

Government of India
Bhabha Atomic Research Centre
Accelerator Control Division

Ref : ACnD/MRG/2017/322

Date : 5-5-2017

Sub : Fabrication, assembly and supply of Chiller piping and header connections along with booster pump and accessories for high field water cooled magnet


Dear Sirs,

1. Quotations are invited for the minor fabrication job "Fabrication, assembly and supply of Chiller piping and header connections along with booster pump and accessories for high field water cooled magnet" as per the technical specifications TSP/PTCH/2017/01.
2. Bidder shall quote for the machining and fabrication, with raw materials. NO FIM is involved. Taxes, VAT and Excise Duties shall be quoted separately.
3. The quotation must reach Head, EMAS by due date 25.05.2017 and must be sent only by speed post in a sealed envelope super scribed with the reference number & the due date given above.
4. The address on the envelop should read:
**Head,
Electromagnetic Applications Section
Accelerator Control Division
BARC, Trombay,
Mumbai - 400 085.
(Kind Attn: Smt Kumud Singh)**
5. Any modification required during the fabrication process shall be made after approval from our engineer.
6. The bidder shall complete the same within 1.5 month from the date of firm work order issued to the bidder.
7. Head, EMAS reserves the rights to accept / reject any or all quotations without assigning any reason.
8. Delivery charges if any must be clearly mentioned in the offer.
9. Quotation must also indicate the validity of offer.
10. Quotation should be submitted on printed format along with PAN, VAT & CST. Computer generated format and without PAN, VAT & CST, the quotation will be rejected.

Encl.:

01) Technical specification : TSP/PTCH/2017/01

Through:


Sanjay Malhotra,
Head EMAS

GOVERNMENT OF INDIA

CONTROL INSTRUMENTATION DIVISION
BHABHA ATOMIC RESEARCH CENTRE
TROMBAY-400085



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Specification no.	Revision	Date of Issue	Total pages
TSP/PTCH/2017/01	0	07/03/2017	6 including cover page

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TSP/PTCH/2017/01	0	07/03/2017

1.0 Scope:

The Quotations are invited for “Fabrication, assembly and supply of Chiller piping and header connections along with booster pump and accessories for high field water cooled magnet”

- Para 2 gives Statement of purpose.
- Para 3 scope of supply and deliverables.
- Para 4 gives technical requirements of the coil winding. Supplier has to offer their product equivalent to this specification along with complete product sheet for technical evaluation.
- Para 5 gives acceptance criteria and test and inspection plan.
- Para 6 gives Clauses for performance of contract. Supplier shall confirm the acceptance of the same.
- Para 7 list down the reference drawings and documents.
- Para 8 gives general instructions.

2.0 Statement of Purpose

This specification lists the properties of the linear stages required for a hall probe scanning bench (three axis scanners) to be used in the Magnet Measurement Facility. The bench will be used primarily to measure field integrals for dipole magnet and other long insertion magnets. A schematic of the measurement bench is shown in Figure 1. It consists of one x-y-z table mounted on a platform made up of aluminium profiles. The x-y-z table carries a long probe holding structure and the measurement probe is firmly fixed on it. The y-z linear stages places the probe at the correct position in the magnet aperture, and the x stage translates the probe from -500mm to +500mm from center of the magnet (magnet center position taken as 0). The probe reads magnetic field at each position and integral field calculation is derived from these measurements.

3.0 Scope of Supply and Deliverables

3.1) Deliverables

The supply shall include the following:

Sr. No	Item	Quantity
1.	1:8 Inlet Header	2 No.s
2.	8:1 Outlet header	2 No.s
3.	Booster pump	2 No.s
4.	Reservoir loft tank	1 No.
5.	Hose pipes and brass fittings	1 set

3.2) Suppliers Responsibility:

- ✓ Preparation of manufacturing drawings on the basis of engineering drawings given by the purchaser. Approval shall be taken from the purchaser on the prepared manufacturing drawings before the start of fabrication.
- ✓ Purchase of raw material and produce test certificates for approval from purchaser.
- ✓ Manufacturing of header as per technical specifications given below.

- ✓ Testing and demonstration of water flow loop.
- ✓ Packing of the header and pump assembly and shipment to the purchaser's site.
- ✓ Installation of the header and pump at purchaser's site.

4.0 Details of Free Issue Material

No free issue material is involved.

5.0 Vendor qualification criteria

5.1 Human resources

The supplier must give the details of human resources including Engineers, Draftsman, Electrical, Welder, assembly mechanic, quality control inspector, machinist etc.

