

**Specification for Tender No. IADD/MJ/2018/OPA 108720, due on 27/06/2018.**

To,

Date: 12/06/2018

**Subject:** Minor fabrication and supply of Copper IRIS Blocks.

Dear Sir,

Please let us have your competitive rate for *Minor fabrication and supply of Copper IRIS Blocks* as per following details:

1. The IRIS Block must be fabricated as per drawing provided and material mentioned. The *ports, flanges* and *IRIS openings* should be aligned with high degree of precision. The component must be manufactured exactly as per the specifications given in the drawing.
2. Generation of 3D CAD model, and detailed engineering drawings generated from the 3D model will be in the scope of the supplier. The supplier shall prepare the detailed fabrication drawings and must submit the drawings to undersigned for approval before starting the fabrication. Digital copies of the 3D model and drawings shall be provided to the indenter, along with hard copy of the drawings.
3. Detailed manufacturing plan and QC plan should be submitted to indenter and approval taken, before starting fabrication.
4. Welding joints and ports of the fabricated job must be thoroughly leak checked with helium leak detector in order to have a leak rate  $10^{-10}$  Torr-litre / sec or better. The leak testing must be done in presence of the undersigned or his representatives at the manufacturer's site. The manufacturer is responsible to arrange the leak test setup and must bear the costs attributed to it. Any extra components such as fixtures, flanges, gaskets or adapters necessary for carrying out the vacuum test should be arranged by the manufacturer.
5. The material used to fabricate IRIS Block should be free from any internal voids or defects. Also the material should meet all the standard physical, mechanical, electrical and thermal properties as applicable. Vendor should provide ultrasonic test reports and chemical analysis report of **OFE Copper** material from govt. approved laboratories in order to ensure there purity and defect free material.
6. The supplier has to provide two separate **sealed** envelopes, one for technical compliance and other for commercial quotation with terms and conditions. **If both (technical and commercial offers) are not in separate sealed envelopes, the offer will be summarily rejected.**
7. The technical offer should contain a table showing compliance statement against each & every point of the **technical specification** (annexure-I). The table shall clearly point out the expected deviations/ relaxations desired by the supplier. Alternatives, if any, shall be proposed by the supplier. Indenter may

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allow the relaxations based on its criticality. Necessary action will be taken if any undisclosed deviations are found on the later stages.

8. Supplier shall also fill in the attached **compliance table** (Annexure-II) and attach it with the technical offer. All entries of the table should be filled. **Quotations where the compliance table is not completely filled are liable to be rejected.**
9. The manufacturer should have previous experience in successfully fabricating OFE copper components for use in ultra-high vacuum (UHV) applications. Also the manufacturer should have good experience of vacuum furnace brazing technology. All the copies of earlier work orders or purchase orders that demonstrate the required experience should be attached with the quotations. **If the supplier is unable to demonstrate suitable experience indicated above, the offer is liable to be rejected.**

**Rights and Privileges:**

Indenter reserves the right to inspect any machinery or material or equipment furnished or used by vendor or to reject any, which is found defective in workmanship, quality, and design or otherwise unsuitable for use which is not in accordance with the specification.

**Note:** In case any further clarification is required, the bidders may contact the undersigned at phone no. 022-2559-6395.

**Your quotation duly filled in the prescribed format, addressed to "Head, IADD, Van-de-Graaff Bldg, BARC, Trombay, Mumbai – 400085" in a sealed envelope quoting tender number and due date, must reach on or before 27/06/2018 date by 3 PM. On top of envelop it must also be written that "kind attention to Mr.Mentes Jose, IADD".**



Mentes Jose  
SO/D, IADD

**Enclosures:**

**Technical Specification (Annexure I)  
Compliance Table (Annexure-II)  
Form of Quotation (Annexure III)  
Drawings/Schematic Details (Annexure IV)**

## Annexure-I

### Technical Specification for Tender No: IADD/MJ/2018/OPA 108720

#### Scope of Work

The job involves fabrication, testing and supply of four numbers of Iris Blocks. The Iris block is machined in three (or more) parts which have to be joined together by vacuum brazing. It will have cooling channel holes drilled (and plugged wherever it is necessary), and SS304 flanges joined by vacuum brazing.

The Iris Block will operate under ultra-high vacuum (UHV) of  $1 \times 10^{-8}$  Torr or better, and should therefore be tested to a leak rate of  $1 \times 10^{-10}$  Torr lit/sec. The fabrication involves precise machining of OFE copper, vacuum tight brazing, leak testing using helium leak detector. As the Iris Block will be used to transport high RF (Radio Frequency) power of up to 250 kW CW (Continuous wave) at 352.2 MHz, all internal surfaces should have sub -micron finish. The detailed specifications are given below.

