

R.I Bakhtsingh **Head, APPD,BARC** rib@barc.gov.in



# Government of India Bhabha Atomic Research Centre Beam Technology Development Group Accelerator and Pulse Power Division

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1 ..... ( \*>122)20000101

Date: 07-04-2022

Ref.: BARC/APPD/RMK/2022/26

<u>Sub</u>: Inviting quotations for fabrication and supply of high vacuum chambers and other parts as per specifications given in Annexure I & II.

Dear Sir.

On behalf of President of India, You are requested to quote for fabrication & supply of high vacuum chambers and other parts as per specifications given in Annexure I & II.

### **Terms and Conditions:**

- 1. The quotations should have the minimum validity period of 3 months. The delivery period must be three months or less. The fabrication shall be subjected to inspection by our engineers. The finished unit shall not be dispatched prior to approval by our engineers at bidder's premise. The vendor should have previous work experience in the fabrication and assembly of similar kind of jobs.
- 2. Since the goods to be supplied against this work order are meant for research purpose of a research institution under the department of Atomic Energy of Government of India, CGST and SGST at the rate of 2.5% each is payable as per notification number 47/2017 integrated Tax (Rate) dated 4.11.2017 issue by ministry of finance. The indenter shall make available the GST exemption certificate for it.
- 3. The bidder shall deliver the finished unit within three months from the date of firm work order issued to the bidder. The unit shall be delivered at Engineering Hall 4, Bhabha Atomic Research Centre, Trombay, Mumbai 400085.
- 4. Payment for the above work will be made after satisfactory completion of job and on production of bill & advanced stamped receipt along with the copy of registration. No advance payment will be made for this work.

# Information to be supplied along with the offer:

Suppliers should submit their offers along with the following information.

(a) period of validity, terms & conditions of the offer, (b) Approximate period of completion of the task and (c) copy of the registration and income-tax clearance certificate, (d) Permanent Account Number of the Supplier.

#### **Additional Information:**

1.For any clarifications before submitting your offer, you can contact Smt. Rakhee Menon K, SO/F, APPD, BARC, on any working day (Monday to Friday) on telephone No.25590174 or email: <a href="mailto:rakheemk@barc.gov.in">rakheemk@barc.gov.in</a>

Your sealed quotation (in <u>your letter head</u>) including all details, like taxes to be paid, transport charges etc., duly indicating our reference number mentioned above and due date may be sent by <u>speed post</u> to "Head, APPD, Hall 4, BARC, Trombay, Mumbai-400085" on or before 18<sup>th</sup> April 2022. The quotations received after due date & by FAX/email will not be considered.

(R.I Bakhtsingh)

Copy to: Accounts Officer (Works), Central Complex, BARC.

# **ANNEXURE-I**

# FOLLOWING PARTS HAVE TO BE FABRICATED & SUPPLIED

Sl.no	Part description	Fabricated/purchased	Part no.
		Quantity	
1	Electrode-1	1	Part-5
2	Electrode-2	1	Part-6
3	Connector	1	Part-7
4	Anode Pin	5	Part-8
5	SS 316 plate	4 (as per drawing)	Part-48
6	SS 304L high vacuum chamber	1	Part-16
7	SS304L plate	1	Part-17
8	SS304L chamber	1 (as per drawing)	Part-18
9	Aluminium disc	2	Part-41
10	Al disc cover	1	Part-40
11	SS304L cathode cover	1	Part-38
12	Rogowski Coil	1 (as per drawing)	Part 49,49/1, 49/2,
			49/3
13	Tungsten pins	as per drawing	Part 1-7
14	SS 304L Small vacuum chamber	1 set (as per drawing)	All parts as per
			XRAY-A-1-D1
15	SS 304L M 10 x 40 Lg HEX HD	24	As specified
	SLOTTED HD BOLT		
16	M 6 x 15 Lg HEX HD SLOTTED HD BOLT	12	As specified
17	M 6 x 15 Lg HEX HD SLOTTED HD BOLT	6	As specified
18	Viton O'ring Φ 3.53 × ID 37.69	2	As specified
19	Viton O'ring Φ 7.92 × ID 569.9	2	As specified
20	SS 304L M6 wing nut	6	As specified
21	OFHC Copper gasket for CF 150 flange	1	As specified
22	SS 304LM 8 x 60 Lg HEX HD SLOTTED HD BOLT & PLAiN WASHER	20	As specified

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#### **Annexure II**

The parts should be fabricated as per drawings mentioned above and specifications given below. In case of doubt in understanding please ask for clarification.

#### 1. General:

- (a) All the parts to be fabricated as per bill of material attached along with drawings. No materials will be supplied by the indentor for fabrication.
- (b) The components are Electrical in nature and stores energy at very high voltages. Hence the fabrication, welding and testing should be in accordance with the procedure laid down by ASME code for boilers and pressure vessels.
- (c) The fabricated parts should have super-finished surfaces as given in the drawings. The stainless steel plates/rods of A-240, or SS-304 should be used in fabrication and then the surfaces are to be polished.
- (d) The fabricators must submit their own fabrication drawings after acceptance of workorder. The fabrication drawings should be got approved before starting the job.
- (e) The indenter reserves the right to make modifications and alterations in the drawings as well as to inspection at every stage of fabrication, testing and assembly. The fabricators should carryout minor modifications without extra cost.

