

Government of India  
Bhabha Atomic Research Centre  
Electronics & Instrumentation Systems Division

Ref: BARC/EISD/RMSB/2018/250

Date: 20/11/2018

To,

As per the list of address attached

**Sub: Invitation of Quotation for Design and Fabrication of Electron Detection System**

Dear Sirs,

1. Quotations are invited for the minor fabrication job, **as per the enclosed specifications in annexures.**
2. Bidder shall quote for the entire work involved in this fabrication.
3. Taxes/GST/IGST/other charges shall be quoted separately.
4. The quotation must reach Head, Electronics & Instrumentation Systems Division by **05/12/2018** and must be sent in a sealed envelope super scribed with the reference number & the due date given above. The quotations must be sent through *Indian Postal Service only* and hand delivery or courier delivery of quotations will not be accepted.
5. The address on the envelope should read:  
**Head, Electronics & Instrumentation Systems Division**  
**BARC, Trombay,**  
**Mumbai – 400085.**  
**(Kind Attn: Shri S. Pal, SO/E)**
6. For any clarification regarding fabrication work, please contact by email at [suvadip@barc.gov.in](mailto:suvadip@barc.gov.in) and phone on 022-25594826.
7. The fabrication work shall be subjected to inspection by our engineers. The finished components shall not be dispatched prior to approval by our engineer. Facility for necessary inspection should be provided to the engineer deputed for inspection of the job during fabrication at bidder's premises.
8. The bidder shall deliver the finished components after approval by our engineer/officer within **3 months** from the date of issue of work order to the bidder. The finished components along with left over materials shall be delivered at **EISD, BARC, Trombay, Mumbai - 400 085.**
9. Head, Electronics & Instrumentation Services Division reserves the rights to accept / reject any or all quotations without assigning any reason.
10. Delivery charges, if any, must be clearly mentioned in the offer.
11. Quotation must also indicate the applicable GST for items and duration of validity of offer.
12. The Bidder should also provide GSTIN/PAN/TAN/GIR No.

*R. M. L.* 20.11.18  
(R. M. Suresh Babu)  
OS & Head, Electronics &  
Instrumentation Systems Division,  
BARC

Encl: Annexure-I to II

आर. एम. सुरेश बाबु / R. M. SURESH BABU  
अध्यक्ष, इआईएसडी / Head, EISD  
भापअ केंद्र, मुंबई / BARC, Mumbai



भारत सरकार  
भाभा परमाणु अनुसंधान केंद्र  
इलेक्ट्रानिकी एवं यंत्रिकरण प्रणाली प्रभाग

