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Government of India  
Bhabha Atomic Research Centre  
**Uranium Extraction Division**

Ref: UED/Pl.13/18/112040

Date: 07/06/18

**Tender No. BARC/UED/RK/18032**

**Due date: 20.06.18**

**Sub: Fabrication, supply, installation, commissioning and guarantee of Fume Hood and associated accessories for Laboratory set up at UMRT, UED/BARC, Mumbai as per Annexure-A**

Quotations are invited in sealed envelopes, for and on behalf of the President of India for “Fabrication, supply, installation, commissioning and guarantee of Fume Hood and associated accessories for Laboratory set up at UMRT, UED/BARC, Mumbai” as per the following details and technical specifications mentioned in Annexure-A .

**1. Scope of Work**

**The scope of work includes the following:**

- i. Preparation of detailed drawing and layout based on site conditions and user requirements and approval from the undersigned.
- ii. Fabrication of the entire system as per the technical specification mentioned in the Annexure A
- iii. Carrying out tests as applicable as per the technical specification mentioned in the Annexure A
- iv. Supply of the equipment to 6th floor, UMRT, South Site, BARC, Trombay, Mumbai-85
- v. Installation of the entire system as per the approval drawing and layout

Sr. No.	Description	Quantity
<i>Fume Hoods</i>		
1	Fume Hoods (Overall Dimensions with base cabinet: 1200 mm W X 900 mm D X 2400 mm H); Type: Low Constant Volume (LCV); inside liner of Phenolic Resin Laminate (6 mm thick) with Chemical Storage Base Cabinet	2 nos.

2	Fume Hood (Overall Dimensions with base cabinet: 1200 mm W X 900 mm D X 2400 mm H); Type: Low Constant Volume (LCV); inside liner of SS304 (1.2 mm thick) with Chemical Storage Base Cabinet	1 no.
<i>Chemical Storage Cabinet</i>		
3	Floor Mounted Full Height Chemical Storage Cabinets (2 Glass Door, Phenolic Resin Laminate Liner, 4 Adjustable Shelves & 1 Fix, 15 PP trays.) 1000 mm (L) x 460 mm (D) x 1800 mm (H)	1 no.
<i>Spot Extractors</i>		
4	Elephant trunk having 75 mm dia exhaust arm made up of 3 ceiling mounted flexible joints. Reach: 1230 mm.	2 nos.
5	Furniture Ceiling Column : 1000Mm. (Side Connection)	2 nos.
6	Furniture Transparent Hood: Dia 385 Mm	2 nos.
<i>Scrubber, Blower and Ducting</i>		
7	Scrubber of 2000 CFM with Centrifugal Blower of 7.5 HP & Pump motor of 3HP for cluster of 3 fume hoods, 1 chemical storage cabinet and 2 nos. Spot extractors	1 no.
8	PP+FRP Ducting (per square feet)	750 sq. Ft.

## 2. Inspection and Testing

The supplier should be ready to carry out any minor modifications, if required, after inspection at no extra cost. The supplier shall dispatch the equipment only after obtaining clearance from the purchaser. However, the purchaser's inspection and certification does not absolve the supplier of his responsibilities towards the satisfactory operation and the guarantee/warranty of the items mentioned in Annexure-A. The purchaser's representative should be given full access to the shop in which the equipment is being manufactured or tested, if required by the purchaser, at any time during fabrication till dispatch. The purchaser should be notified well in advance of the fabrication and major tests for the purpose of general inspection and witnessing the tests, if required by the purchaser.

The supplier shall check the dimensions with the approved drawing. The test certificate duly signed and sealed by the supplier must be sent along with the dispatched material and documents.

## 3. Drawings to be furnished by the Contractor

After the work order is placed, the vendor should visit the site at BARC and carry out all the actual measurements and accordingly prepare the equipment fabrication and layout drawings and submit it to us for approval; before starting the fabrication work.

## 4. Supply of Items from BARC

No items shall be supplied by BARC and the sole responsibility of procurement of the items rests on the contractor.

## **5. Guarantee**

The manufacturer must provide warranty of the supplied items for a period of one year from the date of installation. During this period, the firm shall be bound to meet all warranty obligations with respects to any manufacturing defects and or maintenance.