#### 2. Materials:

- a) All the stainless steel parts mentioned in the drawings are to be fabricated using the SS-304L stainless steel rods of suitable diameter extruded rods and suitable thickness SS-304L stainless steel plates. The surfaces are to be polished by buffing after fabrication. The fabricated parts should have super-finished surfaces as given in the drawings.
- b) Part No:38 should be SS 316.
- c) All O'rings should be viton.

#### 3. Fabrication:

- a) The fabrication of components shall be in accordance with best quality shop practice and conform strictly to dimensions, tolerances and instruction given in the drawings & specifications. All the finished parts are true, flat, smooth, mirror polished, corners rounded off, free of weld spatter, etc. Exposed surface shall be protected from damage at all times.
- b) All the fabricated parts should have super-finished surfaces as given in the drawings to RMS 0.4 µm by grinding, machining, lapping with abrasives and electro-polishing if necessary.
- c) A general tolerance of  $\pm 0.1\%$  on all fabricated parts and 0.05% on machined parts shall be provided unless otherwise specified. Similarly a general tolerance of  $\pm 0^0$ . 30' shall be provided on all angles.

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## 4. Welding:

- a) All the welding shall be electric arc. The root pass of all welding shall be made using TIG welding with continuous inert gas like argon gas backing followed by shielded metallic arc welding.
- b) The welding procedures shall be qualified and approved under section IX of ASME Boiler and Pressure Vessel code and shall also be submitted to and approved by Indenter before commencing fabrication.
- c) All the welds are to be inspected and shall be ground smooth. Completed welds shall be smooth and free from any drop-through spatter, cracks undercut or lack of penetration.

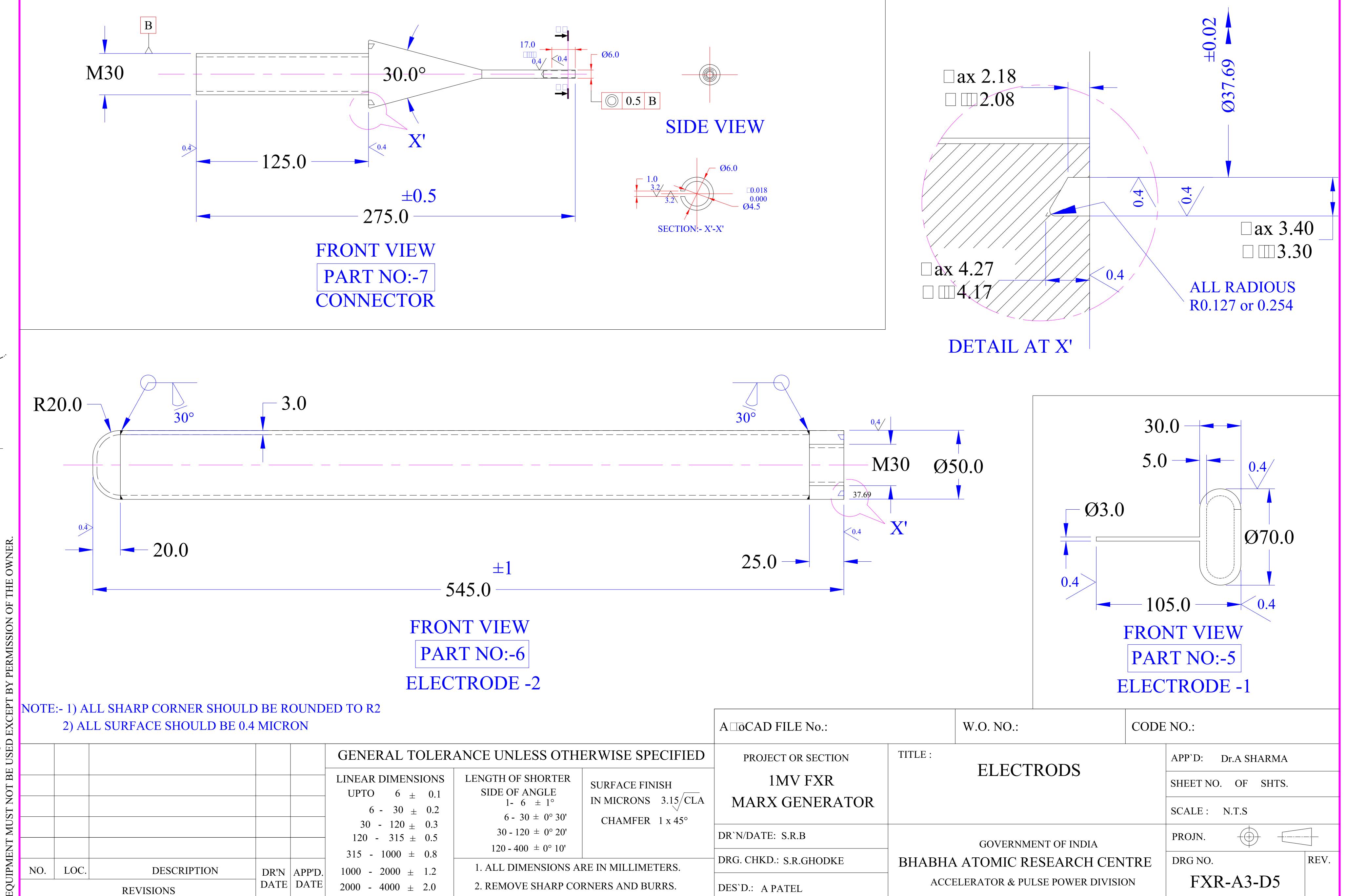
# 5. Testing:

