

INSTITUTE FOR PLASMA RESEARCH

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MINOR FABRICATION WORKS ENQUIRY

Office Copy

ENQUIRY NO :IPR/MFW/20-21/75

Date : 11-09-2020

Due Date : 30-09-2020 13:00 IST

Please send your offer in sealed envelope specifying Inquiry 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 **vipul@ipr.res.in**

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

Kindly go through the following document properly before Quoting which are available on the IPR web portal i.e., <http://www.ipr.res.in/documents/tenders.html/> attached here with.

1. Technical specification as enclosed.
2. Instruction to the bidders & terms and Condition (refer Form NO:**IPR-MFW-01-V1**)
3. Bidding format(refer Biddingformat MFW-Bid.pdf)

GST fro Goods and Services (IGST/CGST/SGST TAX BENEFITS): PLEASE REFER clause no:8 of Form No:**IPR-MFW-01-V1**

QUOTATION SHOULD BE ADDRESSED TO **V. L. TANNA** ONLY.

Sr.No.	Description	Quantity	Rate
1	1. Fabrication of GFRP Tubes as per dwg. Size 25 mm OD 17 mm ID and 82 mm length	25	No.
2	2. Outer filament winding job from 25 mm to 48 mm OD	25	No.
3	Outer filament winding job from 125 mm to 143 mm OD	25	No.
4	4. Fabrication of GFRP insulation Tube of OD 127 mm and length 55 mm	25	No.

Free Issue Material

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Sr.No.	Description	Quantity	Unit	Value
1	1. S-glass Roving Internal dia of roving bobbin : 170 mm, Outer dia of bobbin: 250 mm and Length : 275 mm, 360 tex	8.00	Kg.	10000.00
2	2. 1st stage bonded cryo component (Electrical insulation Breaks IB)part provided for final filament winding over item No. 2 (SS 316 L stub + G-10 CR grade tube)	25.00	No.	125000.00
3	3. 1st stage bonded cryo component (Vacuum barrier, VB) part provided for final filament winding over item No. 3 (SS 316 L stub + G-10 CR grade tube)	25.00	No.	150000.00
4	4. IPR Cryogenic epoxy resin system	6.00	Kg.	199998.00

Note : Please quote with complete technical details (Technical Compliance sheet and product data sheet)

Encl:As per attachment

Sd/-
V. L. TANNA
Scientific Officer-G

Technical Specifications Document

Introduction

The fabricated G-10 tubes needed for fabrication of electrical insulation breaks and cryogenic vacuum barrier. These final fabricated components will be used for liquid helium hydraulics of superconducting fusion magnets of SST-1 machine. The fabricated G-10 tubes will be cryogenic epoxy resin bonded with SS conductor metal and further will be over filament wound subjected to be passed in 1st stage QA/QC test. The final fabricated components should have helium leak tightness of order of $\leq 1 \times 10^{-8}$ mbar-l/s at cryogenic temperature and electrical isolation of minimum 3-5 kV/mm.

Technical Specification

[1] Item No. 1 :Fabrication of GFRP (G-10 CR) grade inner insulation tubes as per figure no. 1 given

- Fabrication of GFRP insulation made by filament winding process as per the drawing, the material (S-glass roving, 360 Tex and IPR resin system) will be issued to as Free Issue Materials for fabricating the tube.
- Qty: 25 numbers

