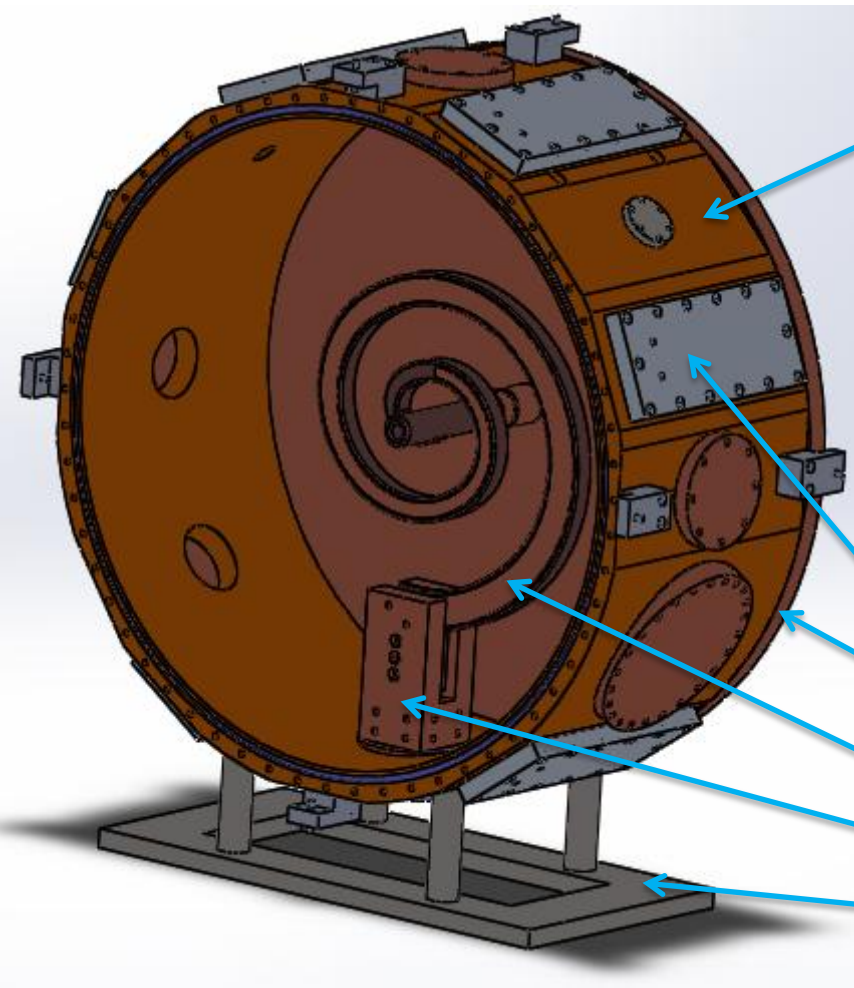


# Spiral Buncher



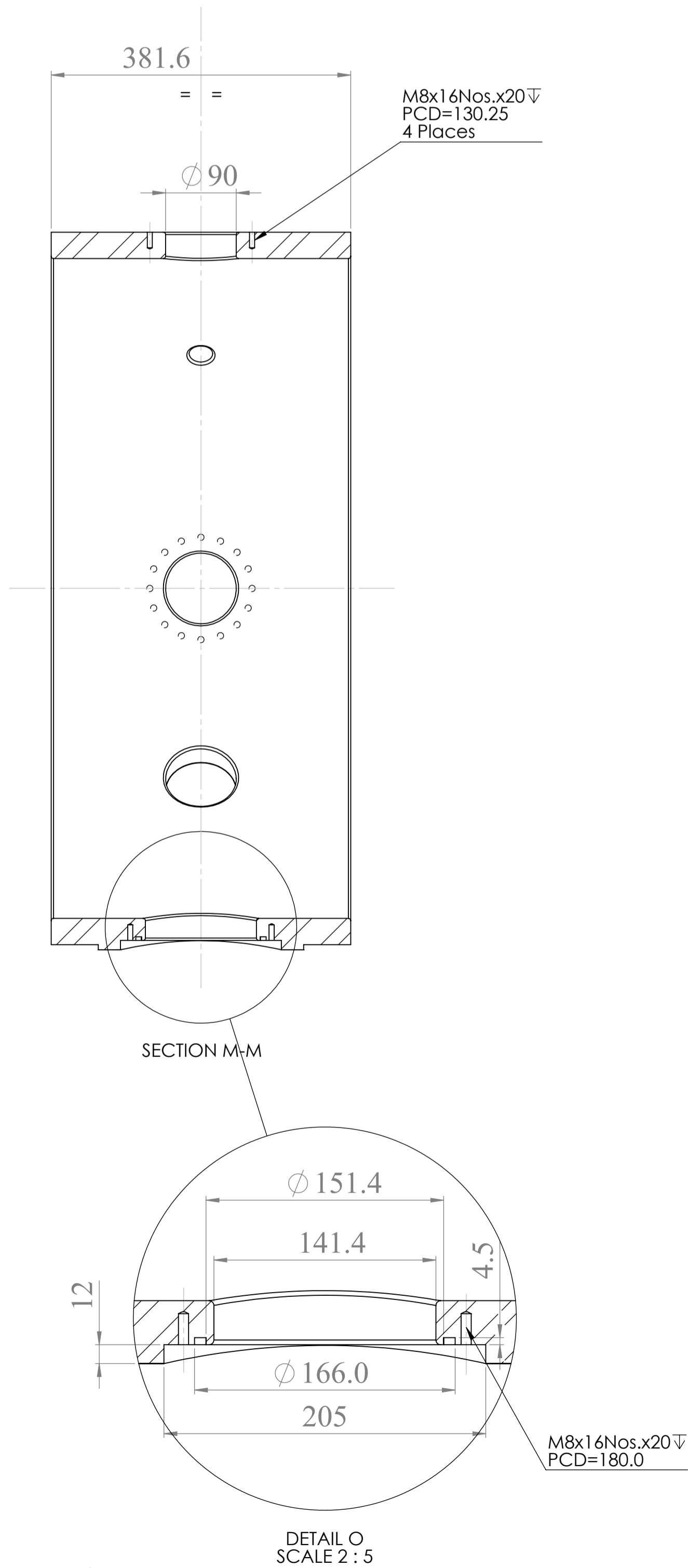
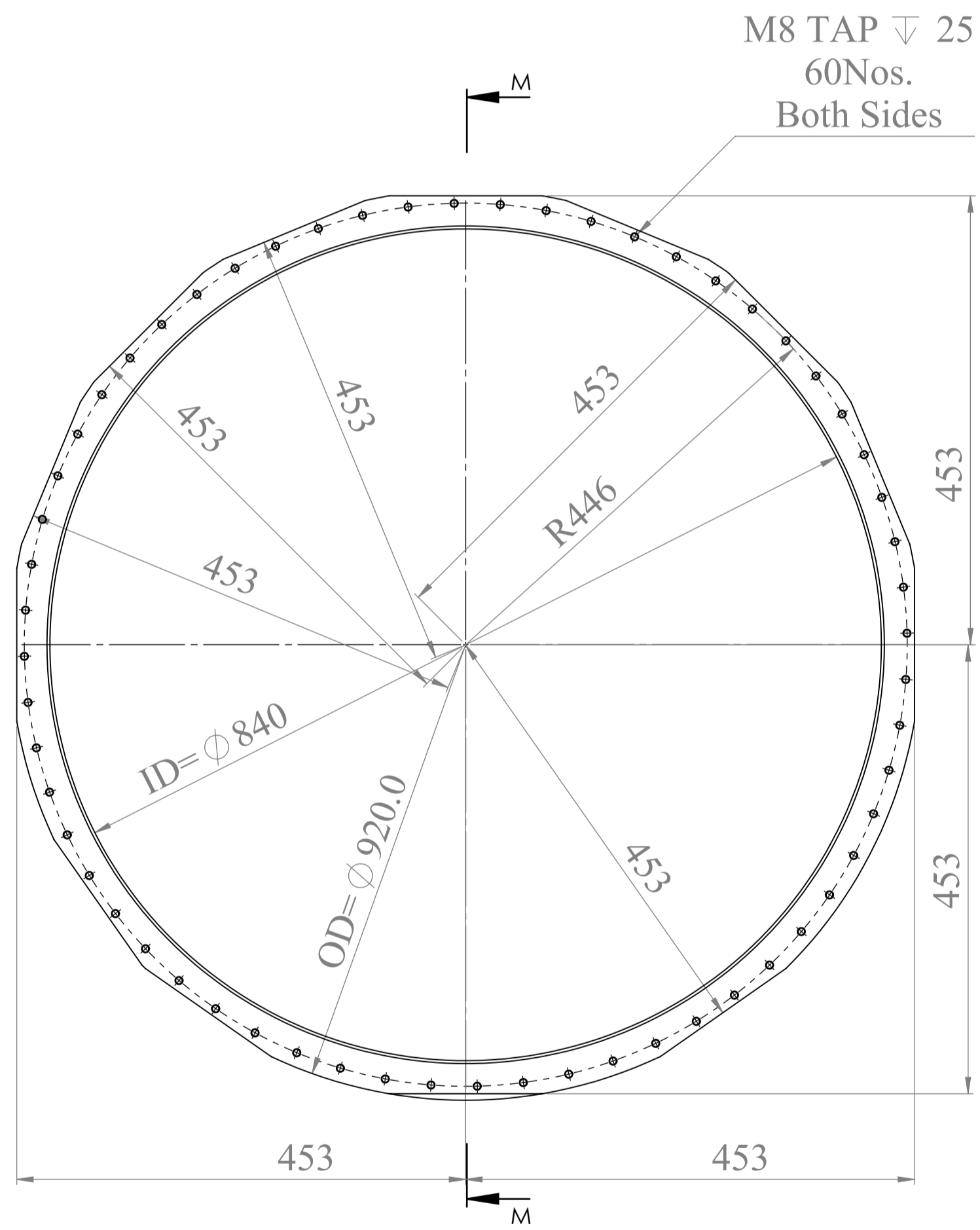
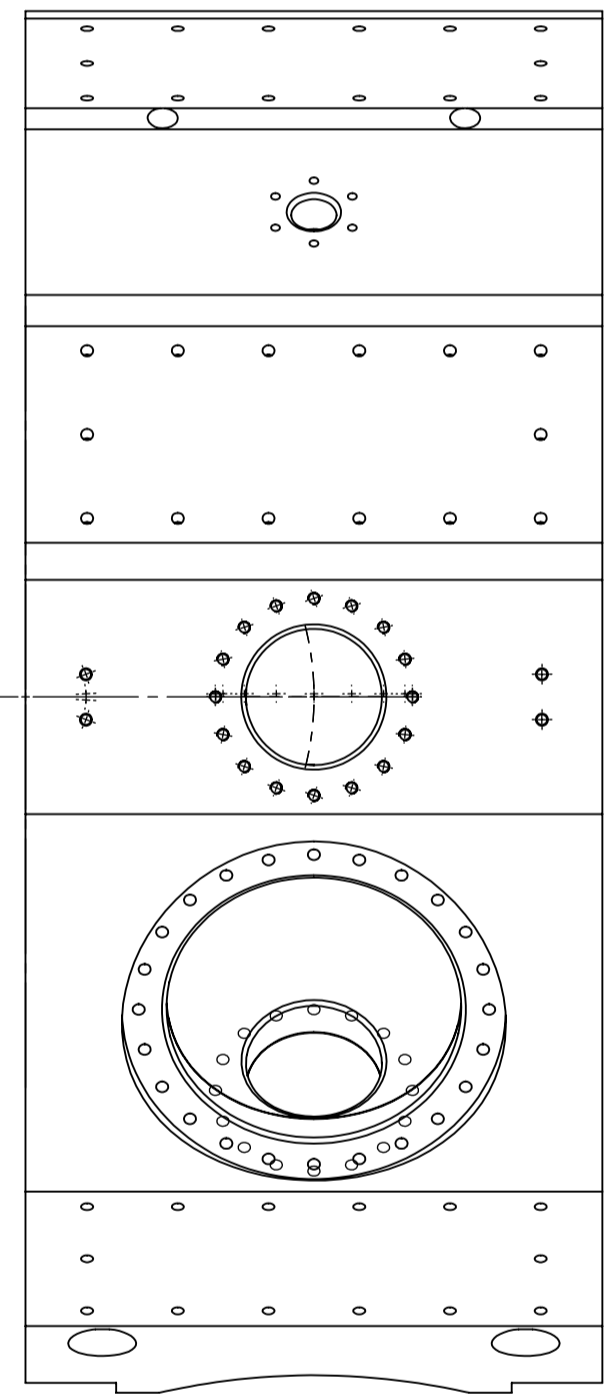
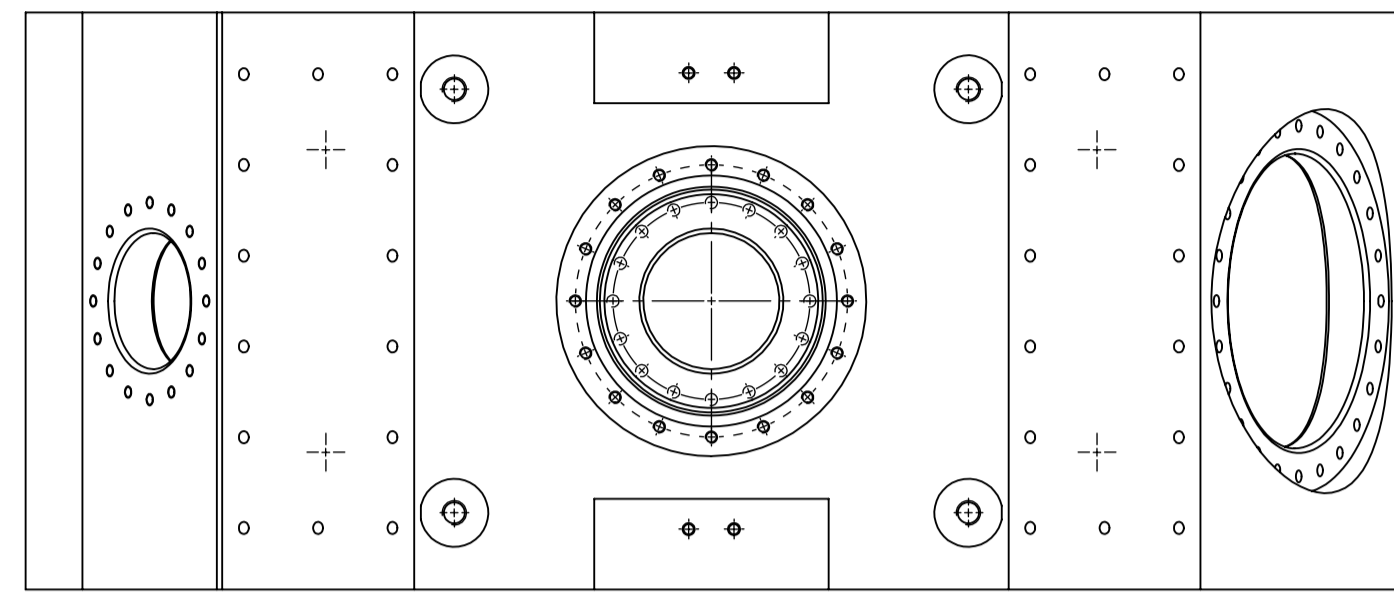
## Vacuum Chamber (Cu Plated)

- a) Material – Forged low carbon steel AISI 1020 / SA 105 or equivalent
- b) Internal Dia = 840 mm
- c) Wall Thickness = 40mm
- d) Length = 381mm
- e) No. of Ports :
- f) DN-40 – 2Nos.
- g) DN-100 – 4 Nos.
- h) DN-200 – 1No.

