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प्लाज़्मा अनुसंधान संस्थान  
INSTITUTE FOR PLASMA RESEARCH  
परमाणु ऊर्जा विभाग, भारत सरकार का एक सहायता प्राप्त  
संस्थान  
An Aided Institute of Department of Atomic Energy,  
Government of India



इन्दिरा पुल के पास, भट, गांधीनगर - 382 428 भारत  
दूरभाष: (079) 2396 2020/2021/2028  
फैक्स: 91-079-23962277  
वेब: [www.ipr.res.in](http://www.ipr.res.in)

NEAR INDIRA BRIDGE, BHAT  
DIST. GANDHINAGAR - 382 428 (INDIA)  
Phone: (079) 2396 2020/2021/2028  
Fax : 91-079-23962277  
Web : [www.ipr.res.in](http://www.ipr.res.in)

## ENQUIRY

ENQUIRY NO : IPR/EQL/18-19/346  
Date : 09-01-2019

**Due on : 07-02-2019 by 1:00 PM IST**

Please send your offer in sealed envelope specifying Enquiry No, Date & Due Date, ALONG WITH your credentials for the following items:

### Important Note:

Please note that e-mail quotations are not acceptable however you may send your queries (if any) to [localpurchase@ipr.res.in](mailto:localpurchase@ipr.res.in)

Please ensure your sealed quotation reaches this office not later than above mentioned due date and time.

Kindly go through the following documents properly before quoting which are available on the IPR web portal i.e., [http://www.ipr.res.in/documents/tender\\_terms.html](http://www.ipr.res.in/documents/tender_terms.html) / attached herewith.

- 1) Instructions to the bidders & Terms and conditions (refer Form No: **IPR-LP-01.V4**)
- 2) Bidding format

**GST for Goods and Services (IGST/CGST/SGST TAX BENEFITS):** Please refer **clause no: 8** of Form No: **IPR-LP-01.V4**

### QUOTATION SHOULD BE ADDRESSED TO PURCHASE OFFICER ONLY

Sr No	Description	Quantity
1	Quartz tube option I	2.0 Nos.
2	Quartz tube option II	2.0 Nos.
3	Quartz tube option III	2.0 Nos.
4	Quartz tube option IV	2.0 Nos.

Note: TDS as per CGST Act: As per provisions of section No. 51 of the CGST Act 2017, TDS @2% (IGST 2% or CGST 1% and SGST 1%) will be deducted while making payment to the suppliers where total value of orders/contracts/work orders exceeds Rs. 2.5 lakhs, in the event of order in Indian Rupees. Necessary TDS Certificate will be issued to the supplier after TDS deduction.

Encl: As per attachment.

Sd/-

Mr. D. Ramesh

**Information to Vendors:** We are working towards a single platform for our future requirement. Hence, please refer IPR website i.e, <http://www.ipr.res.in/documents/tendersenq.html> for our future requirement.

## Specification of quartz tube for Helicon Plasma Thruster

- Tube should be transparent and both end open.
- The tube should be electrically fused for low impurity content.
- Tube should be fabricated as per the drawings attached.
- Tolerance in ID/OD =  $\pm 2$  mm and in length =  $\pm 5$  mm and in thickness =  $\pm 1$  mm.
- Property test certificate of the material used for fabrication should be provided.
- The quartz material used for the fabrication of the tube should have the following properties:

### 1) Mechanical

- Density :  $2.20 \times 10^3 \text{ Kg/m}^3$
- Young's Modulus :  $74 \times 10^6 \text{ KN/m}^2$
- Rigidity Modulus :  $32 \times 10^6 \text{ KN/m}^2$
- Compressive Strength :  $20 \times 10^6 \text{ KN/m}^2$
- Tensile Strength :  $70 \times 10^3 \text{ KN/m}^2$
- Shear Strength :  $70 \times 10^3 \text{ KN/m}^2$

### 2) Electrical

- Electrical Resistivity :  $2 \times 10^{19} \text{ ohm cm at } 20^\circ\text{C}$   
:  $2 \times 10^6 \text{ ohm cm at } 800^\circ\text{C}$
- Dielectric Strength :  $10 \text{KV/mm at } 20^\circ\text{C}$   
:  $2.5 \text{KV/mm at } 500^\circ\text{C}$