Vacuum Leak Test: The vacuum chamber shall be vacuum leak tested at the operating pressure of  $\leq 10^{-5}$  mbar. Distortion or leakage will not be permitted. If any closing flanges are required for testing, it is responsibility of fabricator to do the same.

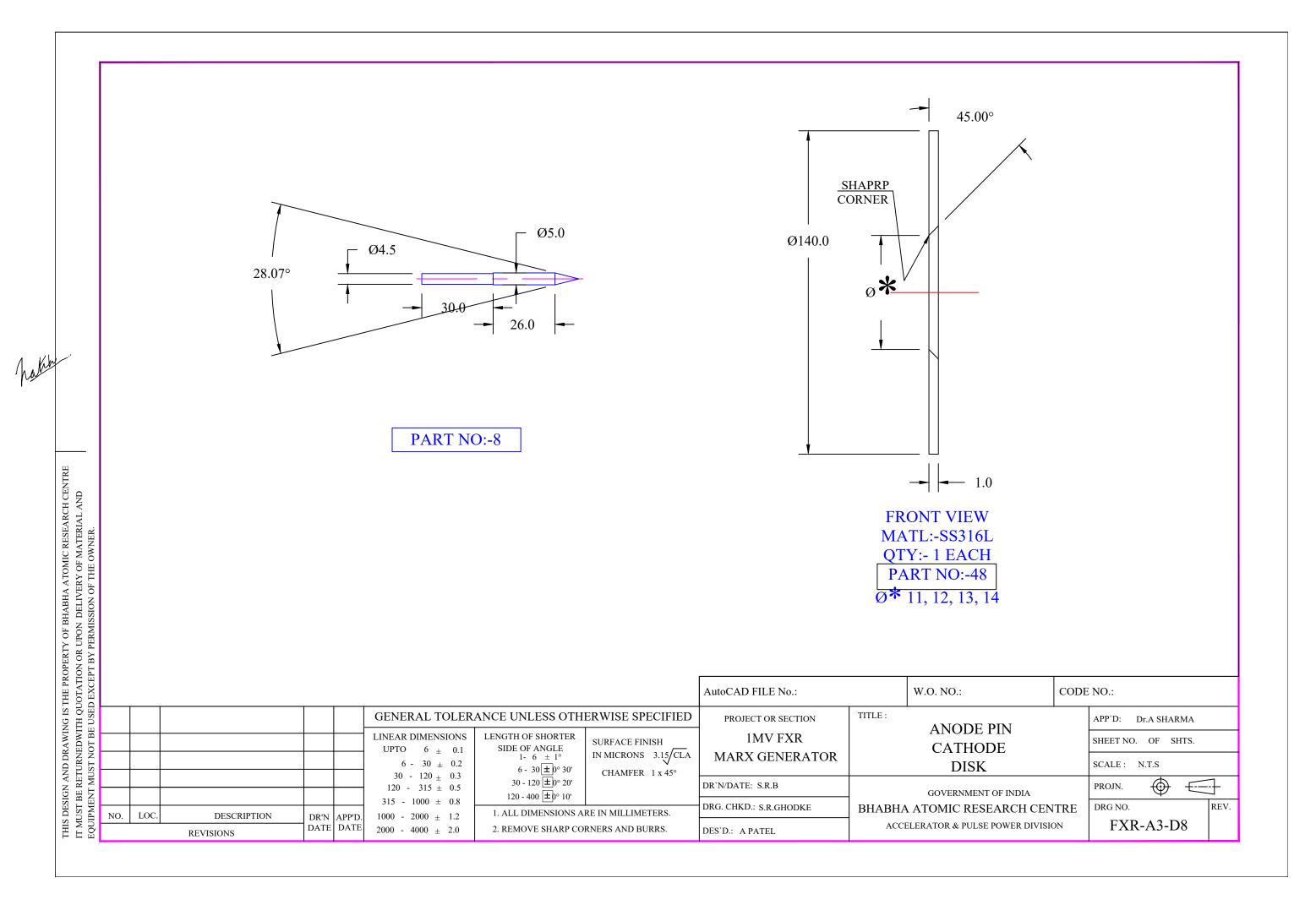
## 6. Cleaning:

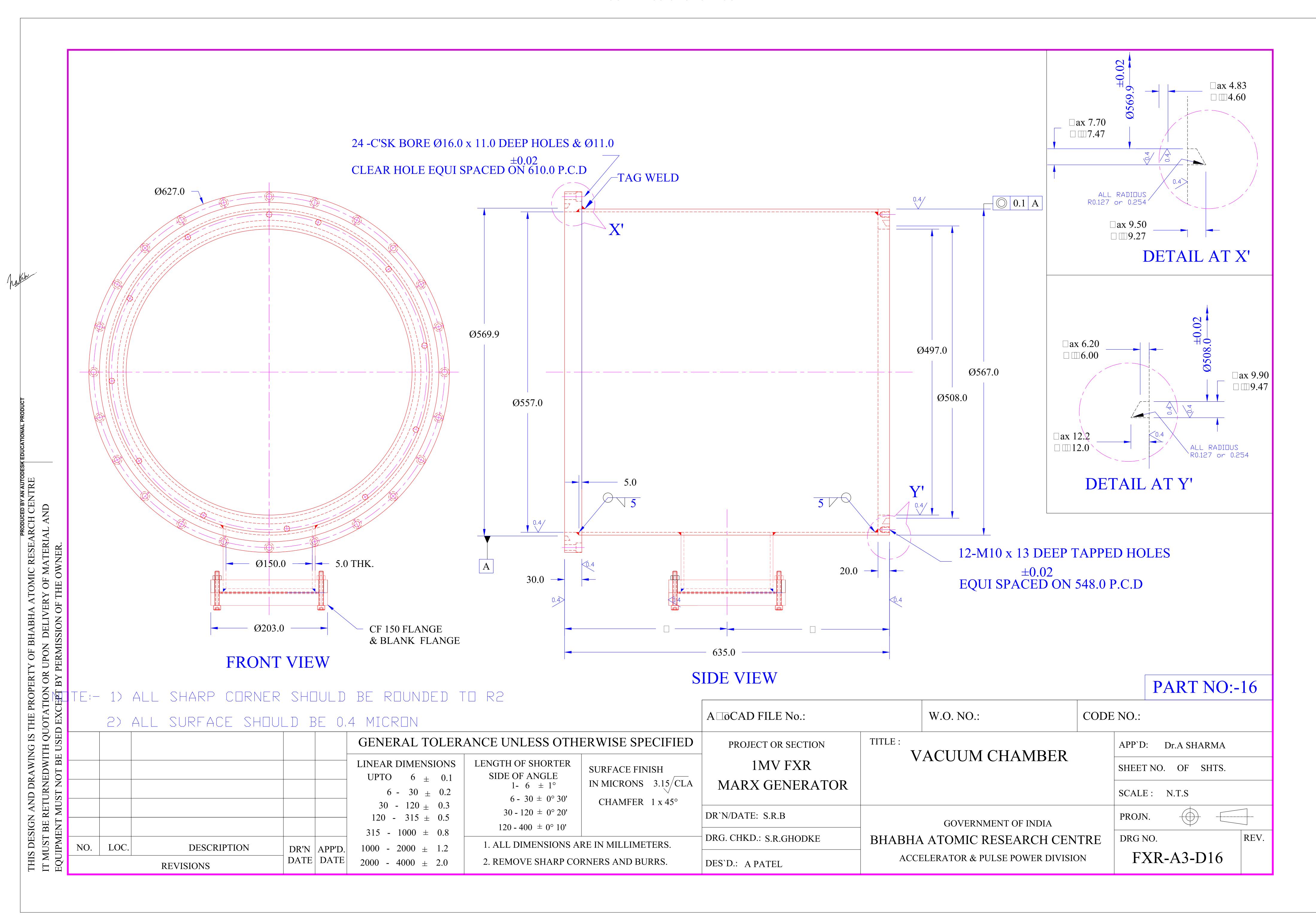
All inside surfaces shall be degreased and then flushed with clean water. The degreasing agent shall not contain halogens. Final cleaning shall be performed with hot water wash using a commercial detergent followed by hot water rinse. Surfaces shall be completely cleaned and degreased.