**Cooling Plates – Matl – AL, Qty. 6 on tank & 4 on End Plates**  
**End Plates – IUAC supplied OFHC Cu**

**Spiral – Matl- ETP Cu.**  
**Stem – Matl – ETP-Cu**  
**Base Plate – M.S.**

Drawing No. - IUAC/ HEBT/BUN /01  
Assembly

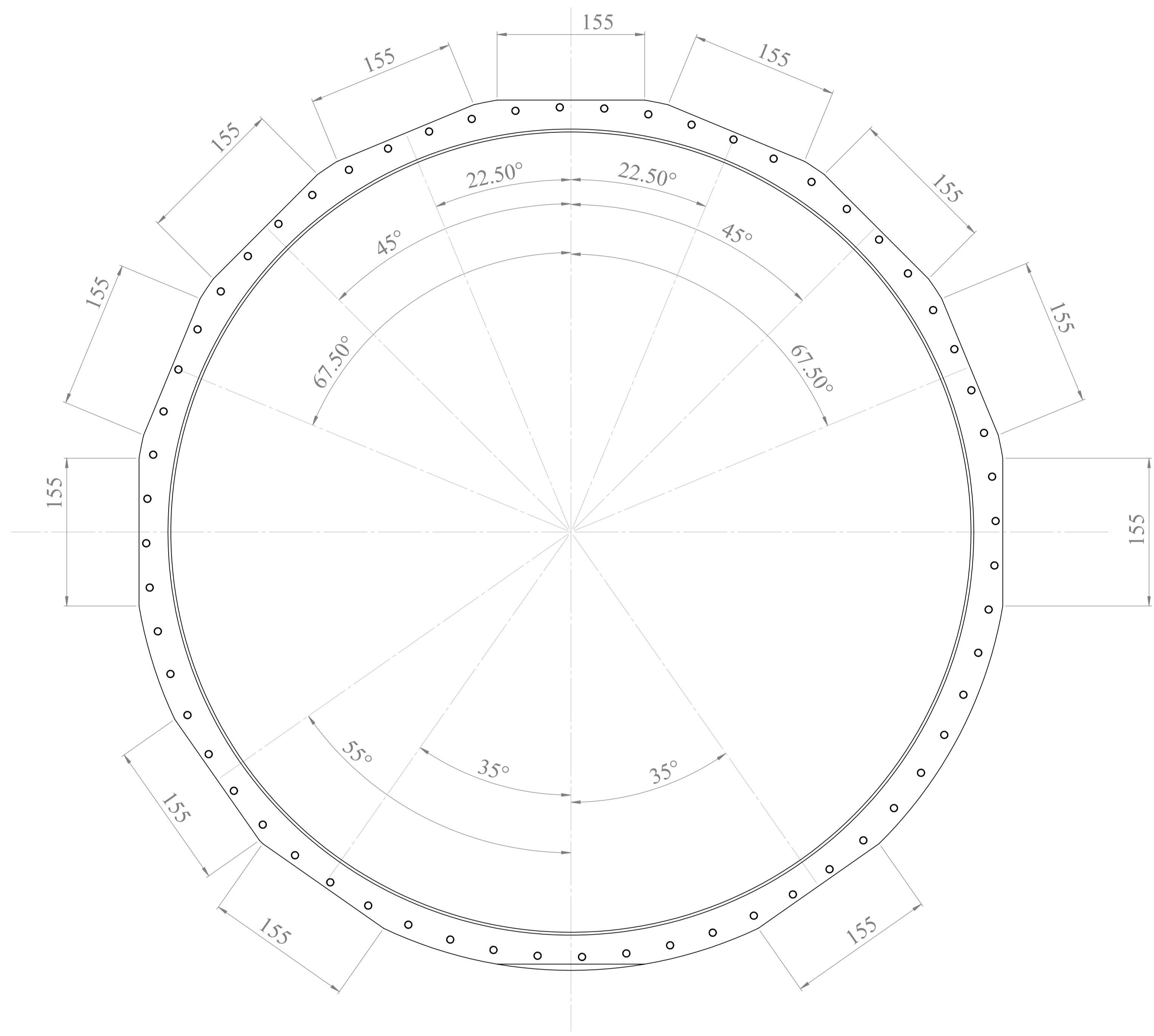


**Note :**

1. Overall length, internal diameter and circularity of the chamber has to be maintained within an accuracy of 1.0 mm
2. No dent or scratch will be tolerated on inside surface of the chamber, O ring grooves and the surfaces which seal the rubber O rings.
3. Vacuum Testing:- The vacuum chambers will be subjected to leak testing in front of IUAC personnel once at vendor's site and once at IUAC site after delivery and helium leak rate should be better than  $1 \times 10^{-9}$  mbar.lt/sec. Ultimate vacuum of the chambers should be better than  $1 \times 10^{-8}$  torr.
4. **Electro plating of the Chamber**
  - a. Copper plating of external and internal surface of the tank as per the specification.
  - b. The thickness of copper deposition on inner surfaces of the chamber should be 100 microns (tolerance of  $\pm 10$  microns) and it should be uniform all over inside and thickness of copper deposition on outer surfaces of the chamber should be minimum 50 microns. Thickness uniformity is not crucial for outside surface of the chamber, where RF is not flowing.
  - c. f. The surface roughness inside the chamber and port bores should be better than Ra value of 1.0 microns
  - d. g. The plating should not peel-off while polishing, buffing and otherwise.
  - e. h. Also the plating should withstand with RF powering up to 10KW or heating up to 80 degree C of uniform heating.

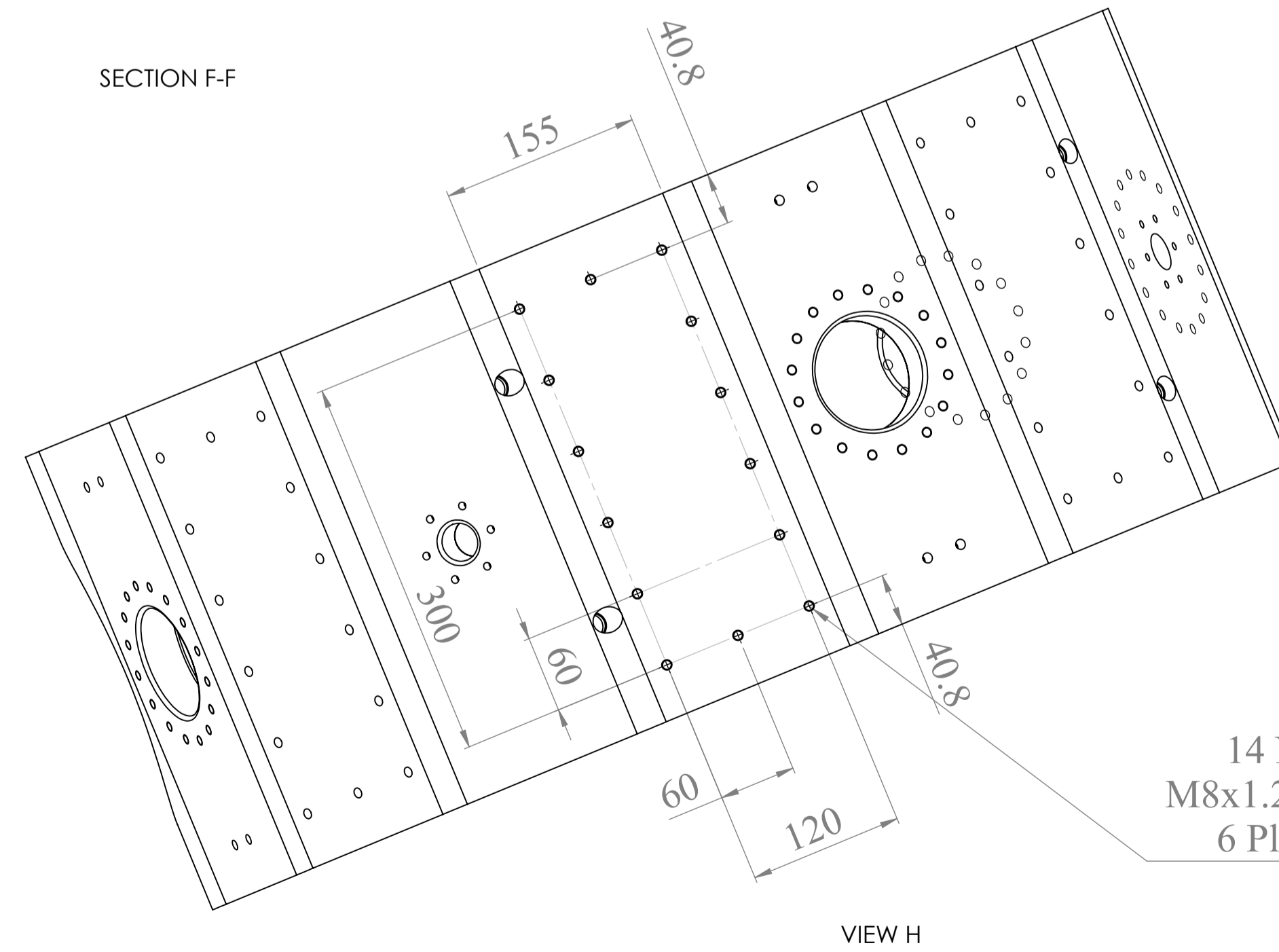
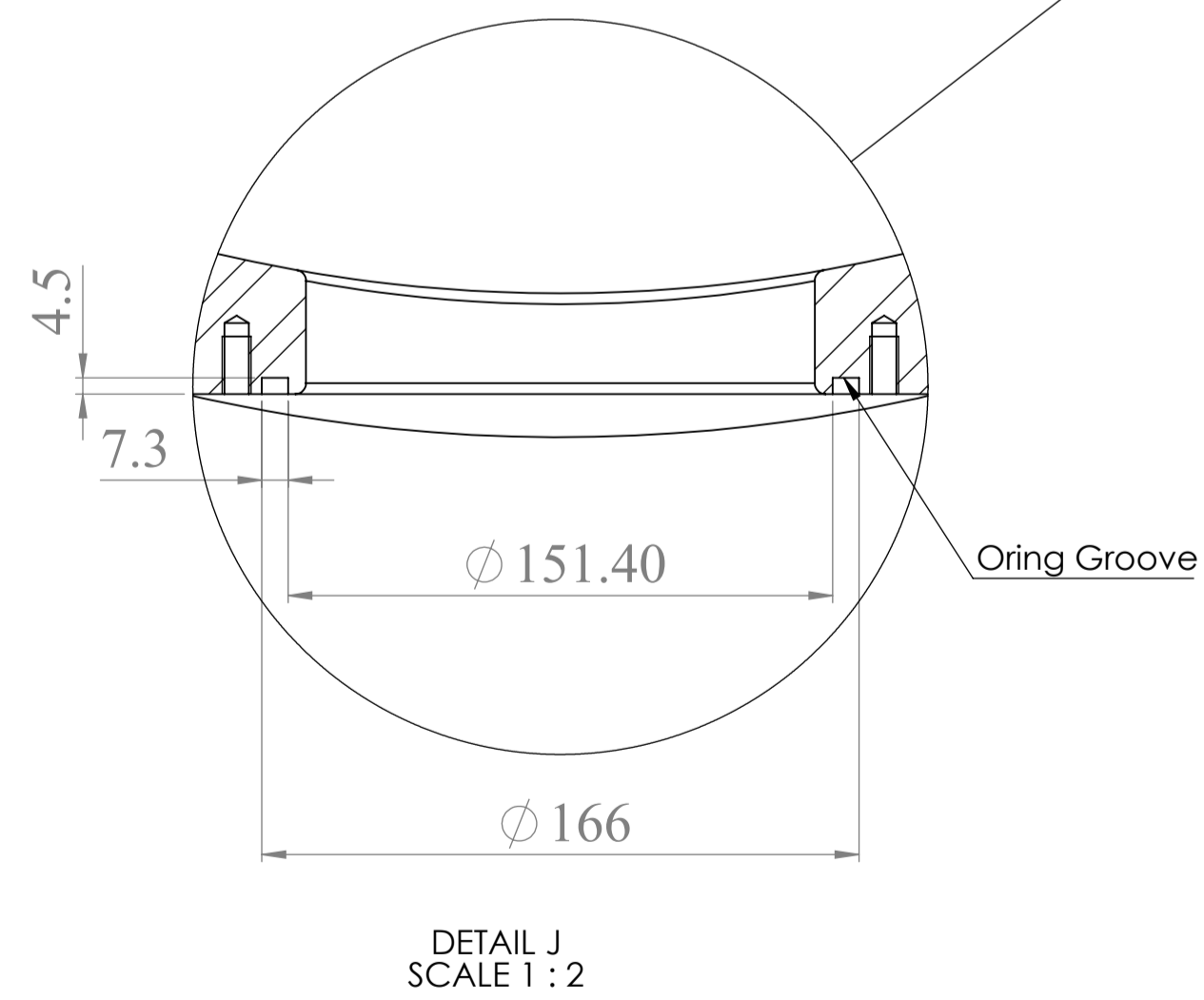
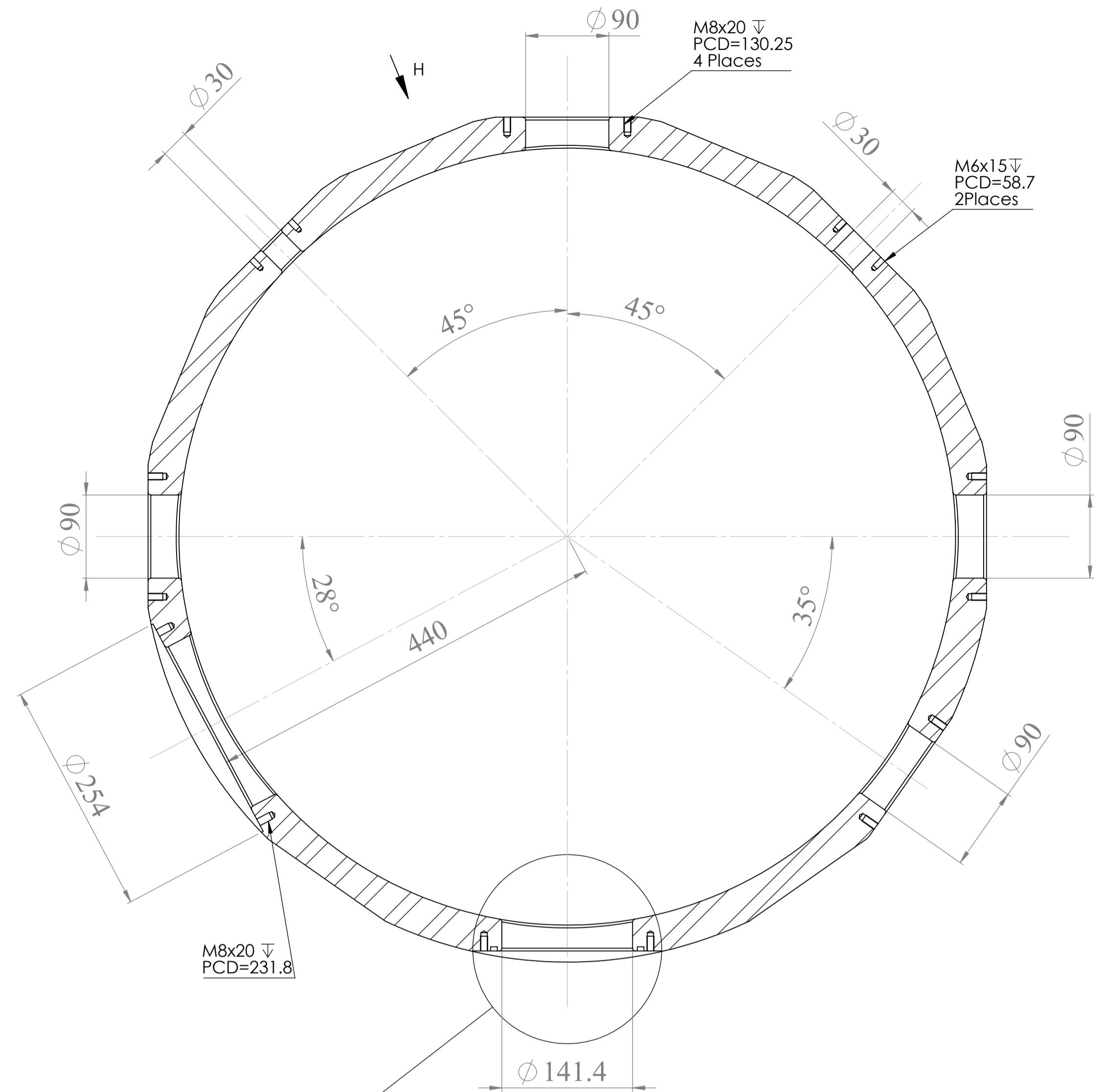
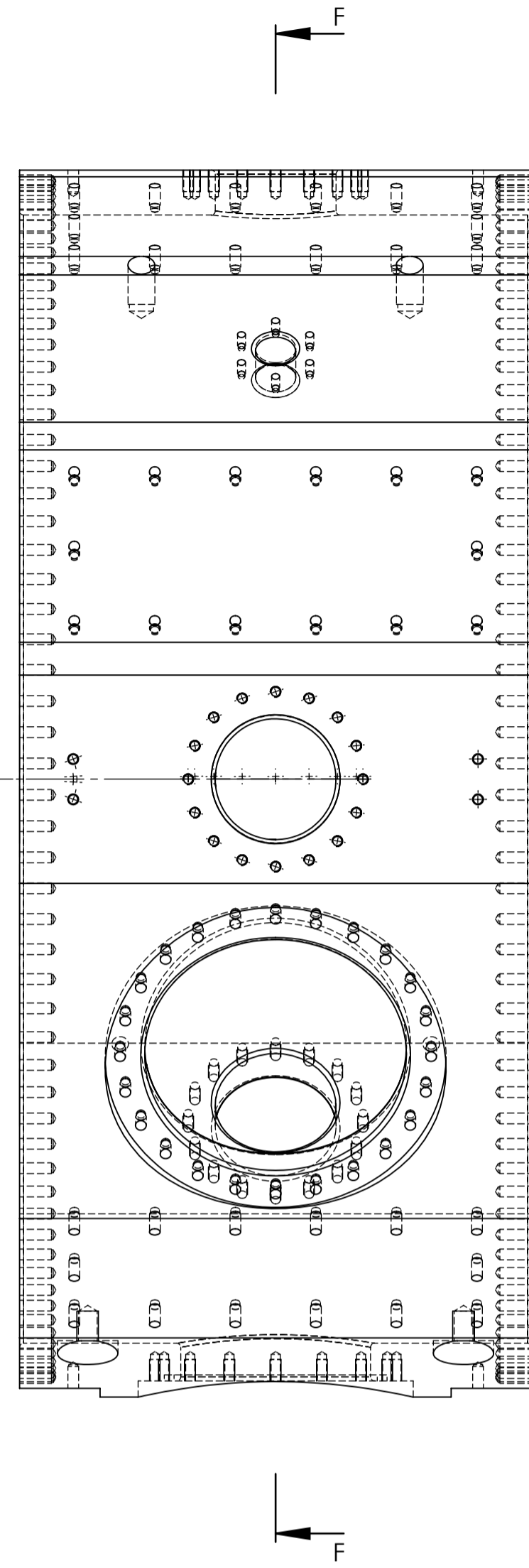
DRAWINGS FOR ESTIMATION PUPOSE ONLY

