controlling, controlled by, or subject to the same common control, as that non-resident:



Provided that such business connection shall not include any business activity carried out through a broker, general commission agent or any other agent having an independent status, if such broker, general commission agent or any other agent having an independent status is acting in the ordinary course of his business :


Provided further that where such broker, general commission agent or any other agent works mainly or wholly on behalf of a non-resident (hereafter in this proviso referred to as the principal non-resident) or on behalf of such non-resident and other non-residents which are controlled by the principal non-resident or have a controlling interest in the principal non-resident or are subject to the same common control as the principal non-resident, he shall not be deemed to be a broker, general commission agent or an agent of an independent status

MANUFACTURING QUALITY PLAN															
 Manufacturer's Name & Address: BHEL Hyderabad-32	Item : 1. MID BFP INNER CASING (HY 19593)		QP : HYQA/MQP/PMP/BFP/547/982 DATE : 08.10.2021		REV. 02 PAGE 6 OF 32		PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) MAIN CONTRACTOR: BHEL - HYDERABAD PACKAGE: TG PACKAGE CONTRACT NO : THDC/RKSH/CC-9915-371								
	Sl. No.	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
					M	C/N				M	C	N			

1.0 RAW MATERIALS & BOUGHT OUT ITEMS														
1.1	Raw material for manufacturing	Chemical Composition	Major	Each Melt	100%	-	Material Specn	Material Specn	Record		P	V	V	
2.0 IN-PROCESS INSPECTION														
2.1	Pattern Making	Dimension of Pattern Core Boxes	Critical	Visual, Measurement	100%	-	Ordering Drawing	Ordering Drawing	Pattern Dimn. Report		P	V		
		Moulding	Major	Visual, Measurt, Inspection of Moulds & Cores	100%	-	As per Drawing	As per Drawing	Moulding Record		P	V		
		Melting & Pouring	Major	Chemical	Every Melt	-	HY19593	HY19593	TC	✓	P	V	V	
2.2	Casting	Heat Treatment	Major	HT Cycle Review	100%	-	HY19593	HY19593	HT Graph	✓	P	V		




 MANUFACTURER / SUB-SUPPLIER		 FOR NTPC USE		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M.MANUFACTURER/SUB-SUPPLIER, C-MAIN SUPPLIER. N-NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE. "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"		DOC.NO. 9915-371-110-HYD-QVM-Q-001 REV.02 CAT - I			
SIGNATURE				REVIEWED BY		APPROVED BY		APPROVAL SEAL	


MANUFACTURING QUALITY PLAN										PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) MAIN CONTRACTOR: BHEL - HYDERABAD PACKAGE: TG PACKAGE CONTRACT NO : THDC/RKSH/CC-9915-371							
Manufacturer's Name & Address: BHEL Hyderabad-32		Item : 1. MID BFP INNER CASING (HY 19593)		QP : HYQA/MQP/PMP/BFP/547/982 DATE : 08.10.2021		REV. 02 PAGE 7 OF 32											
Sl. No.	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS			
					M	C/N					M	C	N				
2.2	-- do --	Identification of Test Sample/Keel Block Identification	Major	Visual & Hard Punching	Each Per Melt/ HT Batch	Each Per Melt/ HT Batch	HY19593	HY19593	Identification Report		P	W	V	Stamping by BHEL/TP/IA			
		NDT(MPI/DP)	Major	NDE	Each Casting	-	HY19593	HY19593	NDT Report	✓	P	V					
		WPS/PQR/Welder qualification record for repair welding	Major	Record Review	100%	-	HY19593	HY19593	Welding Records	✓	P	V	BHEL Approved WPS/PQR				
		100% NDT on weld repair & hardness survey	Major	NDE	100%	-	HY19593 & BHEL Approved WPS/PQR	HY19593	NDT Report	✓	P	V					
		Stress Relieving	Major	Review	100%	-	HY19593	HY19593	ST Chart	✓	P	V					
		Dimensional Inspection (Rough Casting)	Major	Measr	100%	-	Drawing	Drawing	Dimension Report	✓	P	V					
<b>3.0</b>	<b>FINAL INSPECTION AND TESTING</b>																
 MANUFACTURER / SUB-SUPPLIER		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M.MANUFACTURER/SUB-SUPPLIER, C-MAIN SUPPLIER, N-NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE. "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"												 FOR NTPC USE		DOC.NO. 9915-371-110-HYD-QVM-Q-001 REV.02 CAT - I	
SIGNATURE		REVIEWED BY				APPROVED BY				APPROVAL SEAL							