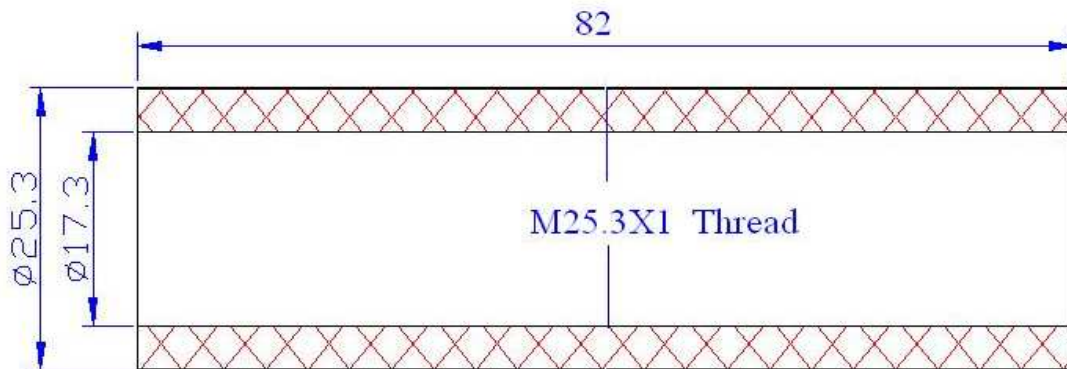


Figure No. 1: G-10 CR garde Inner insulation tube

[2] Item No.. 2: Outer filament winding job over 1st stage bonded cryocomponents as per figure no 2

- Filament Winding Material: S-glass roving with cryogenic resin system
- The filament winding by S-glass yarn and IPR cryogenic resin system that will be provided for filament winding task as free issue material
- From 25 mm to 48.0 mm diameter and filament winding length section: 110 to 115 mm
- The 1st stage bonded cryo components will be provided for filament winding job as free issue material.
- Qty: 25 numbers

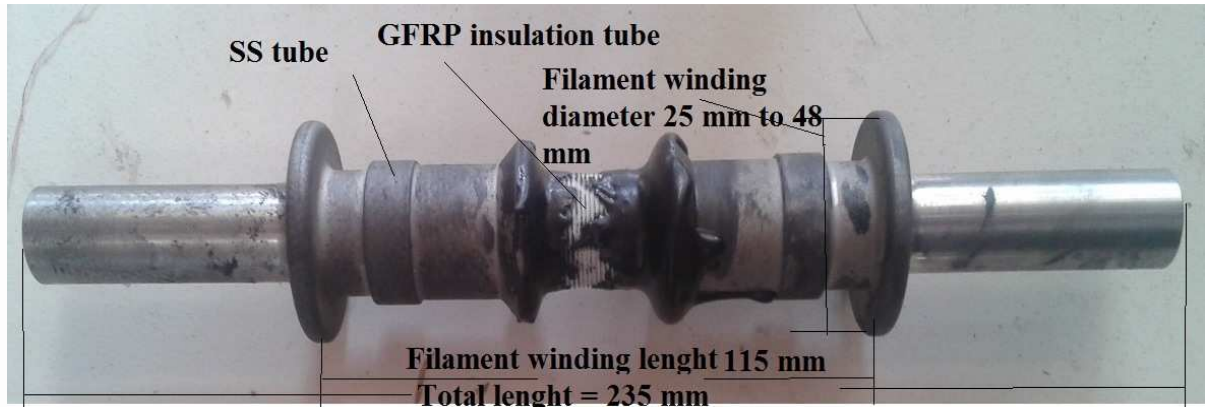


Figure No.2: Filament winding job on pre 1st stage bonded component

[3] Item No.3 : Outer filament winding job over 1st stage bonded cryocomponent as per figure no 3

- Filament winding overpre 1st stage bonded cryo component
- Filament winding section : From OD 125 to 143 mm outer dia of 15 mm section length)
- The filament winding by S-glass yarn and IPR cryogenic resin system that will be provided to vendor for the task of filament winding as free issue material
- The 1st stage bonded cryo components will be provided to filament winding job.
- Qty: 25 numbers



Filament winding section from 125 mm ID to 143 mm OD of 15 mm section

Figure : 3 Filament winding job on pre 1st stage bonded cryo component

[4] Item No.4: Fabrication of GFRP (G-10 CR) grade inner Insulation tubeas per Figure 4. given

- Fabrication of GFRP insulation tube made by filament winding process as per the drawing, the material (S-glass roving, 360 Tex and IPR resin system) will be issued to as Free Issue Materials
- Qty: 25 numbers

