

Tender No.: IISER/PUR/2009/SD/BS/TSM/SC/SP/20-21

तारीख/ Date: 24.03.2021

Index for Invitation for Tender (IFT) (E-Procurement mode only)

The Institute invites Two Cover Tenders for the following items through the eProcurement System of National Informatics Centre, which enables the Tenderers to download the Tender Schedule free of cost and then submit the bids online through Central Public Procurement Portal of Government of India (<https://eprocure.gov.in/eprocure/app>.)

क्रम सं. / Sl. No	विवरण/ Description	Page No
1	Supply Installation and commissioning of 8 fume hoods, ducting system and two flammable storage cabinet in Lab 4203 and Lab 3211 in the chemical science block at IISER campus Vithura (refer Annexure 1 Technical Specifications)	20
2	Supply Installation and commissioning of one fume hoods, ducting system and one flammable storage cabinet in LAB 2111 in Physical Science block at IISER TVM campus, Vithura (refer Annexure 2 Technical Specifications)	30

Annexures enclosed: Bidders should follow the annexures before submission of bids.

1	Annexure 1	Instructions To Bidder for Online Bid Submission
2	Annexure 2	General Terms and conditions of Contract
3	Annexure 3	Tender Acceptance Letter
4	Annexure 4	Model Format for EMD
5	Annexure 5	Model Format for PBG
6	Annexure 6	Special conditions of tender
7	Annexure 7	EMD Declaration
8	Annexure 8	Check list
9	Annexure 1 Technical Specifications	Details of SI No.1 above
10	Annexure 2 Technical Specifications	Details of SI No.2 above

1) All the correspondence in this regard should be done in favor of Deputy Registrar (Purchase & Stores), IISER Thiruvananthapuram referring the tender reference number.

2) EMD and Tender Fee: Bid Security Declaration as per annexure 7 is to be submitted If not, the bid will be summarily rejected.

3) Online Bid Submission: The documents to be uploaded in the e-procurement module, should be in two envelopes / covers

4) Failure to upload the documents as per checklist will lead to rejection of bids.

5) The Class I local supplier and Class II local supplier should mention in the bid, the percentage of local content.

Bidder should provide the details of the location(s) at which the value addition is made along with bid document.

Any non-compliance in this regard, the bid will not be considered in the category

1st Envelope / Cover (Technical Bid)		
Sl No	Contents	Format
1	Compliance sheet as per specifications	PDF
2	Detailed brochures, data sheets, catalogues etc. supporting the compliance of specifications	PDF
3	Clientele list and details of TWO major installations in India	PDF
4	Any other document as mentioned in the specifications or essential as per bidder	PDF
5	All commercial terms and conditions of the bid (except price)	PDF
6	Tender Acceptance Letter, checklist and EMD Declaration	PDF
2nd Envelope / Cover (Price Bid)		
1	Price bid: item-wise prices for the items mentioned in the Technical Bid (clearly mentioning the break Tax/ Duty / other charges etc.)	Excel (.xls)



[Signature]
24/03/21
Deputy Registrar (P&S)

SUDIN. B. BABU
Deputy Registrar
[Purchase & Stores]

Indian Institute of Science Education and Research Thiruvananthapuram
Maruthamala P.O., Vithura
Thiruvananthapuram - 695 551

Invitation for Tender (E-Procurement mode only)

1	Work / Item Description	1. Providing and Fixing 8 fume hoods, ducting system and two flammable storage cabinet in Lab 4203 and Lab 3211 in the chemical science block at IISER campus Vithura (refer Annexure 1 Technical Specifications) 2. Providing and fixing 1 fume hoods, ducting system and one flammable storage cabinet in LAB 2111 in Physical Science block at IISER TVM campus, Vithura (refer Annexure 2 Technical Specifications)
2	Quantity Required	As per the Annexure 1 & 2
3	Tender Type	Open
4	Tender Reference No	IISER/PUR/2009/SD/BS/TSM/SC/SP/20-21
5	Number of covers (1/2/3/4)	2 (Technical and Financial)
6	Date of Issue/Publishing	24.03.2021
7	Document Download/Sale Start Date	24.03.2021
8	Document Download/Sale End Date	14.04.2021 [03.00 P.M]
9	Clarification End Date	31.03.2021 (03.00) P.M
10	Last Date and Time for Uploading of Bids	14.04.2021 [03.00 p.m]
11	Date and Time of Opening of Technical Bids	15.04.2021 [03.30 p.m]
12	Date of Opening of Price Bid	will be intimated later
13	Tender Fee (INR)	Duly filled Annexure 7 to be mandatorily enclosed
14	EMD Amount (INR)	
15	Detailed Specifications	As stated Below

NOTE:

- Please note being an Institute under MHRD, Govt of India, the Institute will not entertain any type of advance payment for the equipment, AMC or any other services.

Detailed Specifications:

Please refer annexure 1 & 2 (technical specifications)



[Handwritten Signature]
24/03/21

SUDIN. B. BABU
Deputy Registrar
(Purchase & Stores)
Indian Institute of Science Education and Research Thiruvananthapuram
Manuthomalai P.O., Vithura
Thiruvananthapuram - 695 551

- 1) ANNEXUE: 1
- 2) Instructions for Online Bid Submission
- 3)
- 4) The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.
- 5) More information useful for submitting online bids on the CPP Portal may be obtained at: <https://eprocure.gov.in/eprocure/app>.
- 6)
- 7) **REGISTRATION**
- 8) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL: <https://eprocure.gov.in/eprocure/app>) by clicking on the link "Online bidder Enrollment" on the CPP Portal which is free of charge.
- 9) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- 10) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- 11) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.), with their profile.
- 12) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
- 13) Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / e-Token.

SEARCHING FOR TENDER DOCUMENTS

- 1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.
- 2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / email in case there is any corrigendum issued to the tender document.
- 3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

- 1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.
- 2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
- 3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.
- 4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" or "Other Important Documents" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.
Note: My Documents space is only a repository given to the Bidders to ease the uploading process. If Bidder has uploaded his Documents in My Documents space, this does not automatically ensure these Documents being part of Technical Bid.

SUBMISSION OF BIDS

- 1) Bidder should log into the site well in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
- 2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
- 3) Bidder has to select the payment option as "offline" to pay the tender fee / EMD as applicable and enter details of the instrument.
- 4) Bidder should prepare the EMD as per the instructions specified in the tender document. The original should be posted/couriered/given in person to the concerned official, latest by the last date of bid submission or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.
- 5) Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and complete the white coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No



- other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.
- 6) The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
 - 7) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid opener's public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
 - 8) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
 - 9) Upon the successful and timely submission of bids (i.e. after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
 - 10) The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

ASSISTANCE TO BIDDERS

- 1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
- 2) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk.

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The document 'Instructions To Bidder for Online Bid Submission' is downloadable from :
<https://eprocure.gov.in/eprocure/app?page=StandardBiddingDocuments&service=page>



Annexure: 2

GENERAL TERMS & CONDITIONS OF THE CONTRACT

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2.1 DEFINITIONS

- 2.1.1 The following words and expressions shall have the meanings hereby assigned to them:
- a) "Contract" means the Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein.
 - b) "Contract Documents" means the documents listed in the Contract Agreement, including any amendments thereto.
 - c) "Contract Price" means the price payable to the Supplier as specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract.
 - d) "Day" means calendar day.
 - e) "Completion" means the fulfilment of the Related Services by the Supplier in accordance with the terms and conditions set forth in the Contract.
 - f) "GCC" means the General Conditions of Contract.
 - g) "Goods" means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.
 - h) "Related Services" means the services incidental to the supply of the goods, such as transportation, insurance, installation, training and initial maintenance and other such obligations of the Supplier under the Contract.
 - i) "SCC" means the Special Conditions of Contract.
 - j) "Subcontractor" means any natural person, private or government entity, or a combination of the above, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.
 - k) "Supplier" means the natural person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement.
 - l) Indian Institute of Science Education and Research, Thiruvananthapuram (IISER-TVM) means a society registered under the Travancore Cochin Literary Scientific and Charitable Societies' Registration Act, 1995 (12 of 1955) on 20.02.2008 at Kerala at no. T-342/08.
 - m) "The final destination," where applicable, means the place named in the SCC.

2.2 CONTRACT DOCUMENTS

- 2.2.1 Subject to the order of precedence set forth in the Contract Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory. The Contract Agreement shall be read as a whole.

2.3 FRAUD AND CORRUPTION

- 2.3.1 The purchaser requires that bidders, suppliers, contractors and consultants, if any, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuit of this policy,

- a) The terms set forth below are defined as follows:
 - i) "Corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement process or in contract execution.
 - ii) "Fraudulent practice" means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;



- (iii) "Collusive practice" means a scheme or arrangement between two or more bidders, with or without the knowledge of the Borrower, designed to establish bid prices at artificial, noncompetitive levels; and
- (iv) "Coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract;
- b) the purchaser will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the Contract in question;
- 2.4 JOINT VENTURE, CONSORTIUM OR ASSOCIATION**
- 2.4.1 If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfilment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.
- 2.5 SCOPE OF SUPPLY**
- 2.5.1 The Goods and Related Services to be supplied shall be as specified in the Schedule of Requirements.
- 2.6 SUPPLIERS' RESPONSIBILITIES**
- 2.6.1 The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with Scope of Supply Clause of the GCC, and the Delivery and Completion Schedule, as per GCC Clause relating to delivery and document.
- 2.7 CONTRACT PRICE**
- 2.7.1 Prices charged by the Supplier for the Goods supplied and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid.
- 2.8 COPYRIGHT**
- 2.8.1 The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.
- 2.9 APPLICATION**
- 2.9.1 These General Conditions shall apply to the extent that they are not superseded by provisions in other parts of the Contract.
- 2.10 STANDARDS**
- 2.10.1 The Goods supplied and services rendered under this Contract shall conform to the standards mentioned in the Technical Specifications and Schedule of Requirements, and, when no applicable standard is mentioned, to the authoritative standard appropriate to the Goods' country of origin and such standards shall be the latest issued by the concerned institution.
- 2.11 USE OF CONTRACT DOCUMENTS AND INFORMATION**
- 2.11.1 The Supplier shall not, without the Purchaser's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample or information, furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Supplier in performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far, as may be necessary for purposes of such performance.
- 2.11.2 The Supplier shall not, without the Purchaser's prior written consent, make use of any document or information enumerated above except for purposes of performing the Contract.
- 2.11.3 Any document, other than the Contract itself, enumerated above shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser on completion of the Supplier's performance under the Contract if so required by the Purchaser.
- 2.12 PATENT INDEMNITY**
- 2.12.1 The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 12.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:
- (a) the installation of the Goods by the Supplier or the use of the Goods in India; and
- (b) the sale in any country of the products produced by the Goods.
- 2.12.2 If any proceedings are brought or any claim is made against the Purchaser, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claims.
- 2.13 PERFORMANCE SECURITY**
- 2.13.1 Within 21 days of receipt of the notification of award/PO, the Supplier shall furnish performance security in the amount specified in SCC, valid till 60 days after the warranty period. Alternatively, the PS may also be submitted at the time of release of final payment in cases where part payment is made against delivery & part on installation. The PS, where applicable, shall be submitted in advance for orders where full payment is to be made on Letter of Credit (LC) or on delivery. In this case, submission of PS at the time of negotiation of documents through Bank would be stipulated as a condition in the LC and the PS should be kept valid till such time the PS is submitted.
- 2.13.2 The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
- 2.13.3 The Performance Security shall be denominated in Indian Rupees for the offers received for supplies within India and denominated in the currency of the contract in the case of offers received for supply from foreign countries.
- 2.13.4 In the case of imports, the PS may be submitted either by the principal or by the Indian agent and, in the case of purchases from indigenous sources, the PS may be submitted by either the manufacturer or their authorized dealer/bidder.
- 2.13.5 The Performance security shall be in one of the following forms:
- (a) A Bank guarantee or stand-by Letter of Credit issued by a Nationalized/Scheduled bank located in India or a bank located abroad in the form provided in the bidding documents. Or,
- (b) A Banker's cheque or Account Payee demand draft in favour of the purchaser. Or,
- (c) A Fixed Deposit Receipt pledged in favour of the Purchaser.