## **6. Work Completion**

**The items should be supplied and installed at UMRT 6th floor, UED, BARC within 90 days from the date of issue of work order.** The work completion schedule should be strictly adhered with. Any delay which is attributable to the contractor is liable for penalty @ 0.5% per week (max 5 %) on total work order value. In case extension in work completion period is required, request for it with proper and valid justification is to be sent to us positively before the expiry of work completion period.

## **7. Safety Clause**

During working at UED, BARC site, the vendor should follow the applicable industrial safety procedure along with BARC safety procedure as per BARC representative's and site's requirement. Any dispute related to labor of vendor and their safety will be the sole responsibility of vendor/contractor only.

## **8. Payment:**

- a. No advance payment will be made.
- b. Full payment will be made by ECS on satisfactory completion of the works. and submission of following documents:
  - i. Delivery Challan
  - ii. Original bill
  - iii. Advance stamped receipt
  - iv. Guarantee Certificate
  - v. ECS mandate form
  - vii. GST undertaking
- c. Income tax @ 2% or as applicable will be deducted at source.

## **9. Price:**

Offered cost shall be valid for the entire scope of work (materials, fabrication, supply, Installation, taxes, packing & forwarding, transportation etc).

## **10. Validity of Offer:**

Offer should be firm and valid for next three months.

## **11. Tax:**

As applicable shall be indicated clearly and separately.

**12. Other conditions:**

1. The party should mention their PAN Number, GSTIN number and HSN code while submitting the quotation. Failing of the same their quotation will become liable to be rejected.
2. Quotation should be sent by registered/SPEED post only in sealed envelope addressed to **Head, Uranium Extraction Division, BARC, Trombay, Mumbai 400 085.**
3. All quotations should be superscripted with (i) the subject, (ii) Tender no., (iii) due date on the top of the envelope.

**13. CONFIDENTIALITY CLAUSE:**

1. No party shall disclose any information to any 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. Any contravention of the above-mentioned provisions by any contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequences under the aforesaid legislation.
3. The contractor or sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use BARCs name for any publicity purpose through any public media like Press, Radio, TV or Internet without the prior written approval of BARC.

**Contractor personnel should have “Police Verification Certificate (PVC)” with them for working inside BARC premises.**

Raj Kumar  
Scientific Officer (F)  
For and on behalf of President of India

**PART – A**

## **TECHNICAL SPECIFICATIONS**

### **SCOPE OF WORK**

Fabrication, supply, installation, commissioning and guarantee of Fume Hood and associated accessories for Laboratory set up at UMRT, UED/BARC, Mumbai

#### **1.1. SIZE AND QUANTITY**

Sr. No.	Description	Quantity
<i>Fume Hoods</i>		
1	Fume Hoods (Overall Dimensions with base cabinet: 1200 mm W X 900 mm D X 2400 mm H); Type: Low Constant Volume (LCV); inside liner of Phenolic Resin Laminate (6 mm thick) with Chemical Storage Base Cabinet	2 nos.
2	Fume Hood (Overall Dimensions with base cabinet: 1200 mm W X 900 mm D X 2400 mm H); Type: Low Constant Volume (LCV); inside liner of SS304 (1.2 mm thick) with Chemical Storage Base Cabinet	1 no.
<i>Chemical Storage Cabinet</i>		
3	Floor Mounted Full Height Chemical Storage Cabinets (2 Glass Door, Phenolic Resin Laminate Liner, 4 Adjustable Shelves & 1 Fix, 15 PP trays.) 1000 mm (L) x 460 mm (D) x 1800 mm (H)	1 no.
<i>Spot Extractors</i>		
4	Elephant trunk having 75 mm dia exhaust arm made up of 3 ceiling mounted flexible joints. Reach: 1230 mm.	2 nos.
5	Furniture Ceiling Column : 1000Mm. (Side Connection)	2 nos.
6	Furniture Transparent Hood: Dia 385 Mm	2 nos.
<i>Scrubber, Blower and Ducting</i>		
7	Scrubber of 2000 CFM with Centrifugal Blower of 7.5 HP & Pump motor of 3HP for cluster of 3 fume hoods, 1 chemical storage cabinet and 2 nos. Spot extractors	1 no.
8	PP+FRP Ducting (per square feet)	750 sq. Ft.

