

Government of India  
Department of Atomic Energy  
Bhabha Atomic Research Centre  
Beam Technology Development Group  
Laser & Plasma Technology Division

Trombay, Mumbai - 400 085

REF : LPTD/WORKS/TD/2019/ 21416

Date: JAN 30, 2019

Sub : **Minor Fabrication - invitation of quotations.**

Sirs,

1. Quotations are invited for the minor fabrications job as per the **enclosed specifications.**
2. Bidder shall quote for fabrication of these components with material and without material.
3. Taxes and excise duties shall be quoted separately. Form **H** shall be provided where necessary.
4. The quotations must reach, **Head, Laser & Plasma Technology Division** by **FEB 12, 2019 AN** and must be sent in a sealed envelope **SUPERSCRIBED** with the above **reference number and due date** given above (**By INDIAN POST**).
5. The address on the envelope should read :  
The Head,  
Laser & Plasma Technology Division,  
Bhabha Atomic Research Centre,  
Trombay, Mumbai - 400 085.  
  
(*Attn.: Shri. **TATSAT DWIVEDI**, Ph: 25592423, 25595066*)
6. The bidder shall have to take an insurance policy against any material issued to him by the purchaser.
7. The fabrication work shall be subject to inspection by our engineer. The finished components shall not be despatched prior to approval by our engineer at bidder's works. Necessary inspection facilities should be provided to our engineers during fabrication at bidder's premises.
8. The bidder shall deliver the finished components after approval by our engineer, within **10 weeks** from the date the firm purchase order is issued to the bidder. The finished components shall be delivered by the bidder at **L & P T Division, Bhabha Atomic Research Centre, Trombay, Mumbai – 400 085.**
9. Head, Laser & Plasma Technology Division, BARC, reserves the right to accept/reject any or all quotations without assigning any reason.

Yours faithfully

(R. K. RAJAWAT)  
Head, L&PTD, BARC

**CC: Head, SIRD (for loading onto BARC website)**

**Notice Board, Vikram Bhavan**

**Notice Board, BARC site**

**AO, Works, BARC.**

## SPECIFICATIONS (Annexure-B)

A double jacketed laser discharge tube to be fabricated of quartz (99.99% purity of GE make) for its operation under cryogenic cooled conditions. The job involves fusing three quartz tubes of ~20 mm OD (~16 mm ID, 1.5 mm thick, and 1360 mm length), 75 mm OD (70 mm ID, 2.5 mm thick, 1200 mm length) & 90 mm OD (85 mm ID, 2.5 mm thick, 1230 mm length) concentrically as shown in the figure. **The internal straightness of the innermost tube where the lasing discharge occurs needs to be ensured.** The tungsten anode rod and cup cathode (picture attached) are to be glass-metal sealed to this innermost tube at the desired locations as shown in the schematic attached. The electrodes will be provided by us. The middle tube to have provision for pouring and evaporation of liquid N<sub>2</sub> as shown in the schematic attached. The middle tube to also have provision for water in and water out as shown in the schematic attached (the liquid tight stopcock may be of the type shown in the picture below (2 nos. to be provided by us). The electrode and water connection tube at each end are at 90 degrees as can be seen from the photograph below. The outermost tube to be baked to 200 degree C to remove the moisture content inside, has to be evacuated to 10<sup>-5</sup> mbar and then sealed.

The schematic drawing of the discharge tube setup with various provisions to be incorporated is attached.

Performance testing: The performance testing of the tube viz., leak testing has to be carried out at the fabricator's end to ensure all joints are sealed. Under dynamic pumping conditions the tube should give a rotary vacuum of ~10<sup>-3</sup> mbar.

### Acceptance Criteria

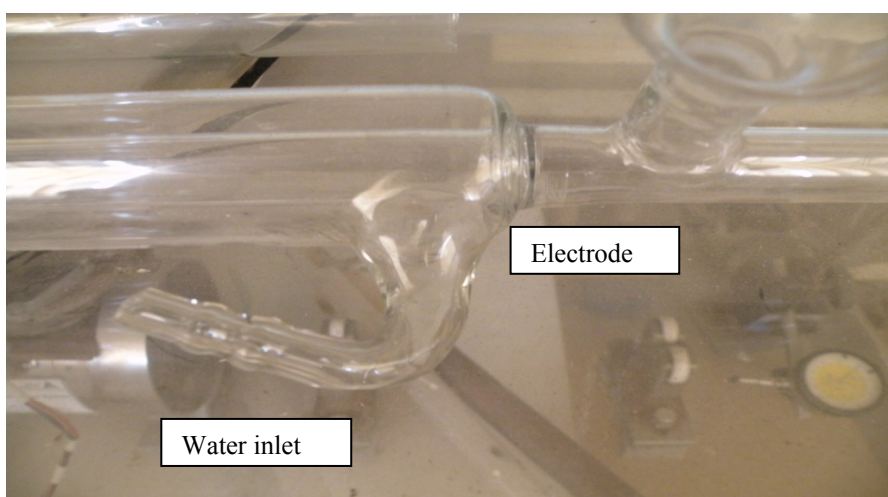
It is mandatory for the vendor to understand the various specifications and discuss the design aspects with the executing officer before submitting the quotation.