संदर्भ: भा.प.अ.केंद्र/ई.आई.एस.डी/आर.एम.एस.बी/२०१८/२५०

दिनांक: २०/११/२०१८

**विषय:** "इलेक्ट्रॉन डिटेक्शन सिस्टम का फ़ैब्रीकेशन" हेतु कोटेशन आमंत्रित करना अनुबंध-१ के अनुसार कार्य-क्षेत्र।

1. अनुबंध के अनुसार, लघु निर्माण कार्य के लिए कोटेशन आमंत्रित किये जाते हैं।
2. बिडर को अनुबंधों के अनुसार कार्य क्षेत्र के लिए कोट करना होगा। यह काम सामग्री की आपूर्ति के बिना क्रियान्वित किया जाएगा।
3. करों और उत्पाद शुल्क को अलग से कोट किया जाये।
4. कोटेशन अध्यक्ष, इलेक्ट्रानिकी एवं यंत्रिकरण प्रणाली प्रभाग को दिनांक ०५/१२/२०१८ तक पहुँच जाना चाहिए तथा मोहर बंद लिफाफे पर संदर्भ संख्या एवं ऊपर दी गई निर्धारित तिथि लिखी होनी चाहिए।
5. लिफाफे पर पते को इस प्रकार लिखा जाना चाहिए :  
**अध्यक्ष, इलेक्ट्रानिकी एवं यंत्रिकरण प्रणाली प्रभाग,  
भा.प.अ.केंद्र, ट्रॉम्बे, मुंबई - ४०००८५  
[ध्यानकर्षण: श्री एस. पाल, वैज्ञानिक अधिकारी (ई)]**
6. कार्य हमारे इंजीनियर की देखरेख में किया जाएगा।
7. हमारे इंजीनियर की देखरेख में बिडर को कार्यदिश मिलने कि तिथि से बिडर ३ महीने के अंदर कार्य पूरा करना पड़ेगा।
8. अध्यक्ष, इलेक्ट्रानिकी एवं यंत्रिकरण प्रणाली प्रभाग बिना कोई कारण बताएं किसी भी या सभी कोटेशन को स्वीकार/अस्वीकार करने का अधिकार सुरक्षित रखते हैं।
9. कोटेशन में प्रस्ताव की वैधता भी दर्शाई जानी चाहिए।
10. कोटेशन केवल मुद्रित लेटर हेडप्रारूप में ही दिए जाए। कंप्यूटर जनित फार्म में प्राप्त कोटेशन को अवैध मानते हुए खारिज कर दिया जायेगा।
11. कोटेशन में फर्म का पैन, वैट या सर्विस टैक्स रजिस्ट्रेशन नंबर शामिल रहना चाहिए।

R. M. L. 20.11.18  
आर. एम. सुरेश बाबू  
उत्कृष्ट वैज्ञानिक एवं अध्यक्ष, ई.आई.एस.डी

आर. एम. सुरेश बाबू / R. M. SURESH BABU  
अध्यक्ष, ई.आई.एस.डी / Head, EISD  
भा.प.अ.केंद्र, मुंबई / BARC, Mumbai

## **Annexure-I**

### **Specifications for Design and Fabrication of Electron Detection System**

#### **Scope of work -**

1. Design and Fabrication of Electron Detection System as per given details.
2. Procurement of all components.
3. Integration of all components and Inspection/Testing of the system at vendor's site.
4. Integration and functional testing of system at user's site

**Quantity Required: 1 Unit.**

#### **Detailed Specification:**

##### **1. Design and Fabrication of Electron Detection System as per given details**

- i. The Electron Detector assembly should consist of Attractor Electrode, Scintillator, Light coupler, Photomultiplier Tube (PMT) along with its socket and high vacuum electrical feedthroughs.
- ii. The system should have a flange of OD 75mm and PCD 64mm to connect with a vacuum chamber maintaining a vacuum of  $10^{-6}$  torr.
- iii. The specifications of each component are given in the following sections along with overall dimensions, wherever necessary. The detailed information will be provided at time of placing work order.
- iv. The vendor must mention in their quotation that they will be agreeable to accommodate minor design changes, if any, in the fabrication work.

The Electron Detection System consists of the following sections:

##### **a) Attractor Elctrode**

- i. Overall Dimension is as below:
  1. Length: 20 mm
  2. Width: 15 mm
  3. Thickness: 2 mm
- ii. Working Voltage: The electrode should be wired to apply 0V to +1KV voltage

##### **b) Scintillator**

- i. Scintillator Material: YAG/YAP
- ii. Coating: 50nm thick uniform Aluminum coating on outer surface of scintillator
- iii. Wavelength of emission: Matching spectral response with PMT
- iv. Working Voltage: The scintillator should be wired to apply +10KV fixed voltage

**c) Light coupler**

- i. Material: Clear fused Quartz rod
- ii. Diameter: 8 mm
- iii. Length: 75 mm

**d) Photomultiplier tube**

- i. Type: Head-on type
- ii. Tube Size: Dia.13 mm
- iii. Photocathode Area Shape: Round
- iv. Photocathode Area Size: Dia.10 mm
- v. Wavelength (Peak): matching Scintillator
- vi. Photocathode Material: Bialkali
- vii. Window Material: Borosilicate glass
- viii. Dynode Stages: 10
- ix. Anode to Cathode Voltage: 1250 V Max.
- x. Average Anode Current: 0.1 mA Max.
- xi. Anode Gain:  $1.0 \times 10^6$  Typ.
- xii. Anode Dark Current (after 30min.): 1 nA Typ.
- xiii. Rise Time: 2.1 ns Typ.
- xiv. PMT should be shielded from outside magnetic field

**e) D-type socket assembly for PMT**

- i. Applicable PMT: 13 mm Head-on type
- ii. Insulation Voltage (Case-Pins): 1250 V Max.
- iii. Supply Voltage: 1250 V Max.
- iv. Total Voltage Divider Resistance: 4 M $\Omega$  (approx.)

