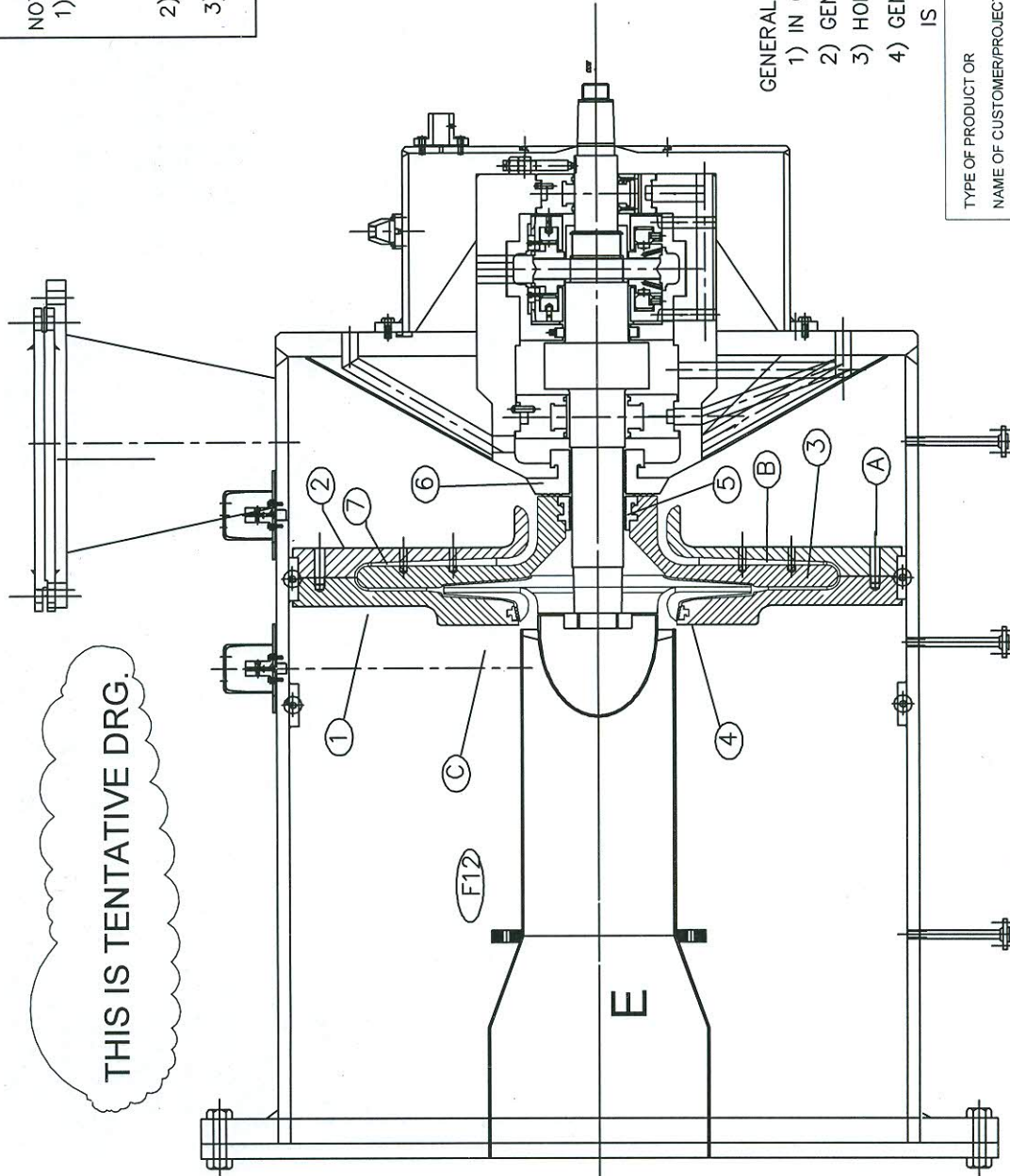


FIRST ANGLE PROJECTION

THIS IS TENTATIVE DRG.



NOTE:  
 1) THIS DRAWING IS STUDY DRAWING WHICH SHOWS THE NEW PARTS TO BE MANUFACTURED FOR F-12 2D IMPELLER TEST RIG.  
 2) ALL DIAPHRAGM SHOULD BE MADE 2062-FE-410-W  
 3) MECHANICAL SEALS SHOULD BE MADE AVONAL-14

FASTENER LIST

ITEM	DESIGNATION	SIZE	QTY.
C	HEX. HEADED BOLT	M12X30L	16
B	HEX. HEADED BOLT	M12X60L	16
A	HEX. HEADED BOLT	M16X85L	16

GENERAL NOTE:

- 1) IN CASE OF DOUBT, DON'T ASSUME, PLEASE ASK.
- 2) GENERAL TOLERANCE  $\pm 0.1$
- 3) HORIZONTAL SPLIT
- 4) GENERAL SURFACE FINISH WHERE IT IS NO MENTIONED IS 3.2 MICRONS.

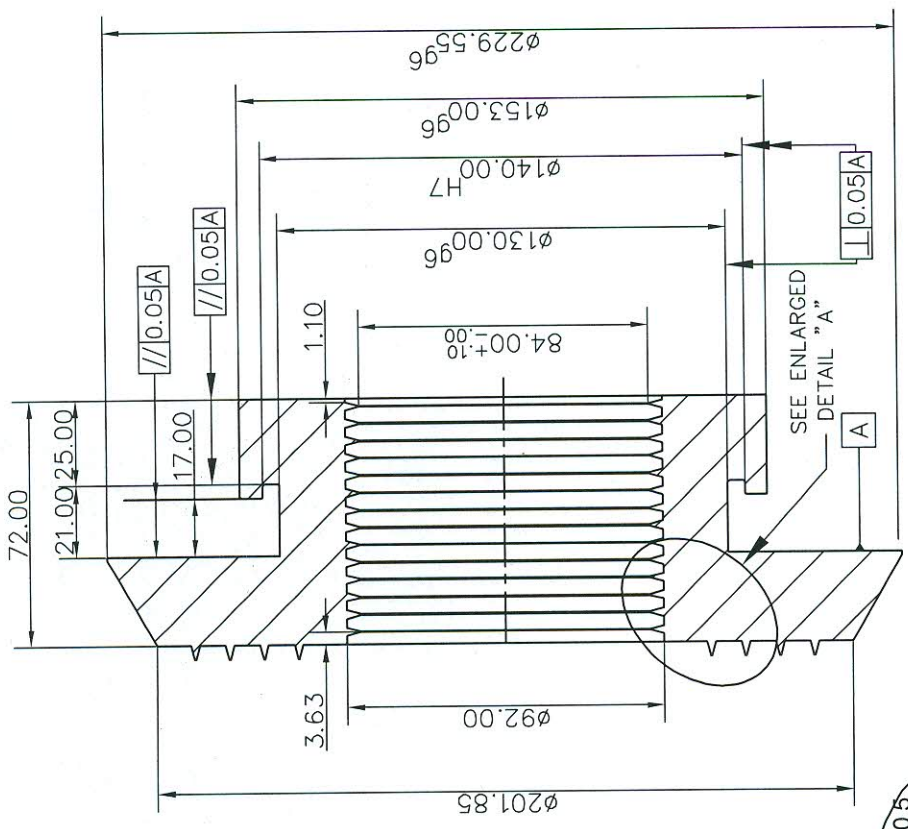
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT  
 PERFORMANCE TESTING OF 500 MM DIA. 2D F12 IMPELLER ( B-F-20-15-752-RD-50 )