MANUFACTURING QUALITY PLAN															
 Manufacturer's Name & Address: BHEL Hyderabad-32		Item : 1. MID BFP INNER CASING (HY 19593)		QP : HYQA/MQP/PMP/BFP/547/982 DATE : 08.10.2021		REV. 02 PAGE 8 OF 32		PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) MAIN CONTRACTOR: BHEL - HYDERABAD PACKAGE: TG PACKAGE CONTRACT NO : THDC/RKSH/CC-9915-371							
				Sl. No.	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY
					M	C/N									

3.1	Proof machined casting	Mechanical Properties (Hardness survey on weld repair areas & casting)	Major	Mechanical	Each Per Melt/ HT Batch	Each Per Melt/ HT Batch	100% area of the casting	100% area of the casting	HY19593	HY19593	Test Certificate	✓	P	W	V	Test sample of each casting
3.2	-- do --	Magnetic Particle Inspection	Major	NDE/MPI	100% area of the casting	100% area of the casting	100% area of the casting	100% area of the casting	HY19593	HY19593	Test Report	✓	P	W	V	
3.5	-- do --	Final Dimensions Inspection	Major	Measrnt	100%	100%	100%	100%	Ordering Drawing	Ordering Drawing	Dimension Report	✓	P	W	V	
3.6	-- do --	Visual Inspection (Surface Finish, Cleaning of internal surfaces, holes etc.)	Major	Visual	100%	100%	100%	100%	MSS SP55	MSS SP55	Test Report	✓	P	V	V	

MARKING																
4.1	Casting Marking	Marking of identification details as per specn	Major	Visual	100%	-	-	-	HY19593	HY19593	-		P	V	-	

PACKING & PRESERVATION									
 MANUFACTURER / SUB-SUPPLIER		 MAIN SUPPLIER		 FOR NTPC USE		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M.MANUFACTURER/SUB-SUPPLIER, C-MAIN SUPPLIER, N-NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE. "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"		DOC.NO. 9915-371-110-HYD-QVM-Q-001 REV.02 CAT - I	
SIGNATURE				REVIEWED BY		APPROVED BY		APPROVAL SEAL	

MANUFACTURING QUALITY PLAN															
 Manufacturer's Name & Address: BHEL Hyderabad-32		Item : 1. MID BFP INNER CASING (HY 19593)		QP : HYQA/MQP/PMP/BFP/547/982 DATE : 08.10.2021		REV. 02 PAGE 9 OF 32		PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) MAIN CONTRACTOR: BHEL - HYDERABAD PACKAGE: TG PACKAGE CONTRACT NO : THDC/RKSH/CC-9915-371							
				QUANTUM OF CHECK M C/N		REFERENCE DOCUMENT		ACCEPTANCE NORMS		FORMAT OF RECORD					
Sl. No.	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	M	C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	M	C	N	AGENCY	REMARKS



5.1	Packing & Preservation	Packing & Preservation	Major	Apply of suitable Anti Corrosive Coating	100%	-	HY19593	HY19593	-			P	V		
-----	------------------------	------------------------	-------	--	------	---	---------	---------	---	--	--	---	---	--	--

**NOTES:**


- 1) Repair of the castings shall not be carried out without prior permission from BHEL
- 2) In case of differing requirements, anomalies, any, specification/drawing shall prevail over quality plan
- 3) This QP is applicable only for approved vendors as per LOA Approved vendor list for THDC, Khurja Project
- 4) This QP is applicable for the main as well as subsequent spare supplies
- 5) For imported vendors, BHEL & NTPC witness shall be considered Verification

**Legend:**



PT : Liquid Penetrant Test, MT : Magnetic Particle Test, UT : Ultrasonic Test, RT : Radiographic Test, HIS : Hydraulic Institute Standard