Good quality quartz tubes (99.99% purity of GE make) to be employed for the fabrication job. **The innermost tube, in particular, should be extremely straight from inside and not skewed/bent which otherwise can drastically affect the resulting lasing output.**

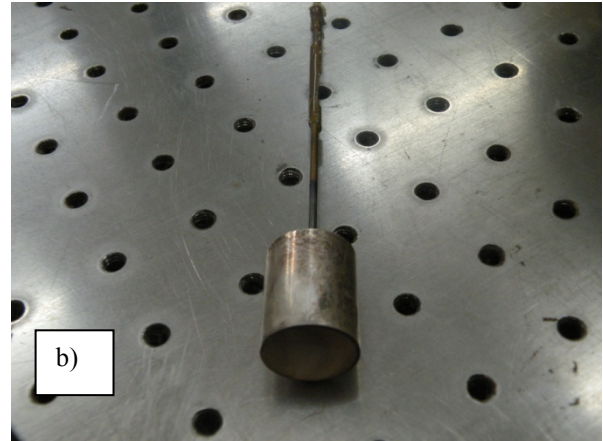
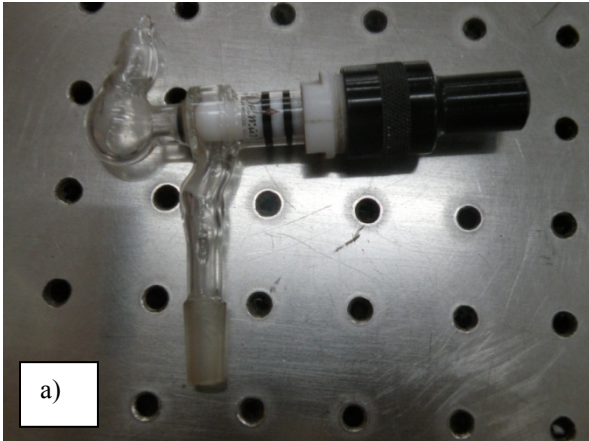
Fabrication and supply of similar jobs by the bidder to BARC or other recognized institutes to be mentioned along with the type of job.

**Graded seal** to be used for fixing the glass metal electrodes for efficient sealing and joints.

Delivery Period: 5 weeks.

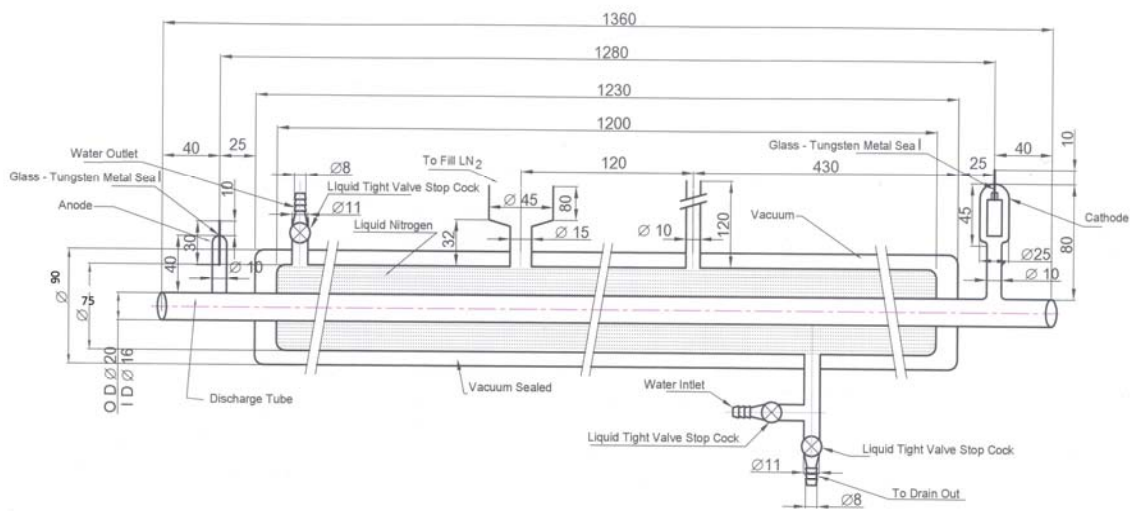


**The electrode and water connection tube are at 90 degrees as can be seen from the photograph.**



a) Water tight valve

b) Cathode with tungsten rod and tungsten anode (anode rod can be cut from the extra length of tungsten available in cup cathode).



Schematic of CO<sub>2</sub> Laser Tube

All Dimensions are in mm