	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> Corp. R&D Division, Vikasnagar HYDERABAD - 500 093		NAME	VINAY	SIGN.	AB	DATE	18.04.16	NO. OF VAR.
	DRN.	P. G. SHANKAR	CHD.	P. G. SHANKAR				18.04.16	N.A
	APPD.	P. G. SHANKAR						18.04.16	
DEPT. TML	GR.	CM/F	UNTO. DIMS.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS	NO. OF N.A
050				N.T.S					
TITLE ASSEMBLY OF F-3 DIA. 500 MM 2D IMPELLER STAGE ( STUDY DRAWING ) SECTIONAL FRONT VIEW		DRAWING NO. RD DG 3 TM 16 F12-1A		SHT. No 1		NO. OF SHT. 1		REV. N.A.	

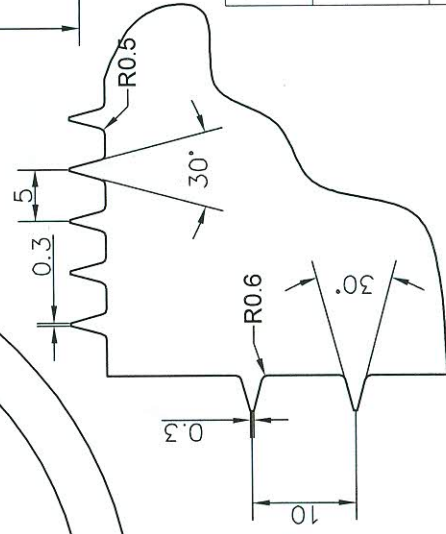
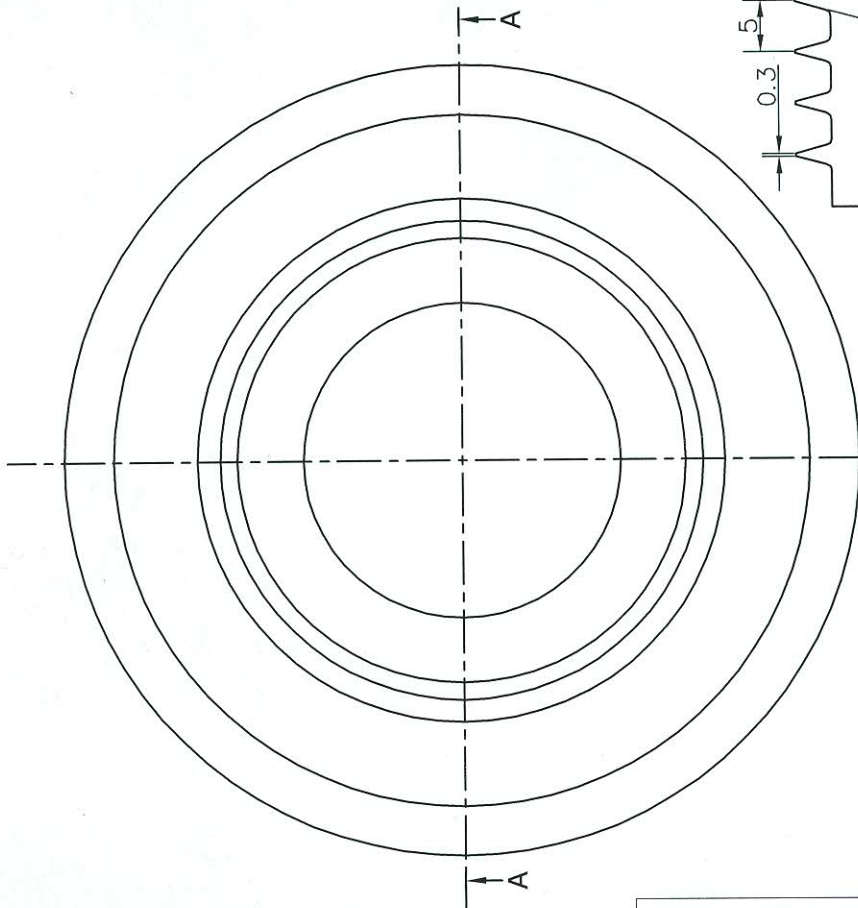
ITEM	DESCRIPTION	DRAWING NO.	NO. OF Sht.	MATERIAL
7	RETURN CHANNEL VANE	RD DG 3 16 F3-9	1	IS: 2062 FE 410 W
6	BEARING SEAL	RD DG 3 16 F3-8	1	AVONAL-14
5	SHAT SEAL	RD DG 3 16 F3-7	1	AVONAL-14
4	IMPELLER SEAL	RD DG 3 16 F3-6	1	AVONAL-14
3	DIAPHRAGM-3	RD DG 3 16 F3-5	1	IS: 2062 FE 410 W
2	DIAPHRAGM-2	RD DG 3 16 F3-4	1	IS: 2062 FE 410 W
1	DIAPHRAGM-1	RD DG 3 16 F3-3	1	IS: 2062 FE 410 W

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN (mm)



SECTION A-A



DETAIL "A"

THIS IS TENTATIVE DRG.