(Note: In the above table and elsewhere in the document, PP: Poly Propylene, FRP: Fibre Reinforced Plastic)

#### **1.2. MATERIALS:**

- a) Steel (Material of construction of the superstructure): Galvanized steel (GI) sheet double skin pass, shall be prime grade 3mm, 2.5mm, 2mm, 1.5mm rolled leveled, and shall be treated at the mill to be free of scale, ragged edges, deep scratches or other deleterious effects. All raw steel have to be procured from reputed manufacturers. Complete metallic parts must be processed with 8-tank pre-treatment.

- b) Galvanized steel sheet with epoxy powder coating of 70-80 microns thickness; material of the coating must be imported from reputed manufacturers like 'Akzonbel/PolyBond/Kansai/Nerolac/Jotun or equivalent.
- Coating should be tested for quality and longevity, it must withstand for a minimum of 1000 hours under salt spray test.
  - Coating surface must get appropriate temperature to bond with the surface.
- c) CRCA sheets corrodes and hence not acceptable.

### 1.3. CONSTRUCTION:

#### FUME HOOD:

Overall Dimensions with base cabinet: 1200 mm W X 900 mm D X 2400 mm H

Fume Hood dimensions: 1200 mm W X 900 mm D X 1550 mm H (approx.)

Base Cabinet dimensions: 1120 mm W X 600 mm D X 650 mm H (approx.) with Castors – 1no.

Inside Fume Hood working volume: 925 mm W X 650 mm D X 1200 mm H (approx.)

Bed size: 925 mm W X 650 mm D

Sr. No.	Specification	Description
1	Usage	Regular Usage
2	Design Basis	<b>American Design Standard: ASHRAE110- 2016</b> All tests including “Tracer gas containment test” passed. <b>European Design Standard: EN-14175- 2003</b> ‘Inner Plane Containment test’ passed.
3	Design Structure	Aerodynamic, Floor mounted
4	Airflow Type	Low Constant Volume ( <i>for A.C. environment</i> )
5	Powder coating	Epoxy powder coating, 70-80 microns thickness
6	Material of Construction of superstructure	Galvanized Iron (GI) as per IS 277: 2003 standard of · 1.0 mm thickness for all sheet metal panelling · 1.2 mm for back pillars · 1.2 mm for front corner post
7	Front Top Panel	Easily openable hinged Top Panel for easy access to Flow Control Valve and Electrical Lighting fixtures for maintenance.
8	Corner Post	Triangular profiled corner post is placed on LHS and RHS of the Fume hood and it houses the utility line fittings and electrical

		receptacles.
<b>9</b>	Inside liner	Chemical & heat resistant, fire retardant, smooth finish, easily cleanable panels made out of: <ul style="list-style-type: none"> <li>- <b> durable PRL integral work walls</b> (6 mm thick) for Fume Hoods 1 &amp; 2 with ASTM flame spread index &lt; 25</li> <li>- <b> SS304</b> (1.2 mm thick) for Fume Hood 3</li> </ul>
<b>10</b>	Active Kinetics exhaust system	Interstitial 7-point active kinetics exhaust system (for light, normal & heavy fumes) with baffle to ensure rapid exhaust of fumes.
<b>11</b>	Airfoil	Aerodynamic Design, Horizontal fixed airfoil mounted on the worktop made of SS 304 (1.2mm) <b>Teflon Coated.</b>
<b>12</b>	Worktop	Chemical resistant splash & spillage proof dished ' <b>Jet Black Granite</b> ' worktop (18 +1 mm thick). Skirting of 15 mm from all sides for no chemical spillage.
<b>13</b>	Sink, Water tap with drain arrangement	Worktop will have sink sealed with silicon sealant for drainage with water tap on left back side of worktop. Sink will have a trap for waste collection. <ul style="list-style-type: none"> <li>· Oval shaped 100 mm X 200 mm sink</li> </ul>
<b>14</b>	Sash (Shutter)	Vertical rising sash counter-balanced with pulley and counter-weight system. Toughened Float Glass sash (4 mm thick). Smooth and light sash operation. Clear openable height = 750 mm. Impact Resistance of the sash (Toughened Glass) is four times higher than other sash materials (like Safety Glass and Polycarbonate). Breaking Stress value for fully toughened glass (Tempered Glass) = 24,000 psi.
<b>15</b>	Wet & Dry Service valves	Remotely operated Colour coded <b>Brass Needle Valves</b> for fine control over utilities (as per DIN 12920 norms) <b>total 2 nos.</b> service valves with PU plumbing with 6 mm internal dia, withstands up to 5kgf pressure <b>(All on LHS)</b> <ul style="list-style-type: none"> <li>- 1 for Raw water (PU)</li> <li>- 1 for Nitrogen(PU)</li> </ul>
<b>16</b>	Maintenance ports	<ul style="list-style-type: none"> <li>- Openable top panel for easy maintenance of tube light and flow control valve</li> <li>- Service panel for maintenance of utility valves and tubing.</li> </ul>