### 3) Thermal

- Strain Point :  $1385^\circ\text{K}$
- Annealing Point :  $1455^\circ\text{K}$
- Softening Point :  $1853^\circ\text{K}$
- Continuous Operating Temp :  $\Rightarrow 1000^\circ\text{C}$
- Coefficient of Expansion :  $0.52 \times 10^{-6} \text{ per } ^\circ\text{C}$

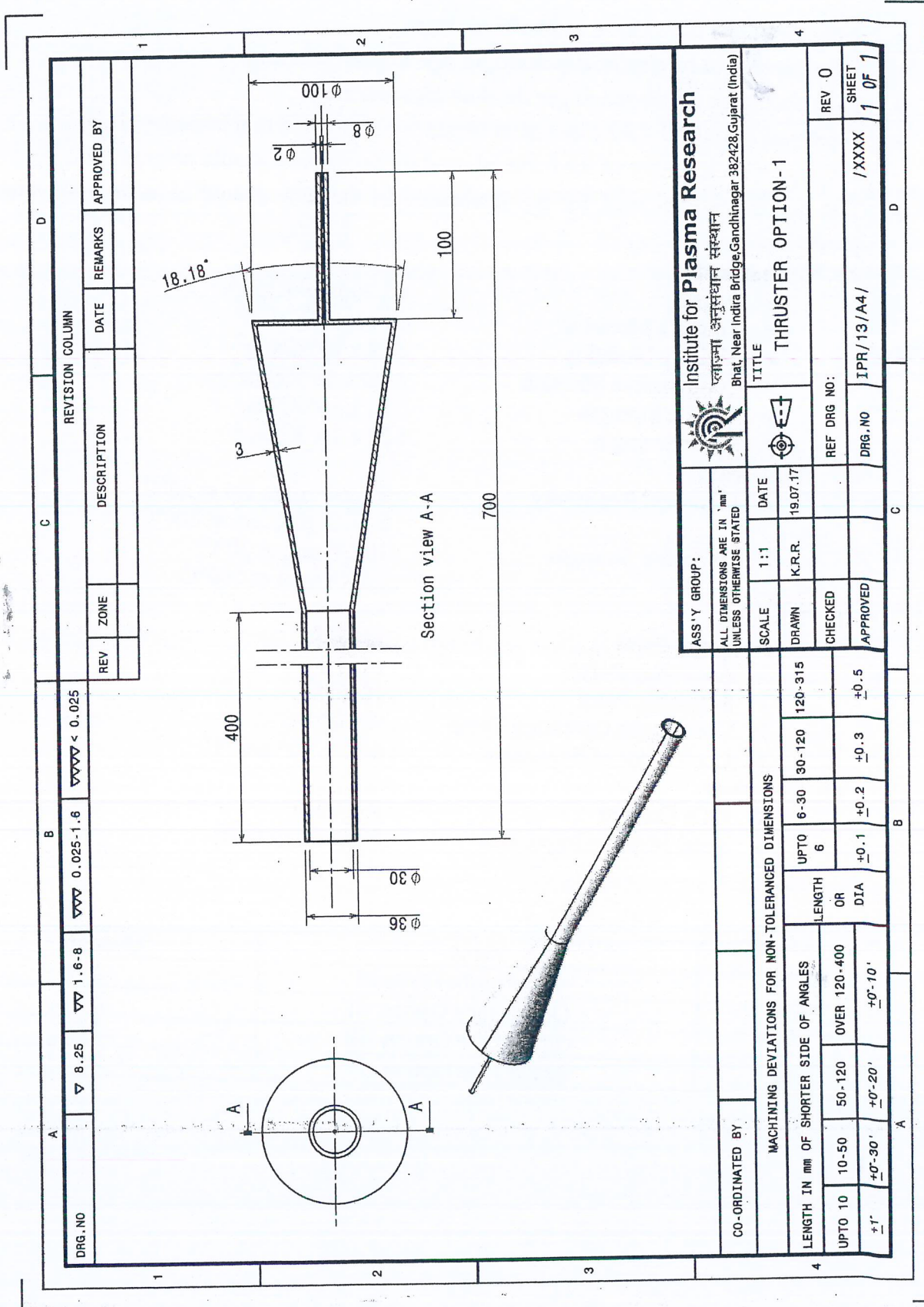
### 4) Chemical

- SiO<sub>2</sub> Content :  $99.995\%$
- Total Metallic Impurities :  $10 \text{ppm (Typical)}$

S. No.	Items	Quantity
1	Quartz tube Option-I	2
2	Quartz tube Option -II	2
3	Quartz tube Option -III	2
4	Quartz tube Option -IV	2

Item 1:  
Required Quantity-2 Nos.