 MANUFACTURER / SUB-SUPPLIER		FOR NTPC USE				DOC.NO. 9915-371-110-HYD-QVM-Q-001 REV.02 CAT - I	
				SIGNATURE		REVIEWED BY	

LEGEND: \* RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER / SUB-SUPPLIER, C-MAIN SUPPLIER, N-NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE. "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"

MANUFACTURING QUALITY PLANS														
 Manufacturer's Name & Address: BHEL Hyderabad-32		Item :		QP : HYQA/MQP/PMP/BFP/547/983		REV. 02		PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) MAIN CONTRACTOR : BHEL - HYDERABAD PACKAGE: TG PACKAGE CONTRACT NO : THDC/RKSH/CC-9915-371						
		1. TD BFP INNER CASING (HY 19593)		DATE : 08.10.2021		Page 10 of 37								
Sl. No.	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
					M	C/N					M	C	N	

1.0 RAW MATERIALS & BOUGHT OUT ITEMS														
1.1	Raw material for manufacturing	Chemical Composition	Major	Each Melt	100%	-	Material Specn	Material Specn	Record		P	-	-	
2.0 IN-PROCESS INSPECTION														
2.1	Pattern Making	Dimension of Pattern Core Boxes	Critical	Visual, Measurement	100%	-	Ordering Drawing	Ordering Drawing	Pattern Dimn. Report		P	V		
		Moulding	Major	Visual, Measurt, Inspection of Moulds & Cores	100%	-	As per Drawing	As per Drawing	Moulding Record		P	V		
		Melting & Pouring	Major	Chemical	Every Melt	-	HY19593	HY19593	TC	✓	P	V	V	
2.2	Casting	Heat Treatment	Major	HT Cycle Review	100%	-	HY19593	HY19593	HT Graph	✓	P	V	V	



 MANUFACTURER / SUB-SUPPLIER		 FOR NTPC USE		DOC.NO. 9915-371-110-HYD-QVM-Q-002		REV.02		CAT - I	
				REVIEWED BY		APPROVED BY		APPROVAL SEAL	


LEGEND: \* RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M.MANUFACTURER/SUB-SUPPLIER, C-MAIN SUPPLIER, N-NTPC, INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE. "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"

		<b>MANUFACTURING QUALITY PLANS</b>				PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) MAIN CONTRACTOR : BHEL - HYDERABAD PACKAGE: TG PACKAGE CONTRACT NO : THDC/RKSH/CC-9915-371							
		Manufacturer's Name & Address: BHEL Hyderabad-32		Item : 1. TD BFP INNER CASING (HY 19593)		QP : HYQA/MQP/PMP/BFP/547/983 REV. 02 DATE : 08.10.2021		REFERENCE DOCUMENT Page 11 of 37		ACCEPTANCE NORMS FORMAT OF RECORD		AGENCY M C N	

Sl. No.	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		Visual & Hard Punching	Each Per Melt/ HT Batch	Each Per Melt/ HT Batch	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N						* D	M	C	
2.2	-- do --	Identification of Test Sample/Keel Block Identification	Major	Visual & Hard Punching	Each Per Melt/ HT Batch	Each Per Melt/ HT Batch	Visual & Hard Punching	-	Each Per Melt/ HT Batch	HY19593	Identification Report	P	W	V	Stamping by BHEL/TP/IA
		NDT(MPI/DP)	Major	NDE	Each Casting	-	NDE	-	-	HY19593	NDT Report	✓	P	V	
		WPS/PQR/Welder qualification record for repair welding	Major	Record Review	100%	-	Record Review	-	-	HY19593	Welding Records	✓	P	V	BHEL Approved WPS/PQR
		100% NDT on weld repair & hardness survey	Major	NDE	100%	-	NDE	-	-	HY19593 & BHEL Approved WPS/PQR	NDT Report	✓	P	V	
		Stress Relieving	Major	Review	100%	-	Review	-	-	HY19593	ST Chart	✓	P	V	
		Dimensional Inspection (Rough Casting)	Major	Measrt	100%	-	Measrt	-	-	Drawing	Dimension Report	✓	P	V	



**3.0 FINAL INSPECTION AND TESTING**


 MANUFACTURER / SUB-SUPPLIER		 FOR NTPC USE		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M:MANUFACTURER/SUB-SUPPLIER, C-MAIN SUPPLIER, N-NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE. "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"		DOC.NO. 9915-371-110-HYD-QVM-Q-002 REV.02 CAT - I	
				REVIEWED BY		APPROVED BY	