17	Internal nozzles	Brass powder coated fittings are staggered in the fume hood to avoid the intermingling of the flexible tubes. Also the taps are tapered in shape to use with flexible tubing of sizes from ¼” to ½” in dia, to provide greater flexibility to the user.  Note: - Our Scope of supply for utility lines ends at 1/4th BSP male adopter.
18	Lighting	Fluorescent light (20 watt, 2 Nos.) with vapour-proof fitting for proper illumination. Intensity approx 400 lux at worktop level.
19	Electrical Utilities	<b>4 nos.</b> electrical sockets ‘North-West’ make or equivalent (230 V, 6/16 A, 50 Hz), <b>4 nos.</b> ‘North-West’ make or equivalent MCBs with blower NO/NC switch with Built-in starter & light switch on front fascia. Cables & wires ‘Fire Retardant Low Smoke’ grade. <b>(All on 2RHS + 2LHS)</b>
20	Built-in Starter	The electrical wiring will have built-in starter of ‘Telemechanique’ make or equivalent; suitable to blower motor capacity.
21	Cable entering port	For easy access of cables from fume hood to electrical sockets.
22	<i>Chemical Storage Base Cabinet (Ventilated &amp; on castors)</i>	Base cabinet will be ready to receive the fume hood at its top. It will have following features:  1) Completely made from 1mm thick GI sheet with highly corrosion resistant epoxy powder coating, 60-80 microns thickness.  2) Cabinet integral work walls will be Special chemical & heat resistant, smooth finish, easily cleanable panels made out of durable PRL sheets.  3) Two exhaust ports connected to the fume hood exhaust system internally.  4) One removable horizontal partition to store chemicals.  5) PP Trays for chemical storage.  6) Cabinets on castors.  7) Roller catch of ‘HAFELE’ (Germany) make or equivalent for the Base Cabinet doors.  8) Polyamide Hinges from outside of Base Cabinet.  Overall Dimensions: 1120mm (W) X 600mm (D) X 655mm (H) with Castors – 1no.
23	Apparatus Holding Grid ( <i>Lattice</i> )	A grid made up of <b>Duralumin Powder coated rod</b> (Dia. 12.7 mm) to hold the apparatus. It will cover the entire length of the



	<i>Assembly)</i>	fume hood and will be built-in at fume hood backside. Installed at the distance of 150 mm from backside of fume hood.
<b>24</b>	Air Flow Monitor AFA 1000/1 TEL.UK	This device is an accessory for Fume hood to indicate the approximate face velocity of airflow with primary purpose of warning when a low flow condition occurs. Red & green LEDs correspond to low & normal flow rates. When flow decreases from Normal to Low, an audible alarm will also actuate requiring manual acknowledgement for silence. <ul style="list-style-type: none"> <li>· Digital display of face velocity in m/sec or fpm</li> <li>· On screen display for Safe and Alarm conditions with</li> <li>· Audible alarm and LED indication.</li> <li>· Push button calibration and configuration</li> <li>· Plug-in connections for power supply and airflow sensor</li> <li>· 3 programmable output relays</li> <li>· 3 configurable inputs</li> <li>· Com port for local or PC network connection</li> </ul>
<b>25</b>	Level adjusting screws	Must be made of SS Bolts to adjust the fume hood level by + 10 mm.
<b>26</b>	Exhaust Port	Exhaust port design must ensure that the fumes will be exhausted smoothly without any turbulence at the exhaust port. Also it must ensure low noise level.
<b>27</b>	Flow control valve	To regulate airflow.
<b>28</b>	Noise Level	< 70db at 1 meter from fume hood.

At the time of installation, supplier should provide with the standard colour list to the users so that the colour combination for fume hood might be selected.

### **CHEMICAL STORAGE CABINET**

Floor Mounted Full Height Chemical Storage Cabinets (2 Glass Door, Phenolic Resin Laminate Liner, 4 Adjustable Shelves & 1 Fix, 15 PP trays.)

