**Government of India**
**Bhabha Atomic Research Centre**
**Electromagnetic Applications & Instrumentation Division**

Ref: EmA&ID /EMAS/21/17253 Date: 01/12/21

Supply, fabrication, integration, testing of warm bore flanges with existing cryostat

Dear Sir/Madam,

1. Quotations are invited for the Supply, fabrication, integration, testing of warm bore flanges with existing cryostat as per technical specifications: EmA&ID/UG/21/01 dated 24/11/2021.
2. Bidder shall quote for fabrication of these components with material as per the enclosed tender technical specification.
3. Taxes and Excise Duties shall be quoted separately. Form AF / H whichever is applicable shall be provided, if required.
4. **The quotation must reach The Head, Electromagnetic Applications Section by 09th Dec, 2021 and must be sent in a sealed envelope super scribed with the reference number & the due date given above.**
5. **The quotations must be send via speed post or registered post only.**
6. The address on the envelop should read:

   **The Head, Electromagnetic Applications & Instrumentation Division,**
   **RCnD Bldg., North Site**
   **BARC, Trombay,**
   **Mumbai - 400 085.**
   **(Kind Attn: Shri Udai Giri Pratap Singh Sachan)**
7. Necessary inspection facilities should be provided to our engineer during fabrication at bidder's premises.
8. The bidder shall deliver the finished components after approval by our engineer within 12 weeks from the date of firm work order issued to the bidder. The finished components along with the left over material shall be delivered by the bidder at **Electromagnetic Applications & Instrumentation Division, BARC, Trombay, Mumbai - 400 085.**
9. Head, Electromagnetic Applications & Instrumentation Division reserves the rights to accept/ reject any or all quotations without assigning any reason.
10. Delivery charges if any must be clearly mentioned in the offer.
11. Quotation must also indicate the validity of offer.
12. Quotation must also indicate the GST no and PAN no of the party.
13. The quotation has to be signed by authorized person along with company seal.

Encl.: Specification Sheet no.- EmA&ID/UG/21/01 dated 24/11/2021

Udai Giri

**(Udai Giri Pratap Singh Sachan)**
**SO/D, EmA&ID**

Copy to:
1. BARC website for uploading

वैज्ञानिक अधिकारी / Scientific Officer
ई एम ए आय डी / EmA&ID
भारत सरकार / Government of India
भाभा परमाणु अनुसंधान केन्द्र
Bhabha Atomic Research Centre
ट्रॉम्बे, मुंबई / Trombay, Mumbai - 400 085

## Annexure-C

| Tender Specification no. | Revision no. | Date of Issue | No of pages |
|---|---|---|---|
| VV/SC/UG/21/01 | 01 | 26/11/2021 | 3 |

**Supply, fabrication, integration, testing of warm bore flanges with existing cryostat**

### 1.0 Scope

Tender is invited for Supply, fabrication, integration, testing of warm bore flanges with existing cryostat. In this specification, the seller shall be referred to as the "Supplier" and Bhabha Atomic Research Centre shall be referred to as the "Buyer".

Supplier shall arrange required raw material, facilities, infrastructure for manufacturing, welding of the vacuum vessel, support structure, leak detection testing etc. The description of the vacuum vessel along with thermal shield are mentioned in Para 4.0 of this tender specification. The fabrication shall be carried out strictly based on the drawings and specifications provided in this tender specification. Any modifications, if required, during the fabrication shall be approved by the buyer before fabrication.

Supplier shall quote lump sum for the above-mentioned job. No Free Issue Material (FIM) is involved in this job. Only overall cost will be compared.

The brief description of contents of the tender specification document is as described below.

Para 2.0 gives the details of deliverables.

Para 3.0 gives statement of purpose.

Para 4.0 gives the general description and technical requirements.

Para 5.0 gives the raw material requirements.

Para 6.0 gives the welding specification and requirements.

Para 7.0 gives the testing and factory acceptance requirements.

Para 8.0 gives the quality assurance requirements.

Para 9.0 gives the price and delivery schedule requirements.

