



Government of India
Bhabha Atomic Research Centre
Accelerator Control Division
Electromagnetic Applications Section



Ref : ACnD/EMAS/RRS/2017/531

Date : 31/07/2017

Sub: Manufacturing, assembly, and testing of High pressure LCW headers for water cooled Electromagnets as per TSP/GC/MAG/09

Dear Sir/Madam,

1. Quotations are invited for the *execution of subject work as per the enclosed specification.*
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 **10th Aug, 2017** 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,
Accelerator Control Division
RCnD Bldg., North Site,
B.A.R.C, Trombay,
Mumbai - 400 085.
(Attn: Shri. R R Singh)
Email: jdsingh@barc.gov.in**

7. The Purchaser representative shall approve the design of the circuit, consequent to which the supplier shall commence the fabrication of the system.
8. The testing of the current amplifier shall be conducted in the presence of the Purchaser representatives only, further details are laid down in the enclosed specification sheet.
9. The bidder is expected to deliver the finished components after the approval by our engineer within 03 months from the date of receipt of firm work order.
10. All electronic components such as precision resistors, Instrumentation amplifiers and other shall have the manufacturer's QC/QA certificates for ensuring the authenticity of the components. Further details are mentioned in the enclosed specification sheet.
11. 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 **B.A.R.C**
12. Head, Electromagnetic Applications Section, Accelerator Control Division reserves the right to accept / reject any or all quotations after assigning reasons.
13. Delivery, packing & forwarding charges, if any, must be clearly mentioned in the offer.
14. Drawings / Sketches (if any) must be returned along with the offer
15. Quotation must indicate the VAT no / PAN no of the vendor & validity of offer. Minimum validity of 60 days is preferred.
16. The quotation has to be duly signed by *authorized person with company seal.* *Unsigned offers shall be treated as invalid.*

Encl.: TSP/GC/MAG/09

(SD/-)
**Head, Electromagnetic Applications
Section
B.A.R.C**
For and on Behalf of the President of India
(The Purchaser)

Specification no.	Revision no.	Date of Issue	Total Number of pages
TSP/GC/MAG/09	0	28/07/2017	4

Manufacturing, assembly, and testing of High pressure LCW headers for water cooled Electromagnets

1.0 Scope:

The tender is invited for the “Manufacturing, assembly, and testing of high pressure LCW headers for electromagnets” as per the following technical specification..This tender specification is arranged as follows:-

- Para 2.0 gives statement of purpose.
- Para 3.0 gives details of items supplied by Purchaser.
- Para 4.0 mentions the deliverable under this tender.
- Para 5.0 highlights the technical requirement for winding the coils.
- Para 6.0 indicates the drawings associated with this specification sheet.
- Para 7.0 specifies the acceptance criteria for all the coils.
- Para 8.0 covers the performance of the contract.
- Para 9.0 describes the general instructions.

2.0 Scope of work:

- 2.1) Supplier shall fabricate the headers as per material as mentioned in this sheet enclosed herewith
- 2.2) The supplier shall perform adequate testing to meet the acceptance criterion
- 2.3) Supplier shall purchase SS316L/equivalent material for fabrication of cooling headers
- 2.4) Supplier shall assemble the coil as per the assembly layout drawing enclosed.
- 2.5) Supplier shall design appropriate jigs and fixtures and to support the header assembly. Prior approval of the manufacturing drawing to be obtained from the purchaser.
- 2.6) Supplier shall provide high pressure hoses for the same.
- 2.7) Supplier has to provide adequate fastening tools, spare sealing gaskets and teflon tapes as spare for future service.

3.0 FREE ISSUE MATERIAL

3.1) No Free Issue material shall be issued by the purchaser.

4.0 DELIVERABLES

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	Quantity	Reference
1.	Water cooled headers	02 Nos	As per Drawing No.-TSP/GC/M/1-A
2.	High pressure hose Swage lock or equivalent	01 Set	

Table-1.0

Following documents (under table 2.0) are to be furnished under this contract

Sr. no	Description	Quantity	Remarks
1	Manufacturing File	01 Set	As per Para 5.0
2	Qualification test reports	01 Set	Refer para 5.0
3	The Quality Control Records	01 Set	Refer para 5.0

Table-2.0

5.0 SPECIFICATION DRAWINGS

Bidders shall, therefore, be aware that certain features shown on the drawings are tentative, and will be subject to adjustment by the manufacturer during the design phase. This reservation applies particularly to: (a) spacing between the outlet pipes (b) overall diameter of the pipes (c) the type of connection (d) type of sealing gaskets to used. This refinement of dimensions is anticipated in view of the high pressure test results of the fabricated headers, however, there shall be strict uniformity in the dimensions of the headers. Adequate space for convenient application spanners/pipe wrenches.