TOLERANCES				DEBUR AND BREAK SHARP EDGES		Inter University Accelerator Centre Formerly : Nuclear Science Centre New Delhi - 110067	
ONE PLACE DECIMAL	TWO PLACE DECIMAL	FRACTIONAL	ANGULAR	ALL DIMENSIONS ARE IN MM		TITLE	
$\pm 0.1\text{mm}$	$\pm 0.02\text{mm}$	$\pm 0.02\text{deg}$				<b>VACUUM CHAMBER</b>	
						<b>Main View</b>	
DRAWN	NAME	SIGNATURE	DATE			DWG NO.	IUAC/HEBT/BUN /02
CHKD			4.12.19				A1
APPVD						MATERIAL: Forged low carbon steel AISI 1020 / SA-105 or equivalent	
MFG						Qty : 2 Nos.	
QA						WEIGHT:	
				SCALE:1:5		SHEET 1 OF 3 Rev - 1	



DRAWINGS FOR ESTIMATION PUPOSE ONLY

TOLERANCES:		DEBUR AND BREAK SHARP EDGES		Inter University Accelerator Centre Formerly : Nuclear Science Centre New Delhi - 110067	
ONE PLACE DECIMAL	± 0.1mm	ALL DIMENSIONS ARE IN MM		TITLE: <b>VACUUM CHAMBER</b>	
TWO PLACE DECIMAL	± 0.02mm			Front View	
FRACTIONAL	± 0.02 deg.			DWG NO. IUAC/HEBT/BUN /02 A1	
ANGULAR	± 0.02 deg.			SCALE: 1:5 SHEET 2 OF 3 Rev - 1	
DRAWN	NAME	SIGNATURE	DATE	MATERIAL:	
CHKD				Qty : No.	
APPVD				WEIGHT:	
MFG					
QA					



14 Nos  
M8x1.25 x 16  
6 Places

DRAWINGS FOR ESTIMATION PUPOSE ONLY

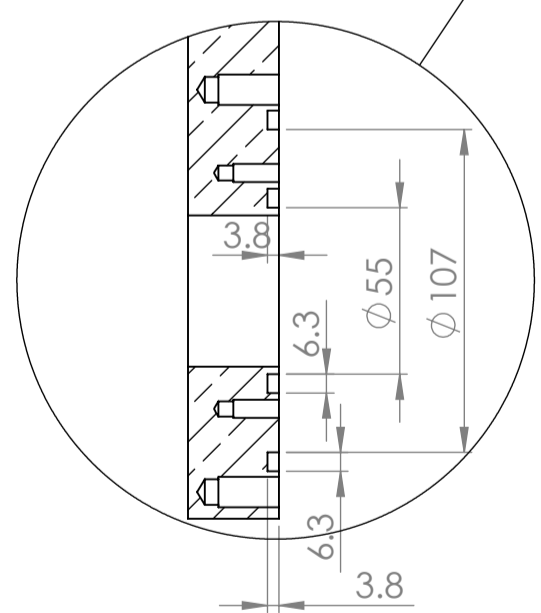
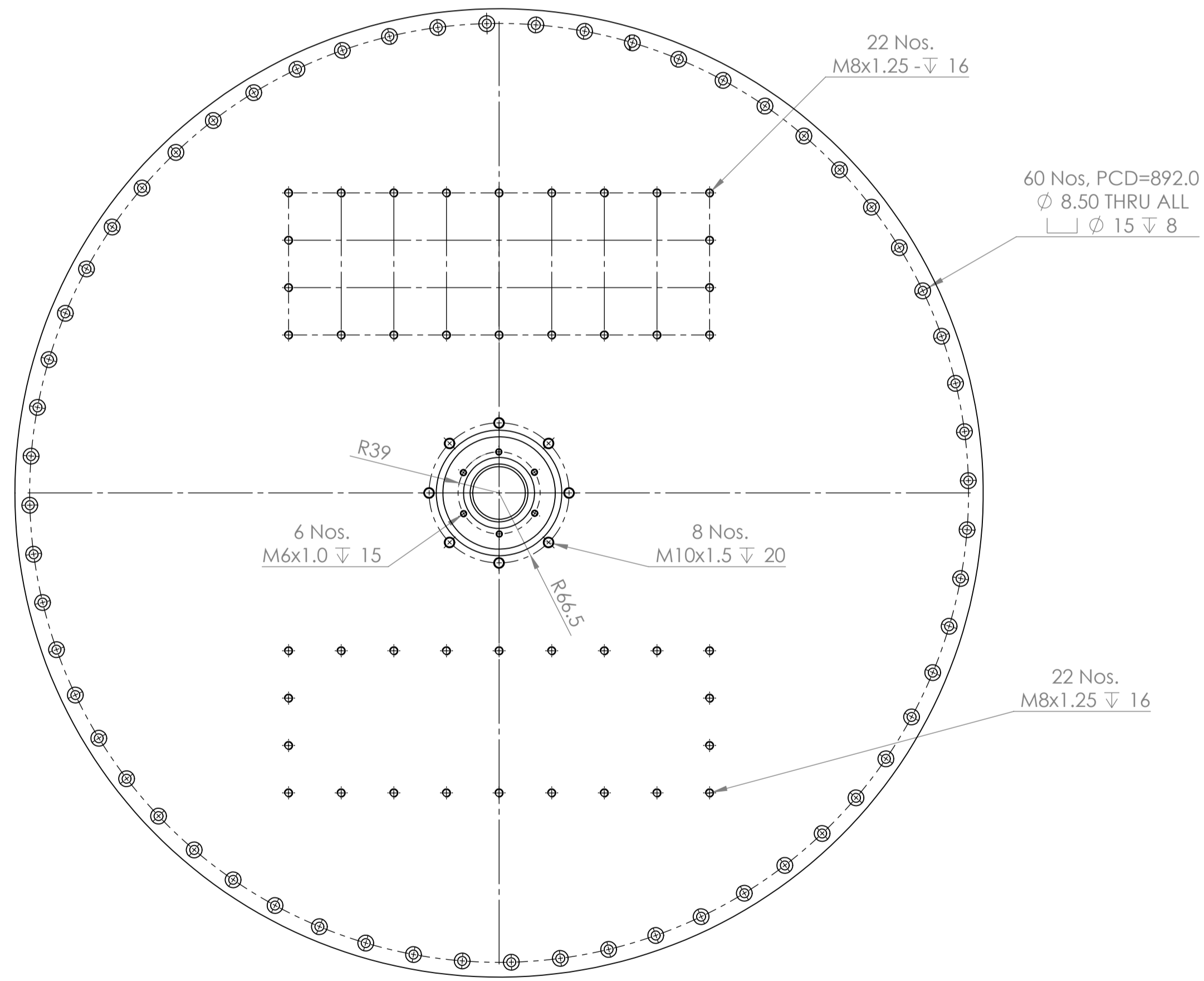
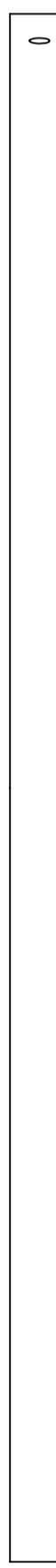
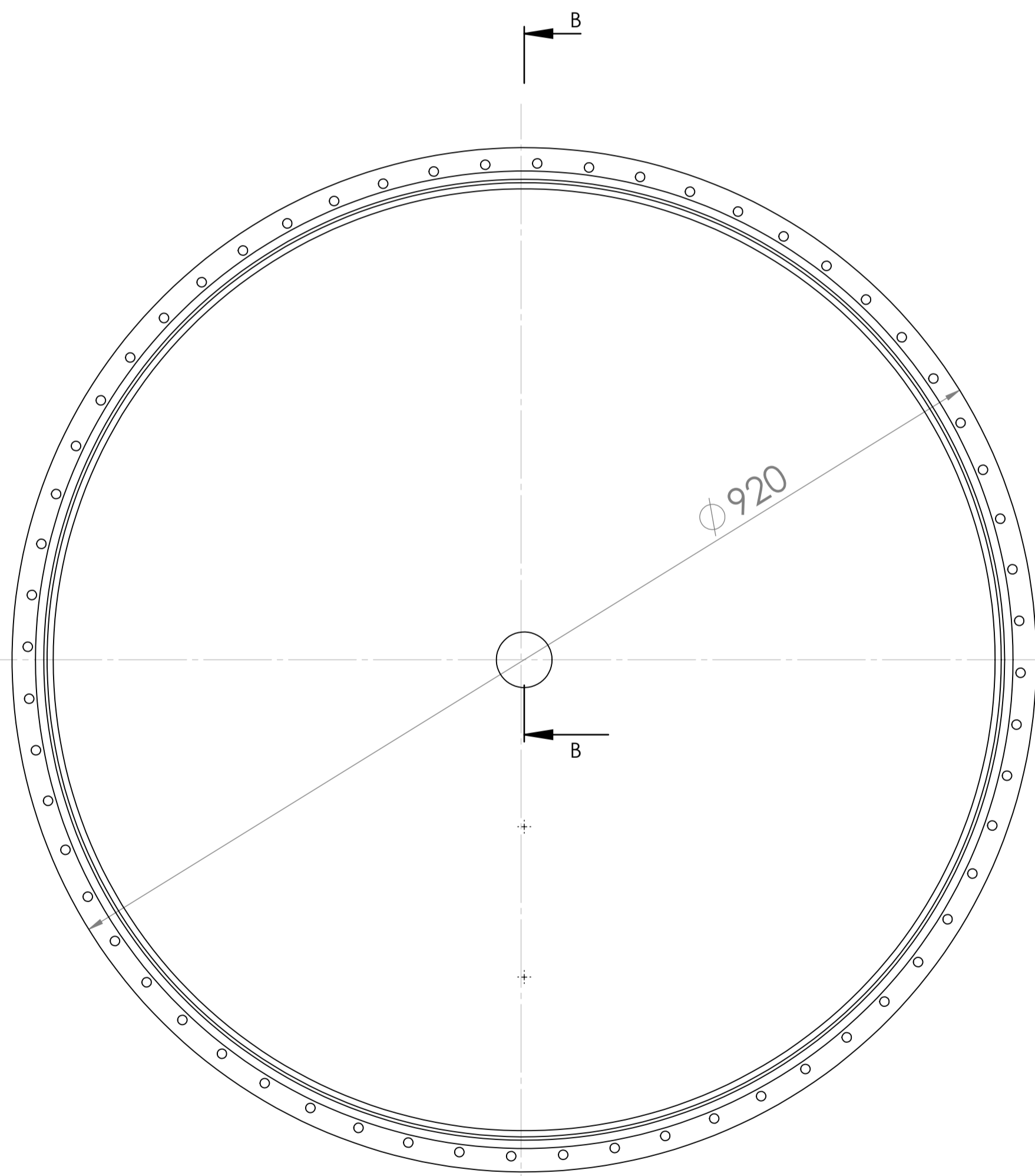
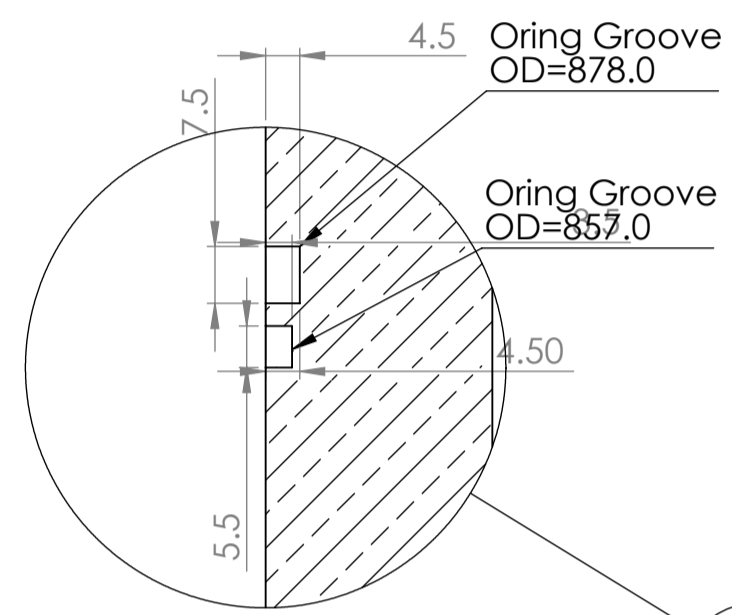
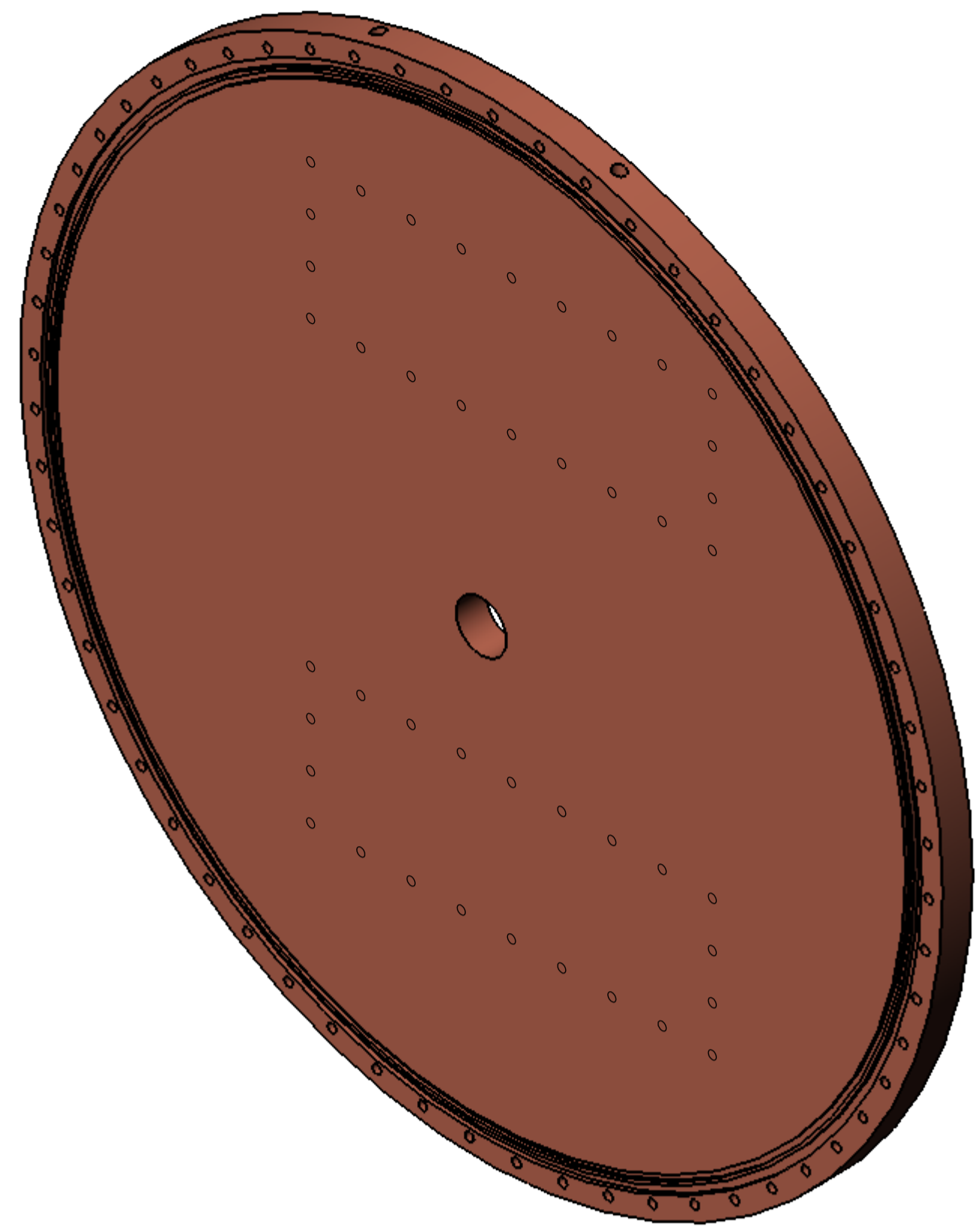
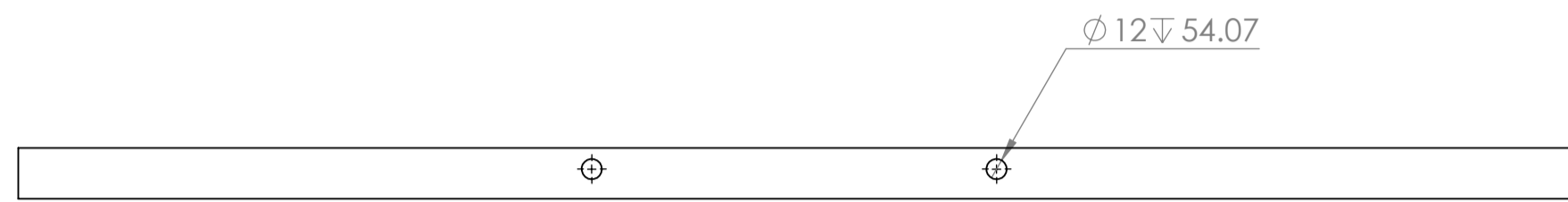
TOLERANCES		DEBUR AND BREAK SHARP EDGES	
ONE PLACE DECIMAL	± 0.1mm	ALL DIMENSIONS ARE IN MM	
TWO PLACE DECIMAL	± 0.02mm		
FRACTIONAL	± 0.02 deg		
ANGULAR	± 0.02 deg		