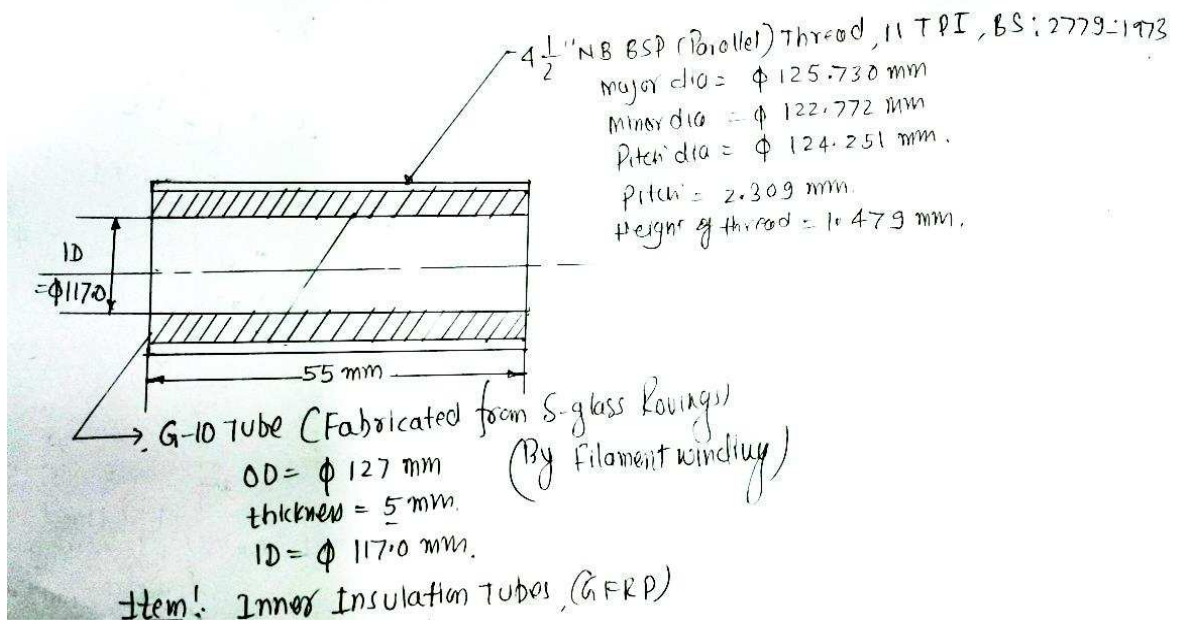


Figure No. 4 : G-10 CR grade insulation tube fabrication

Technical Details

- The fabrication and filament winding job will be done by the vendor as per the facility available (manual or automatic) at their site. The vendor has to confirm the winding facilities available at their end in their offer.
- The following filament winding parameter that will be used for all the items of fabrication and winding jobs
 - (i) 2 roving of S-glass for winding and fabrication
 - (ii) Hoop and helical winding as per the requirement and winding sections of the component
 - (iii) Fiber angle: $\sim 30^\circ$
 - (iv) Tension of fibre: ~ 2 Kg
 - (v) Fiber speed: $< \sim 6$ mm/sec
 - (vi) Void content: $< \sim 1.7$ %
 - (vii) Volume content of fiber of insulation tube: > 55 %
 - (viii) S-glass roving details Internal dia of roving bobbin : 170 mm, Outer dia of bobbin: 250 mm and Length : 275 mm, 360 tex

Terms and Conditions

- The vendor should provide the technical details of fabricated tubes and filament winding job process of all items as winding parameters, quantity of fibre and resin used fibre speed, number of layers, winding angle etc. as per the item requirement.
- This will be preferable that if vendor can be fabricate of item 1 and item 4 in full quantity as per the order and may delivered in full to IPR.
- All unacceptable fabricated G-10 tubes of Item 1 and Item 4 will be fabricated by the Vendor in free of cost and delivered to IPR.
- The epoxy resin system solidifying time and temperature and other technical details shall be provided to vendor for the work/as per the work requirement.
- Vendor should fabricate and carry out filament winding job for all item of same G-10 grade insulation material free issue materials only provided IPR as per table 1.