Size: 1000 mm L X 450 mm W X 1800 mm H

Made up of *Phenolic Resin based material*. It will have an exhaust of 150 mm dia at the top of it with flow control valve.

**Total 4 shelves.** This system will also be connected to a centrifugal exhaust blower for exhaust of chemical vapours formed in it.

Exhaust 100CFM per cabinet.

### **SPOT EXTRACTOR**

<b>Sr. No</b>	<b>Specification</b>	<b>Description</b>
1	Extractor Arm (Reach-1990mm)	Elephant trunk having 75 mm dia exhaust arm made up of 3 flexible joints to allow necessary adjustment. Arm having reach of 1230 mm. One end connected to ceiling column and other end to PP Hood.
2	Extractor Dome (Dia-385mm)	Semi spherical dome (PP Hood) dia of 385 mm with necessary arrangement to attach it to extractor arm.
3	Ceiling column for holding trunk arms (1000mm long)	GI powder coated ceiling column with necessary provision to connect to exhaust duct at one end and extractor arm at another.

### **SCRUBBER, BLOWER AND DUCTING**

- **Scrubber with Centrifugal Blower: (For air suction for cluster of 3 nos. of Fume Hood, chemical storage cabinet & 2 nos. of spot extractor)**

High efficiency Scrubber with remote blower is required to separate the hazardous and toxic vapour from the exhaust. It must comply with the safe and acceptable pollutions norms.

<b>Sr. No.</b>	<b>Specification</b>	<b>Description</b>
1	Material of Construction	Ducting & Chimney: Can be PP + FRP Scrubber & Blower: In PP+FRP Recirculating piping and pump, tank: in PP Packing Material: PP Demister Pad: PP Water Distribution System: PP Flange nozzles as per BS table 10-D
2	Air Suction Capacity of the Blower	2000 CFM confirming to international face velocity norms and as per safe fume hood airflow pattern.
3	Motor (Non- FLP)	Blower: 7.5 HP Motor (3 Phase), direct drive, continuous rating. As per IS 325. Pump: 3 HP Motor (3 Phase)
4	Shell Dimensions	3 mm PP + 5 mm FRP

- **Ducting**

Chemical resistant PP + FRP (3mm + 2mm) rigid & flexible ductwork from Fume hood to exhaust stack point with weatherproof canopy. Total ducting with horizontal, vertical members, flanges, bends, bracketed supports and gooseneck exhaust stack.

#### **1.4. QUALITY ASSURANCE**

- a. The fume hood should be manufactured strictly in accordance with ASHRAE110-2016 as well as European Design Standard: EN-14175- 2003 and the fume hood should be duly third party tested in accordance to the same by an Authorized International Test Lab. The maximum noise criteria level for a fume hood is NC-40 measured 1.2m (4') above the floor, 1.2m (4') from the sash with sash fully opened. Hoods should be specified as low static pressure and low sound level. These should be measured and provided with each fume hood.
- b. The supplier should have his own facility for conducting tests as specified above as well as other applicable tests and should demonstrate the same to BARC Engineers as per standard norms.
- c. The following test needs to be performed on powder coated sample of GI sheets of 150mmx75mmx1.5mm thick sheets and submitted along with the material at time of dispatch.
  1. DFT Test and its results.
  2. Scratch Test
  3. Methyl ethyl ketone Test (MEK Test)
  4. Impact Test

#### **1.5. INSTALLATION:**

##### Preparation:

- Prior to beginning installation, check and verify that no irregularities exist that would affect quality of work specified.
- Adjust and Clean.
- Repair or remove and replace defective work, upon completion of installation.
- Adjust door, drawers and other moving or opening parts to function smoothly.
- Clean shop finished casework; touch up as required.
- Clean work surface and leave them free of all grease and streaks.

Electricals: All electrical wiring in furniture systems, fume hoods, etc. in the main points of both the laboratories in vender's scope.

## **PART-B**

### **GENERAL TERMS & CONDITIONS**

1. Documents: The vendor should submit the following documents along with the offer:

- a. Complete Technical specifications of the offered model, model no. etc.
  - b. Technical literature / brochure of the equipments
  - c. Lists of clients to whom the similar instrument/item(s) was supplied in recent past along with the purchase order number, purchase value, name, telephone no. and e-mail ID of the concerned person.
2. Required regulators, electrical cables and connectors should be supplied.
  3. Operation manual: The vendor shall provide three sets of complete operation manuals of the instrument along with the instrument.