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New Delhi - 110067

NAME	SIGNATURE	DATE
DRAWN		
CHKD		
APPVD		
MFG		
QA		

TITLE: **VACUUM CHAMBER**  
**Sectional View**

DWG NO. IUAC/HEBT/BUN /02 A1  
SCALE: 1:5 **SHEET 3 OF 3** Rev - 1

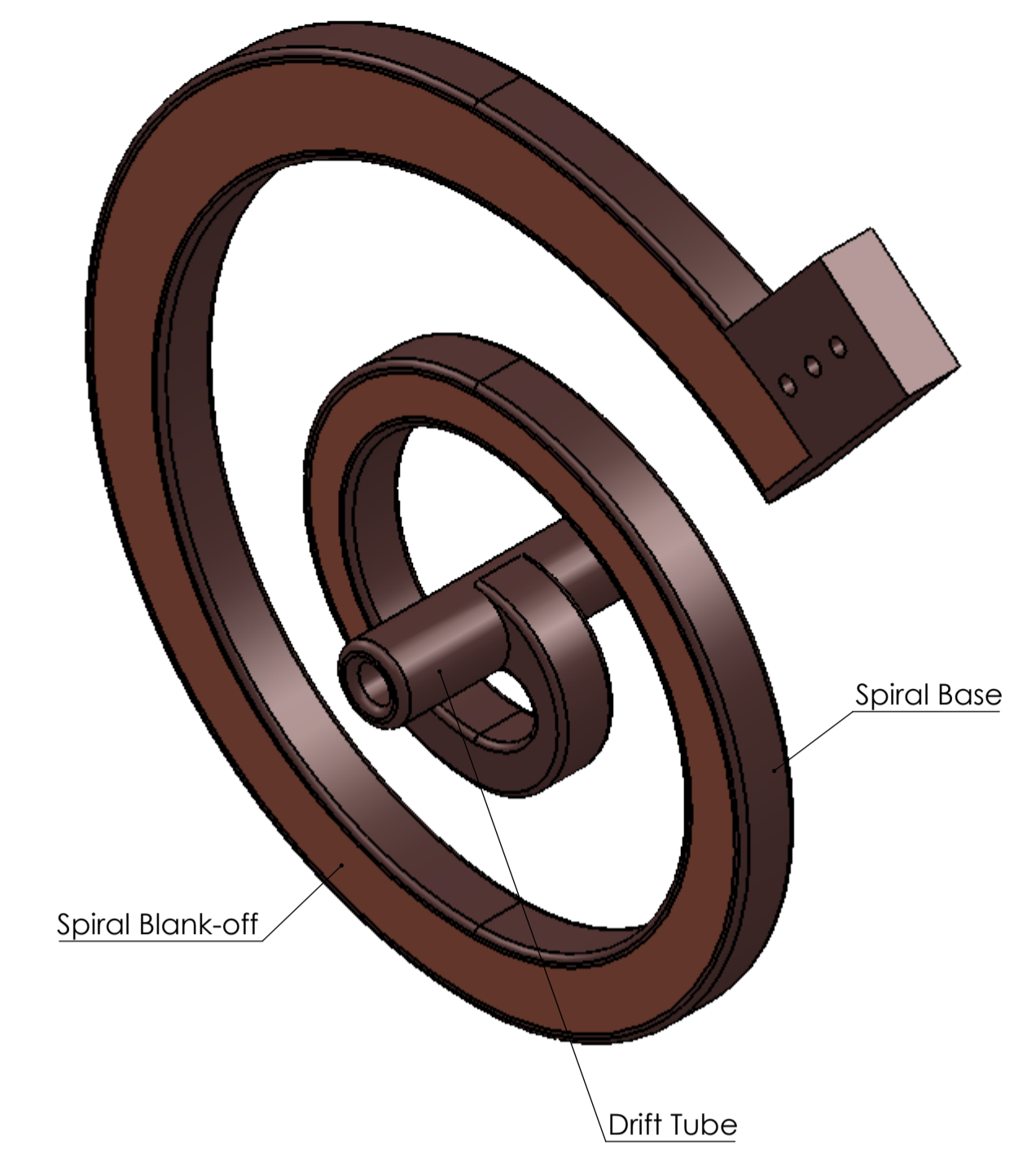
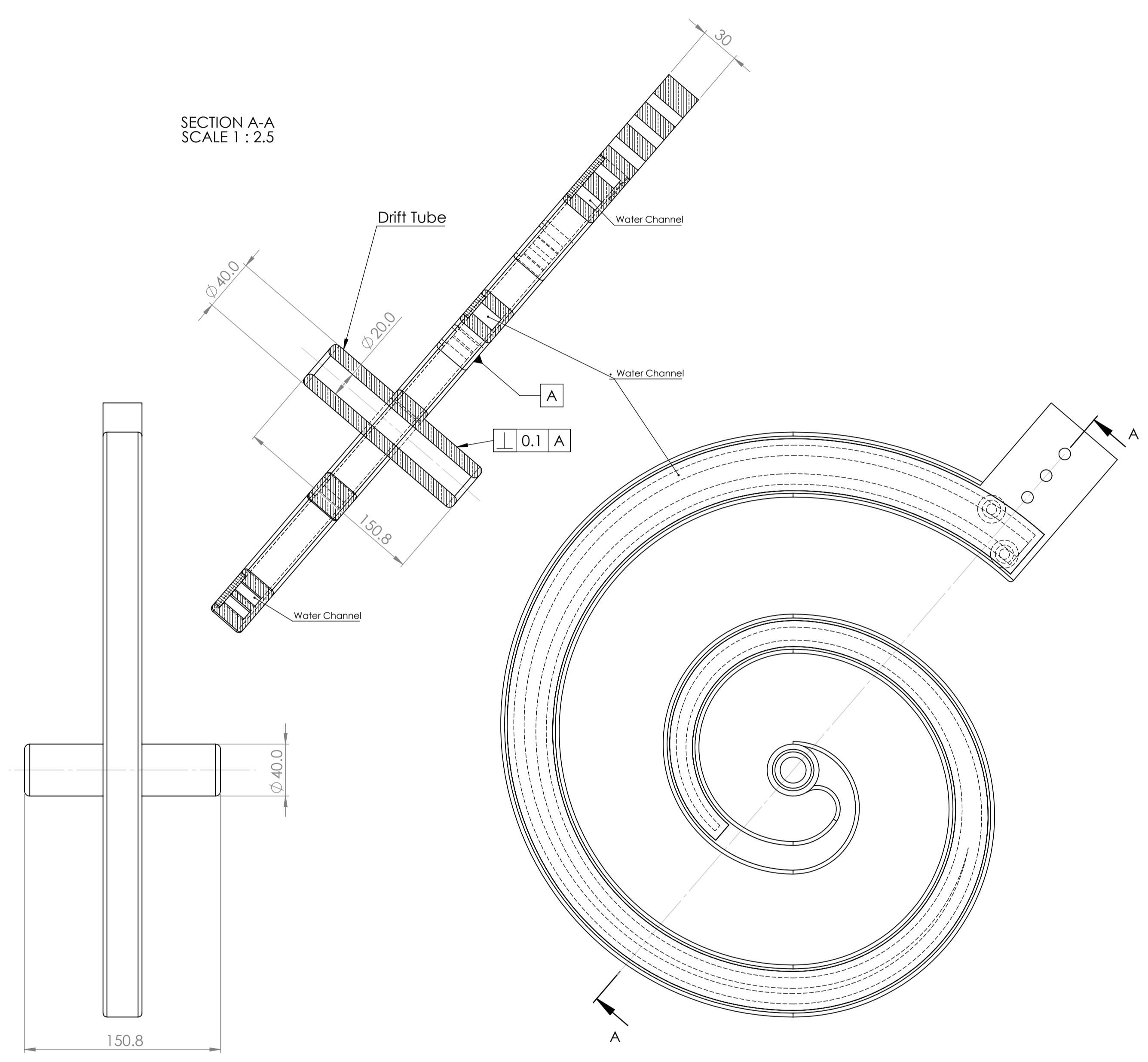
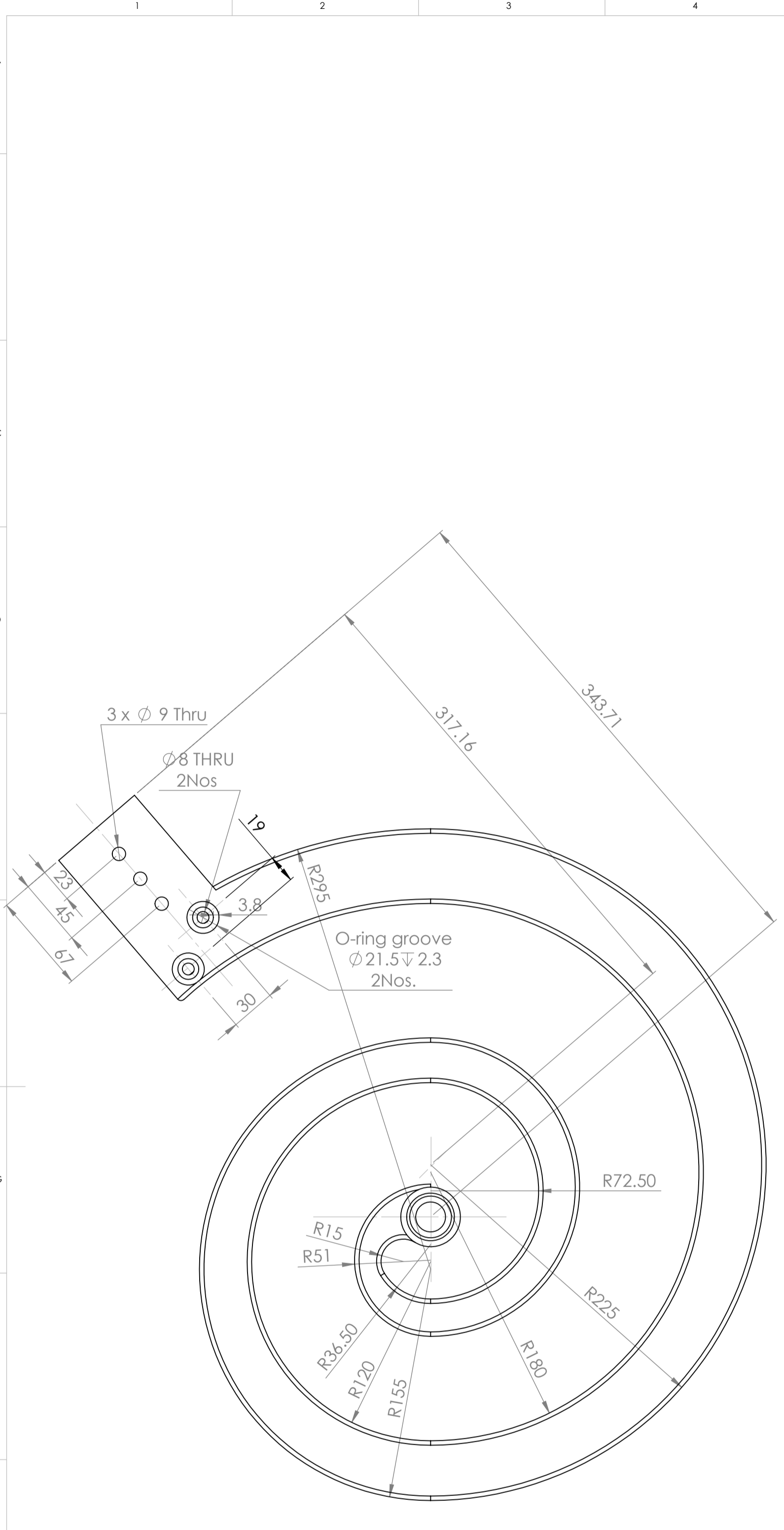