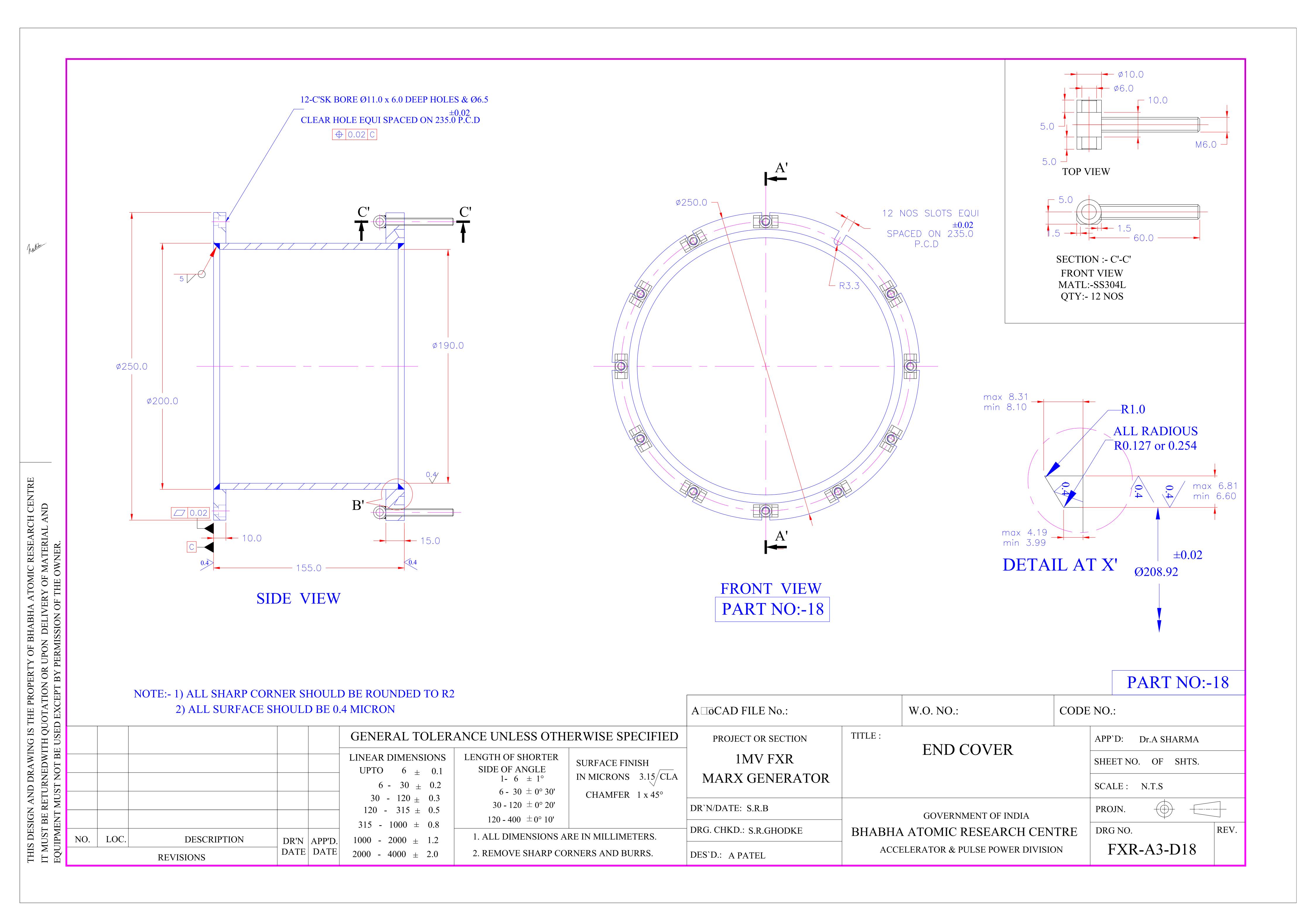
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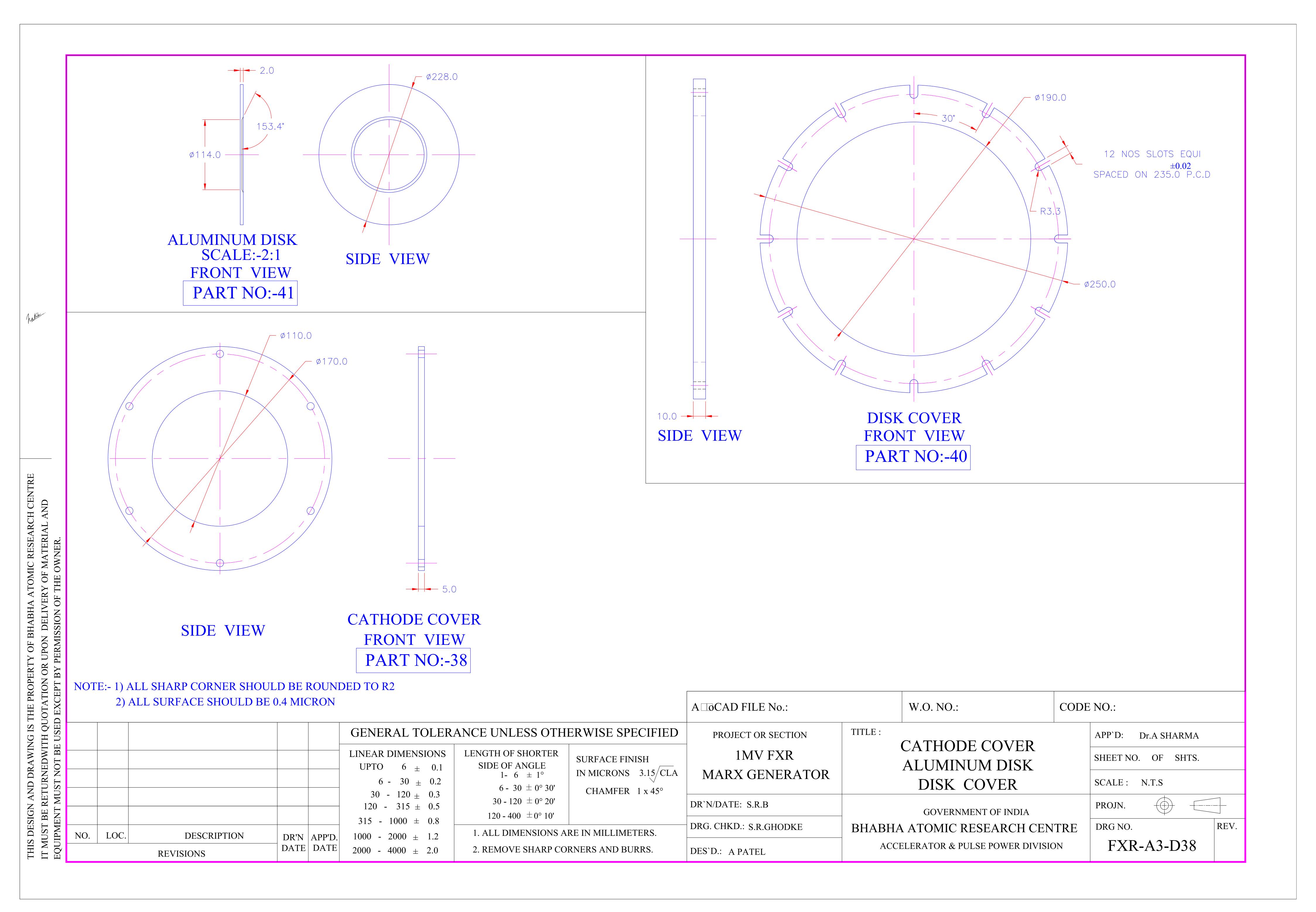