- The 1st stage bonded component part of **items 2 and Item 3** will be provided to vendor for filament winding job at their site in part/batch-wise basis as per the readiness level at IPR.
- It will be preferable that only single vendor should get the work order of all items fabrication and filament winding job.
- The local vendor will be preferable considering the ease of accessibility, inspection and movement of materials.
- The similar work or component fabrication, delivery and work experience with IPR will be preferred.
- The scope of work, price and validity of purchase order is preferable for 1 year considering stage/part wise testing of cryogenic components.
- Since it is a development work any acceptable changes in item dimension which may increase the work load on vendor. No extra charges will be considered other than work order.

Pre-despatch Inspection and Acceptance Criteria

- Considering the criticality of components, pre-despatch inspection and witness of IPR representative will be done at vendor site of filament winding job of 1st stage bonded cryo component of Item 2 and Item 3
- The vendor has to inform to IPR in advance prior to taking filament winding job of Item No.2 and Item No. 3.
- The final testing will be done at IPR for final acceptance of all items delivered to IPR.
 - (i) Dimensional check
 - (ii) Acceptable helium leak tightness at 300 K: $\leq 1 \times 10^{-8}$ mbar-l/s at 300 K and after thermal shock at 77 K
 - (iii) The fabricated G-10 tubes should be free of laps, laminations, scars, visible cracks, tears, grooves, scale, pits, slivers, dirt, grease, paint and other foreign materials. All tubes should be uniform in quality and condition as well as surface finish.

Free Issue Materials

- The following free issue materials will be provided by IPR to the vendor for all items for fabrication and filament winding job.
 - (i) In-house developed Cryogenic epoxy resin system
 - (ii) S-glass fibre roving, 2 numbers of dimension S-glass roving details Internal dia of roving bobbin : 170 mm, Outer dia of bobbin: 250 mm and Length : 275 mm, 360 tex
 - (iii) 1st stage bonded component provided for final filament winding over it (**of Item No. 2 and Item No.3 only**)

Technical Compliance Sheet

Sr. No.	Particulars	IPR Requirements	Vendor's Specification
1	<p>Task 1 Fabrication of G-10 Tubes as per drawing given in figure no.1, Qty.: 25 nos.</p> <p>Task 2 Outer filament winding job over 1st stage bonded cryocomponent as per figure no. 2, Qty.: 25 nos.</p> <p>Task 3 Outer filament winding job over 1st stage bonded cryocomponent as per figure no. 3, Qty. : 25 nos.</p> <p>Task 4 Fabrication of G-10 Tubes as per drawing given in figure no.4, Qty.: 25 nos.</p>	<p>Fabrication and filament winding job of all tasks from 1 to 4 will be used by applying winding parameters. The vendor has to confirm the same.</p> <p>(i) Mixed up 2 roving of S-glass for winding and fabrication</p> <p>(ii) Hoop and helical winding as per the requirement and winding sections of the components</p> <p>(iii) Fiber angle: ~ 30°</p> <p>(iv) Tension of fibre: ~ 2 Kg</p> <p>(v) Fiber speed: <~ 6 mm/sec</p> <p>(vi) Void content: < ~1.7 %</p> <p>(vii)Volume content of fibre of insulation tube: > 55 %</p>	
2.	Fabrication and Filament winding job by manual or automatic process	The fabrication and wet filament winding job will be done by the vendor as per the facility available (manual or automatic) at their site. The vendor has to confirm the winding facilities available at their end.	
3.	Fabrication and winding details	The vendor should provide the technical details of fabricated tubes and filament winding job process of all items in respect of winding parameters, quantity of fibre and resin used fibre speed, number of layers, winding angle etc. as per the item requirement.	
4.	Fabrication and filament winding job of items	Vendor should fabricate and filament winding job of all items of same G-10 grade insulation materials as free issue materials only provided by IPR as listed in table 1.	
5.	Cleaning process	By Isopropyl alcohol	
6.	Fabrication schedule	<p>(i) In first part, the vendor can fabricate full quantity of item 1 and item 4 as per the order and delivered in full to IPR. This will be needed at IPR site for 1st stage bonding and QA/QC passing for over final filament winding job.</p> <p>(ii) In second part, all the received 1st stage bonded part of item 1 and item 4 will be filament winded.</p>	