DETAIL D  
SCALE 2 : 5

**Note :**  
Material for End Plates only will be provided by IUAC

DRAWINGS FOR ESTIMATION PUPOSE ONLY

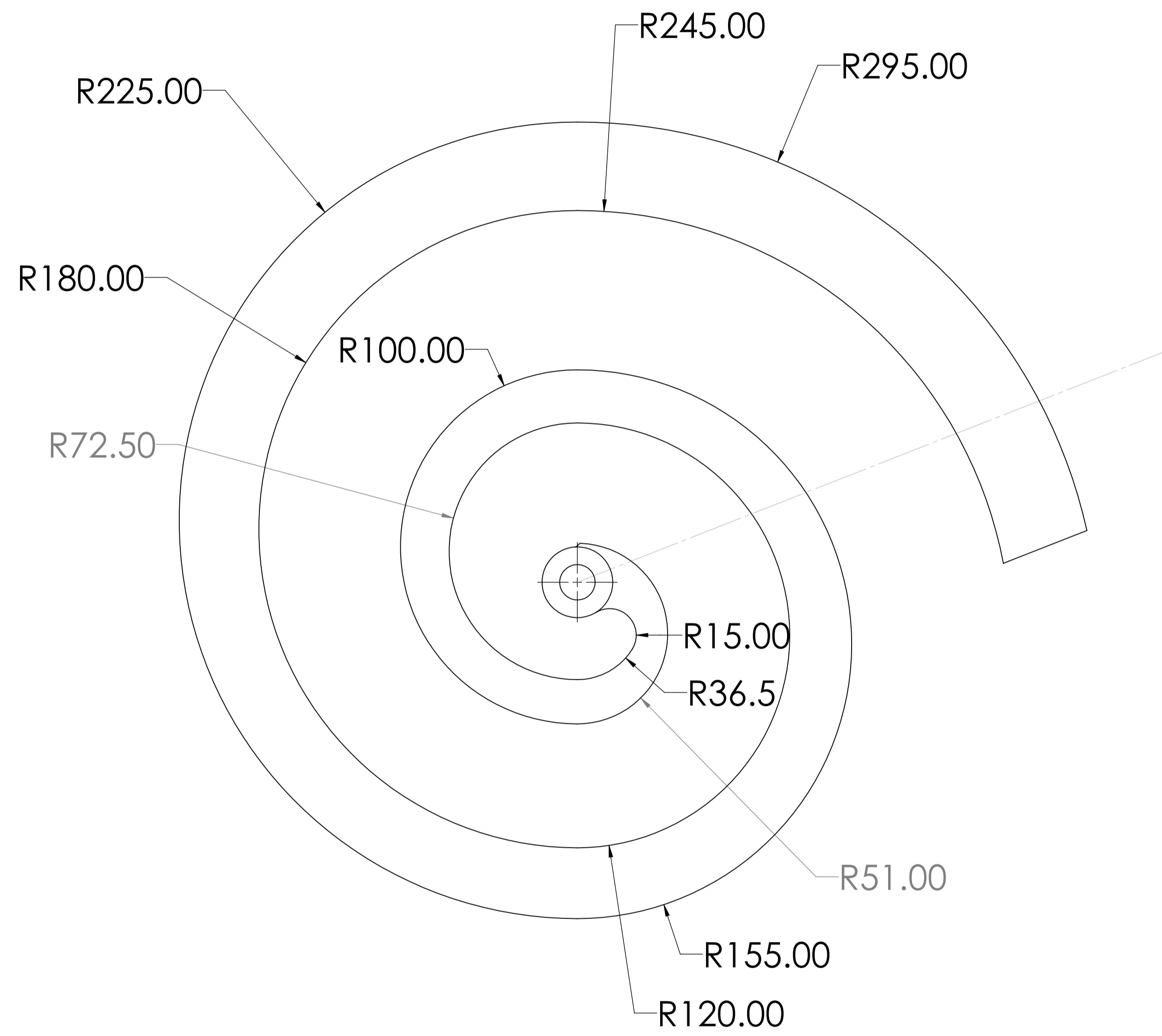
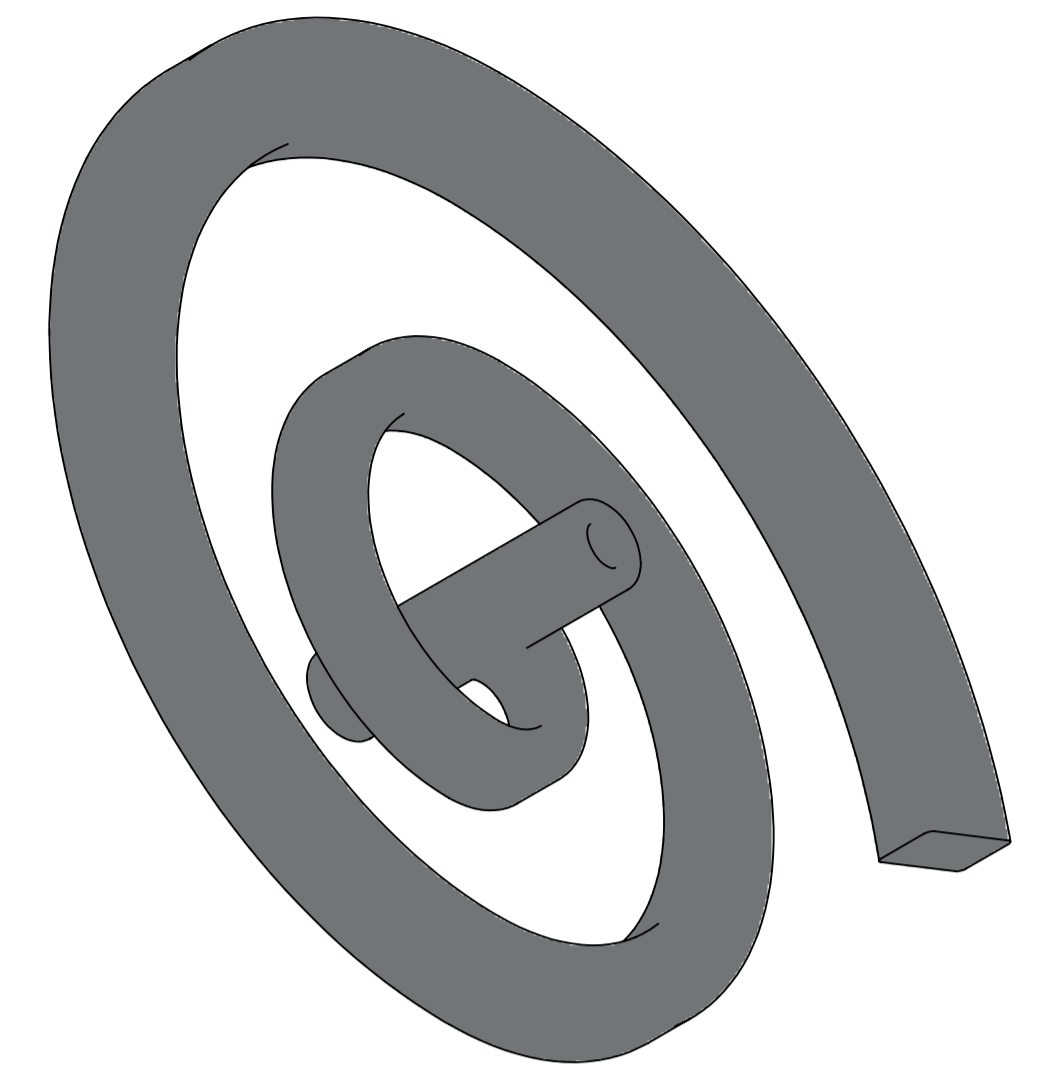
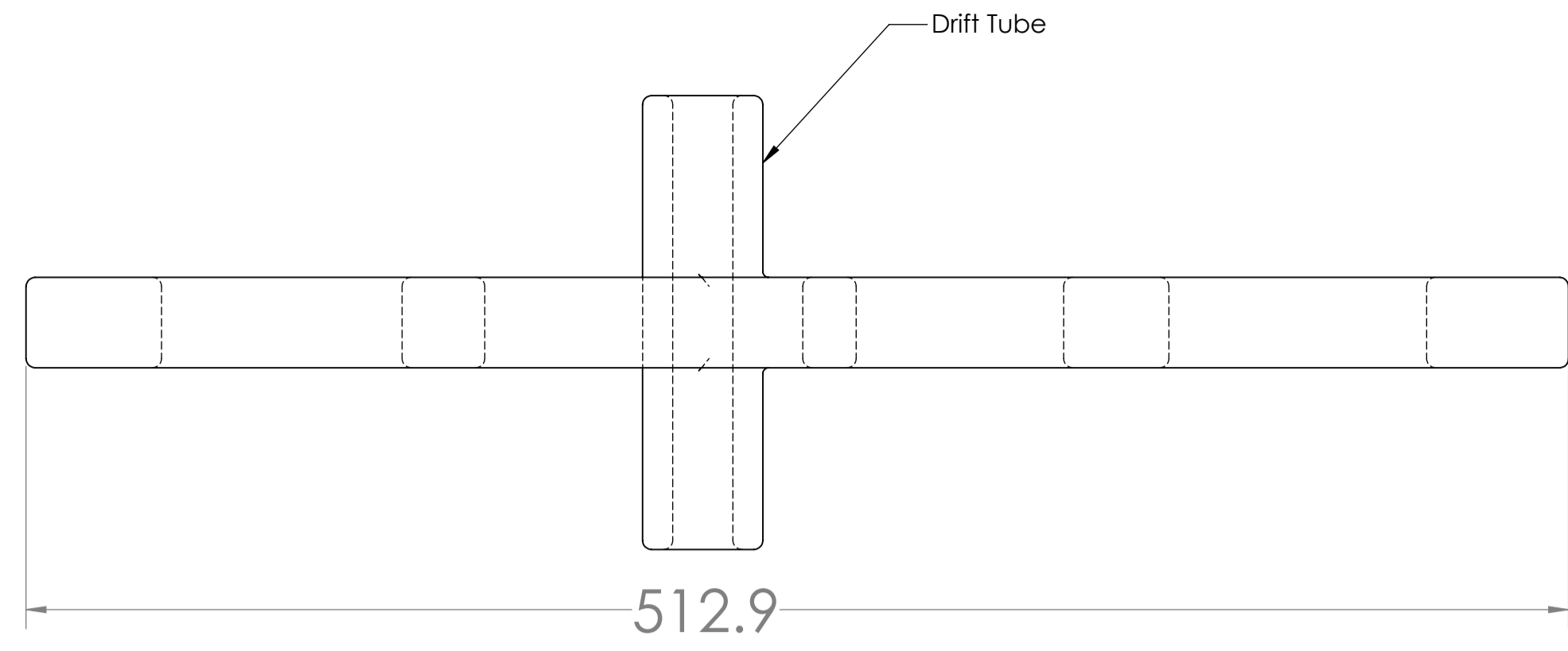
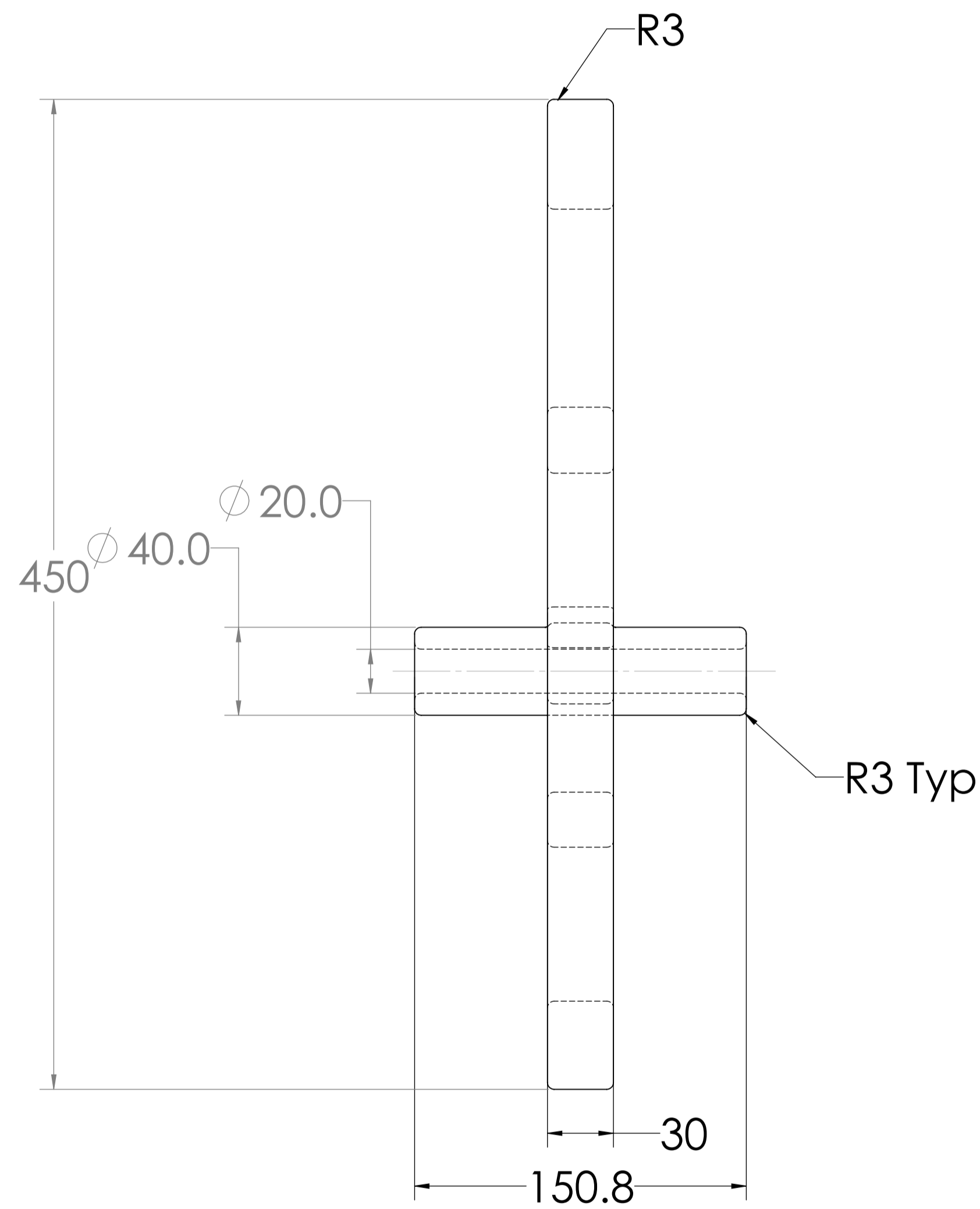
TOLERANCES:		DEBUR AND BREAK SHARP EDGES		Inter University Accelerator Centre Formerly : Nuclear Science Centre New Delhi - 110067	
ONE PLACE DECIMAL	$\pm 0.1mm$	ALL DIMENSIONS ARE IN MM		TITLE:	
TWO PLACE DECIMAL	$\pm 0.02mm$			END PLATE	
FRACTIONAL	$\pm 0.02 deg.$			DWG NO. IUAC/HEBT/BUN /03	
ANGULAR				A1	
DRAWN: SK		DATE: 3.11.19			
CHKD: RA		DATE: 13.12.19			
APPVD:					
MFG:					
Q.A:					
		MATERIAL: IUAC Supplied OFHC Copper		SCALE: 1:5	
		Qty : 04 No.		SHEET 1 OF 1	
		WEIGHT:		Rev - 1	



**Note :**

1. Only ETP (Cu - C11000) material to be used. IUAC will not supply the material.
2. Material test certificate for the material used has to be submitted. In addition test shall be conducted by IUAC on samples from completed components.
3. Spiral Blank off to be Vacuum Brazed with the spiral base component to seal the cooling channels.
4. Flatness and parallelism of the finished component to be maintained within an accuracy of ±0.2 mm.
5. After welding, the finished component should be buffed and polished. No welding/brazing projection or depression should be visible. No sharp corners/edges are allowed. (Successful bidder may suggest any changes in the design to achieve this. Final responsibility will be of the bidder)
6. It will be better to keep machining allowance for machining after welding/brazing.
7. Components model drawing can be provided to vendor in "iges" formats.
8. Before dispatch, vendor will be required to submit CMM report, Hydrostatic pressure test report up to 5 bar pressure & Vacuum Leak test report of the finished component.
9. **Workmanship** :- The supplied components should have excellent workmanship in all the aspects of fabrication.
10. **Vacuum Testing** :- Since the spiral is having water cooling channel and welding joints, therefore the vacuum Leak test report should be sent to IUAC before dispatch. The spiral component will also be subjected to leak testing at IUAC after delivery and the helium leak rate should be better than 1x10<sup>-9</sup> mbar lt/sec.
11. Vendor may have to design and fabricate vacuum leak testing fixture. The spiral component will be vacuum leak tested individually as well as after assembling it inside the vacuum chamber with water flowing at 5bar pressure.
12. Drift tube may be laser welded with Spiral for good electrical contact and Welding strength

<p><b>Gen. TOLERANCES:</b></p> <p>ONE PLACE DECIMAL ± 0.1mm</p> <p>TWO PLACE DECIMAL ± 0.02mm</p> <p>WITHOUT DECIMAL ± 0.5mm</p> <p>ANGULAR: ± 0.20 deg.</p>		<p><b>PROPRIETARY AND CONFIDENTIAL</b></p> <p>THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF IUAC, New Delhi.</p> <p>ANY REPRODUCTION, IN PART OR AS A WHOLE, WITHOUT THE WRITTEN PERMISSION OF IUAC, IS PROHIBITED.</p>		<p>ALL DIMENSIONS ARE IN MM</p> <p>DESIGN AND BREAK SHARP EDGES</p>		<p>Inter University Accelerator Centre Formerly : Nuclear Science Centre New Delhi - 110067</p>	
<p><b>TITLE:</b></p> <p><b>SPIRAL (Cu)</b></p>		<p><b>DWG NO.:</b></p> <p>IUAC/ HEBT/BUN /04</p>		<p><b>SCALE:</b></p> <p>1:1</p>		<p><b>SHEET 1 OF 1</b></p>	



**Note :**

1. Flatness and parallelism of the finished component to be maintained within an accuracy of  $\pm 0.2$  mm.
2. Components model drawing can be provided to vendor in "iges" formats.
3. Vendor will be required to submit CMM report,
4. Drift Tube may be welded / brazed (laser welded) for good electrical contact and mechanical strength.

DRAWINGS FOR ESTIMATION PUPOSE ONLY

**Gen. TOLERANCES:**

ONE PLACE DECIMAL  $\pm 0.1$ mm  
 TWO PLACE DECIMAL  $\pm 0.02$ mm  
 WITHOUT DECIMAL  $\pm 0.5$ mm  
 ANGULAR:  $\pm 0.20$  deg.