- 2.13.6 The performance security will be discharged by the Purchaser and returned to the Supplier not later than 60 days following the date of completion of the Supplier's performance obligations, including any warranty obligations, unless specified otherwise in SCC, without levy of any interest.
- 2.13.7 In the event of any contract amendment, the supplier shall, within 21 days of receipt of such amendment, furnish the amendment to the performance security, rendering the same valid for the duration of the contract, as amended for further period of 60 days thereafter.
- 2.13.8 The order confirmation should be received within 15 days from the date of notification of award. However, the Purchaser has the powers to extend the time frame for submission of order confirmation and submission of Performance Security (PS). Even after extension of time, if the order confirmation /PS are not received, the contract shall be cancelled and limited tenders irrespective of the value would be invited from the responding firms after forfeiting the bid security of the defaulting firm, where applicable provided there is no change in specifications. In such cases the defaulting firm would not be considered again for re-tendering in the particular case.
- 2.14. INSPECTIONS AND TESTS**
- 2.14.1 The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in the SCC or as discussed and agreed to during the course of finalisation of contract.
- 2.14.2 The Purchaser or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract specifications at no extra cost to the Purchaser. The Technical Specifications and SCC shall specify what inspections and tests the Purchaser requires and where they are to be conducted. The Purchaser shall notify the Supplier in writing in a timely manner of the identity of any representatives retained for these purposes.
- 2.14.3 The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at the point of delivery and/or at the Goods final destination. If conducted on the premises of the Supplier or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data - shall be furnished to the inspectors at no charge to the Purchaser.
- 2.14.4 Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.
- 2.14.5 Should any inspected or tested Goods fail to conform to the specifications, the Purchaser may reject the goods and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Purchaser.
- 2.14.6 The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at final destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment.
- 2.14.7 The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.
- 2.14.8 With a view to ensure that claims on insurance companies, if any, are lodged in time, the bidders and /or the Indian agent shall be responsible for follow up with their principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the bidder/Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the purchaser on the event of the delay.
- 2.15. PACKING**
- 2.15.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.
- 2.15.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be provided for in the Contract including additional requirements, if any, specified in SCC and in any subsequent instructions ordered by the Purchaser.
- 2.16. DELIVERY AND DOCUMENTS**
- 2.16.1 Delivery of the Goods and completion and related services shall be made by the Supplier in accordance with the terms specified by the Purchaser in the contract. The details of shipping and/or other documents to be furnished by the supplier are specified in SCC.
- 2.16.2 The terms FOB, FCA, CIP, CIP etc shall be governed by the rules prescribed in the current edition of the Incoterms published by the International Chambers of Commerce, Paris.
- 2.16.3 The mode of transportation shall be as specified in SCC.
- 2.17. INSURANCE**
- 2.17.1 Should the purchaser elect to buy on CIF/CIP basis, the Goods supplied under the Contract shall be fully insured in Indian Rupees against any loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in SCC.
- 2.17.2 Where delivery of the goods is required by the purchaser on CIF or CIP basis the supplier shall arrange and pay for Cargo Insurance, naming the purchaser as beneficiary and initiate & pursue claims till settlement, on the event of any loss or damage.
- 2.17.3 Where delivery is on FOB or FCA basis, insurance would be the responsibility of the purchaser.
- 2.17.4 With a view to ensure that claims on insurance companies, if any, are lodged in time, the bidders and /or the Indian agent shall be responsible for follow up with their principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the bidder/Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the purchaser on the event of the delay.
- 2.18. TRANSPORTATION**
- 2.18.1 Where the Supplier is required under the Contract to deliver the Goods FOB, transport of the Goods, up to and including the point of putting the Goods on board the vessel at the specified port of loading, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract price. Where the Supplier is required under the Contract to deliver the Goods FCA, transport of the Goods and delivery into the custody of the carrier at the place named by the Purchaser or other agreed point shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract price.
- 2.18.2 Where the Supplier is required under the Contract to deliver the Goods CIP or CIP, transport of the Goods to the port of destination or such other named place of destination in the Purchaser's country, as shall be specified in the Contract, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.
- 2.18.3 In the case of supplies from within India, where the Supplier is required under the Contract to transport the Goods to a specified destination in India, defined as the Final Destination, transport to such destination, including insurance and storage, as specified in the Contract, shall be arranged by the Supplier, and the related costs shall be included in the Contract Price.
- 2.19. INCIDENTAL SERVICES**
- 2.19.1 The supplier may be required to provide any or all of the services, if any, specified in SCC.
- 2.20. SPARE PARTS**
- 2.20.1 The Supplier shall be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:
- (a) Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and
 - (b) In the event of termination of production of the spare parts:
 - (i) Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and
 - (ii) Following such termination, furnishing at no cost to the Purchaser the blueprints, drawings and specifications of the spare parts, if requested.
- 2.21. WARRANTY**
- 2.21.1 The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.
- 2.21.2 The Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in India.



- 2.21.3 Unless otherwise specified in the SCC, the warranty shall remain valid for twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the SCC, or for eighteen (18) months after the date of shipment from the port or place of loading in the country of origin, whichever period concludes earlier.
- 2.21.4 The Purchaser shall give notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof.
- 2.21.5 The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.
- 2.21.6 Upon receipt of such notice, the Supplier shall, within a reasonable period of time, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.
- 2.21.7 If having been notified, the Supplier fails to remedy the defect within the reasonable period of time; the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.
- 2.21.8 Goods requiring warranty replacements must be replaced on free of cost basis to the purchaser.
- 2.22 TERMS OF PAYMENT**
- 2.22.1 The method and conditions of payment to be made to the Supplier under this Contract shall be as specified in the SCC.
- 2.22.2 The Supplier's request(s) for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and the Services performed, and by documents, submitted pursuant to Delivery and document Clause of the GCC and upon fulfillment of other obligations stipulated in the contract.
- 2.22.3 Payments shall be made promptly by the Purchaser but in no case later than thirty (30) days after submission of the invoice or claim by the Supplier.
- 2.22.4 Payment shall be made in currency as indicated in the contract.
- 2.23 CHANGE ORDERS AND CONTRACT AMENDMENTS.**
- 2.23.1 The Purchaser may at any time, by written order given to the Supplier pursuant to Clause on Notices of the GCC make changes within the general scope of the Contract in any one or more of the following:
- Drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;
 - The method of shipping or packing;
 - The place of delivery; and/or
 - The Services to be provided by the Supplier.
 - The delivery schedule.
- 2.23.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this clause must be asserted within fifteen (15) days from the date of the Supplier's receipt of the Purchaser's change order.
- 2.23.3 No variation or modification in the terms of the contract shall be made except by written amendment signed by the parties.
- 2.24 ASSIGNMENT**
- 2.24.1 The Supplier shall not assign, in whole or in part, its obligations to perform under the Contract, except with the Purchaser's prior written consent.
- 2.25 SUBCONTRACTS**
- 2.25.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under this Contract if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the Supplier from any liability or duties or obligation under the Contract.
- 2.26 EXTENSION OF TIME.**
- 2.26.1 Delivery of the Goods and performance of the Services shall be made by the Supplier in accordance with the time schedule specified by the Purchaser.
- 2.26.2 If at any time during performance of the Contract, the Supplier or its sub-contractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may, at its discretion, extend the Supplier's time for performance with or without penalty, in which case the extension shall be ratified by the parties by amendment of the Contract.
- 2.26.3 Except as provided under the Force Majeure clause of the GCC, a delay by the Supplier in performance of its delivery obligations shall render the Supplier liable to the imposition of penalty pursuant to Penalty Clause of the GCC unless an extension of time is agreed upon pursuant to above clause without the application of penalty clause.
- 2.27 PENALTY CLAUSE**
- 2.27.1 Subject to GCC Clause on Force Majeure, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as penalty, a sum equivalent to the percentage specified in SCC of the delivered price of the delayed Goods or unperformed Services or contract value for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the Percentage specified in SCC. Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC Clause on Termination for Default. The SCC shall also indicate the basis for ascertaining the value on which the penalty shall be applicable.
- 2.28 TERMINATION FOR DEFAULT**
- 2.28.1 The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part
- If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause on Extension of Time; or
 - If the Supplier fails to perform any other obligation(s) under the Contract.
 - If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent or collusive or coercive practices as defined in GCC Clause on Fraud or Corruption in competing for or in executing the Contract.
- 2.28.2 In the event the purchaser terminates the contract in whole or in part, he may take recourse to any one or more of the following action:
- The Performance Security is to be forfeited;
 - The purchaser may procure, upon such terms and in such manner as it deems appropriate, stores similar to those undelivered, and the supplier shall be liable for all available actions against it in terms of the contract.
 - However, the supplier shall continue to perform the contract to the extent not terminated.
- 2.29 FORCE MAJEURE**
- 2.29.1 Notwithstanding the provisions of GCC Clauses relating to extension of time, penalty and Termination for Default the Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 2.29.2 For purposes of this Clause, "Force Majeure" means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.
- 2.29.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof within 21 days of its occurrence. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
- 2.29.4 If the performance in whole or in part or any obligations under the contract is prevented or delayed by any reason of force majeure for a period exceeding 60 days, either party may at its option terminate the contract without any financial repercussions on either side.
- 2.30 TERMINATION FOR INSOLVENCY**
- 2.30.1 The Purchaser may at any time terminate the Contract by giving written notice to the Supplier, if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the Purchaser.
- 2.31 TERMINATION FOR CONVENIENCE**
- 2.31.1 The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.
- 2.31.2 The Goods those are complete and ready for shipment within 30 days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:
- To have any portion completed and delivered at the Contract terms and prices; and/or
 - To cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and for materials and parts previously procured by the Supplier.
- 2.32 SETTLEMENT OF DISPUTES**
- 2.32.1 The Purchaser and the supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- 2.32.2 If, after twenty-one (21) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention

- to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.
- 2.32.3 The dispute settlement mechanism/arbitration proceedings shall be concluded as under:
- (a) In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Chairman, Board of Governors of ISER TVM and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
 - (b) In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.
- 2.32.4 The venue of the arbitration shall be the place from where the purchase order or contract is issued.
- 2.32.5 Notwithstanding any reference to arbitration herein,
- (a) the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
 - (b) the Purchaser shall pay the Supplier any monies due the Supplier.
- 2.33 GOVERNING LANGUAGE**
- 2.33.1 The contract shall be written in English language which shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the English language only.
- 2.34 APPLICABLE LAW**
- 2.34.1 The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction as specified in SCC.
- 2.35 NOTICES**
- 2.35.1 Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by cable, telex, FAX, e-mail or and confirmed in writing to the other party's address specified in the SCC.
- 2.35.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.
- 2.36 TAXES AND DUTIES**
- 2.36.1 For goods manufactured outside India, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside India.
- 2.36.2 For goods Manufactured within India, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred till its final manufacture/ production.
- 2.36.3 If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in India, the Purchaser shall make its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.
- 2.37 RIGHT TO USE DEFECTIVE GOODS**
- 2.37.1 If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser's operation.
- 2.38 PROTECTION AGAINST DAMAGE**
- 2.38.1 The system shall not be prone to damage during power failures and trip outs.
The normal voltage and frequency conditions available at site as under:
- (a) Voltage 230 volts - Single phase/ 415 V 3 phase (+/- 10%)
 - (b) Frequency 50 Hz.
- 2.39. SITE PREPARATION AND INSTALLATION**
- The Purchaser is solely responsible for the construction of the equipment sites in compliance with the technical and environmental specifications defined by the Supplier. The Purchaser will designate the installation sites before the scheduled installation date to allow the Supplier to perform a site inspection to verify the appropriateness of the sites before the installation of the Equipment, if required. The supplier shall inform the purchaser about the site preparation, if any, needed for installation, of the goods at the purchasers' site immediately after notification of award/contract.



24/03/24
DEPUTY REGISTRAR
[PURCHASE & STORES]
ISERTVM

SUDIN. B. BABU
Deputy Registrar
[Purchase & Stores]
Indian Institute of Science Education and Research Thiruvananthapuram
Maruthamala P.O., Vithura
Thiruvananthapuram - 695 551

ANNEXURE: 3

TENDER ACCEPTANCE LETTER (To be given on Company Letter Head)

To, Date:
**The Director, Indian Institute of Science Education and Research – Thiruvananthapuram,
Maruthamala P.O, Vithura, Thiruvananthapuram, Kerala -695551, India.**

Sub: Acceptance of Terms & Conditions of Tender.