5.2 Infrastructure:

The supplier must give the details of infrastructure suitable for this job such as Manufacturing Machines, and other tools & tackles, Inspection facilities etc.

5.3 Past experience:

The supplier must give their past three year turnover and job executed by them with reference, volume of work and completion schedule, present commitments and anticipated commitments inside and outside India.

5.4 Sub contract:

Supplier should list the jobs, which they want to sub-contract. They should also produce the list of sub-contractors and their infrastructures and facilities.

6.0 Technical requirements

Heat dissipating unit has 2 sets of water entry & 2 sets of water Outlet ports.

Each water Entry port in turn has 8 water inlets & 8 water out let connections

Cold Water (Range 15-25c) shall enter heat dissipating unit at total 16 ports (8+8) & similarly out water temperature (range 20-35c) from 16 ports simultaneously.

Water Chillers are designed for 800 LPH cold water supplies at 2 bars.

Heat dissipating unit has large external water pressure drop

A booster pump is necessary to compensate for additional water pressure drop in the external system.

A mono block booster pump set of Crompton/ Kirloskar make working on 220V 50Hz single phase AC power supply along with four no fabricated headers is preferred.

Each Header shall be fabricated out of 50mm dia PP pipe with 8 inlet/ outlet connections of 15mm dia, each spaced at 35mm centre as per your equipment. One end of each PP pipe header shall be blanked off & other end of headers shall be provided with 50x15 mm reducer.

Two headers (each header having 8 inlet/ outlet connections) shall be joined through a common Tee. Each outlet shall then be joined to respective port of heat dissipating equipment.

Flexible special soft quality thick PVC pipe (without braided wire) along with screw type metal clamps shall be used to avoid any water leakage from interconnections.

Braided wires pipes for interconnection to heat dissipating units are not recommended to avoid any leakage of current as such a special quality soft pipe to withstand 60 °C shall be provided for all interconnections .

Cold water from chiller out let shall be connected by means of soft tubing to a brass mesh water strainer so as to protect your equipment internal pipes from clogging & damage.

Out let of strainer shall be connected to pump suction. Pump discharge shall be connected to common TEE which will evenly distribute water to both headers simultaneously.

Cold water from both headers shall thus enter simultaneously at 16 water entry ports.

Hot Water from Heat dissipating unit shall be connected by means of 2 headers (each having 8 connections) on each header. each header shall be further joined by common TEE & shall be connected to the Water chiller unit for further cooling process.

Bill of Materials

Mono block pump set mounted on suitable wooden base over Rubber Isolation pads to prevent vibration transmission:1 set

Strainer with isolating ball valve: One set

PP Fabricated pipe headers with 8 connections & one water entry/ outlet =4 sets

Pipe clamps: One Lot

Special quality rubber tubing: one lot

Tee: 2 Nos

Necessary hardware such as nipples, connectors & tubing to connect chiller to heat dissipating unit.

(Includes supply, return, make up, over flow, drain piping for the chillers units): one lot

Sr. No	Parameter	Description
1.	Job Details	a) Heat dissipating unit has 2 sets of water entry & 2 sets of water Outlet ports. b) Each water Entry port in turn has 8 water inlets & 8 water out let connections c) Cold Water (Range 15-25c) shall enter heat dissipating unit at total 16 ports (8+8) & similarly out water temperature (range 20-35c) from 16 ports simultaneously. d) Water Chillers are designed for 800 LPH cold water supplies at 2 bars. e) Heat dissipating unit has large external water pressure drop.

2.	Requirements for header and piping connections	<ul style="list-style-type: none"> a) A booster pump is necessary to compensate for additional water pressure drop in the external system. b) A mono block booster pump set of Crompton/ Kirloskar make working on 220V 50Hz single phase AC power supply along with four no fabricated headers is preferred. c) Each Header shall be fabricated out of 50mm dia PP pipe with 8 inlet/ outlet connections of 15mm dia, each spaced at 35mm centre as per your equipment. One end of each PP pipe header shall be blanked off & other end of headers shall be provided with 50x15 mm reducer. d) Two headers (each header having 8 inlet/ outlet connections) shall be joined through a common Tee.Each outlet shall then be joined to respective port of heat dissipating equipment. e) Flexible special soft quality thick PVC pipe (without braided wire) along with screw type metal clamps shall be used to avoid any water leakage from interconnections.
3.	Precautions	<ul style="list-style-type: none"> a) Braided wires pipes for interconnection to heat dissipating units are not recommended to avoid any leakage of current as such a special quality soft pipe to withstand 60 OC shall be provided for all interconnections . b) Cold water from chiller out let shall be connected by means of soft tubing to a brass mesh water strainer so as to protect your equipment internal pipes from clogging & damage. c) Out let of strainer shall be connected to pump suction. Pump discharge shall be connected to common TEE which will evenly distribute water to both headers simultaneously. d) Cold water from both headers shall thus enter simultaneously at 16 water entry ports. e) Hot Water from Heat dissipating unit shall be connected by means of 2 headers (each having 8 connections) on each header. each header shall be further joined by common TEE & shall be connected to the Water chiller unit for further cooling process
4.	Essential list of materials required	<ul style="list-style-type: none"> a) Mono block pump set mounted on suitable wooden base over Rubber Isolation pads to prevent vibration transmission:2 set b) Strainer with isolating ball valve: One set c) PP Fabricated pipe headers with 8 connections & one water entry/ outlet =4 sets d) Pipe clamps: One Lot e) Special quality rubber tubing: one lot f) Tee: 2 Nos g) Necessary hardware such as nipples, connectors & tubing to connect chiller to heat dissipating unit. h) (Includes supply, return, make up, over flow, drain piping for the chillers units): one lot