Drawing



REVISION COLUMN			
REV	ZONE	DESCRIPTION	DATE

ASS'Y GROUP: ALL DIMENSIONS ARE IN "mm" UNLESS OTHERWISE STATED		SCALE 1:1	DATE 19.07.17
CO-ORDINATED BY		DRAWN K.R.R.	CHECKED
DRG.NO		APPROVED	REF DRG NO:
DRG.NO		REF DRG NO:	REV - 0
DRG.NO		REF DRG NO:	SHEET
DRG.NO		REF DRG NO:	1 OF 1

**Institute for Plasma Research**  
 ગાંધી અભ્યાસન સંસ્થા  
 Bhat, Near Indira Bridge, Gandhinagar 382428, Gujarat (India)

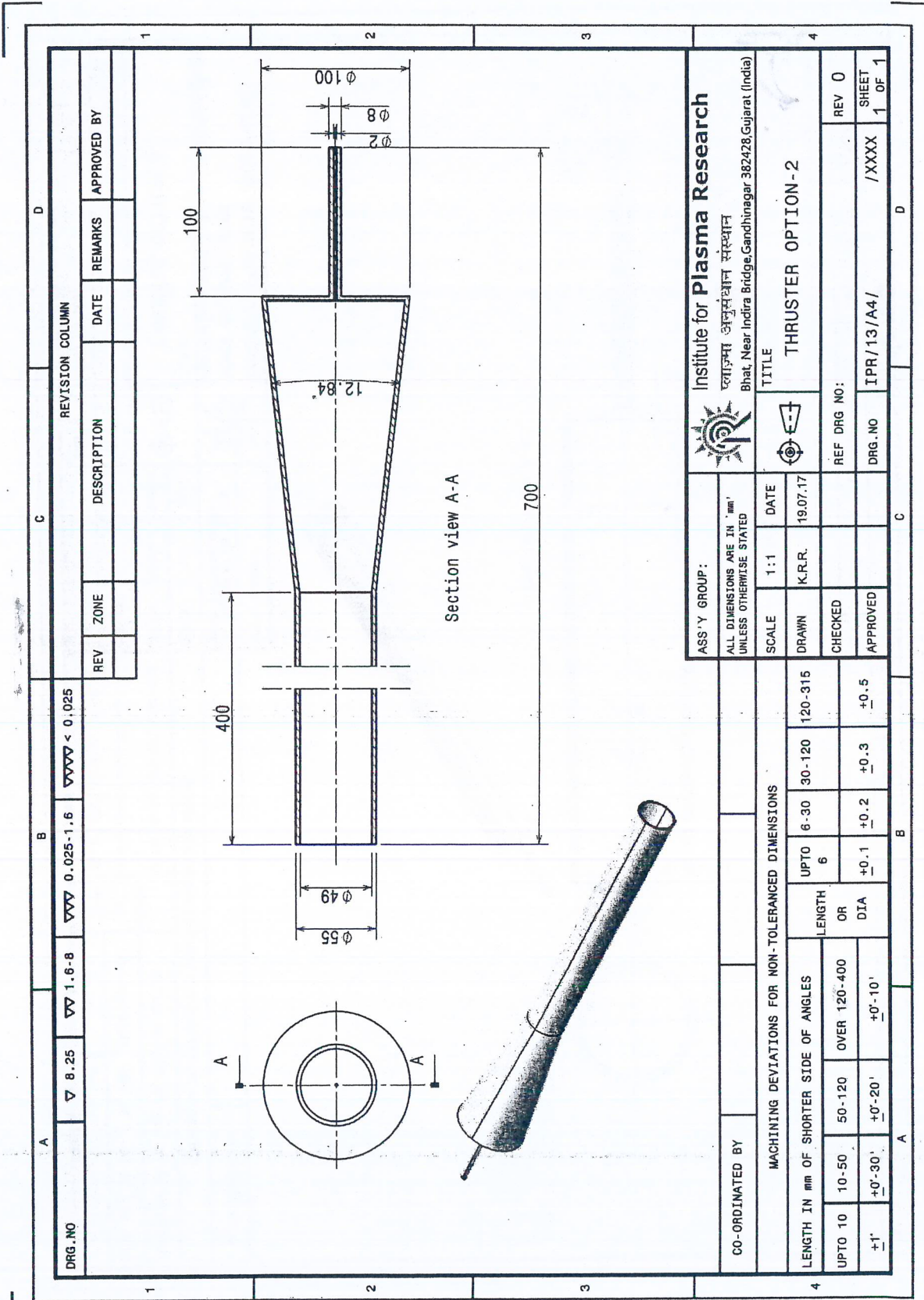
**THRUSTER OPTION - 1**

TITLE: THRUSTER OPTION - 1  
 REF DRG NO: IPR/13/A4/  
 DRG.NO: /XXXX  
 SHEET: 1 OF 1



Item 2:  
Required Quantity-2 Nos.

Drawing



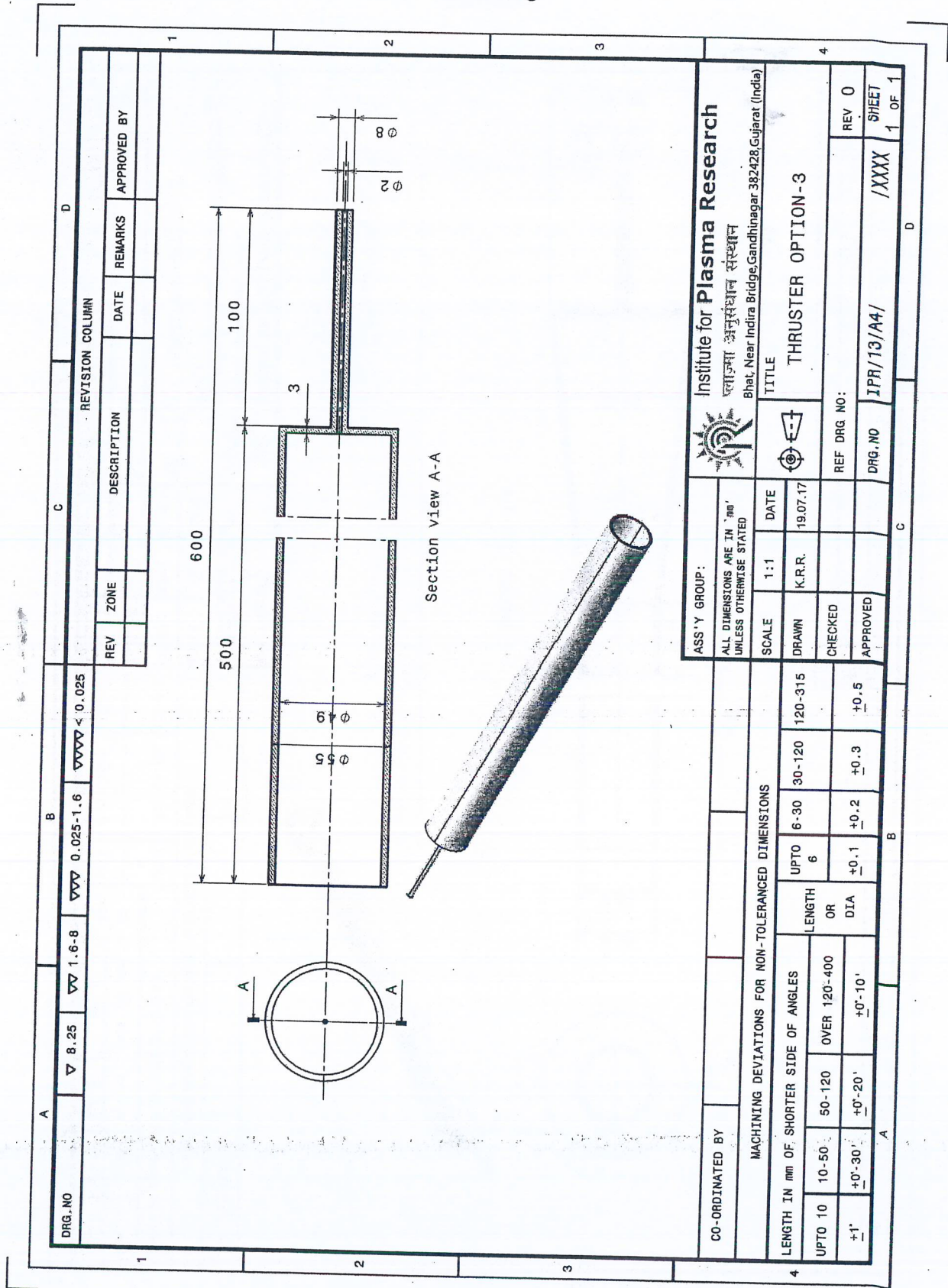
DRG. NO		A		B		C		D	
▽ 8.25	▽ 1.6-8	▽ 0.025-1.6	▽ 0.025	REVISION COLUMN	DESCRIPTION	DATE	REMARKS	APPROVED BY	
REV	ZONE								