Tender Reference No: _____

Name of Tender / Work: - _____

Dear Sir,

1. I / We have downloaded / obtained the tender document(s) for the above mentioned 'Tender/Work' from the web site(s) namely: _____ as per your advertisement, given in the above mentioned website(s).
2. I / We hereby certify that I / we have read the entire terms and conditions of the tender documents from Page No. _____ to _____ (including all documents like annexure(s), schedule(s), etc .), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.
3. The corrigendum(s) issued from time to time by your department/ organization too have also been taken into consideration, while submitting this acceptance letter.
4. I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety.
5. I / We do hereby declare that our Firm has not been blacklisted/ debarred by any Govt. Department/Public sector undertaking.
6. I / We certify that all information furnished by the our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/ organization shall without giving any notice or reason therefore or summarily reject the bid or terminate the contract, without giving any notice or reason therefore or summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.
7. I / We declare the following information provided are correct to the best of my knowledge:

1	Name and Address of the bidder	
2	Manufacturer / Dealer / Agent	
3	Contact Person	
4	Phone	
5	Email	
6	Mobile Number	
7	GST No	
8	PAN No	
9	UTR No / DU No (in case of online transfer of Tender Fee) (if any)	
10	UTR No / DU No (in case of online transfer of EMD)	
12	Warranty, if any	
13	Delivery period	
14	Payment terms	
15	PO to be placed in favour of	

Yours Faithfully,
(Signature of the Bidder, with Official Seal)

MODEL BANK GUARANTEE FORMAT FOR FURNISHING BID SECURITY (BS)

Whereas (hereinafter called the "tenderer")
has submitted their offer dated for the supply of
..... (hereinafter called the
"tender") against the Purchaser's tender enquiry No.....
..... KNOW ALL MEN by these presents that WE.....
..... of having our registered office at.....
..... are bound unto (hereinafter called the "Purchaser") in
the sum of for which
payment will and truly to be made to the said Purchaser, the Bank binds itself, its
successors and assigns by these presents. Sealed with the Common Seal of the
said Bank this day of 20.....

THE CONDITIONS OF THIS OBLIGATION ARE:

- 1) If the tenderer withdraws or amends, impairs or derogates from the tender in any respect within the period of validity of this tender.
- 2) If the tenderer having been notified of the acceptance of his tender by the Purchaser during the period of its validity:-
 - a) If the tenderer fails to furnish the performance security for the due performance of the contract.
 - b) Fails or refuses to accept/execute the contract.

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the purchaser (IISER-TVM) having to substantiate its demand, provided that in its demand the purchaser will note that the amount claimed by it is due to it owing the occurrence of one or both the two conditions, specifying the occurred condition or conditions. This guarantee will remain in force up to and including 45 days after the period of tender validity and any demand in respect thereof should reach the bank not later than the above date.

Signature of the authorized officer of the bank

Name and designation of the officer

Seal, name and address of the Bank and address of the Branch.



SPECIMEN

**PERFORMANCE SECURITY FORM
MODEL BANK GUARANTEE FORMAT FOR PERFORMANCE SECURITY**

To,

.....
WHEREAS

(name and address of the supplier) (hereinafter called "the supplier") has undertaken, in pursuance of contract no. dated to supply (.....description of goods and services) (herein after called "the contract").

AND WHEREAS it has been stipulated by you in the said contract that the supplier shall furnish you with a bank guarantee by a scheduled commercial bank recognized by you for the sum specified therein as security for compliance with its obligations in accordance with the contract;

AND WHEREAS we have agreed to give the supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of (amount of the guarantee in words and figures), and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the supplier before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the supplier shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until the day of, 20.....

(Signature of the authorized officer of the Bank)

.....
Name and designation of the officer

.....
Seal, name & address of the Bank and address of the Branch



Annexure VI: SPECIAL CONDITIONS OF CONTRACT

1.1. ELIGIBLE BIDDERS.

- 1.1.1 This Invitation for Bids is open to all suppliers.
- 1.1.2 Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the goods to be purchased under this Invitation of Bids.

1.2. COST OF BIDDING

- 1.2.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and "the Purchaser", will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

1.3. FRAUD AND CORRUPTION:

- 1.3.1 The purchaser requires that the bidders/suppliers and contractors observe the highest standard of ethics during the procurement and execution of such contracts.

- 1.3.2 The purchaser will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the Contract in question;

The Bidding Documents

1.4. COST OF BIDDING DOCUMENTS

- 1.4.1 Interested eligible bidders may download the document from our Website. However the bid document cost to be paid during the submission of the bid.

1.5. CONTENT OF BIDDING DOCUMENTS

- 1.5.1 The goods required, bidding procedures and contract terms are prescribed in the bidding documents which should be read in conjunction.

- 1.5.2 The Bidder is expected to examine all instructions, forms, terms, and specifications in the bidding documents. **Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the bidding documents in every respect will be at the Bidder's risk and may result in rejection of its bid.**

1.6. CLARIFICATION OF BIDDING DOCUMENTS

- 1.6.1 A prospective Bidder requiring any clarification of the Bidding Documents shall contact the Purchaser in writing via fax/email. The Purchaser will respond in writing to any request for clarification, provided that such request is received not later than ten (10) days prior to the deadline for submission of bids. The Purchaser shall forward copies of its response to all those who have acquired the Bidding Documents directly from it, including a description of the inquiry but without identifying its source. Should the Purchaser deem it necessary to amend the Bidding Documents as a result of a clarification, it shall do so following the procedure under clause relating to amendment of Bidding documents and Clause relating to Deadline for Submission of Bids. The clarifications and amendments issued would also be hosted on the website of the purchaser for the benefit of the other prospective bidders.

1.7. AMENDMENT OF BIDDING DOCUMENTS

- 1.7.1 At any time prior to the deadline for submission of bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by amendment.

- 1.7.2 All prospective bidders who have received the bidding documents will be notified of the amendment in writing or by e-mail and will be binding on them. The same would also be hosted on the website of the purchaser and all prospective bidders are expected to surf the website before submitting their bids to take cognizance of the amendments.

- 1.7.3 In order to allow prospective bidders reasonable time to take the amendment into account, while in preparing their bids, the Purchaser, at its discretion, may extend the deadline for the submission of bids and host the changes on the website of the purchaser.

- 1.7.4 In case of any amendment to the bid, it will be done at least 7 days before due date and will be published in website. Bidders are required to keep this in view before submission. Normally extension of due date will not be entertained. However in special cases if due date is extended, it will be notified under the same tender notice before 3 days of due date.

PREPARATION OF BIDS

1.8. LANGUAGE OF BID

- 1.8.1 The bid prepared by the Bidder, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser, shall be written in English language only especially when the details are technical.

However of GOI makes it mandatory under Rajbhasha Abhniyam in that case views of Rajbhasha unit of IISER-TVM may be sought.

- 1.8.2 The Supplier shall bear all costs of translation, if any, to the English language and all risks of the accuracy of such translation, for documents provided by the Supplier.

1.9. DOCUMENTS COMPRISING THE BID

- 1.9.1 The bid prepared by the Bidder shall include:

- a) Bidder Information
- b) Bid security as specified in the Invitation to Bids.
- c) Service support details



- d) Deviation Statement if any.
- e) Performance Statement.
- f) Manufacturer's Authorization.
- g) Documentary evidence establishing that the bidder is eligible to bid and is qualified to perform the contract if its bid is accepted.
- h) Bid form.
- i) Documents establishing goods eligibility and conformity to bidding documents.
- j) Applicable Price Schedule Form.
- k) DGS&D Registration certificate in case the items under procurement falls under the restricted category of the current export-import policy of the Govt. of India.

1.10. BID FORM AND PRICE SCHEDULE

1.10.1 The bidder shall complete the Bid with the appropriate price schedule.

1.11. BID PRICES

1.11.1 The Bidder shall indicate on the appropriate price schedule, the unit prices and total bid prices of the goods it proposes to supply under the contract.

1.11.2 Prices indicated on the price-schedule form shall be entered separately in the following manner:

(A) FOR GOODS MANUFACTURED WITHIN INDIA

(i) The price of the goods quoted Ex-works including taxes already paid.

(ii) VAT and other taxes like excise duty etc [shall be shown extra] which will be payable on the goods if the contract is awarded.

a. The charges for inland transportation, insurance and other local services required for delivering the goods at the desired destination as specified in the price schedule.

b. The installation, commissioning and training charges including any incidental services, if any.

(B) FOR GOODS MANUFACTURED ABROAD

Bidders are required to show break-up of Ex-works [which should include packing and handling charges], FOB/FCA and CIF/CIP price in the quotation. ISERTVM has a mechanism for consolidation and customs clearance. The consolidators will be nominated for this purpose at the time of awarding the contract if desires so.

(i) The price of the goods, quoted on FCA (named place of delivery abroad) or FOB (named port of shipment), as specified in the price schedule.

(ii) The charges for insurance and transportation of the goods to the port/place of destination.

(iii) The agency commission charges should be shown, if any.

(iv) The installation, commissioning and training charges including any incidental services, if any

1.11.3 The terms FOB, FCA, CIF, CIP etc shall be governed by the rules prescribed in the current edition of the Incoterms published by the International Chambers of Commerce, Paris.

1.11.4 Where there is no mention of packing, forwarding, freight, insurance charges, taxes etc. such offer shall be rejected as incomplete.

1.11.5 The price quoted shall remain fixed during the contract period and shall not vary on any account

1.11.6 All lots and items must be listed and priced separately in the Price Schedules. If a Price Schedule shows items listed but not priced their prices shall be assumed to be included in the prices of other items. Lots or items not listed in the Price Schedule shall be assumed to be not included in the bid.

1.11.7 The purchases made by the purchaser for scientific purpose are exempt from GST under 45/17, 47/17 notification and Custom Duty under notification 51/96.

1.12. BID CURRENCIES

1.12.1 Prices shall be quoted in Indian Rupees for offers received for supply within India and in freely convertible foreign currency in case of offers received for supply from foreign countries.

1.13. DOCUMENTS ESTABLISHING BIDDER'S ELIGIBILITY AND QUALIFICATIONS

1.13.1 The bidder shall furnish, as part of its bid, documents establishing the bidders' eligibility to bid and its qualification to perform the contract if its bid is accepted.

1.13.2 The documentary evidence of the bidders qualification to perform the contract if the bid is accepted shall establish to the purchasers satisfaction that;

(a) The bidder meets the qualification criteria listed in bidding documents, if any.

(b) Bidder that doesn't manufacture the goods it offers to supply shall submit to Manufacturers' Authorization Form (MAF) to demonstrate that it has been duly authorized by the manufacturer of the goods to quote and/or supply the goods.

(c) In case a bidder not doing business within India, it shall furnish the certificate to the effect that the bidder is or will be represented by an agent in India equipped and able to carry out the supply, maintenance, repair obligations etc. during the warranty and post warranty period or ensure a mechanism at place for carrying out the supply, maintenance, repair obligations etc. during the warranty and post-warranty period.

1.13.3 Conditional tenders shall not be accepted

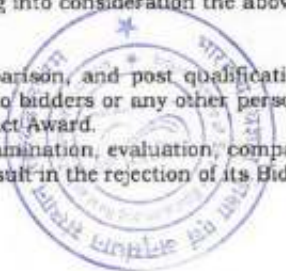
1.14. DOCUMENTS ESTABLISHING GOODS' ELIGIBILITY AND CONFORMITY TO BIDDING DOCUMENTS

1.14.1 To establish the goods' eligibility, the documentary evidence of the goods and services eligibility shall consist of a statement on the country of origin of the goods and services offered which shall be confirmed by a certificate of origin at the time of shipment.

