



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



Tender No. : EmA&ID/JI/2022/17M22A

Date: 21th March, 2022

Sub: On-site preparation and assembly, fabrication, engineering services, ultrasonic cleaning, testing and packaging of high magnetic(7.5T) multi-coil superconducting magnet as per Technical specification sheet - TSP/2022/02

Dear Sir/Madam,

1. Quotations are invited for the *execution of subject work*.
2. Taxes and Excise Duties shall be quoted separately. Form AF / H whichever is applicable shall be provided, if required.
3. The suppliers are shall submit the cost for Design, fabrication, assembly and testing. All necessary tools, instruments have to be arranged by the supplier.
4. The quotation must reach the undersigned on or before **07th April, 2022** and must be sent in a sealed envelope super-scribed with the *reference number & the due date* given above.
5. The quotations must reach us on or before the aforesaid date by India post (by speed post or ordinary post) only.
6. The address on the envelop should read:
The Head,
Electromagnetic Applications Section,
Electromagnetic Applications & Instrumentation Division
RCnD Bldg., North Site,
B.A.R.C, Trombay,
Mumbai - 400 085.
(Attn: Shri. Janvin Itteera)
7. The finished components with the test certificates as mentioned in the enclosures shall be delivered by the manufacturer after the award of the contract at BARC, Trombay, Mumbai - 400 085.
8. Delivery, packing & forwarding charges, if any, must be clearly mentioned in the offer.
9. Drawings / Sketches (if any) must be returned along with the offer
10. Quotation must indicate the PAN and GSTIN no of the vendor. Minimum validity of 60 days is preferred.
11. The quotation has to be duly signed by *authorized person with company seal*. *Unsigned offers shall be treated as invalid*.
12. For any technical clarifications, Please contact the undersigned vide email: janvin@barc.gov.in; Tel: +912225591492/5852
13. Since the job is being service in nature, GST of 18% shall be applicable with no exemption.

(Janvin Itteera)
Scientific Officer(E), B.A.R.C
For & on Behalf of the President of India
(The Purchaser)

On-site preparation and assembly, fabrication, engineering services, ultrasonic cleaning, testing and packaging of high magnetic(7.5T) multi-coil superconducting magnet as per Technical specification sheet - TSP/2022/02

1.0 Scope:

The tender is invited for the above work

2.0 Scope of work:

- 2.1) The location of work shall be within BARC, Trombay
- 2.2) Contractor shall provide engineering support including but not limited to:
- (a) Preparation of fabrication drawings for jigs and fixtures requisite for clean assembly of the magnet
 - (b) Site preparation for handling the delicate superconducting magnet with utmost cleanliness, as they are designed for high vacuum systems
 - (c) Laying of high pressure(16MPa) helium based cryogenic line for cooling the system
 - (d) Organic cleaning of magnet with Iso-propanol(LR) for degreasing
 - (e) Supplier shall arrange 100L ultrasonic cleaner with heating element mounted. Temperature of the liquid shall be adjusted from 30°C to 80°C.
 - (f) Supplier shall arrange indium based low temperature solder(melting point-116°C) (minimum of 100mtr) with 'Halide free(HF260)' flux as deemed necessary.
 - (g) Supplier shall arrange requisite nos of high current vacuum feed through with current rating ~ 200A or more.
 - (h) Requisite raw material such as SS316L/SS304L, high purity(UNS C10200) copper sheets shall be arranged by the contractor substantiated with Mill test certificates
 - (i) Supplier shall provide engineering services for preparing, assembly, installing, packaging and high current testing of 02 nos of superconducting magnet
 - (j) All the chemical required for organic cleaning, ultrasonic de-greasing and high conductivity stycast epoxy (2850FT with catalyst 9LV) or equivalent required for satisfactory completion of the work

3.0 FREE ISSUE MATERIAL

No free issue material will be issued to the contractor.

4.0 DELIVERABLE

The deliverables included in this tender are as follows:-

For the FIM supplied by the purchaser, the items highlighted under table-1.0 are to be delivered:

Sr. no	Description
1	On-site preparation and assembly, fabrication, engineering services and testing of high magnetic(7.5T) multi-coil superconducting magnet as per Technical specification sheet - TSP/2022/02 <i>NO SUPPLY is involved</i>

Table-1.0

5.0 Technical Specification

S No.	Parameters	Value
1	Multi layer insulation blankets wrapping	40 Layers of MLI to be wrapped around the magnet with proper interleaving.

		Material: double-sided aluminized, perforated and interleaved with 10 layers of non-woven polyester spacer material*. Expected length of 200m of 10 layers of multilayer insulated sheets *.
2	Integration of Cryo-cooler Pulse tube type with the compressor, chiller, and the electrical connection	Supplier scope, required tooling also in the supplier's scope
3	Cryogenic grade Cold diode, single stack, bolted joints	I peak - 300A _{rms} Peak reverse voltage - 300V Minimum operating temperature - 4.2K Maximum forward voltage: 15V@ 4.2K
4	Electrical resistor	0.5Ω, 200W with heat sink, Nichrome based
5	Bonding tapes for covering cold surfaces	Cryogenic aluminum tape
6	Electrical Soldering	Using low temperature solder - Indium 63%/Tin 37% (melting point - 116°C solders About 100m will be required.
7	Assembly with cryo-cooler	The cold head has to be integrated with the compressor and chiller as per manufacturer's guidelines

Table-2.0

5.0(a) * FOAM insulated multi-layer blankets shall not be used for the wrapping purpose

5.1) Supplier shall carry MLI wrapping with proper interleaving to prevent any interlayer thermal shorting

5.3) Supplier shall provide adequate accessories such as polyimide tape(Kapton tape) of of high quality with width - 100mm weighing 5kg.

6.0 PERFORMANCE OF THE CONTRACT

6.1 Fabrication and Delivery Schedule

A) The purchaser representative shall be apprised of the changes incorporated in the procedure compartments to do the needful.

B) The entire work has to be completed in less than 06 months

C) During testing, purchaser representatives shall be witness to verify the results.

D) The work completion shall be issued only on satisfactory completion of the work.

E) Purchaser shall provide the GM cryo-cooler, magnet, Multi layer blankets and the custom designed support stands.

F) The safe operation of the instruments, compressor shall be assembled in the presence of the purchaser representative.

G) Supplier shall be responsible for ensuring the safety at site.

6.2.3 Quality Control Records

The QCR shall contain:

Factory test certificates of the solder lead, material test certificates of the MLI, Cryogenic Cold diodes and electrical resistor used shall be submitted prior to their installation.

6.2.3.1 The system has to be tested with an thermal trials with compressor. 4.2K to demonstrated at purchaser premises.

6.2.3.2 The supplier has to develop jigs and fixtures for carrying out hall probe based magnetic measurements on the assembled magnet at purchaser premises. The hall probe based system shall be in the scope of purchaser. The distance shall be digital based linear height gauge, with X-Y adjustment made from non-magnetic structures.

7.0) Warranty:

7.1) Supplier shall be duty bound to provide warranty and adequate labour and replacement support to the entire assembly after the execution of the work for a period of 1 year.

8.0 GENERAL DESCRIPTION:

8.1 Supplier shall submit the offer including the fabrication, assembly and testing

8.2 Overall cost will be compared and include packaging, forwarding and safe delivery to purchaser site.

8.3 Since the job is being in service in nature, GST of 18% shall be applicable with no exemption.