7.	Acceptance of fabricated G-10 tubes of item 1 and item 4	All unacceptable G-10 tubes of Item 1 and Item 4 will be fabricated by the vendor in free of cost and delivered to IPR.	
8.	1 st bonded component part of item 2 and item 3 to vendor	The 1 st stage bonded component part of items 2 and Item 3 will be provided to vendor for filament winding job at their site in part/batch-wise basis as per the readiness level at IPR or subjected to delivery by vendor of item 1 and item 4.	
9.	Validity of work order	The scope of work, price and validity of purchase order is preferable for 1 years considering stage/part wise testing of cryogenic components.	
10.	Extra work done by vendor	Since it is a development work any acceptable changes in item dimension which may increases the work load on vendor. No extra charges will be considered other than work order value.	
11.	Pre-despatch inspection	Considering the criticality of components, the filament winding job of 1st stage bonded cryo component of Item 2 and Item 3. The vendor has to inform to IPR in advanced prior to taking filament winding job.	
12.	Acceptance criteria	The final testing will be done at IPR for final acceptance of all items delivered to IPR. (i) Dimensional check (ii) Acceptable helium leak tightness at 300 K: $\leq 1 \times 10^{-8}$ mbar-l/s at 300 K and after thermal shock at 77 K (iii) The fabricated G-10 tubes and winded items should be free of laps, laminations, scams, visible cracks, tears, grooves, scale, pits, slivers, dirt, grease, paint and other foreign materials. All tubes should be uniform in quality and condition as well as surface finish.	

(Bidder's Sign with Official Stamp)

Table 1
(Free issue materials by IPR to vendor, Technical details)

Sr. No.	Items	Qty.	Technical details
1.	S-glass Roving	1 Nos. (Approx. Weight : 8 Kg)	S glass roving Glass Fibre: 65-72 % wt SiO ₂ : 64-66% wt, Al ₂ O ₃ : 24-25 % wt, CaO: 0-0.18, MgO: 4.5-10.2, Na ₂ O+K ₂ O: 0-0.2, Fe ₂ O ₃ : 0-0.1, Roving : 9 micron, 360 tex Internal dia of roving bobbin : 170 mm, Outer dia of bobbin: 250 mm and Length : 275 mm, 360 tex Fibre tensile strength: 5047 MPa at 300 K, 7826 MPa at 77 K as per ASTM D2101 Impregnated strand properties Tensile modulus: 91 MPa and Toughness: 82 MPa (ASTM D2342) Coefficient of thermal expansion 23-300 °C : 3.4 x10 ⁻⁵ cm/cm.°C ASTM D696 Note: Consumable, the materials will be used/consumed for fabrication of the tubes of item 1 & Item 4 and for filament winding job of item no. 2 & item 3 respectively
2.	1 st stage bonded cryo component (Electrical insulation Breaks IB)part(SS 316 L stub + G-10 CR grade tube) provided for final filament winding item No. 2	25 nos.	The sent item will be returned in complete fabricated component as electrical insulation break final components
3.	1 st stage bonded cryo component (Vacuum barrier, VB) part(SS 316 L stub + G-10 CR grade tube)provided for final filament winding item No. 3	25 nos.	The item will be returned in complete fabricated final component cryogenic vacuum barrier VB
4.	IPR Cryogenic epoxy resin system (Liquid modified Bisphenol Epoxy resin system)	Part A: 4 Kg Part B: 2 Kg	Mixing ratio (by wt.) Epoxy: 100, Resin: 32 Initial mixed viscosity (m pa-s) at 25 °C : 3000-35000 Pot life at 25 °C :60-70 minutes Curing schedule: 24 hrs at 25 °C + 4 hrs at 75 °C Others details of epoxy resin will be provided to vendor if needed as per work requirements. Note: The material epoxy resin will be consumed in fabricating and winding job of all items 1 to item 4.