ASS'Y GROUP :		SCALE		DATE		TITLE	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		1:1		19.07.17		THRUSTER OPTION-2	
CO-ORDINATED BY		DRAWN	K.R.R.	CHECKED		REF DRG NO:	REV 0
MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS		UPTO 6-30		30-120		120-315	
LENGTH IN mm OF SHORTER SIDE OF ANGLES		OR DIA					
UPTO 10	10-50	50-120	OVER 120-400	+0.1	+0.2	+0.3	+0.5
+1	+0-30'	+0-20'	+0-10'				
DRG. NO		IPR/13/A4/		SHEET		1 OF 1	

Institute for Plasma Research  
 ભાવનગર પ્લાઝ્મા સંશોધન સંસ્થા  
 Bhat, Near Indira Bridge, Gandhinagar 382428, Gujarat (India)

Item 3:  
Required Quantity-2 Nos.

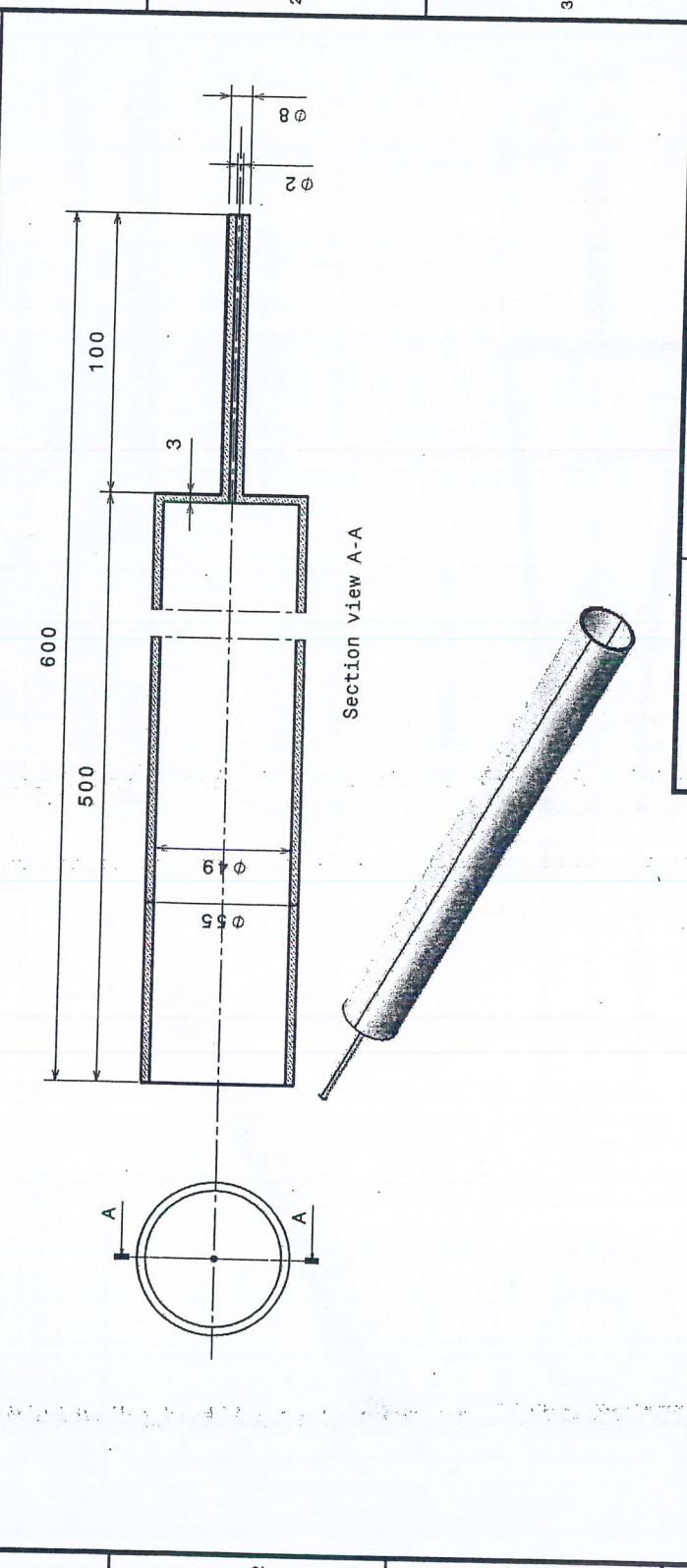
Drawing



DRG. NO		A		B		C		D	
▽ 8.25	▽ 1.6-8	▽ 0.025-1.6	▽ 0.025-1.6	▽ 0.025-1.6	▽ 0.025-1.6	▽ 0.025-1.6	▽ 0.025-1.6	▽ 0.025-1.6	▽ 0.025-1.6

REVISION COLUMN			
REV	ZONE	DESCRIPTION	APPROVED BY



ASS'Y GROUP:		ALL DIMENSIONS ARE IN "mm" UNLESS OTHERWISE STATED		SCALE 1:1		DATE 19.07.17	
CO-ORDINATED BY		MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS		DRAWN K.R.R.		TITLE THRUSTER OPTION-3	
LENGTH IN mm OF SHORTER SIDE OF ANGLES		LENGTH OR DIA		UPTO 6		REF DRG NO: IPR/13/A4/	
UPTO 10		50-120		6-30		REV 0	
+1'		+0'-20'		+0.2		SHEET 1 OF 1	
+0'-10'		+0.3		+0.5		/XXX	



Item 4:  
Required Quantity-2 Nos.

Drawing

A	B	C	D																																				
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:20%;">DRG. NO</td> <td style="width:20%;">▽ 8.25</td> <td style="width:20%;">▽▽ 1.6-8</td> <td style="width:20%;">▽▽▽ 0.025-1.6</td> <td style="width:20%;">▽▽▽▽ &lt; 0.025</td> </tr> </table>	DRG. NO	▽ 8.25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025																																		
