

**Government of India
Bhabha Atomic Research Centre
Accelerator Control Division**

Ref: ACnD/EMAS/FC/18/417

Date: 30.5.2018

Fabrication, testing and supply of male tube end connectors: double ferruled SS 316 of size 1/2" Tube end OD X 1/4" BSPT confirming to the Technical Specification Sheet No: ACnD/MF/FC/01 dated 28.5.2018

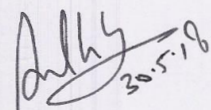
Dear Sir/Madam,

Quotations are invited for "Fabrication, testing and supply of male tube end connectors: double ferruled SS 316 of size 1/2" Tube end OD X 1/4" BSPT confirming to the Technical Specification Sheet No: ACnD/MF/FC/01 dated 28.5.2018".

Bidder shall quote for deliverables as per the technical specifications.

1. No Free Issue material is involved.
2. Taxes shall be quoted separately. Form AF/H whichever is applicable shall be provided, if required.
3. **The quotation must reach The Head, EMAS, ACnD by 13/6/2018 (12:00 Noon) and must be sent in a sealed envelope super scribed with the reference number & the due date given above. Courier are not allowed in BARC premises; the quotation shall be sent by speed post/registered post.**
4. The address on the envelope should read: **The Head,
Electromagnetic Application Section,
Accelerator Control Division,
RCnD Bldg., North Site
BARC, Trombay,
Mumbai - 400 085.
(Kind Attn: Elina Mishra, SO/D)**
5. The bidder shall complete the job within 12 weeks from the date of firm work order issued to the bidder. The finished components shall be delivered by the bidder at **RCZ stores, BARC, Trombay, Mumbai-400 085.**
6. Head, EMAS, Accelerator Control Division reserves the rights to accept/reject any or all quotations without assigning any reason.
7. Delivery charges if any must be clearly mentioned in the offer. Quotation must also indicate the validity of offer. Quotation must also indicate the GST no and PAN no of the party.
8. Drawings / Sketches must be returned along with the offer.
9. The quotation has to be signed by authorized person with company seal.
10. Payment will be made by cheque only after satisfactory completion of work on production of bill, delivery challan and advance stamped receipt. It may be noted that IT @ 2% and surcharge on tax at 15% shall be deducted from your bills.

Encl.: Technical Specification Sheet no: - ACnD/MF/FC/01



Sanjay Malhotra,
Head, EMAS, ACnD

Technical Specification Sheet

| Specification no. | Revision no. | No of sheets | Date of Issue |
|-------------------|--------------|--------------|---------------|
| ACnD/MF/FC/01 | 0 | 4 | 28.5.2018 |

Fabrication, testing and supply of male tube end connectors: double ferruled SS 316 of size 1/2" Tube end OD X 1/4" BSPT

1.0 Scope

This specification specifies "Fabrication, testing and supply of male tube end connectors: double ferruled SS 316 of size 1/2" Tube end OD X 1/4" BSPT" for cooling channel arrangement system.

In different cooling channel assemblies, instrumented tube adapters/connectors are used to connect the hose pipes with the cooling channels of the system or to various headers. The tube connectors needed for our application are needed for connecting the equipment to be cooled to the hose pipe since the end connections of the equipment nozzle is not directly compatible to the hose pipe being used. These connectors need to be double ferruled for better leakage protection, higher pressure withstand capacity and higher durability.

The job includes fabrication and testing of double ferruled SS 316 1/2" tube end OD X 1/4" BSPT male tube connectors. Testing of the fabricated products includes geometrical and hydraulic qualification tests of the tube fittings. Safe packaging of the fittings is also in the supplier's scope.

This document is organized as follows:

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2.0 Statement of purpose

High frequency electromagnetic standing wave are generated when the RF power source like klystrons are connected to the accelerating cavities. These high frequency RF fields lead to the temperature rise of the DTL tank and the various subcomponents. The temperature rise in the DTL tank leads to thermal expansion of the tank. Hence, the increase in diameter of the tank leads to increase in magnetic field dominant region and the resonant frequency of the cavity decreases and leads to reduction in the power transferred to the beam. So, the heat has to be removed continuously from the cavity and the cavity has to be operated at a fixed temperature only. As a result, cooling channels are paved in these subcomponents to remove the heat by circulating low conductivity water. Instrumented tube fittings are an inevitable part of any cooling channel and provides a compatibility between the channel end connection and the hose pipe.

3.0 Details of deliverables and scope of supplier

The list of the items to be fabricated, tested, packed and safely delivered to the purchaser includes:

| Item no. | Description | Quantity |
|-----------------|--|-----------------|
| 1. | BSPT male tube connectors: Double ferruled SS 316 1/2" Tube end OD X 1/4" BSPT | 300 no |

The scope of the supplier includes:

- Preparation of manufacturing drawings on the basis of engineering drawings provided by the purchaser. Approval shall be taken from the purchaser on the prepared manufacturing drawings before the start of fabrication.
- Purchase of raw material as per technical specifications and produce test certificates for approval from purchaser before procuring.
- Inspection of the fabricated components.
- Packing of the tube fittings and shipment of the same.