GENERAL NOE:  
 1) IN CASE OF DOUBT, DON'T ASSUME, PLEASE ASK.  
 2) GENERAL TOLERANCE ± 0.1  
 3) HORIZONTAL SPLIT  
 4) MATERIAL: AVIONAL-14  
 5) GENERAL SURFACE FINISH WHERE IT IS NOT MENTIONED IS 3.2 MICRONS.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		PERFORMANCE TESTING OF 500 MM DIA. 2D F3 IMPELLER ( B-F-20-15.752-RD-50 )	
DEPT. TML CODE 050	UNTO. DIMS. GR. C/MIF	SCALE N.T.S.	WEIGHT (KG)
Bharat Heavy Electricals Limited Corp. R&D Division, Vikasnagar HYDERABAD - 500 093		RD DG 3 TM 16 F12-1A	
DRN. VINAY KUMAR		SIGN. <i>VB</i>	DATE 18.04.16
CHD. P. G. SHANKAR		SIGN. <i>PVS</i>	DATE 18.04.16
APPD. P. G. SHANKAR		SIGN. <i>PVS</i>	DATE 18.04.16
NO. OF ITEMS N/A		REF. TO ASSY. DRG.	NO. OF SHEETS 1
CARD CODE N.A.		DRAWING NO.	REV. 01
TITLE BEARING SEAL		RD DG 3 TM 16 F12-8	

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COMPUTER FILE NAME 93320900169-500-R00.DWG

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

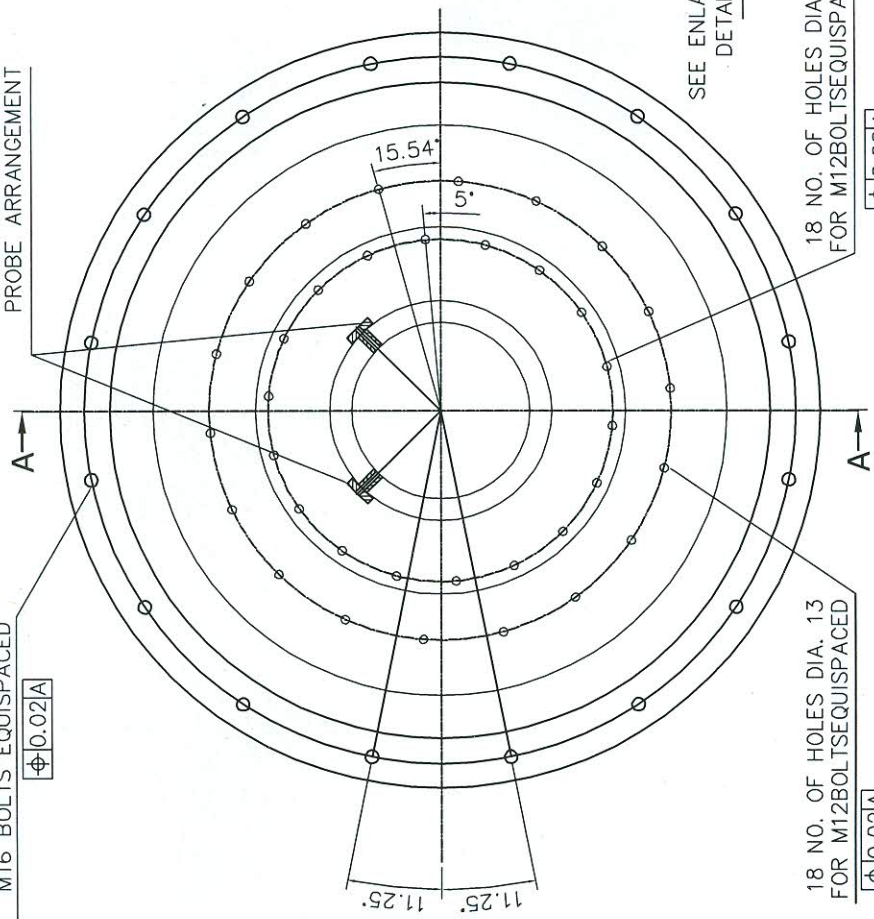
INVENTORY NO



FIRST ANGLE PROJECTION

16 NO OF HOLES DIA.18 FOR M16 BOLTS EQUISPACED

MECHANISM FOR PROBE ARRANGEMENT



$\Phi 0.02A$

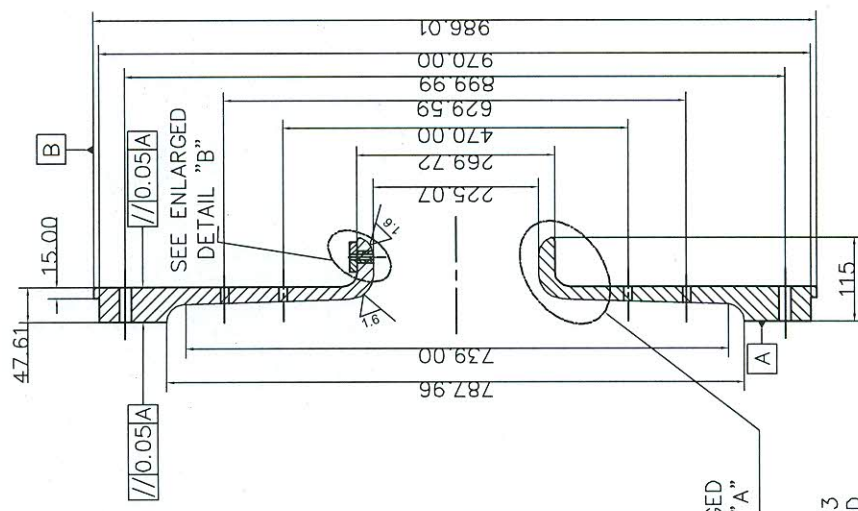
18 NO. OF HOLES DIA. 13 FOR M12BOLTSEQUISPACED

$\Phi 0.02A$

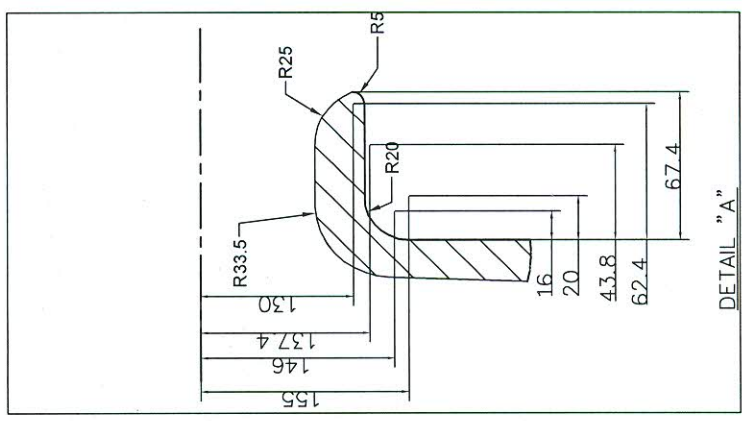
18 NO. OF HOLES DIA. 13 FOR M12BOLTSEQUISPACED