1.14.2 To establish the conformity of the goods and services to the specifications and schedule of requirements of the bidding document, the documentary evidence of conformity of the goods and services to the bidding documents may be in the form of literature, drawings and data, and shall consist of;

(a) A detailed description of the essential technical and performance characteristics of the goods;

- (b) A list giving full particulars, including available sources and current prices, of spare parts, special tools, etc., necessary for the proper and continuing functioning of the goods during the warranty period following commencement of the use of the goods by the Purchaser in the Priced bid; and
- (c) An item-by-item commentary on the Purchaser's Technical Specifications demonstrating substantial responsiveness of the goods and services to those specifications or a statement of deviations and exceptions to the provisions of the Technical Specifications.
- 1.14.3 For purposes of the commentary to be furnished pursuant to above, the Bidder shall note that standards for workmanship, material and equipment, designated by the Purchaser in its Technical Specifications are intended to be descriptive only and not restrictive. The Bidder may substitute these in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.
- 1.15. BID SECURITY**
- 1.15.1 The Bidder shall furnish, as part of its bid, a bid security (BS) for an amount as specified in the Invitation for Bids. In the case of foreign bidders, the BS shall be submitted either by the principal or by the Indian agent and in the case of indigenous bidders, the BS shall be submitted by the manufacturer or their specifically authorized dealer/bidder.
- 1.15.2 The bid security shall be in Indian Rupees for offers received for supply within India and denominated in the currency of the bid or in any freely convertible foreign exchange in the case of offers received for supplies from foreign countries in equivalent Indian Rupees. The bid security shall be in one of the following forms at the bidders' option:
- (a) A bank guarantee issued by a Nationalized/Scheduled bank/Foreign Bank operating in India in the form provided in the bidding documents and valid for 45 days beyond the validity of the bid. In case a bidder desires to submit a BG issued from a foreign bank, then the same should be confirmed by a Nationalized/Scheduled Indian bank; or
- (b) Fixed Deposit receipt pledged in favour of the IISER-TVM.
- (c) A Banker's cheque or demand draft in favour of IISERTVM issued by any Nationalised/Scheduled Indian bank.
- 1.15.3 The bid security shall be payable promptly upon written demand by the purchaser in case the conditions listed in the ITB clause 15.11 are invoked.
- 1.15.4 The bid security should be submitted in its original form. Copies shall not be accepted.
- 1.15.5 While Bid security (EMD) is a requirement, the Director IISER-TVM may grant exemption of Bid security to some specific parties having sound credentials and are of national/international repute.
- 1.15.6 The bid security of unsuccessful bidder will be discharged /returned as promptly as possible positively within a period of 15 days after the expiration of the period of bid validity or placement of order whichever is later, without any interest.
- 1.15.7 The successful Bidder's bid security will be discharged upon the Bidder furnishing the performance security, without any interest. Alternatively, the BS could also be adjusted against PS, if it is paid through DD/BC.
- 1.15.8 **The firms registered with DGS&D, NSIC if any, are exempted from payment of bid security (BS) provided such registration includes the item they are offering which are manufactured by them and not for selling products manufactured by other companies.**
- 1.15.9 In case a bidder intimates at the time of tender opening in writing that the bid security is kept inside the financial bid, then in such cases, the technical bid of the party would be accepted provisionally till opening of the financial bids with which the party has attached the bid security.
- 1.15.10 The bid security may be forfeited:
- (a) If a Bidder withdraws or amends or impairs or derogates its bid during the period of bid validity specified by the Bidder on the Bid Form; or
- (b) **In case of a successful Bidder, if the Bidder fails to furnish order acceptance within 15 days of the order or fails to sign the contract and/or fails to furnish Performance Security within 21 days from the date of contract/ order.**
- 1.16. PERIOD OF VALIDITY OF BIDS**
- 1.16.1 Bids shall remain valid for minimum of 90 days after the date of bid opening prescribed by the Purchaser. **A bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.**
- 1.16.2 In exceptional circumstances, the Purchaser may solicit the Bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing (or by cable, telex, fax or e-mail). The bid security provided shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required nor permitted to modify its bid.
- 1.16.3 Bid evaluation will be based on the bid prices without taking into consideration the above corrections.
- 1.17. CONFIDENTIALITY**
- 1.17.1 Information relating to the examination, evaluation, comparison, and post qualification of bids, and recommendation of contract award, shall not be disclosed to bidders or any other persons not officially concerned with such process until publication of the Contract Award.
- 1.17.2 Any effort by a Bidder to influence the Purchaser in the examination, evaluation, comparison, and post qualification of the bids or contract award decisions may result in the rejection of its Bid.
- 1.18. CLARIFICATION OF BIDS**



- 1.18.1 To assist in the examination, evaluation, comparison and post qualification of the bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in prices or substance of the bid shall be sought, offered or permitted. However, no negotiation shall be held except with the lowest bidder, at the discretion of the purchaser. Any clarification submitted by a bidder in respect to its bid which is not in response to a request by the purchaser shall not be considered.
- 1.19. CONVERSION TO SINGLE CURRENCY**
- 1.19.1 To facilitate evaluation and comparison, the Purchaser will convert all bid prices expressed in the amounts in various currencies in which the bid prices are payable to Indian Rupees at the selling exchange rate established by any bank in India on the date of bid opening in the case of single part bidding and the rates prevalent on the date of opening of the Priced bids in the case of two-part bidding. For this purpose, exchange rate notified in www.xe.com or www.rbi.org or any other website could also be used by the purchaser.
- 1.20. CONTACTING THE PURCHASER**
- 1.20.1 Subject to ITB Clause 1.24, no Bidder shall contact the Purchaser on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded.
- 1.20.2 Any effort by a Bidder to influence the Purchaser in its decisions on bid evaluation, bid comparison or contract award may result in rejection of the Bidder's bid.
- 1.21. POST QUALIFICATION**
- 1.21.1 In the absence of pre-qualification, the Purchaser will determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated responsive bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB Clause 13.
- 1.21.2 The determination will take into account the eligibility criteria listed in the bidding documents and will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Purchaser deems necessary and appropriate.
- 1.21.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's bid.
- 1.22. PURCHASER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS**
- 1.22.1 The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders.
- 1.23. WARRANTY**
- 1.23.1 The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.
- 1.23.2 The Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in India.
- 1.23.3 Unless otherwise specified, the warranty shall remain valid for twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated, or for eighteen (18) months after the date of shipment from the port or place of loading in the country of origin, whichever period concludes earlier.
- 1.23.4 The Purchaser shall give notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof.
- 1.23.5 The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects. Upon receipt of such notice, the Supplier shall, within a reasonable period of time, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.
- 1.23.6 If having been notified, the Supplier fails to remedy the defect within the reasonable period of time; the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.
- 1.23.7 Goods requiring warranty replacements must be replaced on free of cost basis to the purchaser.
- 1.23.8 **Performance Guarantee:**
The successful bidder is required to submit a performance Guarantee of 10% of Purchase Order value valid during warranty period, plus two months grace period.
- 1.24. PENALTY CLAUSE**
- 1.24.1 Subject to GCC Clause on Force Majeure, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as penalty, a sum equivalent to the percentage specified in contract of the delivered price of the delayed Goods or unperformed Services or contract value for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the Percentage specified in contract. Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC. Clause on Termination for Default. The SCC shall also indicate the basis for ascertaining the value on which the penalty shall be applicable.
- 1.25. INSURANCE**
- 1.25.1 Should the purchaser elect to buy on CIF/CIP basis, the Goods supplied under the Contract shall be fully insured in Indian Rupees against any loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in contract.

- 1.25.2 Where delivery of the goods is required by the purchaser on CIF or CIP basis the supplier shall arrange and pay for Cargo Insurance, naming the purchaser as beneficiary and initiate & pursue claims till settlement, on the event of any loss or damage.
- 1.25.3 Where delivery is on FOB or FCA basis, insurance would be the responsibility of the purchaser.
- 1.25.4 With a view to ensure that claims on insurance companies, if any, are lodged in time, the bidders and /or the Indian agent shall be responsible for follow up with their principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the bidder/Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the purchaser on the event of the delay.
- 1.26 TRANSPORTATION**
- 1.26.1 Where the Supplier is required under the Contract to deliver the Goods FOB, transport of the Goods, up to and including the point of putting the Goods on board the vessel at the specified port of loading, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract price. Where the Supplier is required under the Contract to deliver the Goods FCA, transport of the Goods and delivery into the custody of the carrier at the place named by the Purchaser or other agreed point shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract price.
- 1.26.2 Where the Supplier is required under the Contract to deliver the Goods CIF or CIP, transport of the Goods to the port of destination or such other named place of destination in the Purchaser's country, as shall be specified in the Contract, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.
- 1.26.3 In the case of supplies from within India, where the Supplier is required under the Contract to transport the Goods to a specified destination in India, defined as the Final Destination, transport to such destination, including insurance and storage, as specified in the Contract, shall be arranged by the Supplier, and the related costs shall be included in the Contract Price.
- 1.27 PACKING**
Should be as per standards prescribed for international trade and movement of the goods.
- 1.38 STANDARDS**
The Goods supplied and services rendered under this Contract shall conform to the standards mentioned in the Technical Specifications and Schedule of Requirements, and, when no applicable standard is mentioned, to the authoritative standard appropriate to the Goods' country of origin and such standards shall be the latest issued by the concerned institution.
- 1.39 PERFORMANCE SECURITY**
- 1.39.1 Within 21 days of receipt of the notification of award/PO, the Supplier shall furnish performance security of 7% of Contract/ Purchase Order value in the amount specified in the Contract, valid till 60 days beyond the completion of contractual obligations.
- 1.39.2 The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
- 1.39.3 The Performance Security shall be denominated in Indian Rupees for the offers received for supplies within India and denominated in the currency of the contract in the case of offers received for supply from foreign countries.
- 1.39.4 In the case of imports, the PS may be submitted either by the principal or by the Indian agent and, in the case of purchases from indigenous sources, the PS may be submitted by either the manufacturer or their authorized dealer/bidder.
- 1.39.5 The Performance security shall be in one of the following forms:
- (d) A Bank guarantee or stand-by Letter of Credit issued by a Nationalized/Scheduled bank located in India or a bank located abroad in the form provided in the bidding documents. Or,
- (e) A Banker's cheque or Account Payee demand draft in favour of the purchaser. Or,
- (f) A Fixed Deposit Receipt pledged in favour of the Purchaser.
- 1.40 DELIVERY SCHEDULE :** Delivery schedule should be specified clearly
- 1.41 PAYMENT TERMS**
For Indigenous supplies payment will be made within 30 days from the date of supply, installation and commissioning. For Imported goods, the preferred payment mode of the Institute is Sight Draft /Net 30 days. If Letter of Credit is insisted by the vendors, the LC will be established for 100% of Purchase Order value out of which 90% will be paid against shipping evidence and 10% after installation and commissioning and on submission of Performance Bank Guarantee for 10% of Purchase Order value which should be valid during warranty period. However the advance payment to the vendors is not encouraged.



[Handwritten Signature]
Deputy Registrar (P&S)

SUDIN. B. BASU
Deputy Registrar
(Purchase & Stores)
Indian Institute of Science Education and Research Thiruvananthapuram
Manipalams P.O. Kerala

BID SECURITY DECLARATION
(To be given on Company Letter Head)

To,

Date:

The Director, Indian Institute of Science Education and Research – Thiruvananthapuram,
Maruthamala P.O, Vithura, Thiruvananthapuram, Kerala -695551, India.

Sub: Bid Security Declaration.

Tender Reference No: _____

Name of Tender / Work: -

Dear Sir,

We M/s _____

_____ (Full name and address of the bidding firm) here by undertake that we will automatically be suspended from being eligible for bidding in any contract with Indian Institute of Science Education and Research Thiruvananthapuram for a period of time of **THREE YEARS**, starting from the date of Tender Enquiry, if we are in breach of our obligation(s) under the bid conditions as follows:-

- (a) In the event of withdrawal or modification of bids during the period of validity of the above mentioned tender document
- (b) Fails to comply with IISER Tvm's variation of requirement as per tender document and its corrigendum, if any.
- (c) If we are awarded the contract and failed to execute the contract / fail to supply the items mentioned in the contract
- (d) If we fail to submit a performance security before the deadline defined in the bid document.



Yours Faithfully,

(Signature of the Bidder, with Official Seal)

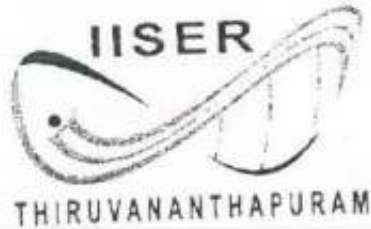
CHECK LIST OF DOCUMENT REQUIRED

<u>Ser</u>	<u>List of documents required</u>	<u>Yes / No</u>
1.	Tender Acceptance Letter	
2.	EMD Details / Bid Security Declaration / MSME Certificate	
3.	Brochure/ Catalogue/ Datasheet	
4.	Technical Compliance statement with tender specifications	
5.	BoQ	
6.	Statutory Registration Certificates	
7.	Previous purchase orders (if any)	
8.	Tender document duly signed on all pages along with bidders seal.	
9.	Self-certification regarding local content as per clause 5 of tender document	
10.	Other documents pertaining to technical aspects	
11.	Any other document as provided in technical specifications	



Annexure-1

INDIAN INSTITUTE OF SCIENCE EDUCATION AND
RESEARCH THIRUVANANTHAPURAM (IISER TVM) (An Autonomous Institute
under MHRD, Govt. of India)



TECHNICAL SPECIFICATIONS

Name of Work: Providing and fixing 8 fume hoods, ducting system, and two flammable storage cabinet in LAB 4203 and LAB 3211 in the Chemical Science Block at IISER Campus, Vithura



Sudin B. Babu
24/03/24

SUDIN. B. BABU
Deputy Registrar
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Indian Institute of Science Education and Research Thiruvananthapuram
Maruthamala P.O., Vithura
Thiruvananthapuram - 695 551

Specification for Furnishing Laboratory Fume Hood at LAB 4203 and 3211 at
Chemical Science Block, IISER, Vithura, Trivandrum

Contents

1. General
2. Scope of Work
3. Technical Specification
4. Supply and Installation of Standalone Flammable Chemical Storage Cabinet
5. Instructions for Installation
6. Functional Performance Test
7. List of Approved Makes


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FUME HOODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the selection, installation, and commissioning of laboratory fume hoods. The scope of work includes, but is not limited to, the following:

1. The installation of all specified accessories such as monitor, cup sinks, petcocks, lighting, electrical, base cabinets, work surfaces, and filler panels.
2. Internal hoods plumbing and wiring.