Sr. no	Description	Drawing number
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1	Type-A	TSP/GC/M/1-A
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Table-3.0

6.0 TECHNICAL REQUIREMENTS OF THE HEADER

6.1 HYDRAULIC REQUIREMENTS

Table-1.0 briefly highlights the requirements of double pan cake coil.

Table 1. Main parameters of the coil winding:

Sr.No	Parameter	Value
1.	Material of construction	AISI 304L/ AISI 316L
2.	Operational pressure	10 Bar
3.	Hydrostatic leak tightness	To be tested up to 16 Bar, for 10 Min in compliance with ASTM E1003
4.	In-built filters	Polypropylene filters - seive size < 10µm
5.	Flow switch	NO/NC type to be included in the
6.	Spare connections	01 No per header (to be plugged at the time of delivery)
7.	Temperature sensor	One no of PT-100 sensors has to be installed on the outer surface of each header
8.	Pressure sensor	Bourdon Tube type pressure gauge, 0-15 Bar
9.	Flow limiting vales	7mm x 7mm with 5mm dia hole for carrying DM water
10	Length of each hose	2.5m
11	Make of Hose	M/s. Swagelock or equivalent

Table-4.0

7.0 ACCEPTANCE CRITERIA

7.1 Qualification Test

The contractor is welcome to complement the tests described here with additional ones on each coil during winding or before impregnation, as part of his quality control.

7.1.1 Visual and dimensional inspection

No visible cracks in weld.

7.1.2 Hydrostatic Test

The fabricated headers shall be connected to hydrostatic pump capable of generating of 1.8MPa. The test duration is 10 Min, during which pressure drop shall not more than 5% for acceptance of the system.

7.2 Documentation of Test results

7.2.1 All the coils shall be inspected in presence of Purchaser's representative. Only after the approval of all test results and verification, all the coils be dispatched to purchaser's site.

7.2.2 The aforesaid test shall be conducted at supplier premises and the purchaser reserves the right to access the supplier premises and witness the qualification test as and when deemed necessary.

7.2.3 It is the responsibility of the contractor to document all the aforesaid test results of para 4.1 separately for each header. The document format for the same shall be furnished by the purchaser after the award of the contract. This document shall form the part of the quality assurance procedure and the results shall be endorsed by the purchaser representative. The supplier is requested to notify the purchaser the dates of testing and make necessary arrangements to expedite the same.

8.0 PERFORMANCE OF THE CONTRACT

8.1 Fabrication and Delivery Schedule

The bidder shall complete the job within preferably within 2-3 months starting from the date of firm purchase order is issued to successful bidder. The contractor is also obliged to re-wind/enact corrective winding measures during the period of the above contract, if any of the coil fails to pass the qualification tests. This may involve the revision in the practises governing the winding, vacuum impregnation and jigs fixtures after consulting with the purchaser. All the changes called for, shall be intimated vide Engineering/Design change notice(ECN/DCN) duly approved. A copy of the

DCN/ECN may be forwarded to the purchaser for information and records. The purchaser shall incorporate the remarks of the aforesaid notices at applicable test documents and release the revisions of the same to the contractor. This is mandatory, to ensure the quality of the delivered goods.

8.2 Document to be furnished prior to the start of winding

After the successful award of the contract, supplier shall first deliver the manufacturing file(MF) containing the manufacturing drawing of the coil.

The manufacturing file shall contain the following information:

- a) Engineering Details of jigs and fixtures to be used
- b) The schematic representation of the winding procedures
- c) Details of insulating material proposed to be indicating the make and class
- d) The fabrication drawing of the headers indicating the adjustment allowed in para 3.0

8.2.3 Quality Control Records

The QCR shall contain:

- The material certificates, in particular varnish, epoxy any other material intended to be used.
- All the documentation requested in the para 6.0. All these documents shall be endorsed by the purchaser for approval during successive stages of the production, 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 period of this contract, it shall through mutual agreement between purchaser and the contractor, the related templates in the MF shall be revised as well.

8.3) WARRANTY AND DELIVERY SCHEDULE:

8.3.1) All items covered under this contract shall have a warranty of 12 Months

8.3.2) The fabrication, assembly and testing has to be completed and delivered at the purchaser premises within 3 Months from the date of work order.

9.0 GENERAL DESCRIPTION:

9.1 Supplier shall submit the offer for the winding of coil using hollow conductor that shall be supplied as free issue material from the purchaser.

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

9.3 Suppliers shall give complete details of their product, facilities, winding machine details, list of users and compliance certificates from users for technical evaluation. Quotations submitted with incomplete details are viable for rejection.

9.4 Vendors with test facilities for qualification of winding resistance, Insulation test, Inter-turn insulation , temperature qualification, 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. Under any circumstances, the responsibility for the satisfactory completion of job lies solely the supplier. Vendors shall document the details of qualification checks performed on the fabricated parts by self or in collaboration with other laboratories.