$\Phi 0.02A$

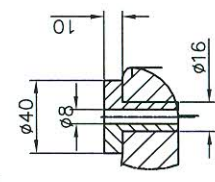
SEE ENLARGED DETAIL "A"



SEE ENLARGED DETAIL "B"



DETAIL "A"



DETAIL "B"

SPLIT IN TO TWO PARTS

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		PERFORMANCE TESTING OF 500 MM DIA. 2D F12 IMPELLER ( B-F-20-15-752-RD-50 )			
DRN.	VINAY KUMAR	SIGN.	AS	DATE	18.04.16
CHD.	P. G. SHANKAR	SIGN.	P.G.	DATE	18.04.16
APPD.	P. G. SHANKAR	SIGN.	P.G.	DATE	18.04.16
DEPT. TML.		WEIGHT (KG)		REF. TO ASSY. DRG.	
CODE 050		SCALE	N.T.S.	ITEM NO.	
		UNTO. DIMS. GR. C/MIF		RD DG 3 TM 16 F12-1A	
				RD DG 3 TM 16 F12-4	
TITLE		DIAPHRAM PART-2			
INVENTORY NO		CARD CODE	DRAWING NO.		
		N.A.	RD DG 3 TM 16 F12-4		
			SHT. No	1	NO. OF SHT. 1
			REV.		00

THIS IS TENTATIVE DRG.

- GENERAL NOTE:
- 1) IN CASE OF DOUBT, DON'T ASSUME, PLEASE ASK.
  - 2) GENERAL TOLERANCE  $\pm 0.1$
  - 3) HORIZONTAL SPLIT
  - 4) MATERIAL: IS: 2062 FE 410 W
  - 5) GENERAL SURFACE FINISH WHERE IT IS NO MENTIONED IS 3.2 MICRONS.

ALL DIMENSIONS ARE IN MM

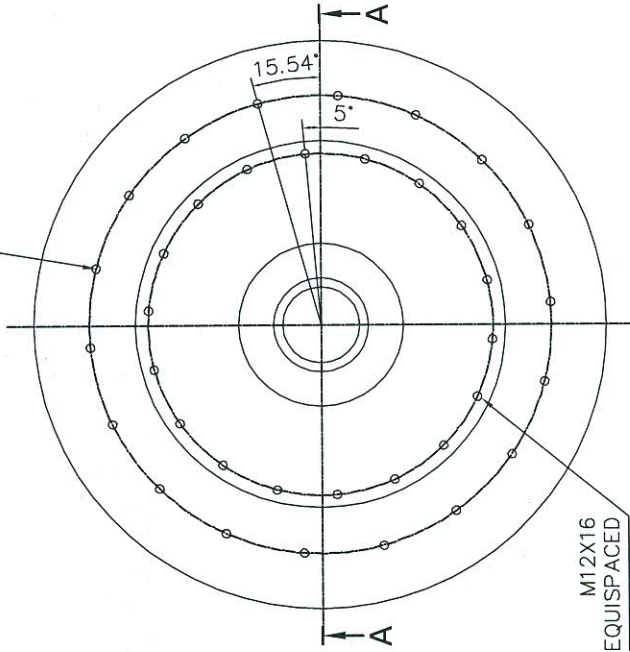
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN (MM)

THIS IS TENTATIVE DRG.

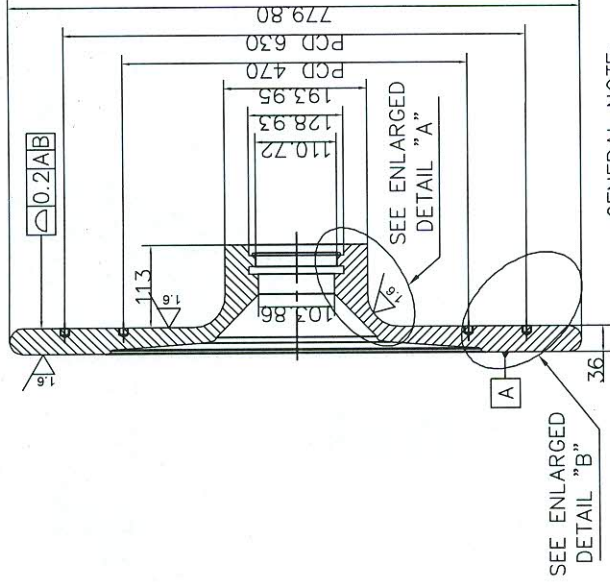
M12X16  
EQUISPACED

Φ0.02A



M12X16  
EQUISPACED

Φ0.02A

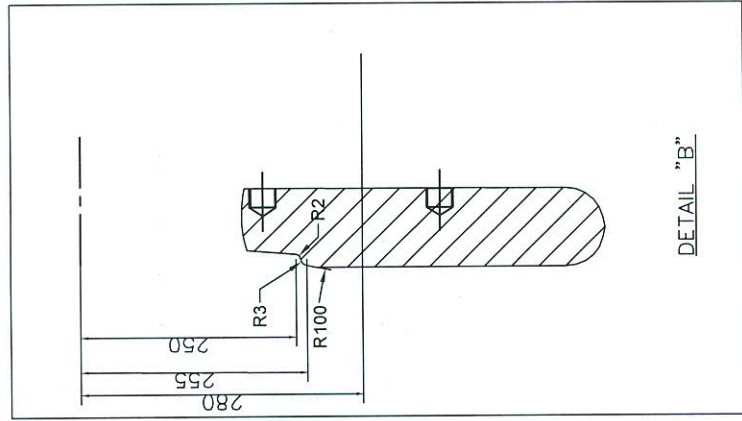


SEE ENLARGED  
DETAIL "B"