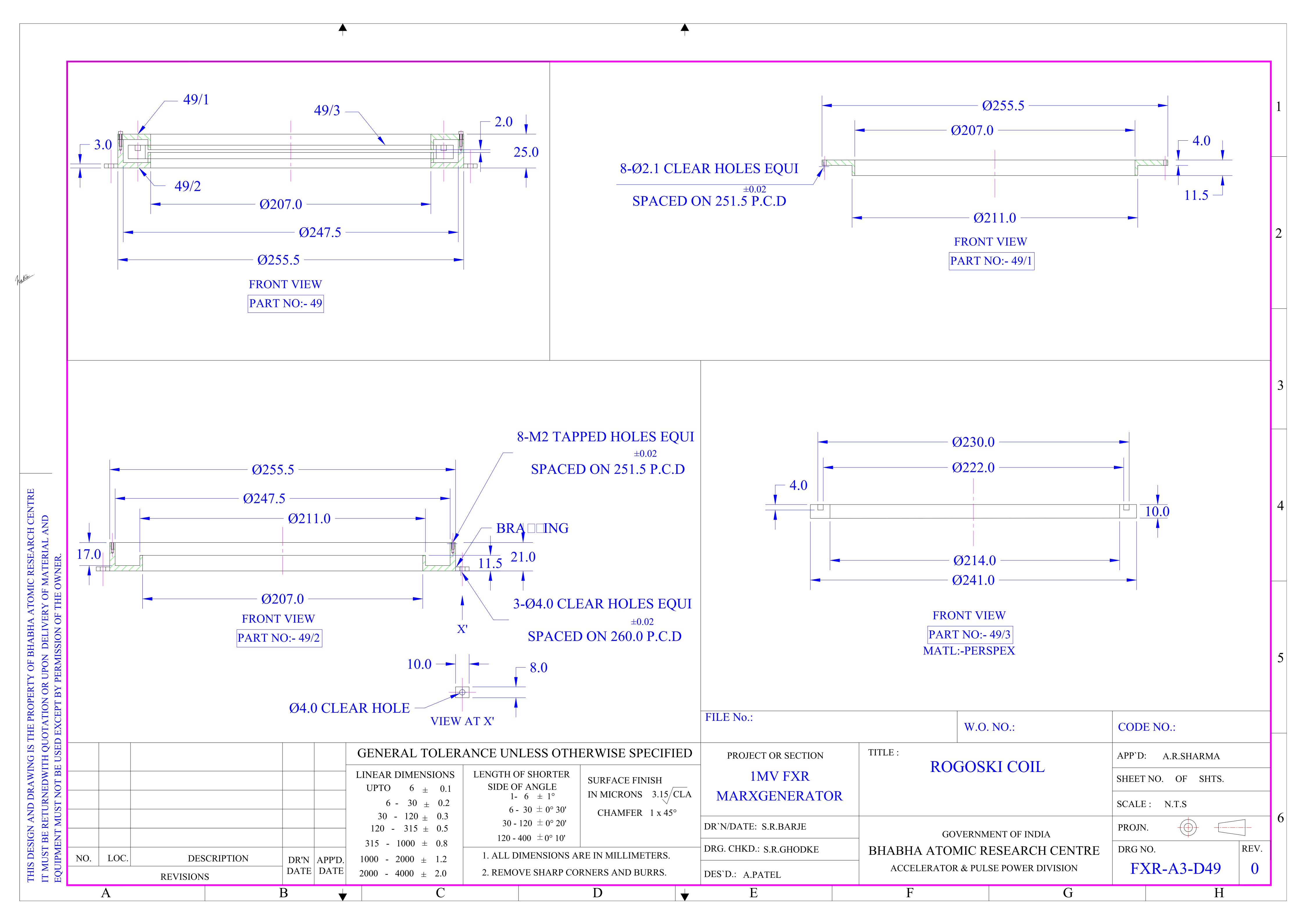
THIS DESIGN AND DRAWING IS THE PROPERTY OF BHABHA ATOMIC RESEARCH CENTRE IT MUST BE RETURNEDWITH QUOTATION OR UPON DELIVERY OF MATERIAL AND EQUIPMENT MUST NOT BE USED EXCEPT BY PERMISSION OF THE OWNER.