B. The supplier shall provide all miscellaneous parts and labor required to provide a complete and functioning fume hood.

1.2 RELEVANT CODES AND STANDARDS:

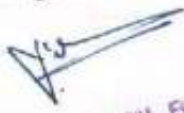
The following are the primary organizations and standards regarding fume hoods:

-OSHA Part 1910.1450. OSHA stands for Occupational Safety and Health Administration. The agency regulations regarding fume hood operation are listed in the Code of Federal Regulations Volume 29 Part 1910.1450. This code addresses several aspects of laboratory design and operation. Regarding hoods, it is primarily concerned with airflow at the face of the hood, monitoring, maintenance and exhaust.

-ANSI/ASHRAE 110-1995. Method of Testing Performance of Laboratory Fume Hoods. This standard is published by the American National Standards Institute and the American Society of heating, Refrigerating and Air Conditioning Engineers, Inc. It concerns itself primarily with methods of testing fume hoods to check their operation.

-ANSI/AIHA Z9.5. Titled "The American National Standard for Laboratory Ventilation" this standard is published by ANSI and the American Industrial Hygiene Association. It covers a variety of lab ventilation issues including hood monitoring, face velocities and exhaust.




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-IS 4209, Indian Standard code for Chemical Laboratories- Code of Safety. It generally deals with the factors involving safety, laboratory design for safety, etc.

-NFPA 45. This standard is prepared by the National Fire Protection Association. It recommends hood construction, location, fire protection, specialty hoods, identification, inspection, testing and maintenance and exhaust.

-SEFA 1.2-1996. SEFA is the Scientific Equipment & Furniture Association. Its publication "Laboratory Fume Hoods Recommended Practices" covers design requirements of hoods, face velocities and testing.

1.3 INSTALLER QUALIFICATIONS

A. Fume hoods shall be installed by skilled electricians and mechanics, all of whom are properly trained and qualified for this work. As a minimum, the system must conform to all codes and manufacturers' instructions and recommendations.

1.4 SUBMITTALS

A. Prepare and submit CAD Shop Drawings and product data. Includes:

1. Plans, elevations, sections, and details illustrating shop fabrication, field assembly, and installation.
 - a. Show size and location of all cutouts.
2. Fume hood data including all components and accessories
 - a. Identify all manufacturer standard components with catalog numbers, and identify all materials of custom-fabricated items.
3. Monitor manual with calibration instructions
4. Manufacturer's test and certification data
5. Manufacturer's installation manual



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- B. For Owner's Final Inspection, prepare and submit fume hood FPT documentation
- C. For Substantial Completion, submit O&M Manual information required


PART 2 - SCOPE OF WORK

- a) Supply and Installation of fume hoods (both superstructure and under structure cabinets) including worktops based on the specified Make List based on ASHRAE 110 (American Society of Heating, Refrigeration and Air Conditioning Engineers) - American Standards for Laboratory fume hood testing and European Standards for fume hood testing
- b) Supply and Installation of fume hood accessories like service outlets/fittings, electrical switches as per the specified make list. Fittings attached to the fume hood superstructure shall be mounted on the front fascia of the hood.
- c) Plumbing fixtures mounted on the fume hood super structures shall be pre - plumbed and electrical fixtures shall be pre - wired. All fume hoods to be fitted with electrical control box with motor starter and all the required electronic circuits.
- d) Removal of all debris, dirt and rubbish accumulated as a result of installation of the fume hoods leaving the premises clean and orderly.
- e) Manufactures should provide data indicating compliance with ASHRAE 110 or BS EN-14175 standards, at least one of the two.

Standard Fume Hood Performance Requirements

Fume hoods shall be of complete airfoil design to ensure maximum operating efficiency. Foil sections at the front facials of the hood shall minimize eddying of air currents at the hood face and the rear baffle system shall minimize turbulence in the upper portion of the hood interior. All the fume hoods shall be designed for an approximate face velocity of 80 to 100 fpm.




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PART 3 - SPECIFICATION

Type of Fume Hood: Constant Air Volume (CAV) Type bench Fume hoods

Overall Dimension: L \geq 1500 mm x D \geq 1070 mm x H \geq 2500 mm

Inner Dimension: L \geq 1300 mm x D \geq 800 mm x H \geq 1200 mm

(I) Outer Construction/ Super structure

The super structure shall be double walled construction housing, concealed steel angle frame members of size 45x45x2mm, attaching brackets and remote service fixture valves, constructed using high quality, cold rolled, mild and degreased steel (conforming to IS: 513/ASTM A366).

Fume hood superstructure consisting -

- Structure frame in 2.0 mm thick GI construction
- Outer panels in 1.2 mm thick GI construction
- The exterior of the structure shall be pre-treated with 8 tank chemical processes and powder coated with highly chemical resistant epoxy Colors having dry film thickness of 70 to 80 microns for chemical resistance, scratch resistance and to prevent rusting.
- The rear part of the fume hood shall have service access for maintenance.

Inner lining and worktop

Internal side wall panels shall be fabricated using minimum 6 mm thick liner of high pressure laminate made by compressing impregnated paper or wood fiber and epoxy, phenolic or poly propylene resin of approved make with an opening that provides access to the service piping and valves to facilitate installation and maintenance. The work top shall be made of minimum 20 mm thick material (EBC cured phenolic resin) of high pressure laminate of approved make provided with a PP cup drain flush with the recessed work surface.



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Sash

The sash shall be made of 5 mm thick transparent toughened glass having a breaking stress value of 24,000 psi with a clear openable height of 750mm and heat resistant. Vertically moving sashes shall be provided. The sash handle should be of type 316 stainless steel with satin finish, and should not generate eddies in the plane of the sash opening. The counterbalance mechanism should use a single counterweight, stainless steel wires on ball bearing pulley assemblies. A cable-retaining device should be provided, assembled to prevent tilting of the sash during operation. Spring counterbalance mechanisms are not acceptable. The sash should move easily and quietly and remain in place wherever it is stopped. The sash should open and close against rubber bumper stops, installed so that the user can readily adjust the sash opening when moving the sash from either end. The design should ensure that, in the event of a failure of the counterbalance mechanism, the sash cannot fall within 50 mm of the bottom airfoil. This is in order to avoid the potential for serious injury to the fume hood user.

Airfoil

A streamlined "flip-on" type airfoil shall be integral at the bottom of the hood opening on bench hoods. The horizontal airfoil should be of 1.6 mm stainless steel, type 316 L with Teflon coated, typically installed approximately 25 mm above the raised portion of the work surface. It should be designed and installed for eddy-free entry of air into the fume hood. The airfoil should be designed to eliminate reverse flow within 75 mm of the plane of the sash.

Baffle

The baffles shall be fabricated using minimum 6 mm thick liner of high pressure laminate of approved make and should have excellent chemical and heat resistant and fire retardant. At least three slots shall be provided for effective distribution of flow of air which shall be placed at a distance of approximately 5 cm from the back liner and shall be removable for cleaning.



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Scaffold/Lattice

A 4x4 height and width adjustable scaffold made of SS 316 (minimum 12 mm diameter) shall be provided on to the internal liner clamped with the PP clamps to hold the test samples and rotors within the fume hood.

Cup Sink

There shall be provision for water supply with a single valve tap in each fume hood with a high density polypropylene/Solid Epoxy (approx. dimension 80x160 mm) oval shaped cup sink directly below the tap and shall be connected to the existing water inlet as well as drain outlet respectively.

Electrical Services

Lighting fixtures shall be of twin LED type light with fluorescent lamps which are sealed, vapor tight and protected by a transparent, scratch-resistant, shatter-resistant and flame resistant material. All the electrical switches and sockets (GI construction) shall be positioned outside the fume hood just below the work top. Each fume hood shall necessarily possess minimum six 3-pin electrical sockets (220-240V, 6-16A) and a shunt tripper for the safety control of all the electrical points.

Service Valves and Plumbing

The shut-off valve or cock for the water supply shall be provided outside the fume hood. All the fittings shall be of approved makes. Utility services like Nitrogen, Compressed Air & Potable water shall consist of remote control valves as selected located within the end panels, controlled by in and out facility with flexible hose passing through the side panels of the hood, with color coded PP handles. All gas valves for regular lab gases to have standard needle valve and push and turn type arrangement for all gases to be supplied. All supplied valves to clear the following pressure test conditions: Gas Fittings - 7 bar, Water fittings - 10 bar. Interior fitting for gases and water shall be with polypropylene/epoxy coated forged brass construction 2.0 m long flexible tubing with end fittings for following services:



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SERVICE	LETTER CODING	COLOUR CODING	Tube construction
Water	DIW	White	PU-4
Compressed Air	AIR	Orange	PU-4
Argon/Nitrogen	A/N	Blue	PU-4

Digital Face Velocity Monitor

Fume hoods shall be provided with an alarm system to detect low and high hood face velocities. The alarm signals shall activate any time the face velocity falls below the low velocity alarm set point or rises above the high velocity alarm set point. There shall be both visual and audible alarm signals. The audible alarm shall have a mute provision.

- Provide fume hood manufacturer's recommended face velocity monitor with a local audible and visual alarm, capable of detecting a drop or rise in airflow (not static pressure) through the hood.
- The velocity monitor shall be digital with a LCD screen.
- All parts of the system which are apt to be in contact with vapors or gases in the fume hood shall be chemically resistant, such as the controller, sensing device, and wiring.
- Provide a means for setting the alarm set point to the exhaust level desired. This adjustment shall be "internal" so that it is not readily adjustable by operating personnel.
- The low level alarm point is 80 feet per minute (fpm) for conventional fume hoods and 56 fpm for low flow fume hoods.

Duct Collar

A 8"-10" diameter polypropylene duct collar shall be located in the top of the hood plenum chamber.

Page



[Signature]

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Motorized Volume Control Dampers

Damper Sets with actuator - Damper sets with actuator shall be arranged in substantial supporting frames and each blade shall be mounted on a shaft, which turns in sintered bronze bearings. All damper blades shall be inter-connected by means of a suitable bar linkage for ganged operation. All dampers shall be arranged with spindle horizontal and shall be sized to handle the required air quantities. Whenever the fume hood is ON the damper should remain open and when in OFF condition the same should automatically get closed. This shall be integrated with the hood blower.

Under Hood Cabinets

Under hood cabinets of approved makes shall be of double wall construction having an air space of 1 1/2" throughout using 18 gauge CRCA sheet epoxy coated for chemical resistance, scratch resistance and to prevent rusting. The cabinets shall be provided with leak proof sills to prevent leakage in case of accidental spills. The doors shall be of self-latching mechanism for complete closure with flush mounted locking handles and secured on full length heavy duty piano hinges. Suitable air ducts ready for connection to main exhaust system of the fume hood shall be provided. Adjustable leveling legs shall be provided to place the cabinet on uneven surface. Cabinets should be provided with large illuminating warning label to identify the type of material stored within the unit.

Finally: No fumes leak point should be present when the fume hood is in closed condition. This is extremely important from safety point of view.

(II) Centrifugal Blower

Silent high efficiency PP + FRP lined remote blower consisting of continuous rating motor and chemical resistant impeller. The blower is designed to give a face velocity at safe working height as per the international safe velocity norms. (ANSI/AIHA Z9.5). The blower body is polypropylene UV treated high density and chemical (corrosion) resistant and is mounted on a metallic stand. Centrifugal Blower shall be with specs: CFM 3200, 120-140 mm, WC Drive -



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5.0 HP, 2800 RPM, 415V, 50 Hz., TEFC class B insulation induction motor with IP55 enclosure, in Non-FLP construction

General:

The exhaust fans supplied and installed shall be of 'Centrifugal Corrosion Resistant' type and shall be capable of delivering the design flow rate against all duct losses. The fans shall be robust in construction and suitable for continuous duty operation. It shall be mounted with ease of maintenance and shall be installed with proper vibration isolators to minimize vibration transmission to ductwork and support structure. Fans selected shall be silent and vibration free when running and suitable for outdoor use.