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## Compliance Sheet

Sr. No.	IPR Specification	IPR Requirement	Vendor
1		Tube should be transparent and both end open.	
2		The tube should be electrically fused for low impurity content.	
3		Tube should be fabricated as per the drawings attached.	
4		The quartz material used for the fabrication of the tube should have the following properties:	
5	<b>Mechanical properties</b>  Density  Young's Modulus  Rigidity Modulus  Compressive Strength  Tensile Strength  Shear Strength	2.20 x 10 <sup>3</sup> Kg/m <sup>3</sup>  74 x 10 <sup>6</sup> KN/m <sup>2</sup>  32 x 10 <sup>6</sup> KN/m <sup>2</sup>  20 x 10 <sup>6</sup> KN/m <sup>2</sup>  70 x 10 <sup>3</sup> KN/m <sup>2</sup>  70 x 10 <sup>3</sup> KN/m <sup>2</sup>	
6	<b>Electrical Properties</b>  Electrical Resistivity	2 x 10 <sup>19</sup> ohm cm at 20°C 2 x 10 <sup>6</sup> ohm cm at 800°C	

	Dielectric Strength	10KV/mm at 20°C 2.5KV/mm at 500°C	
7	<b>Thermal properties</b>		
	Strain Point	1385°K	
	Annealing Point	1455°K	
	Softening Point	1853°K	
	Continuous Operating Temp	=>1000°C	
	Coefficient of Expansion	0.52 x 10 <sup>-6</sup> per °C	
8	<b>Chemical properties</b>		
	SiO <sub>2</sub> Content	99.995%	
	Total Metallic Impurities	10ppm (Typical)	
9	Tolerance in ID/OD = ±2 mm and in length = ± 5 mm and in thickness=±1 mm.		
10	Property test certificate of the material used for the fabrication should be provided.		