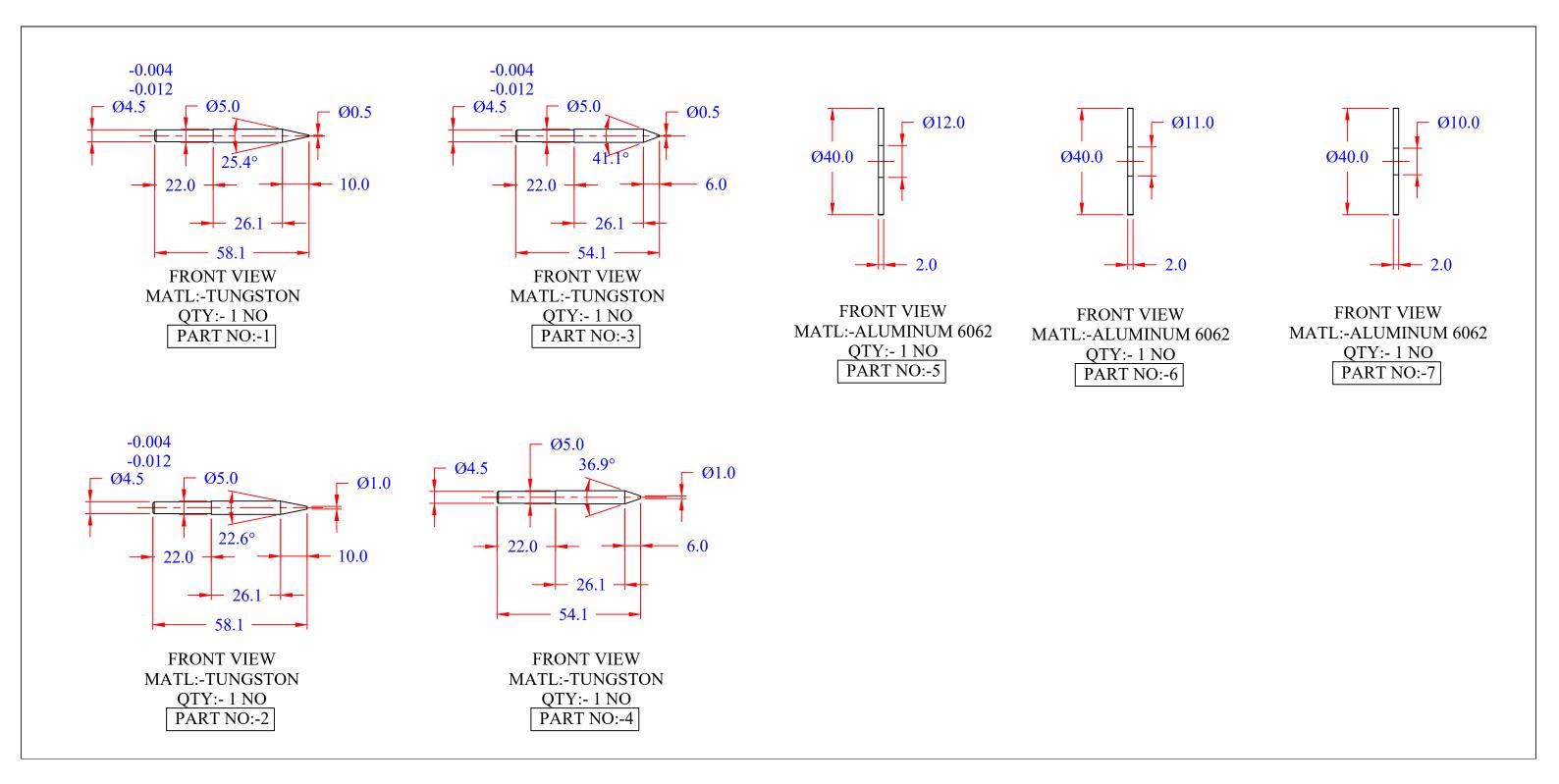












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2 V Ø112.0 FRONT VIEW Ø65.0 MATL:-GLASS QTY:- 1 NO SIDE VIEW PART NO:- 40 // Ø0.010 B 141.5 65.0 141.5 Ø70 0 34.0 DETAIL B' 6-Ø6.7 CLEAR HOLES EQUL \$PACED ON 58.7 P.C.D FRONT VIEW LEFT SIDE VIEW RIGHT SIDE VIEW MATL:-SS304L QTY:- 1 NO PART NO:-1 THIS DESIGN AND DRAWING IS THE PROPERTY OF BHABHA ATOMIC RESEARCH CENTRE IT MUST BE RETURNEDWITH QUOTATION OR UPON DELIVERY OF MATERIAL AND EQUIPMENT MUST NOT BE USED EXCEPT BY PERMISSION OF THE OWNER. NOTE:1) ALL SHARP CORNER SHOULD BE ROUNDED TO R2/R1.
2) ALL INSIDE SURFACE SHOULD BE 0.4 MICRON.
-6
3) ALL WELDINGS SHOULD BE FROM INSIDE COMPATABLE FOR 10 mbar VACUUM. DETAIL A' 6-Ø6.7 CLEAR HOLES EQUI SPACED ON 58.7 P.C.D 4-Ø5.5 CLEAR HOLES EQUI Ø41.3 Ø36.6 Ø48.10 Ø48.2 Ø48.4 Ø48.08 Ø48.2 Ø48.4 016.5 Ø14.5 Ø12.0 Ø29.0 Ø19.5 Ø25.5 TOP VIEW FRONT VIEW MATL:-NEOPREN SIDE VIEW SIDE VIEW QTY:- 1 NO PART NO:- 41 FRONT VIEW SECTION :- C'-C' DETAIL O' DETAIL C' MATL:-SS304L NOTE:-FRONT VIEW 1) \* 2 & 3 mm Thk. PLATE ONE EACH. FILE No.: SECTION :- B'-B' QTY:- 1 Each MATL:-SS304L W.O. NO.: CODE NO.: PART NO:-31 