Specifications:

- Housings: PP- Single block strong high density UV treated and recyclable polypropylene (PPH) with no welded joint. Reversible and rotatable to any 8 standard discharge positions by 45 degree increments. All fan mounting hardware in stainless steel.
- Wheels: PP - Forward curved centrifugal type impeller made, of injection moulded PPH. Fan wheel supplied with hub cap constructed of PPH. Wheels electronically and dynamically balanced to ISO 1940.
- Motors - Direct drive, asynchronous, three phases, IP55. Single speed: three phase 230/400 V-50/60 Hz. Motor is outside the airstream. Three phase motors speed adjustable by variable frequency inverter drive.
- Motor Support - Several options: no stand, metal stand constructed of epoxy coated sheet metal, polypropylene motor pedestal or roof unit kit.
- Temperature Resistance - PPH casing and wheel recommended up to 80 °C.
- Performance - Fan performance based on tests conducted in accordance with AMCA 210-85 and ISO 5801.



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- Warranty - Equipment to be free from defects in workmanship and material under normal use and service for one year after installation, and commissioning of fume hoods

Exhaust System

Technical Specifications for PP/FRP Ducting:

- PP means PPGL: One side smooth & glossy finish and other end is matt finish.
- The smooth surface should be the inner surface of the duct.
- On mat side, FRP lining to be done.
- 25 mm x 25 mm Stitch welding is done on inner surface and continuous welding on outer surface with 5 mm welding thickness.
- FRP Lining to be done on the outer surface of PPGL i.e. on mat side.
- One layer FRP is one mm.
- The final layer should be with fine mat to have smooth and good finish.
- While making the lining, there should not be any air pockets or any sort of uneven finish.

(III) Ducting

(i) Rigid Ducting of PP (Polypropylene) + FRP (Fiber Reinforced Polyester) and flexible ducting with flanges, bends, damper transitions, clamps etc. Flexible joint is provided in the ducting in order to avoid transmitting the blower vibrations to the hood. A weather proof rain cowl is provided at the outlet of blower. All PP FRP to be 3+3 mm thick.

In addition, the following points should be also taken into account while fabrication of ducts.

- 1) All ducts of size larger than 450mm shall be cross broken.
- 2) All ducts shall be supported from the ceiling / slab by means of MS rods of dia 8mm with MS angle of size 40 x 40 x 5 mm at the bottom with neoprene pad in between the duct &



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MS angle. The ducts shall be suspended from the ceiling with the help of dash fasteners. Provision for necessary ancillary materials required for hanging the ducts shall be arranged by the supplier.

3) The vanes shall be provided wherever required and shall be securely fastened to prevent noise & vibration.

4) The rubber gasket shall be installed between duct flanges in all connections and joints.

5) All flanges and supports should be primer coated.

6) The ducting work can be modified if deemed necessary in consultation with the Engineer in Charge to suit actual site conditions in the building

3.1 Terms and conditions

A. Mechanical, electrical and associated systems shall be safe, reliable, efficient, durable, easily and safely operable, maintainable, and accessible.

B. All equipment must be compatible with Indian electrical standards and codes.

C. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. Digital electronics devices, software and systems such as controls, instruments, shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years.

D. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.

E. Vendor must provide a list of satisfied Indian users and their contact details for using offered items.

F. Electrical Components and Devices: UL listed and labeled for intended use.

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3.2 Test and Submittals

A. Manufacturer's Literature and Data: Include the following:

1. Illustrations and descriptions of laboratory fume hoods and factory-installed devices for fume hoods.
2. Catalog or model numbers for each item incorporated into the work.
3. Results of testing according to ASHRAE 110.

B. Field Test Reports: Indicate dates and times of tests and certify test results.

C. Factory Test Reports: Provide manufacturer's QC checklist or other reports that indicate comprehensive factory testing has been performed, and the results of these tests have been certified.

3.3 TESTING EQUIPMENT

A. Testing equipment must be maintained and calibrated in accordance with manufacturer's specifications and have been calibrated within the past year. Indicate calibration dates and equipment type on test data form.

PART 4 Supply and Installation of Standalone Flammable Chemical Storage Cabinet:

JUSTRITE or approved make from the list Safety Cabinet - 45 Gallon (170L)

Made of minimum 18 gauge (1mm) Double Wall Steel with 38mm of Insulating Air Space. Fully Welded Constructions with continuous Piano Hinges fitted with dual Vents with Built-in Flame Arrester. Cabinet should be provided with 2" Height Liquid Tight Containment Sump to hold any leakages - Adjustable Shelves Provisions- Manual Close Doors (when pushed closed- doors will automatically self-latch) with Flush Paddle Handle and Slip Resistant Grip with provision for double key set (one keyed lock). Fully powder coated- Durable & Chemical Resistant Cabinet with High Reflective Band.



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Dimension: H 65" x W 43" x D 18"

Color: Yellow

Cabinet: Manual Closing Double Door with ≥ 3 Shelves.

Approvals: FM- N-O.

PART 5 INSTRUCTIONS FOR INSTALLATION

5.1 DELIVERY AND IDENTIFICATION

A. Deliver fume hoods to the job-site, clearly identified in plain view by specifying fume hood manufacturer, size and type of fume hood, sash type and any special features included.

5.2 INSTALLATION

A. Make all field measurements, and verify all dimensions and that required utilities are roughed-in and ready for hook-up prior to installation.

B. Install fume hood base cabinets plumb and level and parallel to walls and in accordance with manufacturer's instructions.

C. Install monitors in accordance with manufacturer's instructions.

Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.

Fume hood Installation shall meet seismic support and anchorage requirements. Coordinate the installation of all supplementary framing and backing plates.

D. Repair or remove defective work upon completion of installation. Touch up as required.

E. Remove all packing materials, tags, tape, and shipping materials.

4.2 CLEANING AND PROTECTION

A. Clean all exposed interior and exterior surfaces and protect from damage by work of other trades.

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PART 6 - SUPPLIER FUNCTIONAL PERFORMANCE TESTING (FPT)

A. Pre-test meeting: The Supplier shall coordinate its FPT activities of fume hoods, including test procedures and FPT documentation, with the Client's confirmation testing activities.

1. This meeting shall include a face velocity test of at least one fume hood by third party with a representative of the department present.

B. Supplier face velocity testing shall not start until the following is complete:

1. Pre-test meeting
2. Verification that all specified fume hood components and accessories are provided.
3. Start-up and functional performance testing of all fume hood accessories and utilities is complete and in accordance with manufacturer's specifications
4. Ceiling tiles are in place and laboratory doors are closed (the space is contained).

C. For each fume hood, the Supplier shall perform and document the following FPT requirements:

1. Face velocity
 - a. For conventional flow fume hoods, the target air velocity with the sash height at 18 inches is 100 feet per minute (fpm) +/- 10%.
 - b. Face velocity shall be tested using a VelGrid probe by Shortridge instruments, or an anemometer.
2. Sound level
 - a. Sound level must be at or below 50 dB measured with the sash height at 18" and the sound level meter located 3 feet from the sash and 5 feet above the floor.



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b. Sound level shall be tested using a Type 2 sound level meter manufactured to meet the American National Standards Institute (ANSI) S1.4 "Standard for Sound Level Meters" capable of measuring decibels in dBA.

3. Monitor functionality

- a. The fume hood monitor is verified to be functioning and properly calibrated.
- b. Verify that the face velocity is displayed.
- c. Raise the sash to reduce the face velocity. Confirm that both the visible and audible alarm signals function when the velocity drops below 80 fpm
- d. Test the monitor's mute function and the reset button.
- e. This test fails if the monitor does not alarm, is more than 10 fpm out of calibration, or if it fails any functional test or is damaged.

D. Fume Hood FPT Documentation

1. Record all test data on FPT data field forms for each fume hood.

6.1 FINAL INSPECTION REQUIREMENTS

A. The Supplier shall provide end-user ten (10) working days advance notice to schedule Client's fume hood confirmation testing.

1. Include:

- a. Complete fume hood FPT documentation.
- b. For each fume hood type, the manufacturer's installation and operation manual.
- c. For each monitor type, the manufacturer's manual with calibration instructions.

B. The end-user, will review the Supplier's FPT documentation. If the documentation meets the performance requirements of these specifications, then the end-user will conduct



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confirmation testing of each fume hood in accordance with the Scientific Equipment and Furniture Association (SEFA) standard 1 for face velocity, sound level, monitor functionality, and VAV tracking (if specified). Also the under hood cabinetry shall be tested in accordance with SEFA 8 standards.

C. The end-user will notify the Supplier if any fume hoods fail confirmation testing. Any fume hoods that do not meet the performance requirements shall be repaired and re-tested by the Supplier. The Supplier shall submit new FPF documentation for review and additional confirmation testing until each fume hood satisfies the requirement of end-user.

1. Once the final testing is accepted and complete, the end-user will place appropriate labels on the fume hoods allowing use and this Work shall be substantially complete.

PART 7 LIST OF APPROVED MAKES:

Below mentioned makes to be used unless/otherwise defined in technical specifications details

STEEL ANGLES:	SAIL, TATA, VIZAG, JINDAL
CRCA SHEETS:	SAIL, TATA, VIZAG
LABORATORY FITTINGS:	WATER SAVER, BROEN, BROWNALL LABTAP
LABORATORY SINKS/DRIP CUPS:	KILLAB, WATER SAVER, BROEN
ELECTRICAL SOCKET:	Highly reputed brands such as LEGRAND, NORTHWEST, MK, NORISYS
EYEWASH/SHOWER:	WATER SAVER, BROEN
HINGES:	Highly reputed brands such as HETTICH, HAFFLE
LEGS:	HETTICH, HAFFLE
LOCKS:	Highly reputed brands such as HETTICH, HAFFLE
DOUBLE EXTENTION BALL SLIDE:	HETTICH, HAFFLE
LABORATORY STORAGE CABINETS:	JUSTRITE, LABOR SECURITY SYSTEM,



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APPROVED MAKE OF MATERIALS FOR FUMEHOOD

FUME HOOD SERVICE FIXTURES:	WATER SAVER, BROEN
ELECTRICAL SOCKETS:	Highly reputed brands such as LEGRAND, NORTHWEST, MK, NORISYS
FACE VELOCITY AND CONTROLS:	TEL, TROX, PHOENIX
CENTRIFUGAL BLOWERS:	SEAT, COLASIT
WORK TOP:	TRESPA TOP LAB ^{PLUS}
INNER LINING:	TRESPA TOP LAB ^{VERTICAL}
TOUGHENED GLASS:	SAINT GOBAIN, MODI, ASAHI INDIA, GSC, ATUL

General Standards to be followed for Fume hood:

Air Flow

Proper air flow at the face of the hood is probably the most common cause of confusion regarding fume hood operation. Here are what the codes and standards say:

OSHA: "General air flow should not be turbulent and should be relatively uniform throughout the laboratory, with no high velocity or static areas; air flow into and within the hood should not be excessively turbulent; hood face velocity should be adequate. (Typically 60-110 fpm.)"

ANSI/AIHA Z9.5: "Each hood shall maintain an average face velocity of 80-120 fpm with no face velocity measurement more than plus or minus 20% of average."

SEFA: "Face velocities of laboratory fume hoods may be established on the basis of the toxicity or hazard of the materials used or the operations conducted within the fume hood. Note: Governmental codes rules and regulation may require specific face velocities. A fume hood face velocity of 100 fpm is considered acceptable in standard practice. In certain situations, face velocity of up to 125 fpm or as low as 75 fpm may be acceptable to meet required capture velocities of the fume hood."

Monitoring/Alarms

OSHA: "each hood should have a continuous monitoring device to allow convenient confirmation of adequate hood performance before use. If this is not possible, work with substances of unknown toxicity should be avoided or other types of local ventilation devices should be provided."



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ANSI/AIHA Z9.5: "New and remodeled hoods shall be equipped with a flow-measuring device."

NFPA 45: "New and remodeled hoods shall be equipped with a flow-measuring device."

Maintenance/Inspection

As with all equipment maintenance is important to proper operation.