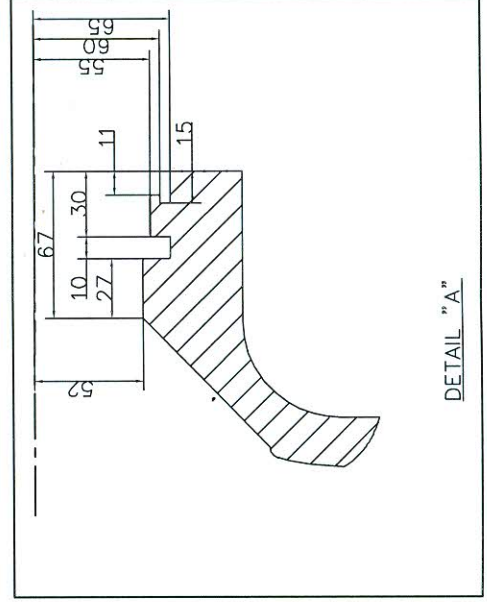
SECTION A-A

GENERAL NOTE:

- 1) IN CASE OF DOUBT, DON'T ASSUME, PLEASE ASK.
- 2) GENERAL TOLERANCE ± 0.1
- 3) HORIZONTAL SPLIT
- 4) MATERIAL: IS: 2062 FE 410 W
- 4) GENERAL SURFACE FINISH WHERE IT IS NO MENTIONED IS 3.2 MICRONS.



DETAIL "B"



DETAIL "A"

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		PERFORMANCE TESTING OF 500 MM DIA. 2D F12 IMPELLER ( B-F-20-15-752-RD-50 )			
	DRN.	NAME	SIGN.	DATE	NO OF VAR.
	CHD.	VINAY KUMAR	AS	18.04.16	N.A
	APPD.	P. G. SHANKAR	P.G.	18.04.16	N.A
DEPT. TML. CODE 050	UNTO. DIMS. GR. C/M/F	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO OF ITEMS
			RD DG 3 TM 16 F12-1A		N.A
TITLE		DRAWING NO.		REV.	
DIAPHRAM PART-3		RD DG 3 TM 16 F12-5		00	
N.A.		SHT. No	1	NO. OF SHT. 1	

INVENTORY NO

SIGN. AND DATE

REF. DRG. NO.

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DEPT. I.T.D. CODE 415		UNTO. DIM. GR. c/m/f		SCALE NTS		WEIGHT (KG) REF. TO ASSY DRG.		DRAWING NO. RD DG 4 TM 16 F3-1-2		SHT No. 1 NO OF SHT. 1	
DEPT. I.T.D. CODE 415		UNTO. DIM. GR. c/m/f		SCALE NTS		WEIGHT (KG) REF. TO ASSY DRG.		DRAWING NO. RD DG 4 TM 16 F3-1-2		SHT No. 1 NO OF SHT. 1	
DEPT. I.T.D. CODE 415		UNTO. DIM. GR. c/m/f		SCALE NTS		WEIGHT (KG) REF. TO ASSY DRG.		DRAWING NO. RD DG 4 TM 16 F3-1-2		SHT No. 1 NO OF SHT. 1	
DEPT. I.T.D. CODE 415		UNTO. DIM. GR. c/m/f		SCALE NTS		WEIGHT (KG) REF. TO ASSY DRG.		DRAWING NO. RD DG 4 TM 16 F3-1-2		SHT No. 1 NO OF SHT. 1	



BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

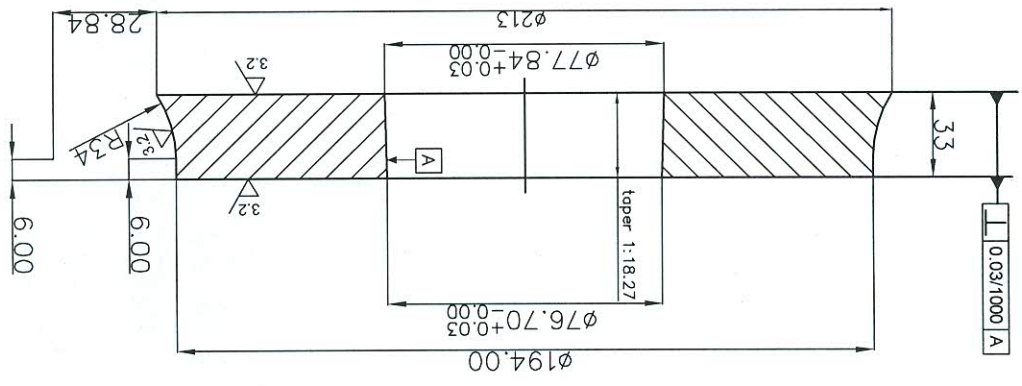
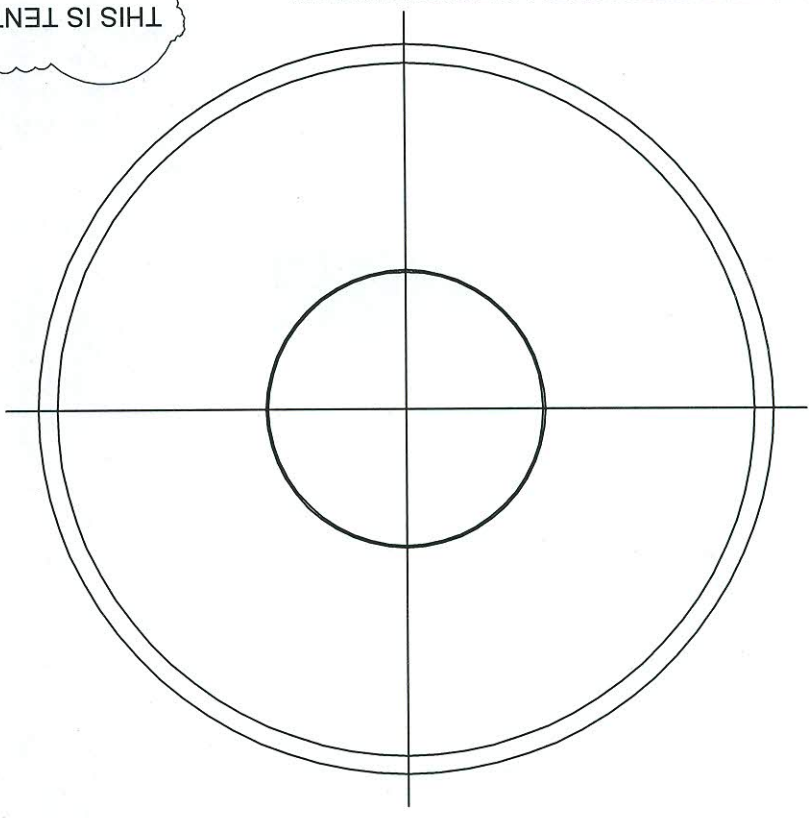
REMARKS	ITEM NO	DESCRIPTION	STD	MATL. CODE	MATL. SPEN.	C	A	UNIT	QTY.