1. **Joining and material details:** All Iris Block parts should be machined from OFE copper material and joined using vacuum furnace brazing only; torch brazing is not permitted. The flanges should be made from SS304 material and should be joined to the copper coupler parts by vacuum brazing.

2. **Leak rate requirements:** All joints should be vacuum leak tight and helium leak rate should be  $1 \times 10^{-10}$  Torr.Lit/sec or better.

3. **Surface finish and flatness:** Surface finish of all internal surfaces should be better than 1 micron. Surface flatness should be less than 20 microns. **Surface finish should be achieved only by machining; grinding, buffing, etc. are not permitted.**

4. **Dimensional tolerances:** For the gap of 1.55 mm dimensional tolerance is  $\pm 30$  micron (as shown in fig 3.3 c). For other dimensions the tolerance is  $\pm 60$  microns.

5. **Water leak testing:** All the water coolant channels should be thoroughly checked for vacuum tightness (helium leak rate should be  $1 \times 10^{-10}$  Torr lit/sec or better) as well as leak tightness with 10 bar water pressure.

#### 6. **Additional requirements:**

- Before finish machining the rough machined OFE Cu components should be annealed in a vacuum furnace.
- The Iris Blocks' components should meet the desired dimensional accuracy, surface finish and vacuum leak rate. Vendor should provide the required test reports using only Coordinate Measurement Machine (CMM). Inspection reports with vernier will not be accepted.
- Vacuum leak of better than  $1 \times 10^{-10}$  torr lit/sec should be demonstrated by the vendor at its works/site to the indenter. Helium leak rate detector should be used for vacuum leak rate measurements using helium spray technique at their works/site before shipping and at user site after shipping.
- The Iris Blocks shall be delivered only after getting all the test reports approved by the

## Annexure-I

indenter.

- All the internal surfaces should not be painted or have any type of coating.
- Components should be thoroughly degreased and cleaned before testing and backing.

### **Packing**

- The use of self-adhesive is forbidden.
- The indented component is to be delivered as packed in the factory.
- Packing at factory will involve blanking off the flanges and pressurizing with inert gas. Provision for the pressure reading gauge needs to be made on the flange.

### **Imp Note:**

**Post supply inspection in respect of supplies made is not permitted. Any offer containing the condition of post supply inspection will be rejected out-right. It is therefore, mandatory for the bidders, while quoting, to indicate in clear terms the requirement of post supply inspection by any outside agency.**

## Annexure-II

### Compliance Table

Sl. No	Requirement	Compliance (Write YES or NO Only)		Comments
1	Demonstrated experience in high precision machining of OFE/ETP copper components ( $\pm 30$ micron). Copies of earlier work orders or purchase orders should be attached.	Experience exists?	WO/PO attached?	
2	Demonstrated experience in UHV applications (ultimate vacuum of $1e-8$ Torr or better). Copies of earlier work orders or purchase orders should be attached.	Experience exists?	WO/PO attached?	
3	Demonstrated experience in vacuum furnace brazing of OFE copper components. Copies of earlier work orders or purchase orders should be attached.	Experience exists?	WO/PO attached?	
5	Surface finish of all internal surfaces should be better than 1 micron. Surface finish should be achieved only by machining. <i>Grinding, buffing, etc. are not permitted</i>	Will comply?		
6	For the gap of 1.55 mm dimensional tolerance should be $\pm 30$ micron. For other dimensions the tolerance should $\pm 60$ microns.	Will comply?		
7	All the water coolant channels should be thoroughly checked for vacuum tightness (helium leak rate should be $1e-10$ Torr lit/sec or better) as well as leak tightness with 10 bar water pressure.	Will comply?		
8	Before finish machining, the rough machined OFE Cu components should be annealed in a vacuum furnace	Will comply?		
9	Vendor should provide the required test reports using only	Will comply?		

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	Coordinate Measurement Machine (CMM). <i>Inspection reports with Vernier will not be accepted.</i>			
10	Vacuum leak of 1 e-10 torr lit/sec or better should be demonstrated by the vendor at its works/site to the indenter. Helium leak rate detector should be used for vacuum leak rate measurements.	<b>Will comply?</b>		
11	Packing at factory will involve blanking off the flanges and pressurizing with inert gas Provision for the same needs to be made on the flange.	<b>Will comply?</b>		

**Annexure-III**

**Format of Quotation for Tender No. IADD/MJ/2018/OPA 108720**

<b>Items</b>	<b>Quantity</b>	<b>Cost/Remark</b>
Minor fabrication and supply of Copper Iris Blocks	4	
Taxes		
Delivery Charges, if any		
Delivery Schedule		
Documents Required, if Any		
Validity		
Remarks		

VAT No.

PAN No.

**(Vendors Name)**  
**Authorised Signatories & Company Seal**

**Note: The quotation must be sent by speed post only.**