OSHA: "Quality and quantity of ventilation should be evaluated on installation, regularly monitored (at least every 3 months), and re-evaluated whenever a change in local ventilation devices is made."

ANSI/AIHA Z9.5: "A routing performance test shall be conducted on every fume hood at least annually or whenever a significant change has been made to the operational characteristics of the system"

NFPA 45: "When installed or modified and as at least annually thereafter, laboratory hoods, laboratory hood exhaust systems, and laboratory special exhaust systems shall be inspected and tested."


NFPA 45: "Special use laboratory hoods and special use local exhaust systems shall be identified to indicate their intended use." "A sign shall be affixed to each hood containing the following information from the last inspection: Inspection interval, Last inspection date, Average face velocity, location of fan that serves hood, Inspectors name. Exception: In lieu of a sign, a properly maintained log of all hoods giving the above information shall be deemed acceptable."

Exhaust

ANSI/AIHA Z9.5: "Discharged in manner and location to avoid re-entry into the laboratory building or adjacent buildings at concentrations above 20% of the allowable concentrations inside the laboratory under any wind or atmospheric conditions." Exhaust stack: "Be in a vertical up direction at a minimum of 10 feet above the adjacent roof line as so located with respect to opening and air intakes of the laboratory or adjacent buildings to avoid re-entry."

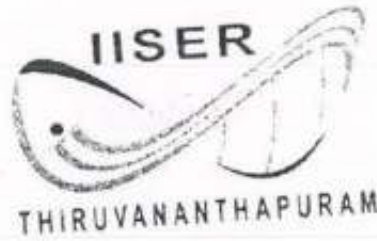
NFPA 45: "Air exhausted from laboratory hoods and other special local exhaust systems shall not be re-circulated." "Air from laboratory units and laboratory work areas in which chemicals are present shall be continuously discharged throughout systems maintained at a negative pressure relative to the pressure of normally occupied areas of the building."




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Annexure-2

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Govt. of India)



TECHNICAL SPECIFICATIONS

Name of Work: Providing and fixing 1 fume hood, ducting system, and 1 flammable storage cabinet in LAB 2111 in the Physical Science Block at IISER Campus, Vithura

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Specification for Furnishing Laboratory Fume Hood at LAB 2111 at Physical
Science Block, IISER, Vithura, Trivandrum

Contents

1. General
2. Scope of Work
3. Technical Specification
4. Supply and Installation of Standalone Flammable Chemical Storage Cabinet
5. Instructions for Installation
6. Functional Performance Test
7. List of Approved Makes




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FUME HOODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the selection, installation, and commissioning of laboratory fume hoods. The scope of work includes, but is not limited to, the following:

1. The installation of all specified accessories such as monitor, cup sinks, petcocks, lighting, electrical, base cabinets, work surfaces, and filler panels.
2. Internal hoods plumbing and wiring.

B. The supplier shall provide all miscellaneous parts and labor required to provide a complete and functioning fume hood.

1.2 RELEVANT CODES AND STANDARDS:

The following are the primary organizations and standards regarding fume hoods:

-OSHA Part 1910.1450. OSHA stands for Occupational Safety and Health Administration. The agency regulations regarding fume hood operation are listed in the Code of Federal Regulations Volume 29 Part 1910.1450. This code addresses several aspects of laboratory design and operation. Regarding hoods, it is primarily concerned with airflow at the face of the hood, monitoring, maintenance and exhaust.

-ANSI/ASHRAE 110-1995. Method of Testing Performance of Laboratory Fume Hoods. This standard is published by the American National Standards Institute and the American Society of heating, Refrigerating and Air Conditioning Engineers, Inc. It concerns itself primarily with methods of testing fume hoods to check their operation.

-ANSI/AIHA Z9.5. Titled "The American National Standard for Laboratory Ventilation" this standard is published by ANSI and the American Industrial Hygiene Association. It covers a variety of lab ventilation issues including hood monitoring, face velocities and exhaust.

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-IS 4209, Indian Standard code for Chemical Laboratories- Code of Safety. It generally deals with the factors involving safety, laboratory design for safety, etc.

-NFPA 45. This standard is prepared by the National Fire Protection Association. It recommends hood construction, location, fire protection, specialty hoods, identification, inspection, testing and maintenance and exhaust.

-SEFA 1.2-1996. SEFA is the Scientific Equipment & Furniture Association. Its publication "Laboratory Fume Hoods Recommended Practices" covers design requirements of hoods, face velocities and testing.

1.3 INSTALLER QUALIFICATIONS

A. Fume hoods shall be installed by skilled electricians and mechanics, all of whom are properly trained and qualified for this work. As a minimum, the system must conform to all codes and manufacturers' instructions and recommendations.

1.4 SUBMITTALS

A. Prepare and submit CAD Shop Drawings and product data. Includes:

1. Plans, elevations, sections, and details illustrating shop fabrication, field assembly, and installation.

a. Show size and location of all cutouts.

2. Fume hood data including all components and accessories

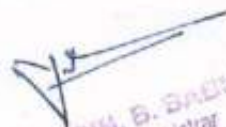
a. Identify all manufacturer standard components with catalog numbers, and identify all materials of custom-fabricated items.

3. Monitor manual with calibration instructions

4. Manufacturer's test and certification data

5. Manufacturer's installation manual




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- B. For Owner's Final Inspection, prepare and submit fume hood FPT documentation
- C. For Substantial Completion, submit O&M Manual information required

PART 2 - SCOPE OF WORK

- a) Supply and Installation of fume hoods (both superstructure and under structure cabinets) including worktops based on the specified Make List based on ASHRAE 110 (American Society of Heating, Refrigeration and Air Conditioning Engineers) - American Standards for Laboratory fume hood testing and European Standards for fume hood testing
- b) Supply and Installation of fume hood accessories like service outlets/fittings, electrical switches as per the specified make list. Fittings attached to the fume hood superstructure shall be mounted on the front fascia of the hood.
- c) Plumbing fixtures mounted on the fume hood super structures shall be pre - plumbed and electrical fixtures shall be pre - wired. All fume hoods to be fitted with electrical control box with motor starter and all the required electronic circuits.
- d) Removal of all debris, dirt and rubbish accumulated as a result of installation of the fume hoods leaving the premises clean and orderly.
- e) Manufactures should provide data indicating compliance with ASHRAE 110 or BS EN-14175 standards, at least one of the two.

Standard Fume Hood Performance Requirements

Fume hoods shall be of complete airfoil design to ensure maximum operating efficiency. Foil sections at the front facials of the hood shall minimize eddying of air currents at the hood face and the rear baffle system shall minimize turbulence in the upper portion of the hood interior. All the fume hoods shall be designed for an approximate face velocity of 80 to 100 fpm.




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PART 3 - SPECIFICATION

Type of Fume Hood: Variable Air Volume (CAV) Type bench Fume hoods compatible in air conditioned laboratory room equipped with dehumidifier (maintaining constant humidity level at ~50%).

Overall Dimension: L \geq 1500 mm x D \geq 1070 mm x H \geq 2500 mm

Inner Dimension: L \geq 1300 mm x D \geq 800 mm x H \geq 1200 mm

(I) Outer Construction/ Super structure

The super structure shall be double walled construction housing, concealed steel angle frame members of size 45x45x2mm, attaching brackets and remote service fixture valves, constructed using high quality, cold rolled, mild and degreased steel (conforming to IS: 513/ASTM A366).

Fume hood superstructure consisting -

- Structure frame in 2.0 mm thick GI construction
- Outer panels in 1.2 mm thick GI construction
- The exterior of the structure shall be pre-treated with 8 tank chemical processes and powder coated with highly chemical resistant epoxy Colors having dry film thickness of 70 to 80 microns for chemical resistance, scratch resistance and to prevent rusting.
- The rear part of the fume hood shall have service access for maintenance.

Inner lining and worktop

Internal side wall panels shall be fabricated using minimum 6 mm thick liner of high pressure laminate made by compressing impregnated paper or wood fiber and epoxy, phenolic or poly propylene resin of approved make with an opening that provides access to the service piping and valves to facilitate installation and maintenance. The work top shall be made of



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minimum 20 mm thick material (EBC cured phenolic resin) of high pressure laminate of approved make provided with a PP cup drain flush with the recessed work surface.

Sash

The sash shall be made of 5 mm thick transparent toughened glass having a breaking stress value of 24,000 psi with a clear openable height of 750mm and heat resistant. Vertically moving sashes shall be provided. The sash handle should be of type 316 stainless steel with satin finish, and should not generate eddies in the plane of the sash opening. The counterbalance mechanism should use a single counterweight, stainless steel wires on ball bearing pulley assemblies. A cable-retaining device should be provided, assembled to prevent tilting of the sash during operation. Spring counterbalance mechanisms are not acceptable. The sash should move easily and quietly and remain in place wherever it is stopped. The sash should open and close against rubber bumper stops, installed so that the user can readily adjust the sash opening when moving the sash from either end. The design should ensure that, in the event of a failure of the counterbalance mechanism, the sash cannot fall within 50 mm of the bottom airfoil. This is in order to avoid the potential for serious injury to the fume hood user.

Airfoil

A streamlined "flip-on" type airfoil shall be integral at the bottom of the hood opening on bench hoods. The horizontal airfoil should be of 1.6 mm stainless steel, type 316 L with Teflon coated, typically installed approximately 25 mm above the raised portion of the work surface. It should be designed and installed for eddy-free entry of air into the fume hood. The airfoil should be designed to eliminate reverse flow within 75 mm of the plane of the sash.

Baffle

The baffles shall be fabricated using minimum 6 mm thick liner of high pressure laminate of approved make and should have excellent chemical and heat resistant and fire retardant. At



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least three slots shall be provided for effective distribution of flow of air which shall be placed at a distance of approximately 5 cm from the back liner and shall be removable for cleaning.

Scaffold/Lattice

A 4*4 height and width adjustable scaffold made of SS 316 (minimum 12 mm diameter) shall be provided on to the internal liner clamped with the PP clamps to hold the test samples and rotors within the fume hood.

Cup Sink

There shall be provision for water supply with a single valve tap in each fume hood with a high density polypropylene/Solid Epoxy (approx. dimension 80*160 mm) oval shaped cup sink directly below the tap and shall be connected to the existing water inlet as well as drain outlet respectively.

Electrical Services

Lighting fixtures shall be of twin LED type light with fluorescent lamps which are sealed, vapor tight and protected by a transparent, scratch-resistant, shatter-resistant and flame resistant material. All the electrical switches and sockets (GI construction) shall be positioned outside the fume hood just below the work top. Each fume hood shall necessarily possess minimum six 3-pin electrical sockets (220-240V, 6-16A) and a shunt tripper for the safety control of all the electrical points.

Service Valves and Plumbing

The shut-off valve or cock for the water supply shall be provided outside the fume hood. All the fittings shall be of approved makes. Utility services like Nitrogen, Compressed Air & Potable water shall consist of remote control valves as selected located within the end panels, controlled by in and out facility with flexible hose passing through the side panels of the hood, with color coded PP handles. All gas valves for regular lab gases to have standard




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needle valve and push and turn type arrangement for all gases to be supplied. All supplied valves to clear the following pressure test conditions: Gas Fittings - 7 bar, Water fittings - 10 bar. Interior fitting for gases and water shall be with polypropylene/epoxy coated forged brass construction 2.0 m long flexible tubing with end fittings for following services:

SERVICE	LETTER CODING	COLOUR CODING	Tube construction
Water	DIW	White	PU-4
Compressed Air	AIR	Orange	PU-4
Argon/Nitrogen	A/N	Blue	PU-4

Digital Face Velocity Monitor

Fume hoods shall be provided with an alarm system to detect low and high hood face velocities. The alarm signals shall activate any time the face velocity falls below the low velocity alarm set point or rises above the high velocity alarm set point. There shall be both visual and audible alarm signals. The audible alarm shall have a mute provision.

- Provide fume hood manufacturer's recommended face velocity monitor with a local audible and visual alarm, capable of detecting a drop or rise in airflow (not static pressure) through the hood.
- The velocity monitor shall be digital with a LCD screen.
- All parts of the system which are apt to be in contact with vapors or gases in the fume hood shall be chemically resistant, such as the controller, sensing device, and wiring.
- Provide a means for setting the alarm set point to the exhaust level desired. This adjustment shall be "internal" so that it is not readily adjustable by operating personnel.



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- The low level alarm point is 80 feet per minute (fpm) for conventional fume hoods and 56 fpm for low flow fume hoods.

Duct Collar

A 8"-10" diameter polypropylene duct collar shall be located in the top of the hood plenum chamber.