### 2.0 Details of deliverables

| S.No | Component | Nos |
|---|---|---|
| 1. | Warm bore flanges with crush O-Rings<br>(along with CMM measurements and vacuum tested with vacuum vessel) | 02 Set |

### 3.0 Statement of purpose

A large warm bore 1.5 Tesla superconducting magnet shall be cooled by two stage Pulse Tube cryo cooler. The superconducting magnet shall be used for high uniformity magnetic field applications. It is a horizontal superconducting magnet housed inside a vacuum vessel. To reduce the radiation losses, intermediate thermal shields are required. The magnet shall have a warm bore of 300 mm and which is accessible from both the sides.

### 4.0 General description and technical requirements

4.1 Warm bore 1.5 Tesla superconducting magnet is required for high uniformity applications. The electromagnet is a split coil magnet for better field uniformity. The magnet is a warm

Udai Giri

bore magnet for carrying out measurements and experiments. The heat load is reduced by operating the magnet under cold bore condition.

4.2 The supplier has to understand the complete system and offer various suitable options for cold bore conversion.

4.3 The flat surfaces shall have parallilty of 10 microns over the complete face. The flanges needs to be mated with the existing cryostats.

4.4 Spacer Flanges shall have inbuilt flange lifters.

4.5 The flanges are rotatable flanges with crush O-rings. Supplier has to supply molded crush O-Ring with the system.

## 5.0 Raw Material requirements

5.1 Stainless steel 304L sheet thickness 12 mm as per ASTM A240 / ASME SA-204M, preferably 2B rolled sheet shall be used for cylindrical vacuum vessel construction.

5.2 Linear rail guides with a length of 1 meter each should be purchased. The linear rail guides shall have precision of 100 microns over the length of 1 meter.

Stainless steel 304L plate thickness 20 mm as per ASTM A240 / ASME SA-204M, preferably 2B rolled sheet shall be used for top and bottom flange construction.

## 6.0 Welding specification and requirements

6.1 All the joints shall be TIG welded by purging 99.9% pure Argon gas.

6.2 The fillet material used shall be SS-316L only.

## 7.0 Testing and factory acceptance requirements

7.1 After fabrication of flanges following acceptance test shall be carried out:

a) Leak detection of the vacuum vessel upto $10^{-10}$ Torr.L/sec.

b) CMM measurements shall be carried out on these blank flanges.

## 8.0 Quality assurance requirements

8.1 The supplier shall maintain a documented quality assurance program that will insure that each item offered for acceptance or approval conforms to the requirements.

8.2 Quality surveillance and expediting, relating to all the aspects of the contract will be carried out by the buyer or his authorized representative for which purpose the supplier and his subcontractor shall

8.2.1 Allow access at all reasonable times during manufacture, assembly and testing to the premises in which the work is being carried out.

8.2.2 Furnish the latest drawings and/or tooling, gauges, instruments, testing equipment etc. required for inspecting the jobs. Prints of all the latest required drawings and approved procedures shall be made available for inspection and retention, if so desired.

## 9.0 Price and delivery schedule requirements

9.1 The supplier shall furnish workmanship guarantee certificate valid for one year.

9.2 The delivery of the vacuum vessel with its relevant technical documentation is expected within 1 month from date of placement of work order.

9.3 The supplier shall give detailed break up cost with delivery schedule. However only overall cost will be compared.

Udai Giri

## Annexure-D

Document to be filled and provided by the supplier for technical evaluation

The below content shall be printed in the company letter head. All the enclosure requested in this table has to be provided. Otherwise the offer will be out rightly rejected.

| | |
|---|---|
| Does the supplier have previous experience in carrying out similar such electronic systems development for BARC, IGCAR any recognized government research Labs and has the supplier enclosed copy /proof of the purchase orders and photo copies of the developed systems | Yes/No |
| Has the supplier enclosed the list of employees, design engineers, assistants, CAD/EDA software, CMM, CNC facilities, available with them to carry out the present job? | Yes/No |
| Does the supplier agree to carry out acceptance testing for the system to be developed? | Yes/No |
| Has the supplier sub-contracted the part of job? If yes, they should also produce the list of sub-contractors and their infrastructures and facilities. | Yes/No |

Udai Giri