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ALL DIMENSIONS ARE IN MM

DESIR AND BREAK SHARP EDGES

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 New Delhi - 110067

NAME	SIGNATURE	DATE
DRAWN: DKP		06/12/19
CHKD:		
APPVD: RA		13.12.19
MFG:		
G.A:		

**TITLE:**

**SPIRAL (AL)**

DWG NO : IUAC/ HEBT/BUN /05

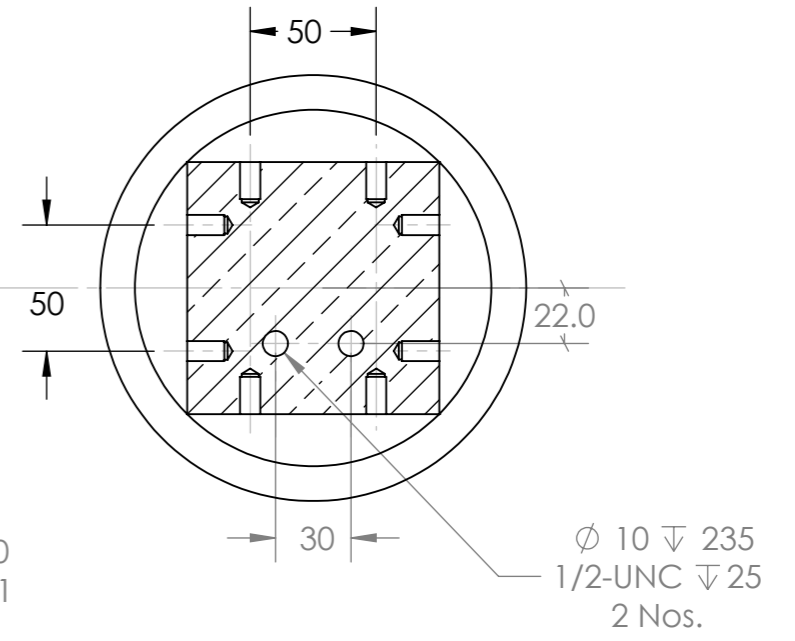
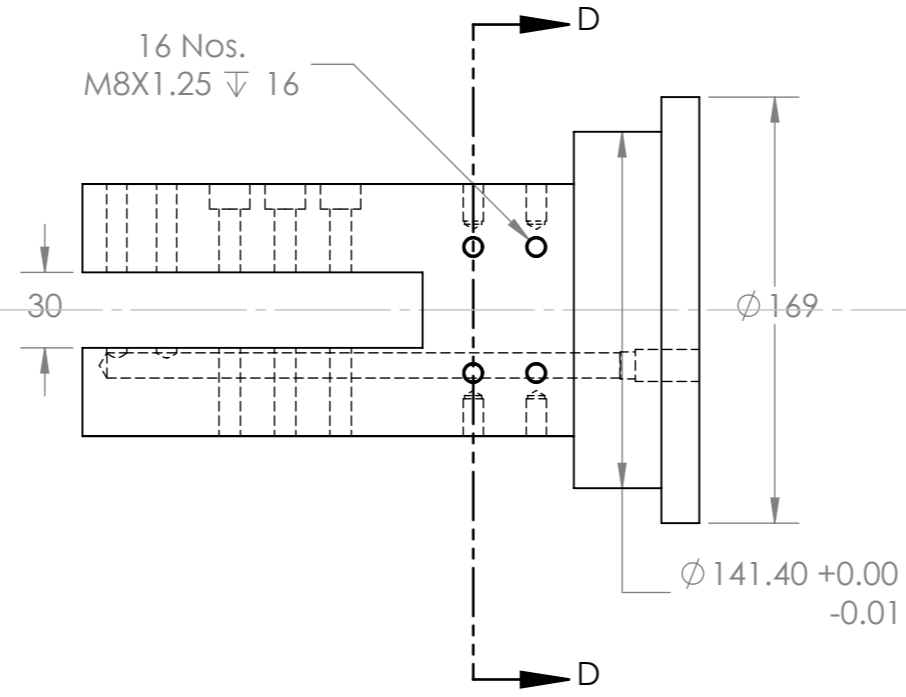
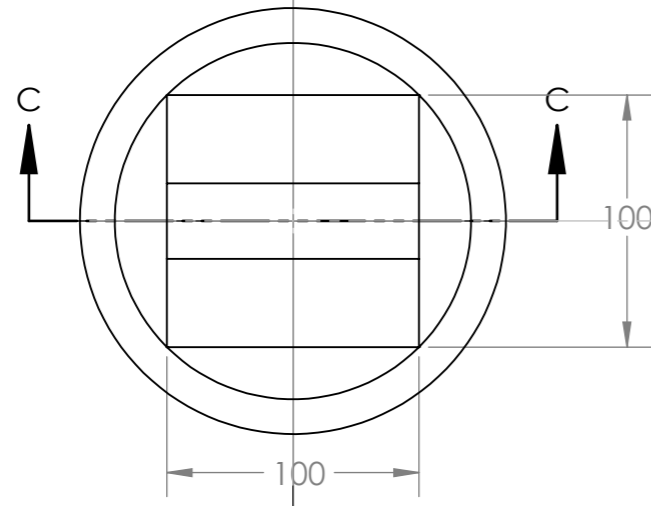
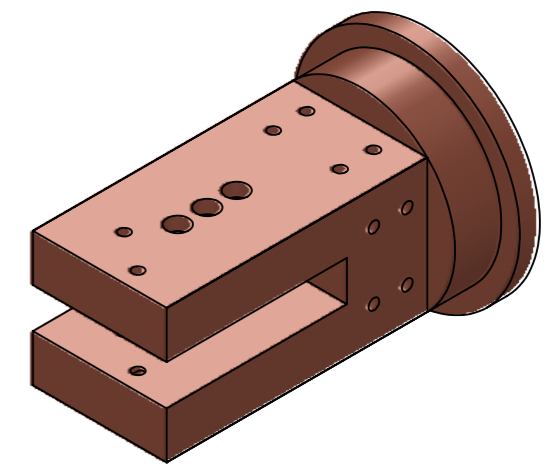
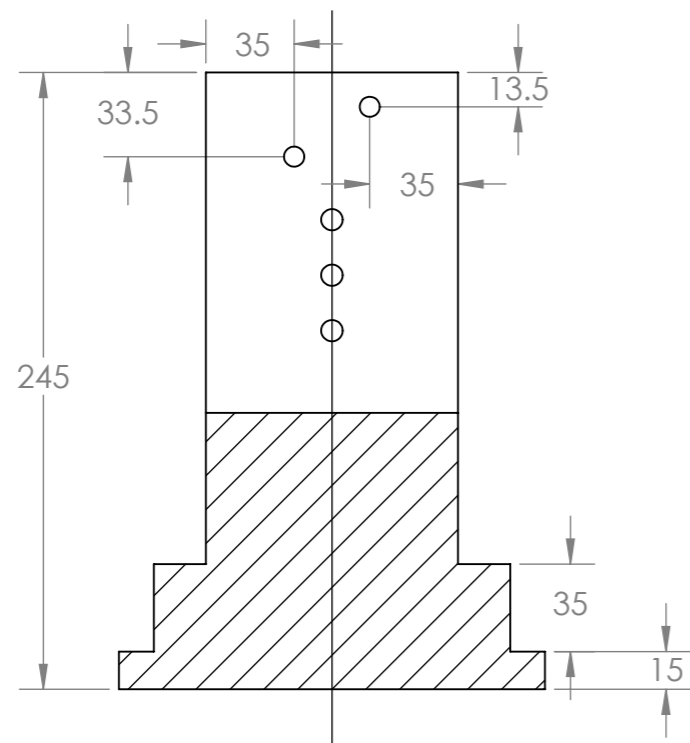
MATERIAL: Aluminium

Qty. : 01 No.

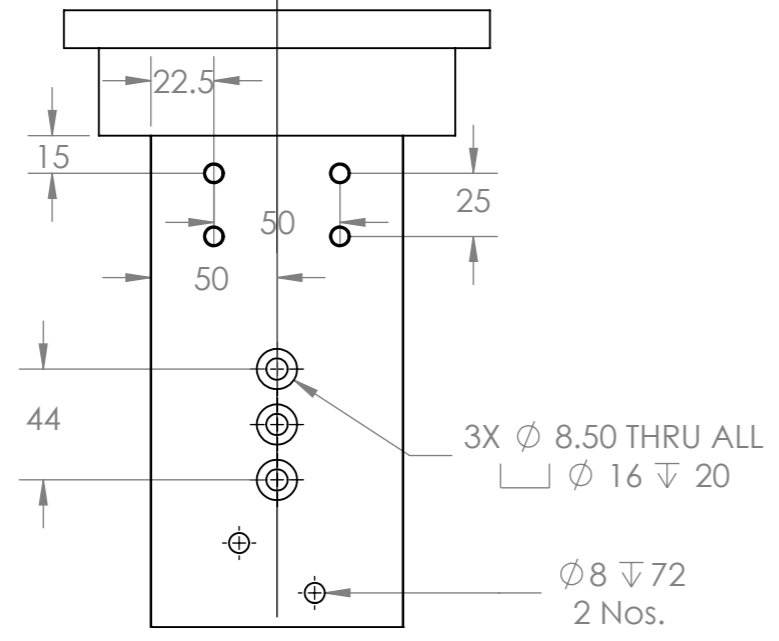
SCALE: 1:2

A1

SHEET 1 OF 1

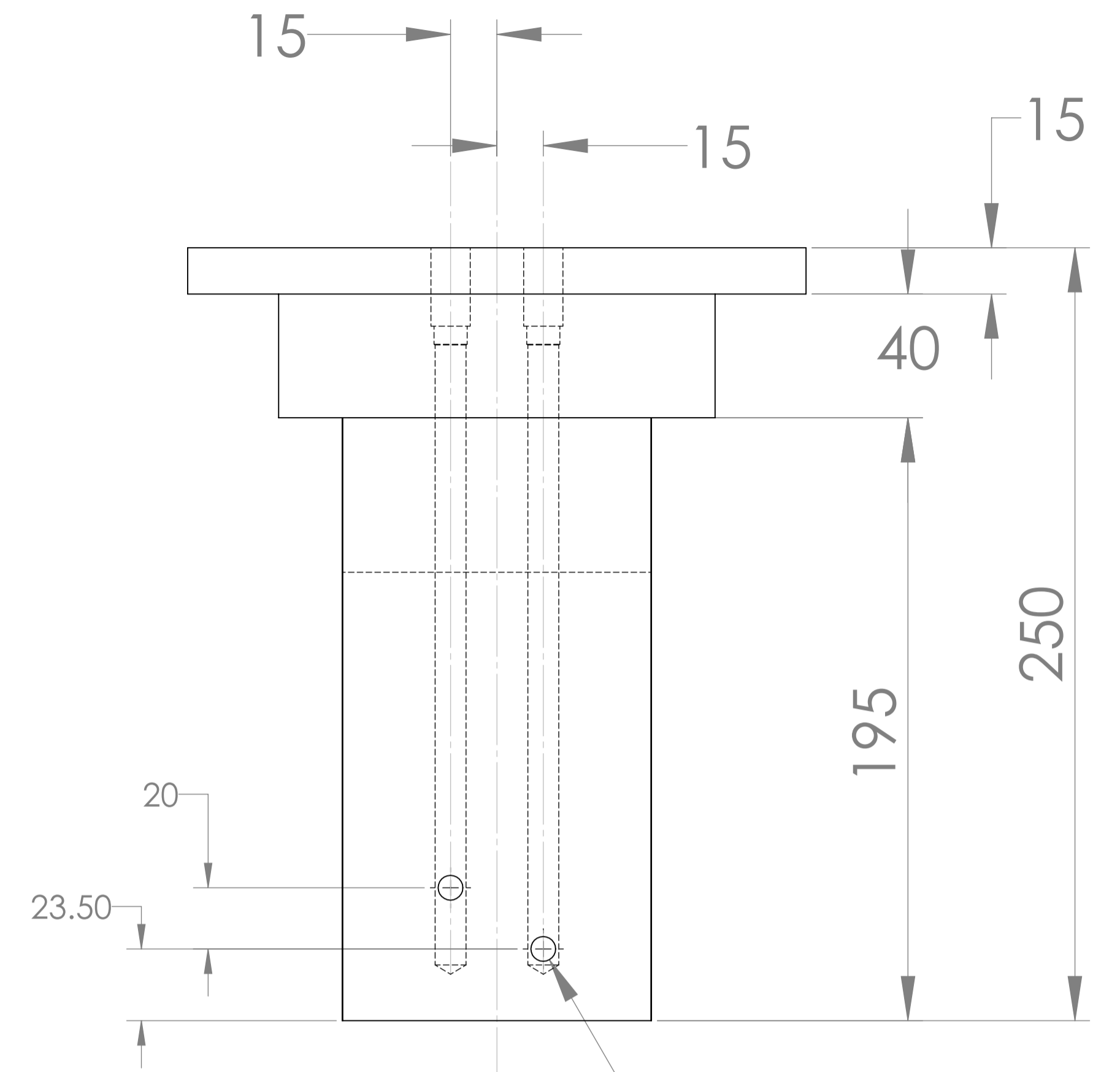
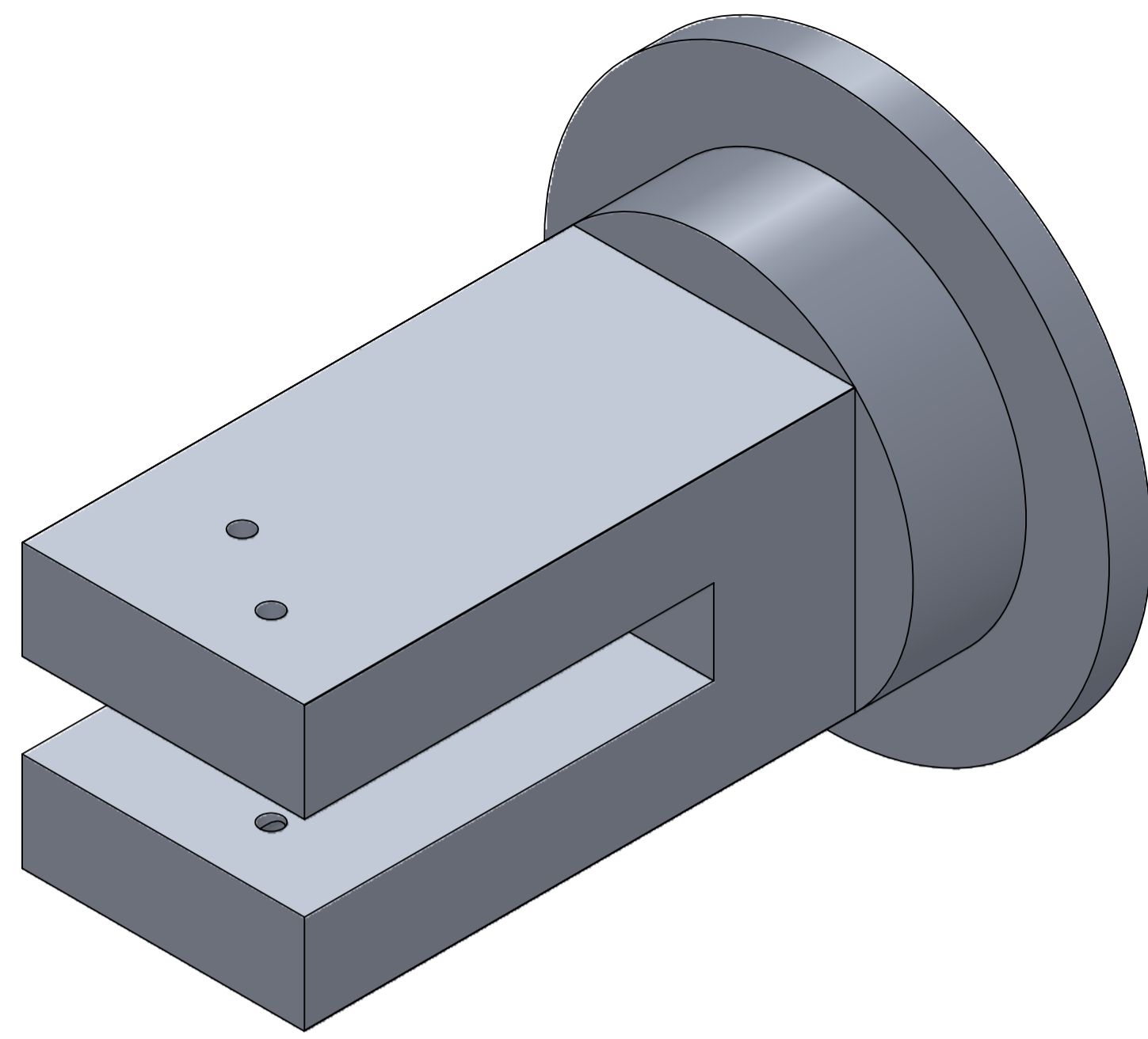