7.0 Acceptance criteria

Acceptance tests to be performed			
Sr.No	Type of test	Applicable Standard/Document Test Procedure	Scope
1.	Visual Inspection	Header assembly shall be free from any visual defects, loose connections and leakage. Header clamping arrangement shall be firm and clamped on the top of magnet coils and headers shall be mechanically coupled for alignment.	Purchaser will perform pre dispatch inspection at supplier's premises.
2.	Dimensional inspection		Supplier shall perform this test and submit the test report. Purchaser reserves the right to be present during the inspection tests.
3.	Programme demonstration	Supplier shall demonstrate the programming of the controller unit for operation and synchronization with RS232 input.	Demonstration shall be carried out in presence of purchaser's representative. Any changes or feedback shall be incorporated if required.
4.	Installation	Installation shall be done by suppliers' representative at purchaser's site.	

8.0 PERFORMANCE OF THE CONTRACT

8.1 Fabrication and Delivery Schedule

The bidder shall complete the job within 1.5 month starting from the date of firm purchase order is issued to bidder.

Award of contract	week 0
Manufacturing drawings and manufacturing file	week 1
Approval of drawings	week 2
Fabrication of headers	week 3
Testing and demonstration	week 4
Installation at purchaser's site	week 5

8.2 To be supplied before starting the manufacture of header and piping connections

The contractor shall first deliver the MF. A review meeting will be scheduled within two weeks after its receipt. This document shall be approved by purchaser, although the review and the approval process shall not relieve the contractor from his full responsibility to produce the

headers and piping connections according to the requirements set out in this technical specification.

The detailed design and production information in the Manufacturing file shall be submitted to purchaser for written approval as foreseen in the Fabrication and Delivery Schedule.

Once the MF is fully approved, the execution of the contract can proceed with the procurement of material, the samples and the preliminary tests detailed in the ITP (inspection & test plan).

8.3 Quality Control Records

The QCR shall contain:

The material certificates, in particular pumps and hoses;

Inspection and test plan documents shall be sent to purchaser for approval before successive stages of the production can be undertaken, or for provisional acceptance before authorization for shipment can be granted. The baseline format of the QCR shall be specified in the MF. If any format is changed during the production through mutual agreement between purchaser and the contractor, the relative templates in the MF shall be updated as well.

9.0 DRAWINGS AND REFERENCE DOCUMENTS

The specification drawings enclosed with this technical specification is an integral part of this document. Any conflicts noted by the contractor shall be immediately brought to the attention of BARC and clarified before proceeding with the work. All engineering drawings shall be produced by the contractor.

10.0 GENERAL DESCRIPTION:

- ✓ Supplier shall quote with material; no free issue material is involved in this tender.
- ✓ Overall cost will be compared and include packaging, forwarding and safe delivery to BARC at RCZ stores.
- ✓ Suppliers shall give complete details of their product, facilities, winding machine details, list of users and compliance certificates form users for technical evaluation. Quotations submitted with incomplete details are viable for rejection.
- ✓ Vendors with test facilities for qualification of flow loops, hydro-test facilities and basic metrology equipment's for dimensional checks will be given preference. In case vendor plans of sub-contracting the job, same shall be clearly brought out in quotations. The sub-contracting can only be carried out only after prior permission of the purchaser. In all circumstances the responsibility of completion of job up to the satisfaction of the purchaser lies with the supplier. Vendors shall list down the details of qualification checks performed on the fabricated parts by self or in collaboration with other laboratories.