**f) High Vacuum Electrical Feedthrough**

- i. 2 nos. of high vacuum electrical feedthroughs should be integrated within the system.
- ii. Feedthroughs should be compatible with vacuum  $\sim 1 \times 10^{-6}$  Torr
- iii. One feedthrough should be connected with the attractor through insulated cable and the rating of this feedthrough is 15KV, 1mA and the other feedthrough should be connected with the scintillator through insulated cable.

## **g) Cables**

- i. The system should come with following cables:
- ii. RG-174/U Cable (min. 1 meter) for detector signal output along with a BNC Male connector ( $50\Omega$ ) at the end.
- iii. A shielded cable (min. 1 meter) for providing PMT power (max. -2KV, 1mA) along with a BNC Male connector at the end.
- iv. A shielded cable (min. 1 meter) for providing Faraday Cage power (max. 1KV, 1mA) along with a BNC Male connector at the end.
- v. A shielded cable (min. 1 meter) for providing scintillator power (+10KV, 1mA).

## **2. Procurement of all components**

- i. All the **components**, as per specifications given above, **should be procured by the vendor from authorized distributor only**.
- ii. The vendor is required to submit the **traceability certificate or sufficient documentary evidence of purchase**, if necessary, failing which the offer will be rejected.

## **3. Integration of all components and Inspection/Testing of the system at vendor's site**

- i. All the procured components are required to be assembled in the System
- ii. Wherever required, mounting or fixing of components are in supplier's scope.
- iii. Inspection/testing must be carried out at the supplier's place only.

## **4. Integration and functional testing of Electron Detection System at user's site**

- i. The **Electron Detection System** should be integrated in a working vacuum chamber and Functional testing of the System should be carried out at user's site.

## **5. Pre-despatch Inspection**

In the event of placement of work-order, on-site inspection will be performed by the users at intermediate stages of fabrication process. The final product will also be inspected by the users before delivery, for testing of the SE Detector Unit at supplier's premises.

## **6. Packaging**

As the item is intended for use in high precision instrumentation, the assembly needs to be packaged with utmost care and attention to prevent dust contamination, mechanical deformation, abrasion or rupture during transportation and normal handling. Due consideration need to be taken while packaging to ensure that the detector should not have any damages and all components should be protected from humidity. **Damaged item will not be accepted.**

## **7. Transportation**

Due considerations are needed to be taken for transportation of the deliverables.

## **8. Warranty**

The deliverables should have warranty against defective materials or workmanship **for a period of not less than one year from the date of final acceptance** at purchaser's premises. In case of repair/replacement during warranty period, if equipment has to be sent to supplier's site, the freight charges shall be borne by vendor. Suitable **warranty certificate indicating this should be provided.**

## **9. Confidentiality Clause**

Annexure-II details the clause of confidentiality that must be strictly adhered to by the vendor.

## **Annexure-II**

### **Confidentiality clause:**

- 1. No party shall disclose any information to third party concerning the matters under this contract generally. In particular, any information identified as “PROPRIETARY” in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party.**
- 2. “RESTRICTED INFORMATION” categories under section 18 of the Atomic Energy Act, 1962 and “OFFICIAL SECRETS” under section 5 of the official Secrets Act, 1923: Any contravention of the above mentioned provisions by any contractor, sub-contractor, consultant, advisor or the employees of a contractor will invite penal consequences under the aforesaid legislation.**
- 3. Prohibition against the use of BARC’s name without permission for publicity purposes:-The contractor or sub-contractor, consultant, advisor or the employees engaged by the contractor shall not use BARC’s name for Publicity purpose through any public media like press, radio, T.V. or internet without the prior written approval of BARC. (Vide circular ref: 2/Misc-9/Lgl/2001/92 dated April 30, 2001).**