D:\SUPRIYA\OLD\SUPRIYAD\SUPRIYA\DWG\CHODARY QTY:- 6 NOS GENERAL TOLERANCE UNLESS OTHERWISE SPECIFIED TITLE: PROJECT OR SECTION APP'D: Dr. A.SHARMA **DETAILS OF** LENGTH OF SHORTER LINEAR DIMENSIONS APPD (BARC) SHEET NO. OF SHTS. SURFACE FINISH VACUUM CHAMBER SIDE OF ANGLE UPTO  $6 \pm 0.1$ IN MICRONS 3.15/CLA 1- 6 ± 1°  $6 - 30 \pm 0.2$ SCALE:  $6 - 30 \pm 0^{\circ} 30'$ CHAMFER 1 x 45° 30 - 120  $\pm$  0.3  $30 - 120 \pm 0^{\circ} 20'$ DR'N/DATE: S.R.B 25-02-2020 PROJN.  $120 \ \textbf{-} \ 315 \ \pm \ 0.5$ GOVERNMENT OF INDIA  $120 - 400 \pm 0^{\circ} 10'$  $315 - 1000 \pm 0.8$ DRG. CHKD.: S.R. GHODKE DRG NO. REV. BHABHA ATOMIC RESEARCH CENTRE 1. ALL DIMENSIONS ARE IN MILLIMETERS. NO. LOC. DESCRIPTION 1000 - 2000  $\pm$  1.2DR'N APP'D. XRAY-A-1-D1 R4 ACCELERATOR & PULSE POWER DIVISION DATE DATE 2000 - 4000  $\pm$  2.02. REMOVE SHARP CORNERS AND BURRS. DES'D.: RAKHEE M REVISIONS Η Α G

4-M5 TAPPED HOLES EQUI  $\pm 0.02$ 

SPACED ON 47.0 P.C.D

0.02

6-M6 X 5 DEEP TAPPED HOLES

EQUI SPACED ON 104.0 P.C.D

6-Ø6.7 CLEAR HOLES EQUI

SPACED ON 58.7 P.C.D

Ø100.0 P.C.D

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6-Ø6.5 CLEAR HOLES EQUI

\$PACED ON 152.0 P.C.D