		<b>MANUFACTURING QUALITY PLANS</b>				PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) MAIN CONTRACTOR : BHEL - HYDERABAD PACKAGE: TG PACKAGE CONTRACT NO : THDC/RKSH/CC-9915-371							
		Manufacturer's Name & Address: BHEL Hyderabad-32		Item : 1. TD BFP INNER CASING (HY 19593)		QP : HYQA/MQP/PMP/BFP/547/983 REV. 02 DATE : 08.10.2021		REFERENCE DOCUMENT Page 12 of 37		ACCEPTANCE NORMS FORMAT OF RECORD * D		AGENCY M C N	
Si. No.	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY		REMARKS
					M	C/N				D	M	C	N

3.1	Proof machined casting	Mechanical Properties (Hardness survey on weld repair areas && casting)	Major	Mechanical	Each Per Melt/ HT Batch	Each Per Melt/ HT Batch	HY19593	HY19593	Test Certificate	✓	P	W	W	Test sample of each casting
3.2	-- do --	Magnetic Particle Inspection	Major	NDE/MPI	100% area of the casting	100% area of the casting	HY19593	HY19593	Test Report	✓	P	W	W	
3.5	-- do --	Final Dimensions Inspection	Major	Measrt	100%	100%	Ordering Drawing	Ordering Drawing	Dimension Report	✓	P	W	W	
3.6	-- do --	Visual Inspection (Surface Finish, Cleaning of internal surfaces, holes etc.)	Major	Visual	100%	100%	MSS SP55	MSS SP55	Test Report	✓	P	V	V	

<b>4.0 MARKING</b>														
4.1	Casting Marking	Marking of identification details as per specn	Major	Visual	100%	-	HY19593 R03	HY19593 R03	-		P	V	-	
<b>5.0 PACKING &amp; PRESERVATION</b>														

 MANUFACTURER / SUB-SUPPLIER		MAIN SUPPLIER		SIGNATURE		 FOR NTPC USE		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M.MANUFACTURER/SUB-SUPPLIER, C-MAIN SUPPLIER, N-NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE. "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"		DOC.NO. 9915-371-110-HYD-QVM-Q-002 REV.02 CAT - I		APPROVED BY		APPROVAL SEAL	
								REVIEWED BY		APPROVED BY		APPROVAL SEAL			

MANUFACTURING QUALITY PLANS														
 Manufacturer's Name & Address: BHEL Hyderabad-32		Item : 1. TD BFP INNER CASING (HY 19593)		QP : HYQA/MQP/PMP/BFP/547/983 REV. 02		PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) MAIN CONTRACTOR : BHEL - HYDERABAD PACKAGE: TG PACKAGE CONTRACT NO : THDC/RKSH/CC-9915-371								
		DATE : 08.10.2021		Page 13 of 37										
Sl. No.	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
					M	C/N					M	C	N	



5.1	Packing & Preservation	Packing & Preservation	Major	Apply of suitable Anti Corrosive Coating	100%	-	HY19593 R03	HY19593 R03	-		P	V		
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**NOTES:**

- 1) Repair of the castings shall not be carried out without prior permission from BHEL
- 2) In case of differing requirements, anomalies, any, specification/drawing shall prevail over quality plan
- 3) This QP is applicable only for approved vendors as per LOA Approved vendor list for THDC, Khurja
- 4) This QP is applicable for the main as well as subsequent spare supplies
- 5) For imported vendors, BHEL & NTPC witness shall be considered Verification

**Legend:**

PT : Liquid Penetrant Test, MT : Magnetic Particle Test, UT : Ultrasonic Test, RT : Radiographic Test, HIS : Hydraulic Institute Standard

 MANUFACTURER / SUB-SUPPLIER		FOR NTPC USE				DOC.NO. 9915-371-110-HYD-QVM-Q-002 REV.02 CAT - I	
				REVIEWED BY		APPROVED BY	
LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M-MANUFACTURER/SUB-SUPPLIER, C-MAIN SUPPLIER, N-NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE. "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"							