NO. OF VAR.	18.04.16	DRN.	VINAY KUMAR	NAME		SIGN.		DATE	18.04.16
NO. OF	18.04.16	CHD.	P.G.S						18.04.16
ITEM	18.04.16	APPD.	P.G.S						18.04.16

NOTE:-

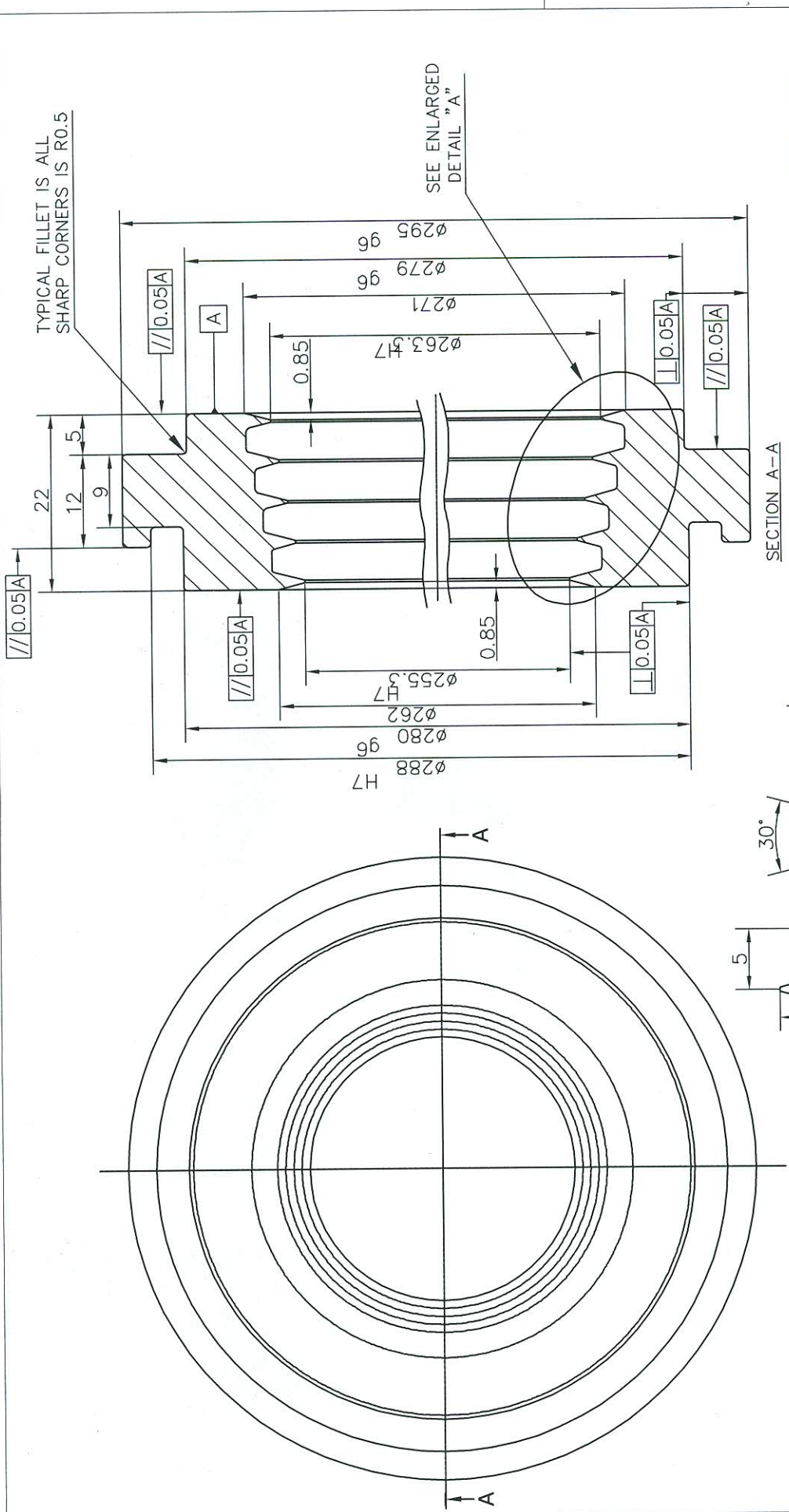
1. MATERIAL IS TO BE HEAT TREATED TO A HARDNESS 230/260 BHN.
2. CONCENTRICITY ON ALL DIAMETERS W.R.F. (A) IS 0.02
3. GENERAL TOLERANCE IS ±0.1MM

THIS IS TENTATIVE DRG.



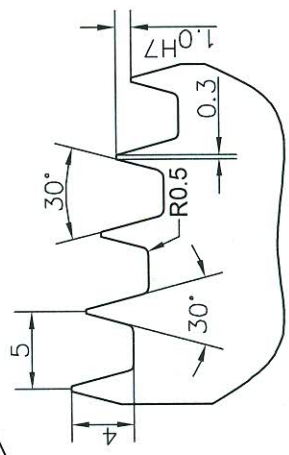
FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

FIRST ANGLE PROJECTION



ALL DIMENSIONS ARE IN (mm)

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		PERFORMANCE TESTING OF 500 MM DIA. 2D F12 IMPELLER ( B-F-20-15.752-RD-50 )	
DEPT. TML CODE 050	UNTO. DIMS. GR. C/M/F	SCALE N.T.S.	WEIGHT (KG)
Bharat Heavy Electricals Limited Corp. R&D Division, Vikasnagar HYDERABAD - 500 093		RD DG 3 TM 16 F12-1A	
TITLE <b>IMPELLER SEAL</b>		CARD CODE N.A.	REV. 00
DRAWING NO. RD DG 3 TM 16 F12-6		SHT. No 1	NO. OF SHT. 1
DRN. VINAY KUMAR	CHD. P. G. SHANKAR	APPD. P. G. SHANKAR	REF. TO ASSY. DRG.
SIGN. <i>[Signature]</i>	SIGN. <i>[Signature]</i>	SIGN. <i>[Signature]</i>	SIGN. <i>[Signature]</i>
DATE 18.04.16	DATE 18.04.16	DATE 18.04.16	DATE 18.04.16
NO. OF VAR. N.A.	NO. OF ITEMS N.A.	NO. OF SHT. N.A.	NO. OF SHT. N.A.