SECTION D-D  
SCALE 1 : 3



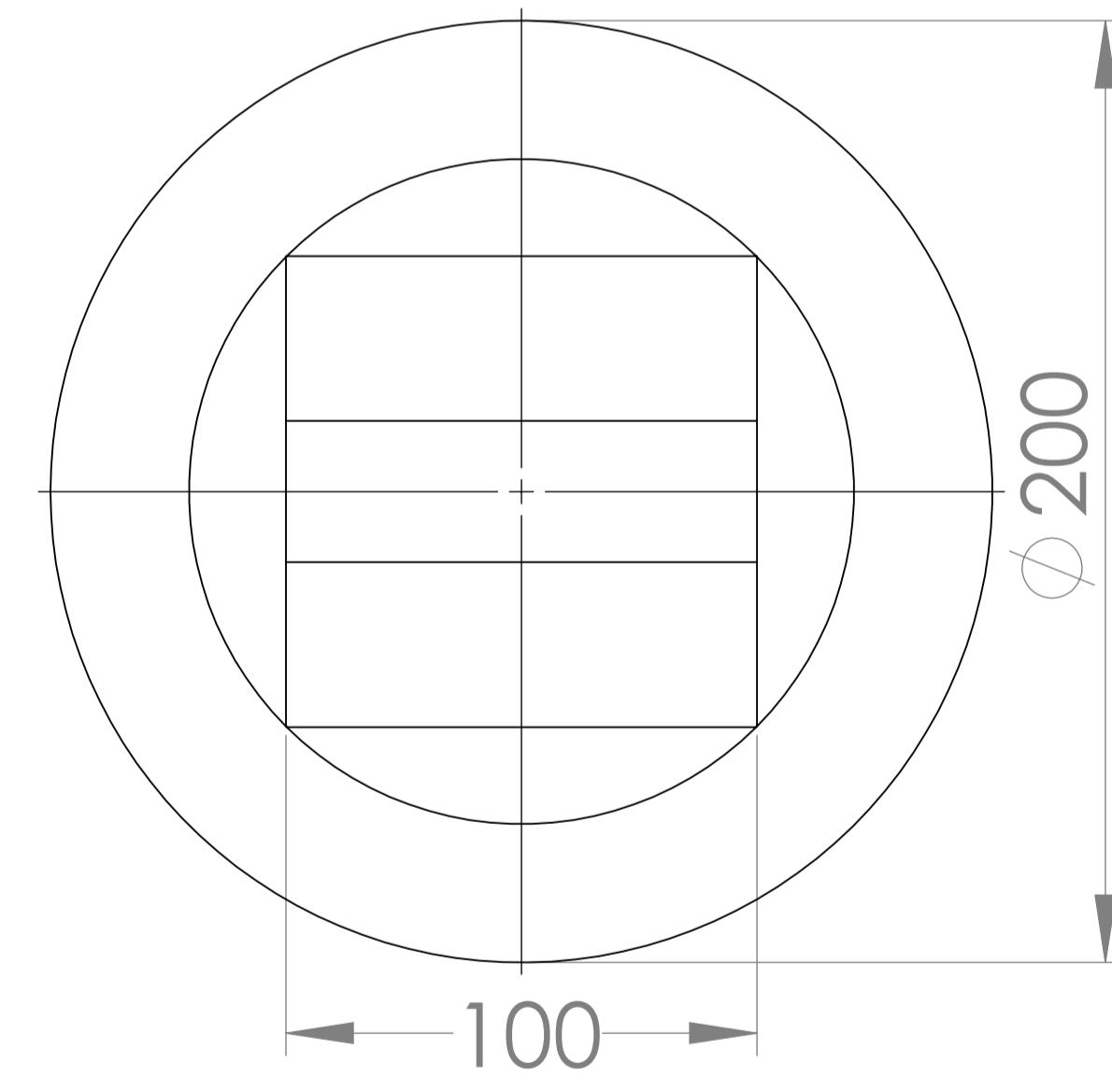
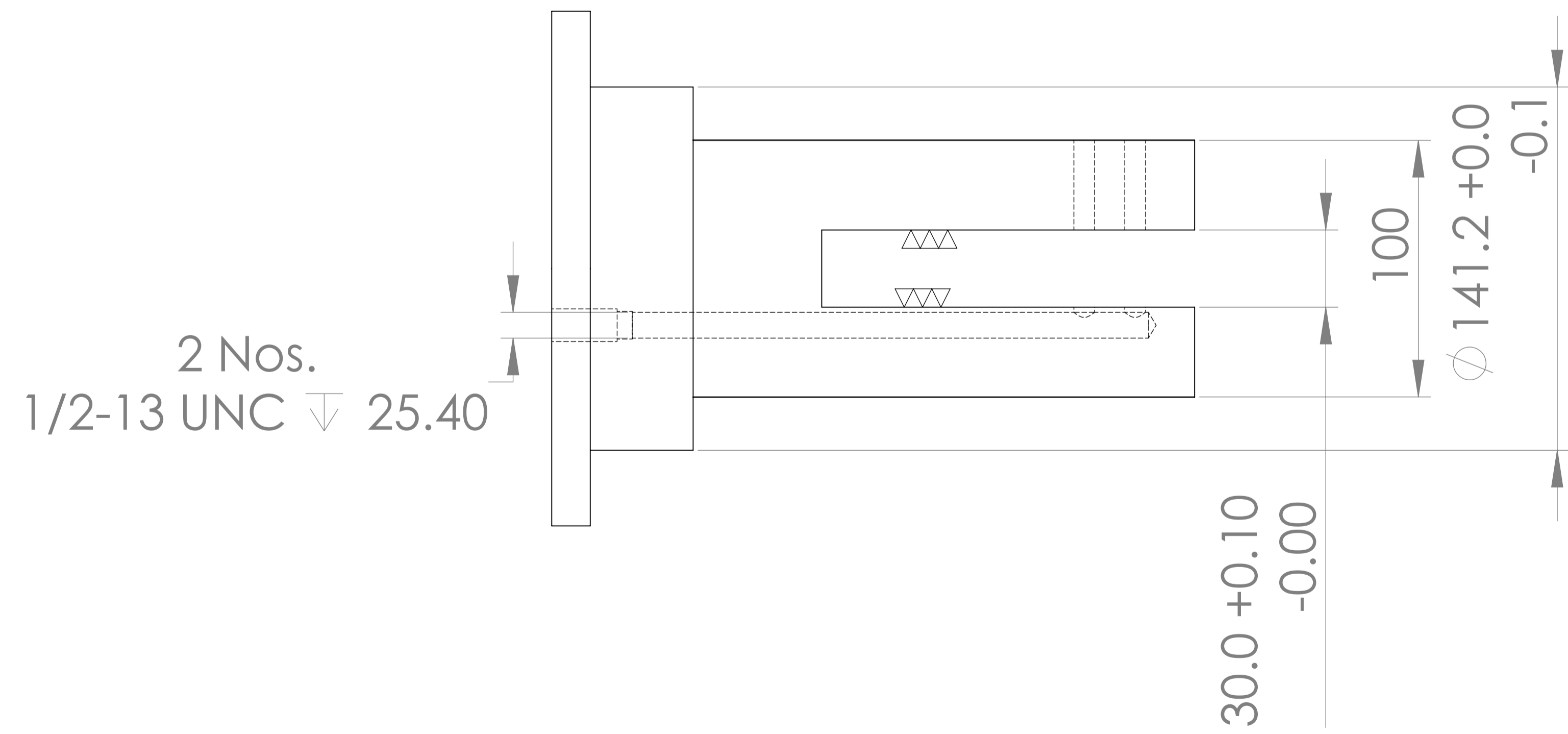
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:				FINISH:		DEBURR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING		REVISION	
DRAWN DKP				SIGNATURE		DATE 2.12.19		TITLE: <b>SPIRAL POST (Cu)</b>			
CHK'D								DWG NO. IUAC/ HEBT/BUN /06			
APPV'D								A3			
MFG								SCALE:1:5			
Q.A						Material : ETP-Cu C-11000		WEIGHT:			
						Qty. : 02 Nos.					





2 Nos.  $\varnothing 8 \nabla 70$

DRAWINGS FOR ESTIMATION PUPOSE ONLY



Gen. TOLERANCES:

ONE PLACE DECIMAL  $\pm 0.1\text{mm}$   
 TWO PLACE DECIMAL  $\pm 0.02\text{mm}$   
 WITHOUT DECIMAL  $\pm 0.5\text{mm}$   
 ANGULAR:  $\pm 0.20 \text{ deg.}$

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ALL DIMENSIONS ARE IN MM

NAME	SIGNATURE	DATE
DRAWN DKP		09/12/19
CHKD		
APPVD RA		13.12.19
QA		
MFG		

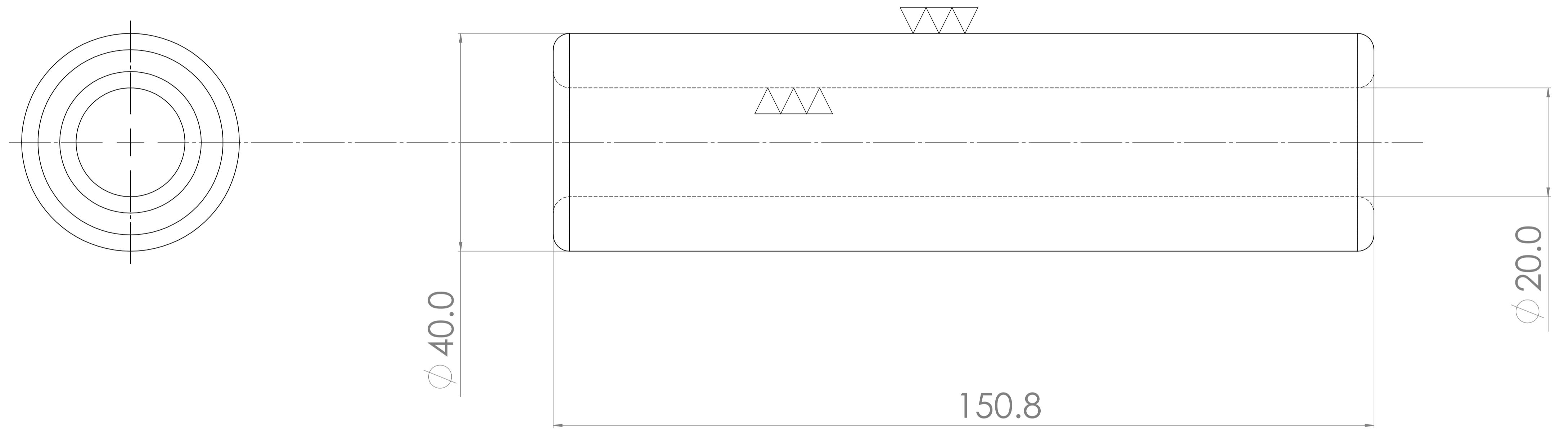
MATERIAL: Aluminium  
 Qty. : 01 Nos.

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 New Delhi - 110067

TITLE:  
**SPIRAL POST (AL)**

DWG NO :  
 IUAC/ HEBT/BUN /07

A1



DRAWINGS FOR ESTIMATION PUPOSE ONLY

**Gen. TOLERANCES:**

ONE PLACE DECIMAL ± 0.1mm  
 TWO PLACE DECIMAL ± 0.02mm  
 WITHOUT DECIMAL ± 0.5mm  
 ANGULAR: ± 0.20 deg.

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DESIR AND BREAK SHARP EDGES

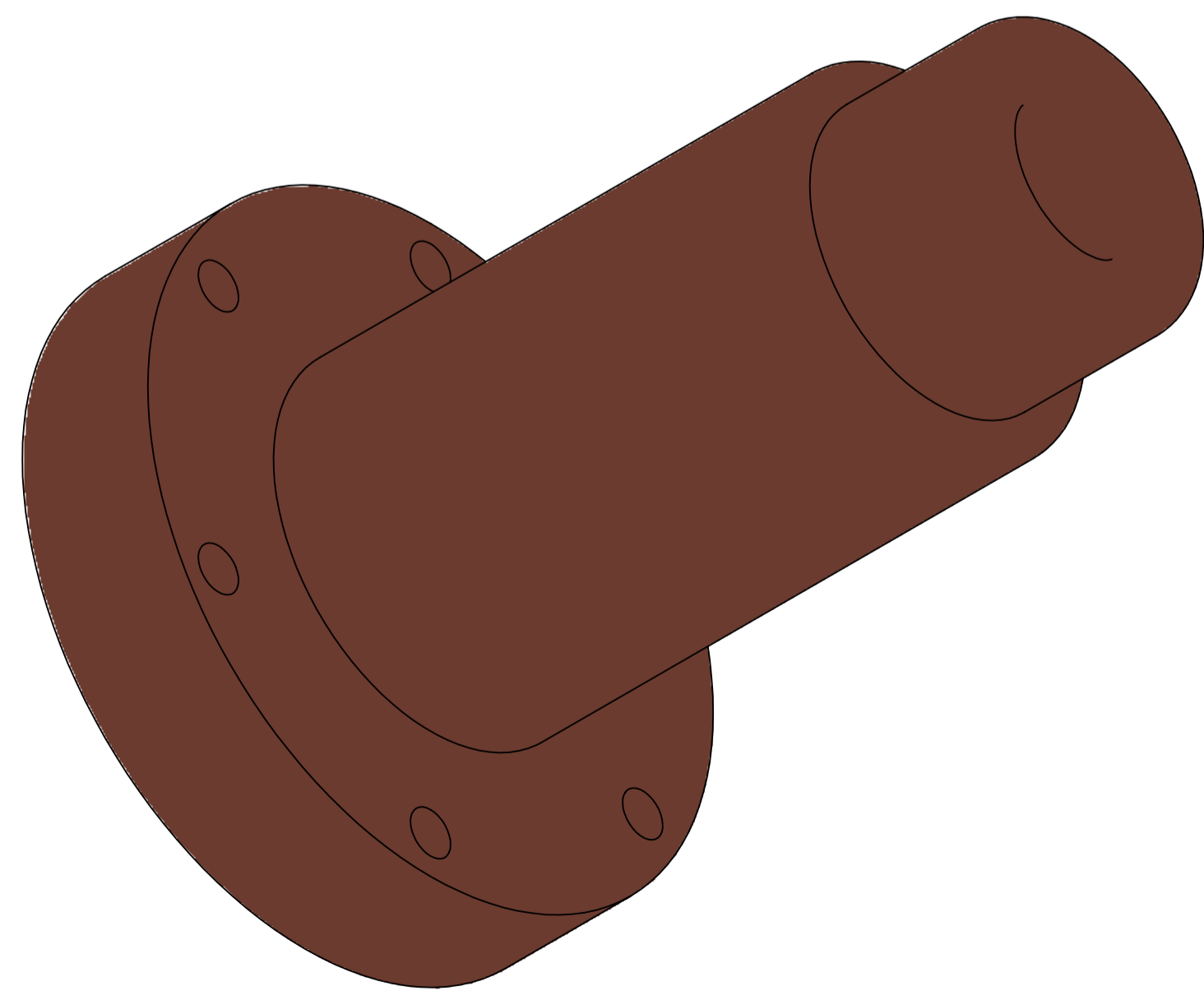
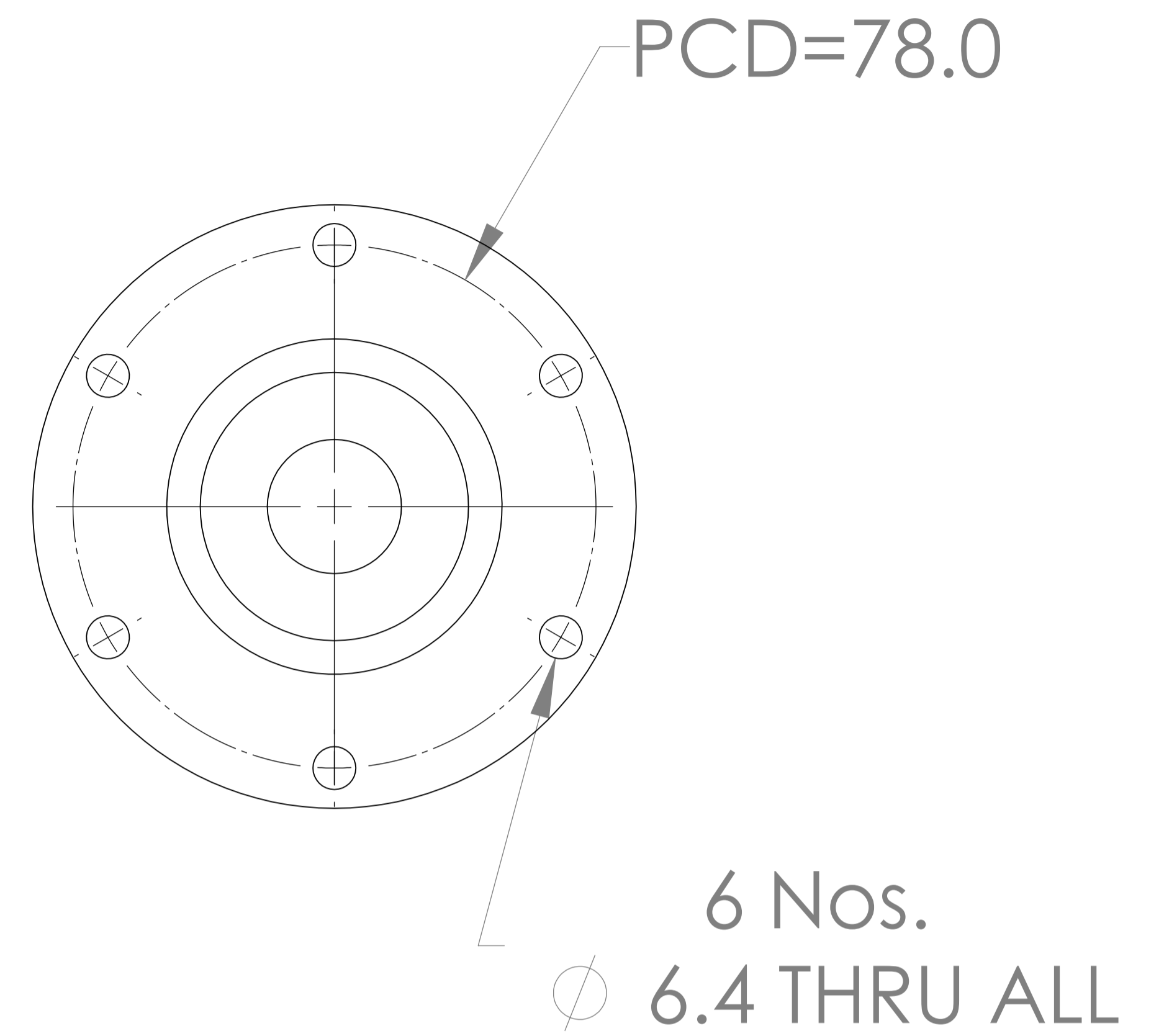
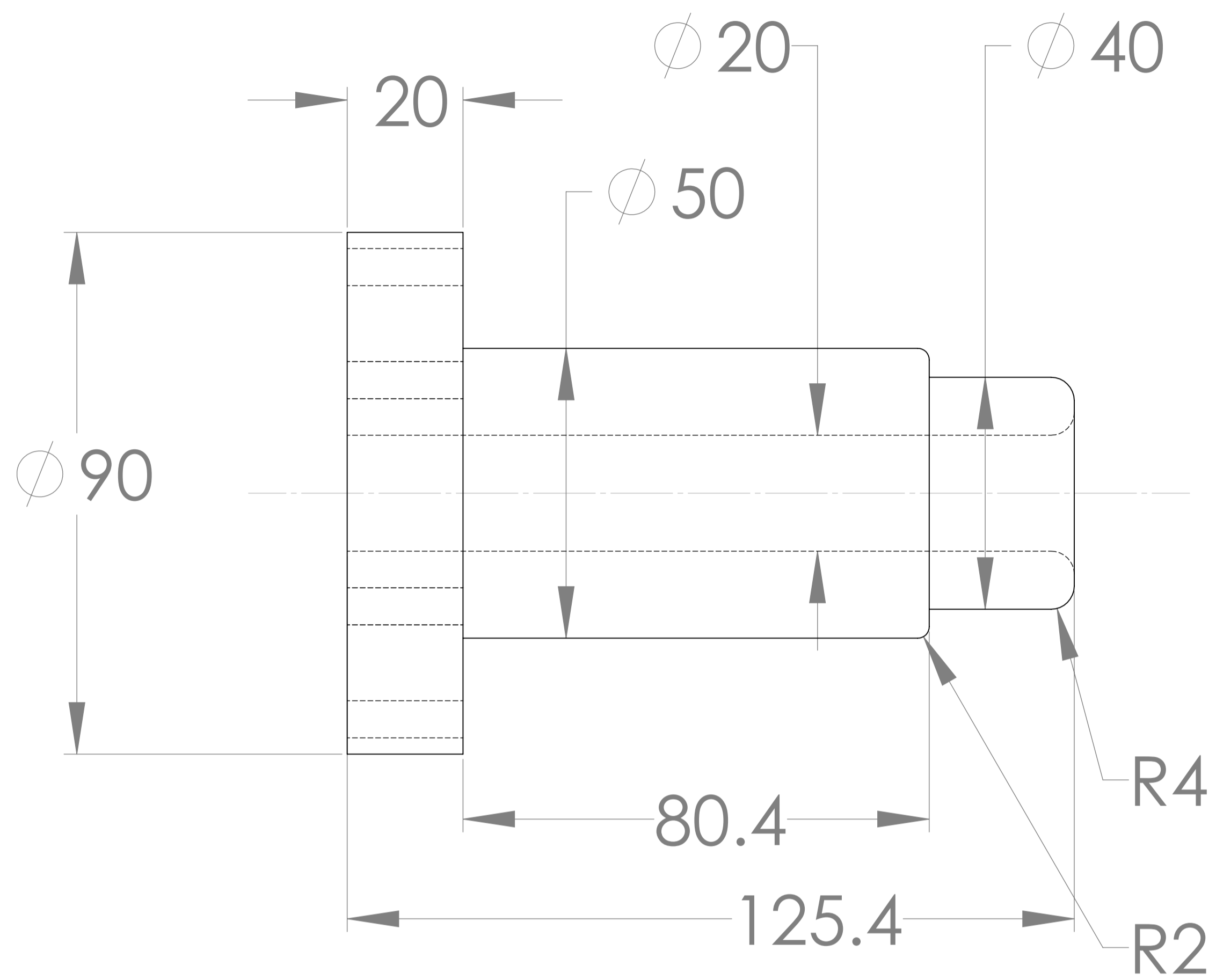
**Inter University Accelerator Centre**  
 Formerly : Nuclear Science Centre  
 New Delhi - 110067