11. **Liquidated Damages:** The successful Vendor/Bidder should pay liquidated damages @ ½% (half percent) of the total work order value for the delay of each week in the scheduled date of completion of the work envisaged in the Work Order subject to a maximum of 5% (Five percent) of the total Work Order value.
12. **Inspection:** Goods on its arrival at IPR will be inspected by Stores, and his decision in the matter will be final. However, where the items are required to be inspected at the Contractors Premises, Contractor has to give advance notice regarding readiness of the Goods to enable us to depute our representative for inspection.
13. **Payment:** Payment will be arranged for accepted goods only within 30 days from the date of receipt of goods at IPR and bills in our accounts section, completed in all respects.
14. No correspondence will be entertained within 30 days from the date of receipt of good and bills, whichever is later.
15. **Guarantee:** The Stores offered should be guaranteed for a minimum period of twelve months, from that date of acceptance, against defective Goods, design, workmanship, operation or manufacture. For defects noticed and communicated during the Guarantee period, replacement/rectification should be arranged free of cost within a reasonable period of such notifications. In case where our specifications call for a guarantee period more than 12 months specifically, then such a period shall apply.
16. **Performance Bank Guarantee:** If demanded by IPR, the successful bidder will have to furnish Performance Bank Guarantee for 10% of the order value (basic price) from a Nationalized/Scheduled Bank/State Bank of India, valid throughout the Guarantee/Warranty period. The scheduled banks approved by IPR are Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank. Bank Guarantees submitted other than from banks approved by IPR will not be accepted.
17. **Security Deposit:** If demanded the successful Bidder will have to furnish to the Purchaser an interest free security deposit for 10% (Ten percent) of the order value in the form of Bank Guarantee of an equivalent amount from a nationalized/ scheduled Bank/State Bank of India within 15 days from the date of work order and the said Guarantee should be valid till the goods are accepted by IPR. The scheduled banks approved by IPR are Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank. Bank Guarantees submitted other than from banks approved by IPR will not be accepted. The Security deposit shall be forfeited in case the selected Bidder does not start the work within the time limit specified or fail to complete the work within the stipulated delivery period or fail to comply with any of the terms and conditions in the work order. On successful completion of scope of work and its acceptance by IPR, Contractor should send a letter requesting return of the original BG.
18. The Contractor shall at all times indemnify the purchase against all claims which may be made in respect of the stores for infringement of any right protected by Patent Registration of design or Trade Mark and shall take all risk of accidents or damage, which may cause failure of supply from whatever cause arising and the entire responsibility for sufficiency of all means used by him for the fulfilment of the contract.
19. **Free Issue Material (FIM):** Successful tenderer will have to arrange insurance showing beneficiary as "Institute for Plasma Research" at their risk and cost towards adequate security for the materials/property provided/issued by the Purchaser as Free Issue Material for the due execution of the contract.
20. The Director, IPR reserves the right to accept or reject any quotations fully or partly or to cancel the enquiry without assigning any reason.
21. **Jurisdiction:** The contract shall be governed by the Laws of India for the time being in force. The Courts of Gandhinagar only shall have jurisdiction to deal with and decide any legal or dispute arising out of this Contract.

(This need to be printed in Bidders letter head)

1. Please quote with complete technical details along with technical compliance sheet.
2. Quotation should be submitted in the format given below, else IPR shall not consider the offer by the vendor.

NAME OF PARTY : _____

ENQUIRY NO: _____

QUOTATION No. & DATE : _____

Currency of Quotation: **Indian Rupees**

Sr. No.	Item Description	HSN/SAC Code	Quantity	Unit Rate (Basic)	Packaging & forwarding (P&F)	Applicable GST	Rate (incl P&F and GST)	Total Value
			a	b	c	d	e = b + c + d	f = a * e
1								
2								
3								
4								
5								
6								

Sr. No.	Particular	Remarks
I.	Ex-works / FOR Destination	
II.	Freight	
III.	Insurance	
IV.	Delivery Period	
V.	Payment (IPR terms will apply)	
VI.	Guarantee / Warrantee	
VII.	Validity Period	
VIII.	Discount (if any)	
IX.	Remarks	

Place: Authority Signatory

Date: Company Seal

Note:

1. Bidder should submit the copy of GSTIN / ARN Certificate along with the offer
2. Bidder should specify the SUPPLY and SERVICE rates/ charges separately wherever applicable