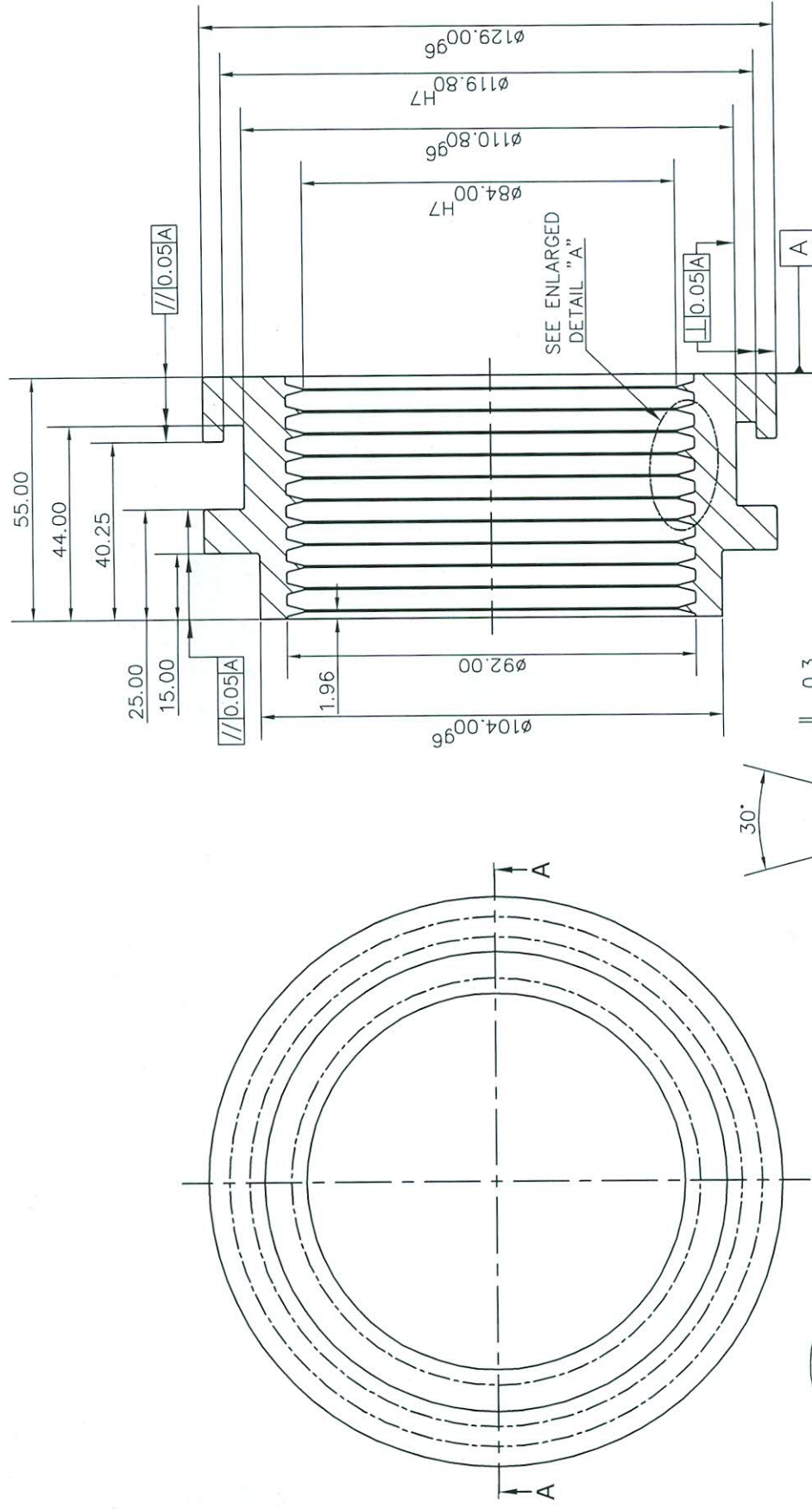
**THIS IS TENTATIVE DRG.**

GENERAL NOE:

- 1) IN CASE OF DOUBT, DON'T ASSUME, PLEASE ASK.
- 2) GENERAL TOLERANCE  $\pm 0.1$
- 3) HORIZONTAL SPLIT
- 4) MATERIAL: AVONAL-14
- 5) GENERAL SURFACE FINISH WHERE IT IS NOT MENTIONED IS 3.2 MICRONS.
- 6) SEAL DIMENSIONS SHOULD BE MATCHED WITH THE CORRESPONDING GROOVE IN THE DIAPHRAGM-1.

ALL DIMENSIONS ARE IN (mm)

FIRST ANGLE PROJECTION



SECTION A-A

**THIS IS TENTATIVE DRG.**

GENERAL NOE:

- 1) IN CASE OF DOUBT, DON'T ASSUME, PLEASE ASK.
- 2) GENERAL TOLERANCE  $\pm 0.1$
- 3) HORIZONTAL SPLIT
- 4) MATERIAL: AVIONAL-14
- 5) GENERAL SURFACE FINISH WHERE IT IS NOT MENTIONED IS 3.2 MICRONS.
- 6) SEAL DIMENSIONS SHOULD BE MATCHED WITH THE CORRESPONDING GROOVE IN THE DIAPHRAGM-2.