	NAME	SIGNATURE	DATE
DRAWN	SK		3.2.2020
CHK'D			
APP'VD	RA		
MFG			
G.A			

**TITLE:**  
 Drift Tube

**MATERIAL:**  
 ETP Cu - 02 Nos.  
 Qty. : Aluminium - 01 No

**DWG NO :** IUAC/ HEBT/BUN /8 **A1**



DRAWINGS FOR ESTIMATION PUPOSE ONLY

**Gen. TOLERANCES:**

ONE PLACE DECIMAL ± 0.1mm  
 TWO PLACE DECIMAL ± 0.02mm  
 WITHOUT DECIMAL ± 0.5mm  
 ANGULAR: ± 0.20 deg.

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ALL DIMENSIONS ARE IN MM

	NAME	SIGNATURE	DATE
DRAWN	DKP		06/12/19
CHKD			
APPVD	RA		13.12.19
MFG			
G.A			

MATERIAL: ETP Cu  
 Qty. : 04 Nos.

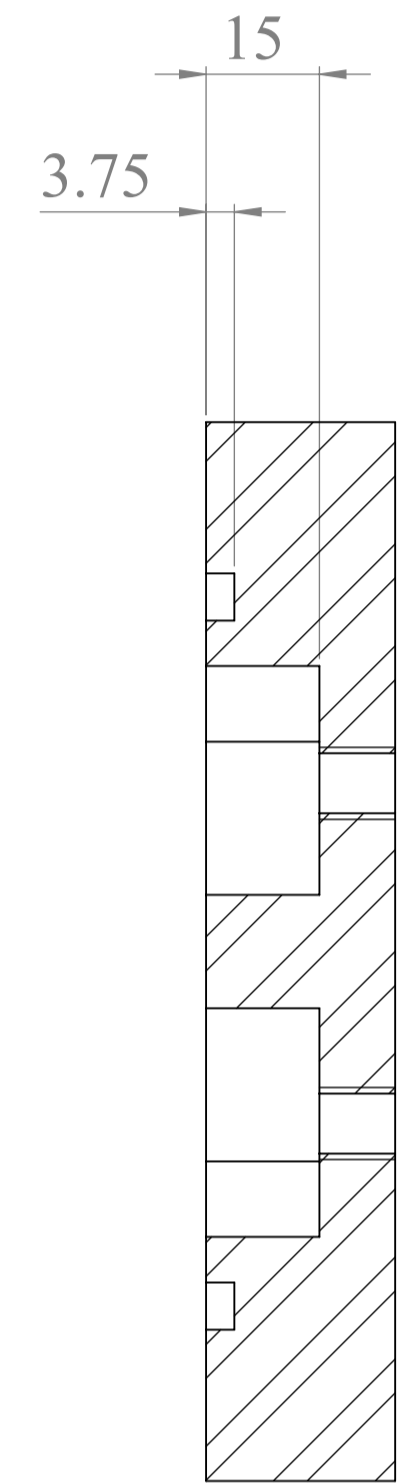
Inter University Accelerator Centre  
 Formerly : Nuclear Science Centre  
 New Delhi - 110067

**TITLE:**  
**SIDE DRIFT TUBE**

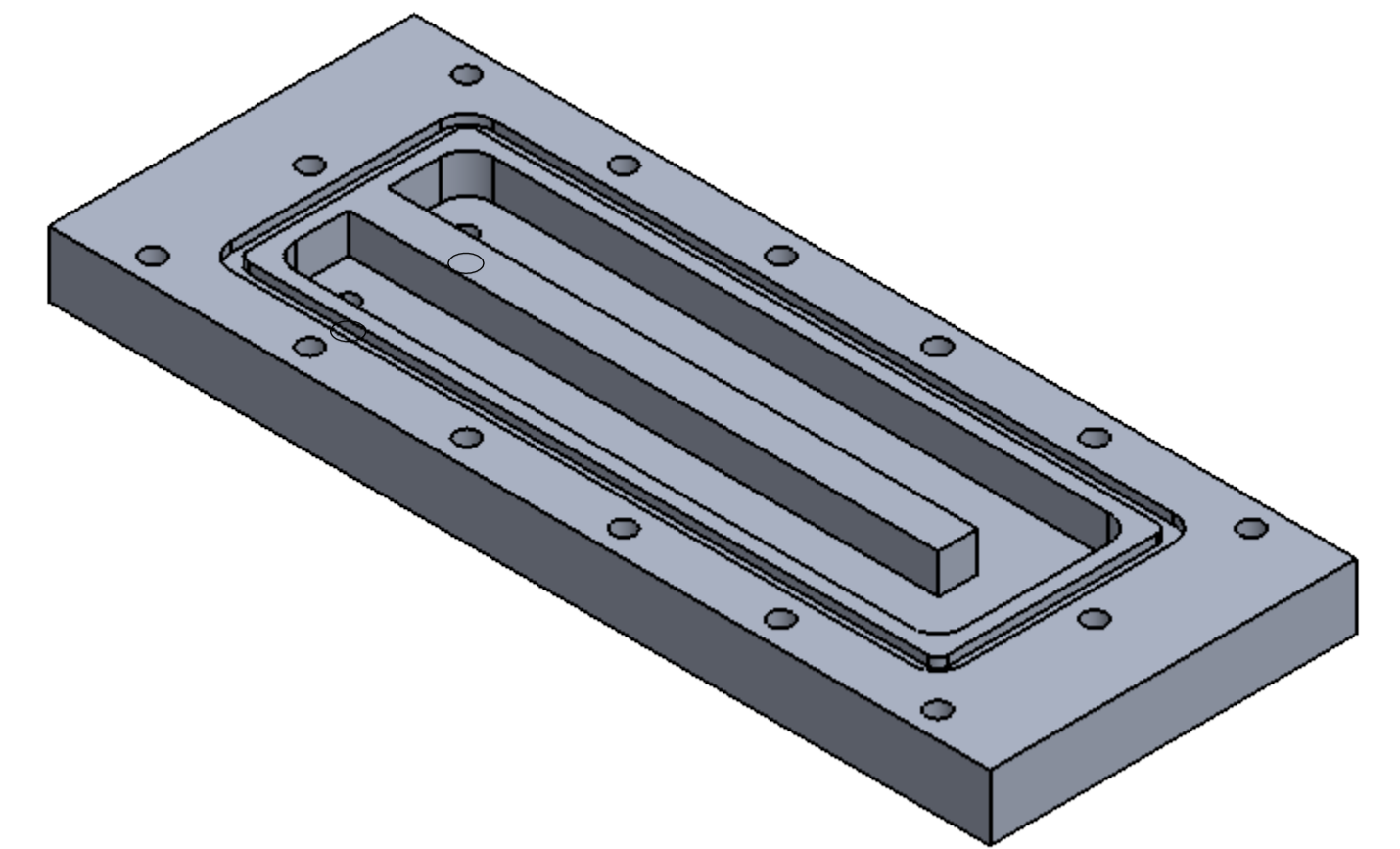
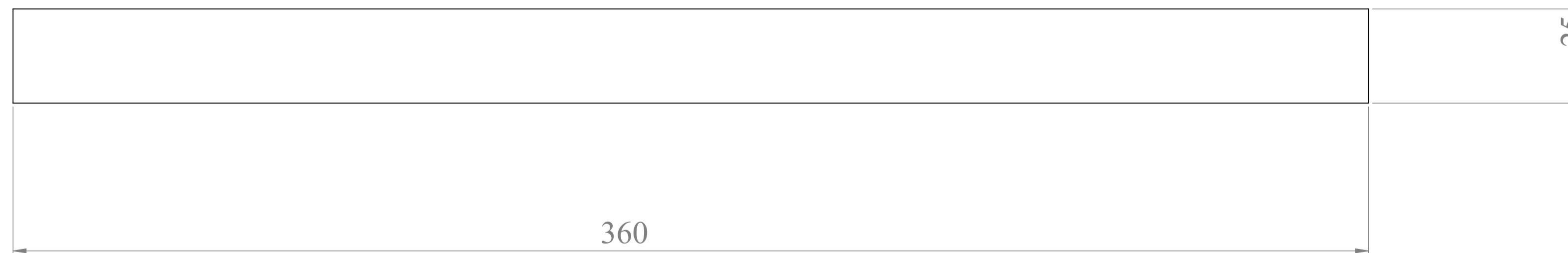
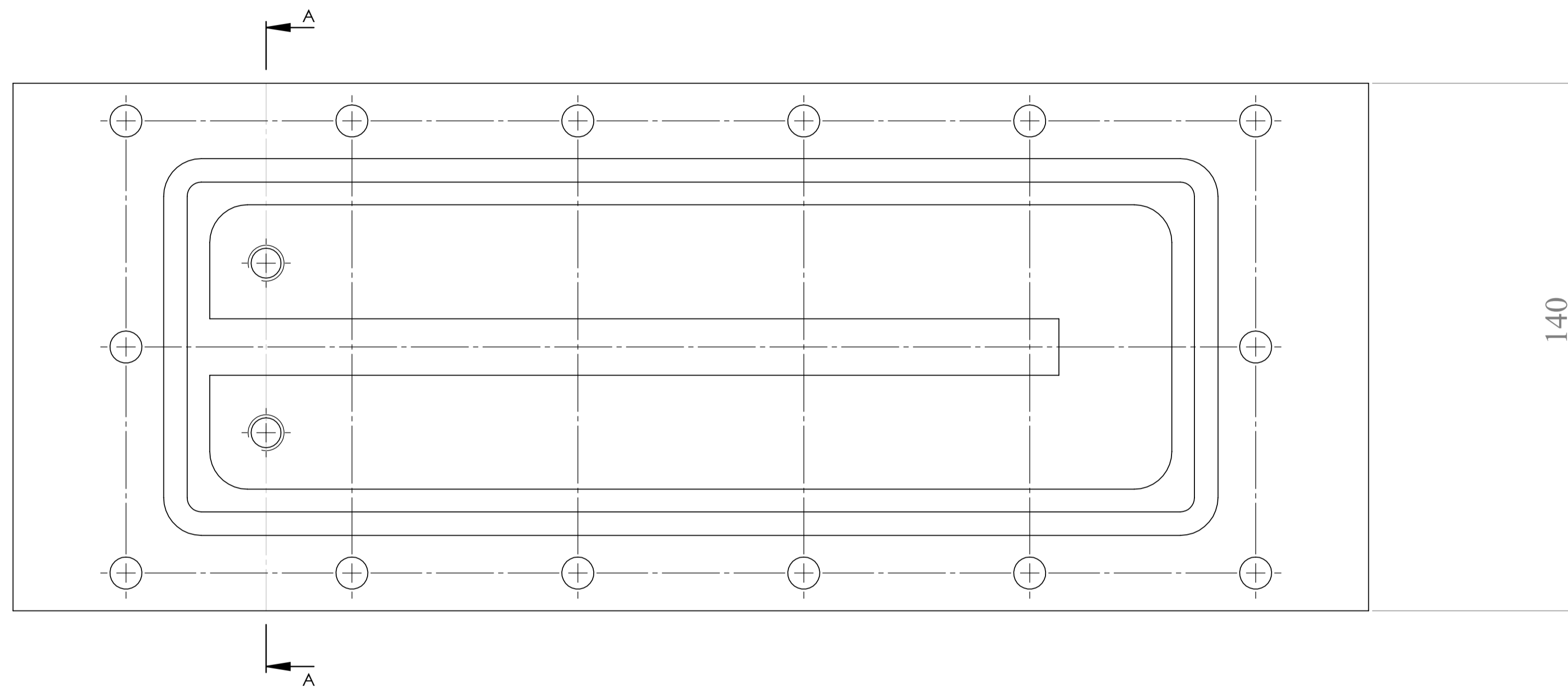
DWG NO :  
 IUAC/HEBT/BUN /09

A1

SCALE:1:1 SHEET 1 OF 1



SECTION A-A  
SCALE 1 : 1



DRAWINGS FOR ESTIMATION PUPOSE ONLY

**Gen. TOLERANCES:**

ONE PLACE DECIMAL ± 0.1mm  
 TWO PLACE DECIMAL ± 0.02mm  
 WITHOUT DECIMAL ± 0.5mm  
 ANGULAR: ± 0.20 deg.

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ALL DIMENSIONS ARE IN MM

DESIR AND BREAK SHARP EDGES

Inter University Accelerator Centre  
 Formerly : Nuclear Science Centre  
 New Delhi - 110067

NAME	SIGNATURE	DATE
DRAWN DP		17.12.19
CHKD		
APPVD		
MFG		
G.A		

**TITLE:**

**Chamber Cooling Plate**

DWG NO : IUAC/HEBT/BUN/10

MATERIAL: AL  
 Qty. : 10 Nos.