4.0 Vendor Qualification

Suppliers will be qualified based on technical evaluation. The supplier must have technically qualified and trained staff for mechanical and hydraulic jobs. Supplier must have required infrastructure and past experience of similar jobs. Supplier will be evaluated based on the information provided by the supplier as requested below. Purchaser's specialists may visit the supplier facilities for evaluation and for detailed technical discussions.

| SN | Type of job | Outsourcing permissible (Yes/No) |
|----|---|----------------------------------|
| 1. | Preparation of manufacturing drawings on the basis of engineering drawings provided by the purchaser. | No |
| 2. | Fabrication of the customised tube fittings as per the technical specifications | No |

Purchaser's specialists may visit the supplier facilities for evaluation and for detailed technical discussions. Details to be furnished by the vendor related to facilities and expertise:

| Particulars | To be filled by the vendor |
|--|----------------------------|
| Human resource (The supplier must give the complete detail of human resources including Engineers, Consultants (if any), Draftsmen, Technicians, Welder, Assembly Mechanic, quality control inspector, machinist etc.) | |
| Infrastructure: The supplier must give the details of infrastructure suitable for this jobs such as Manufacturing machines, assembly room, other tools and tackles, Inspection and Metrology facilities, hydraulic test facilities. | |

5.0 Details of Free Issue Material to be provided by the purchaser

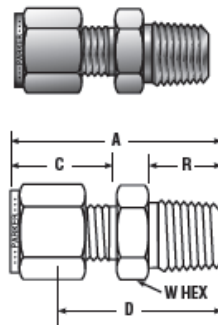
No free issue material will be provided to the supplier. The physical, chemical, geometrical inspection reports of the raw materials should be provided to the purchaser by the supplier and the raw material shall be purchased only after approval from the purchaser.

6.0 Technical description of the job

This document describes the technical specifications of the double ferruled SS 316 1/2” Tube end OD X 1/4” BSPT male tube connections. Precise fabrication and qualification of the fittings are very critical. The end use of these components demands fabrication within the tolerances which are covered in this document.

6.1 General specifications:

A schematic figure of the fitting to be supplied by the supplier and the associated dimensions and specification of various parts of it are described as below:



| SN | Type of Fitting | Description | A (inches) | C (inches) | D (inches) | R (inches) | W HEX (inches) |
|----|---|-----------------------|---------------|---------------|---------------|---------------|-------------------|
| 1 | 1/2” Tube OD X 1/4” BSPT Male tubing connection | Double ferruled SS316 | 1.69 | 0.86 | 1.31 | 0.56 | 13/16 |

6.2 Raw material specifications:

The raw material and forging process being used to fabricate the instrumented fittings must qualify the following standards:

| Basic fitting material | Bar stock | Forging |
|----------------------------|---|--|
| Stainless steel (Type 316) | ASME-SA-479 Type 316-SS BS970 316-S31 DIN 4401 ASTM A276 Type 316 | ASTM-SA-182 316 BS970 316-S31 DIN 4401 |

Note:

- Hardness of the back ferrule must be greater than 80 Rb.
- The nut threads should be silver plated.
- Heat code traceability for the fittings must be provided.
- Only products with proper company catalogues will be acceptable.

6.3 Compliance certificates:

The supplier has to furnish the following compliance certificates for the acceptance of the material.

| SN | Certificates |
|----|---|
| 1 | Material test certificate as per 6.2 standard |
| 2 | ISO certificate |

6.4 Packing and shipment:

The tube fittings shall be properly packed and shipped to the purchaser with all the geometric and hydraulic test certificates.

7 Acceptance criteria

Following are the acceptance criteria of the components and coils and other relevant parameters:

| S.N. | Particulars | Acceptance criteria |
|------|---------------------------|---|
| 1. | Visual Qualification | Any signs of damage, deterioration and oxidation shall not be present on any component. |
| 2. | Geometrical Qualification | All the geometrical dimensions of the tube fittings should comply with the technical specifications documented. |
| 3. | Hydraulic Qualification | The hydrostatic and hydrodynamic qualification tests should be carried out to test for pressure handling tests and leak tests |

8 Price

The supplier shall give overall price and its break-up for all the deliverables mentioned. The overall price will be compared. The supplier shall offer prices in following format.

| Item no. | Description | Quantity | Price per unit | Total price |
|----------|--|----------|----------------|-------------|
| 1. | Double ferruled SS 316 1/2" Tube end OD X 1/4" BSPT male tube connectors | 300 nos. | | |

9 General conditions

- a. All intellectual property rights belong to purchaser for work done under this technical specification/PO.
- b. Supplier shall maintain the authenticity of drawings or any related drawings/document provided by the purchaser.
- c. All activities would normally be carried with due professional care. However, purchaser shall not be responsible for any loss or personnel accident during execution of the work pertaining to the technical specifications under this PO.
- d. Supplier shall agree to hold in confidence all information provided by the purchaser.
- e. All the raw materials required for deliverables except the Free Issue Material mentioned is in scope of supplier and the supplier should quote accordingly.
- f. Overall cost of all the items in the deliverables will be compared including packaging, forwarding and safe delivery to BARC RCZ stores and shall be quoted separately.
- g. Suppliers shall give complete details of their product & list of users for technical evaluation.