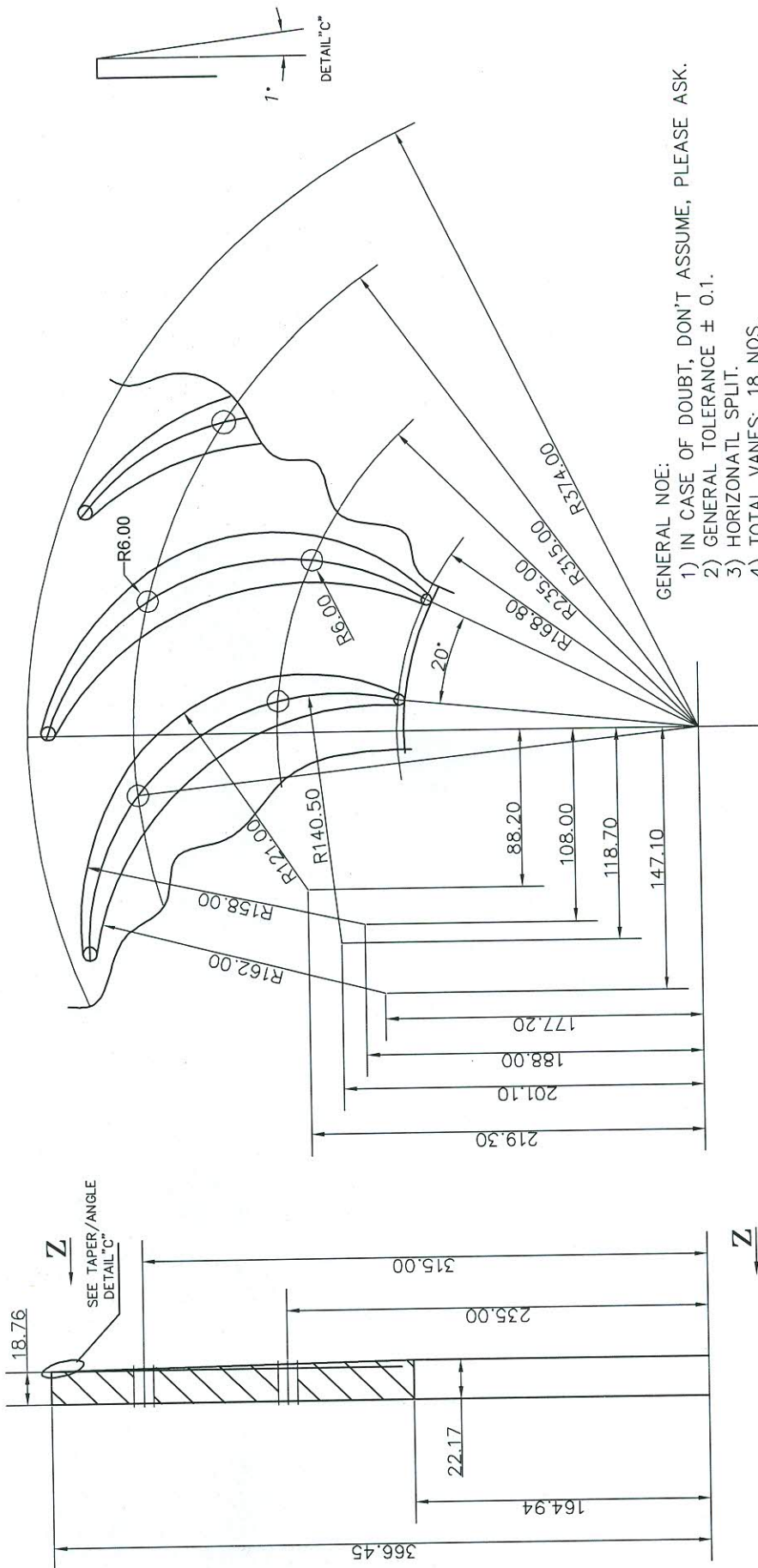
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		PERFORMANCE TESTING OF 500 MM DIA. 2D F12 IMPELLER ( B-F-20-15-752-RD-50 )	
DEPT. TML 050	UNTOLED DIMS. GR. C/M/F	SCALE N.T.S.	WEIGHT (KG)
TITLE		RD DG 3 TM 16 F12-1A	
SHAFT SEAL		CARD CODE	DRAWING NO.
		N.A.	RD DG 3 TM 16 F12-7
		NO. OF SHT.	NO. OF SHT.
		1	1
		NO. OF ITEMS	NO. OF ITEMS
		N.A.	N.A.
		DATE	DATE
		18.04.16	18.04.16
		SIGN.	SIGN.
		AB	AB
		NAME	NAME
		VINAY KUMAR	VINAY KUMAR
		DRN.	DRN.
		P. G. SHANKAR	P. G. SHANKAR
		CHD.	CHD.
		P. G. SHANKAR	P. G. SHANKAR
		APPD.	APPD.
		P. G. SHANKAR	P. G. SHANKAR
		REF. TO ASSY. DRG.	REF. TO ASSY. DRG.
		RD DG 3 TM 16 F12-1A	RD DG 3 TM 16 F12-1A
		ITEM NO.	ITEM NO.
		11	11
		NO. OF VAR.	NO. OF VAR.
		N.A.	N.A.
		REV.	REV.
		00	00



**BHARAT HEAVY ELECTRICALS LIMITED**  
 Corp. R&D Division, Vikasnagar  
 HYDERABAD - 500 093

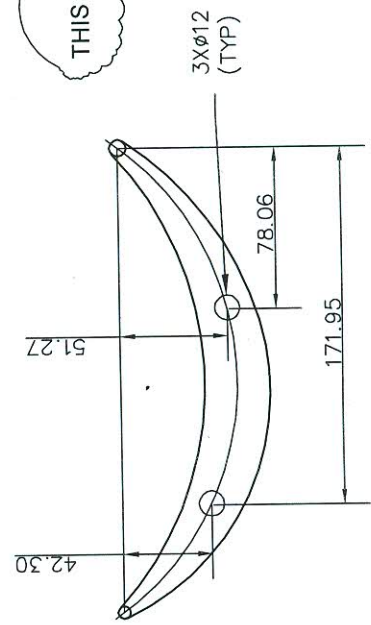
ALL DIMENSIONS ARE IN (MM)

FIRST ANGLE PROJECTION



GENERAL NOE:  
 1) IN CASE OF DOUBT, DON'T ASSUME, PLEASE ASK.  
 2) GENERAL TOLERANCE  $\pm$  0.1.  
 3) HORIZONTAL SPLIT.  
 4) TOTAL VANES: 18 NOS.  
 4) MATERIAL: IS: 2062 FE 410 W.  
 4) GENERAL SURFACE FINISH WHERE IT IS NOT MENTIONED IS 3.2 MICRONS.

THIS IS TENTATIVE DRG.



TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		PERFORMANCE TESTING OF 500 MM DIA. 2D F3 IMPELLER ( B-F-20-15-752-RD-50 )	
DRN.	NAME	SIGN.	DATE
CHD.	VINAY KUMAR	AS	18.04.16
APPD.	P. G SHANKAR	P	18.04.16
	P. G SHANKAR	P	18.04.16
DEPT. TML CODE 050	UNTO. DIMS. GR. CM/F	WEIGHT (KG)	NO. OF ITEMS
		RD DG 3 TM 15 F12-1A	N.A
TITLE		CARD CODE	REV.
RETURN CHANNEL VANES		RD DG 3 TM 16 F12-9	00
		SHT. No	NO. OF SHT.
		1	1

**BHARAT HEAVY ELECTRICALS LIMITED**  
 Corp. R&D Division, Vikasnagar  
 HYDERABAD - 500 093