Motorized Volume Control Dampers

Damper Sets with actuator - Damper sets with actuator shall be arranged in substantial supporting frames and each blade shall be mounted on a shaft, which turns in sintered bronze bearings. All damper blades shall be inter-connected by means of a suitable bar linkage for ganged operation. All dampers shall be arranged with spindle horizontal and shall be sized to handle the required air quantities. Whenever the fume hood is ON the damper should remain open and when in OFF condition the same should automatically get closed. This shall be integrated with the hood blower.

Under Hood Cabinets

Under hood cabinets of approved makes shall be of double wall construction having an air space of 1 1/2" throughout using 18 gauge CRCA sheet epoxy coated for chemical resistance, scratch resistance and to prevent rusting. The cabinets shall be provided with leak proof sills to prevent leakage in case of accidental spills. The doors shall be of self-latching mechanism for complete closure with flush mounted locking handles and secured on full length heavy duty piano hinges. Suitable air ducts ready for connection to main exhaust system of the fume hood shall be provided. Adjustable leveling legs shall be provided to place the cabinet on uneven surface. Cabinets should be provided with large illuminating warning label to identify the type of material stored within the unit.

Finally: No fumes leak point should be present when the fume hood is in closed condition. This is extremely important from safety point of view.




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(II) Centrifugal Blower

Silent high efficiency PP + FRP lined remote blower consisting of continuous rating motor and chemical resistant impeller. The blower is designed to give a face velocity at safe working height as per the international safe velocity norms. (ANSI/AIHA Z9.5). The blower body is polypropylene UV treated high density and chemical (corrosion) resistant and is mounted on a metallic stand. Centrifugal Blower shall be with specs: CFM 3200, 120-140 mm, WC Drive - 1.0 HP, 2800 RPM, 415V, 50 Hz., TEFC class B insulation induction motor with IP55 enclosure, in Non-FLP construction

General:

The exhaust fans supplied and installed shall be of 'Centrifugal Corrosion Resistant' type and shall be capable of delivering the design flow rate against all duct losses. The fans shall be robust in construction and suitable for continuous duty operation. It shall be mounted with ease of maintenance and shall be installed with proper vibration isolators to minimize vibration transmission to ductwork and support structure. Fans selected shall be silent and vibration free when running and suitable for outdoor use.

Specifications:

- Housings: PP- Single block strong high density UV treated and recyclable polypropylene (PPH) with no welded joint. Reversible and rotatable to any 8 standard discharge positions by 45 degree increments. All fan mounting hardware in stainless steel.
- Wheels: PP - Forward curved centrifugal type impeller made, of injection moulded PPH. Fan wheel supplied with hub cap constructed of PPH. Wheels electronically and dynamically balanced to ISO 1940.
- Motors - Direct drive, asynchronous, three phases, IP55. Single speed: three phase 230/400 V-50/60 Hz. Motor is outside the airstream. Three phase motors speed adjustable by variable frequency inverter drive.



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- Motor Support - Several options: no stand, metal stand constructed of epoxy coated sheet metal, polypropylene motor pedestal or roof unit kit.
- Temperature Resistance - PPH casing and wheel recommended up to 80 °C.
- Performance - Fan performance based on tests conducted in accordance with AMCA 210-85 and ISO 5801.
- Warranty - Equipment to be free from defects in workmanship and material under normal use and service for one year after installation, and commissioning of fume hoods

Exhaust System

Technical Specifications for PP/FRP Ducting:

- PP means PPGL: One side smooth & glossy finish and other end is matt finish.
- The smooth surface should be the inner surface of the duct.
- On mat side, FRP lining to be done.
- 25 mm x 25 mm Stitch welding is done on inner surface and continuous welding on outer surface with 5 mm welding thickness.
- FRP Lining to be done on the outer surface of PPGL i.e. on mat side.
- One layer FRP is one mm.
- The final layer should be with fine mat to have smooth and good finish.
- While making the lining, there should not be any air pockets or any sort of uneven finish.

(III) Ducting

(i) Rigid Ducting of PP (Polypropylene) + FRP (Fiber Reinforced Polyester) and flexible ducting with flanges, bends, damper transitions, clamps etc. Flexible joint is provided in the



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ducting in order to avoid transmitting the blower vibrations to the hood. A weather proof rain cowl is provided at the outlet of blower. All PP FRP to be 3+3 mm thick.

In addition, the following points should be also taken into account while fabrication of ducts.

- 1) All ducts of size larger than 450mm shall be cross broken.
- 2) All ducts shall be supported from the ceiling / slab by means of MS rods of dia 8mm with MS angle of size 40 x 40 x 5 mm at the bottom with neoprene pad in between the duct & MS angle. The ducts shall be suspended from the ceiling with the help of dash fasteners. Provision for necessary ancillary materials required for hanging the ducts shall be arranged by the supplier.
- 3) The vanes shall be provided wherever required and shall be securely fastened to prevent noise & vibration.
- 4) The rubber gasket shall be installed between duct flanges in all connections and joints.
- 5) All flanges and supports should be primer coated.
- 6) The ducting work can be modified if deemed necessary in consultation with the Engineer in Charge to suit actual site conditions in the building

3.1 Terms and conditions

A. Mechanical, electrical and associated systems shall be safe, reliable, efficient, durable, easily and safely operable, maintainable, and accessible.

B. All equipment must be compatible with Indian electrical standards and codes.

C. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. Digital electronics devices, software and systems such as controls, instruments, shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years.

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D. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.

E. Vendor must provide a list of satisfied Indian users and their contact details for using offered items.

F. Electrical Components and Devices: UL listed and labeled for intended use.

3.2 Test and Submittals

A. Manufacturer's Literature and Data: Include the following:

1. Illustrations and descriptions of laboratory fume hoods and factory-installed devices for fume hoods.

2. Catalog or model numbers for each item incorporated into the work.

3. Results of testing according to ASHRAE 110.

B. Field Test Reports: Indicate dates and times of tests and certify test results.

C. Factory Test Reports: Provide manufacturer's QC checklist or other reports that indicate comprehensive factory testing has been performed, and the results of these tests have been certified.

3.3 TESTING EQUIPMENT

A. Testing equipment must be maintained and calibrated in accordance with manufacturer's specifications and have been calibrated within the past year. Indicate calibration dates and equipment type on test data form.

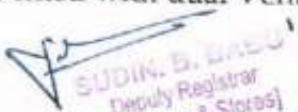
PART 4 Supply and Installation of Standalone Flammable Chemical Storage Cabinet:

JUSTRITE or approved make from the list Safety Cabinet - 45 Gallon (170L)

Made of minimum 18 gauge (1mm) Double Wall Steel with 38mm of Insulating Air Space.

Fully Welded Constructions with continuous Piano Hinges fitted with dual Vents with Built-




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in Flame Arrester. Cabinet should be provided with 2" Height Liquid Tight Containment Sump to hold any leakages - Adjustable Shelves Provisions- Manual Close Doors (when pushed closed- doors will automatically self-latch) with Flush Paddle Handle and Slip Resistant Grip with provision for double key set (one keyed lock). Fully powder coated- Durable & Chemical Resistant Cabinet with High Reflective Band.

Dimension: H 65" x W 43" x D 18"

Color: Yellow

Cabinet Manual Closing Double Door with ≥ 3 Shelves.

Approvals: FM- N-O.

PART 5 INSTRUCTIONS FOR INSTALLATION

5.1 DELIVERY AND IDENTIFICATION

A. Deliver fume hoods to the job-site, clearly identified in plain view by specifying fume hood manufacturer, size and type of fume hood, sash type and any special features included.

5.2 INSTALLATION

A. Make all field measurements, and verify all dimensions and that required utilities are roughed-in and ready for hook-up prior to installation.

B. Install fume hood base cabinets plumb and level and parallel to walls and in accordance with manufacturer's instructions.

C. Install monitors in accordance with manufacturer's instructions.

Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.


Fume hood Installation shall meet seismic support and anchorage requirements. Coordinate the installation of all supplementary framing and backing plates.

D. Repair or remove defective work upon completion of installation. Touch up as required.

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E. Remove all packing materials, tags, tape, and shipping materials.

4.2 CLEANING AND PROTECTION

A. Clean all exposed interior and exterior surfaces and protect from damage by work of other trades.

PART 6 - SUPPLIER FUNCTIONAL PERFORMANCE TESTING (FPT)

A. Pre-test meeting: The Supplier shall coordinate its FPT activities of fume hoods, including test procedures and FPT documentation, with the Client's confirmation testing activities.

1. This meeting shall include a face velocity test of at least one fume hood by third party with a representative of the department present.

B. Supplier face velocity testing shall not start until the following is complete:

1. Pre-test meeting

2. Verification that all specified fume hood components and accessories are provided.

3. Start-up and functional performance testing of all fume hood accessories and utilities is complete and in accordance with manufacturer's specifications

4. Ceiling tiles are in place and laboratory doors are closed (the space is contained).

C. For each fume hood, the Supplier shall perform and document the following FPT requirements:

1. Face velocity

a. For conventional flow fume hoods, the target air velocity with the sash height at 18 inches is 100 feet per minute (fpm) +/- 10%.

b. Face velocity shall be tested using a VelGrid probe by Shortridge instruments, or an anemometer.




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2. Sound level

- a. Sound level must be at or below 50 dB measured with the sash height at 18" and the sound level meter located 3 feet from the sash and 5 feet above the floor.
- b. Sound level shall be tested using a Type 2 sound level meter manufactured to meet the American National Standards Institute (ANSI) S1.4 "Standard for Sound Level Meters" capable of measuring decibels in dBA.

3. Monitor functionality

- a. The fume hood monitor is verified to be functioning and properly calibrated.
- b. Verify that the face velocity is displayed.
- c. Raise the sash to reduce the face velocity. Confirm that both the visible and audible alarm signals function when the velocity drops below 80 fpm
- d. Test the monitor's mute function and the reset button.
- e. This test fails if the monitor does not alarm, is more than 10 fpm out of calibration, or if it fails any functional test or is damaged.

D. Fume Hood FPT Documentation

1. Record all test data on FPT data field forms for each fume hood.

6.1 FINAL INSPECTION REQUIREMENTS

A. The Supplier shall provide end-user ten (10) working days advance notice to schedule Client's fume hood confirmation testing.

1. Include:

- a. Complete fume hood FPT documentation.
- b. For each fume hood type, the manufacturer's installation and operation manual.

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c. For each monitor type, the manufacturer's manual with calibration instructions.

B. The end-user, will review the Supplier's FPT documentation. If the documentation meets the performance requirements of these specifications, then the end-user will conduct confirmation testing of each fume hood in accordance with the Scientific Equipment and Furniture Association (SEFA) standard 1 for face velocity, sound level, monitor functionality, and VAV tracking (if specified). Also the under hood cabinetry shall be tested in accordance with SEFA 8 standards.

C. The end-user will notify the Supplier if any fume hoods fail confirmation testing. Any fume hoods that do not meet the performance requirements shall be repaired and re-tested by the Supplier. The Supplier shall submit new FPT documentation for review and additional confirmation testing until each fume hood satisfies the requirement of end-user.

1. Once the final testing is accepted and complete, the end-user will place appropriate labels on the fume hoods allowing use and this Work shall be substantially complete.

PART 7 LIST OF APPROVED MAKES:

Below mentioned makes to be used unless/otherwise defined in technical specifications details

STEEL ANGLES:	SAIL, TATA, VIZAG, JINDAL
CRCA SHEETS:	SAIL, TATA, VIZAG
LABORATORY FITTINGS:	WATER SAVER, BROEN, BROWNALL LABTAP
LABORATORY SINKS/DRIP CUPS:	KLLAB, WATER SAVER, BROEN
ELECTRICAL SOCKET:	Highly reputed brands such as LEGRAND, NORTHWEST, MK, NORISYS
EYEWASH/SHOWER:	WATER SAVER, BROEN
HINGES:	Highly reputed brands such as HETTICH, HAFFLE
LEGS:	HETTICH, HAFFLE



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LOCKS:	Highly reputed brands such as HETTICH, HAFFLE
DOUBLE EXTENTION BALL SLIDE:	HETTICH, HAFFLE
LABORATORY STORAGE CABINETS:	JUSTRITE, LABOR SECURITY SYSTEM, SECURALL, LACONT

APPROVED MAKE OF MATERIALS FOR FUMEHOOD

FUME HOOD SERVICE FIXTURES:	WATER SAVER, BROEN
ELECTRICAL SOCKETS:	Highly reputed brands such as LEGRAND, NORTHWEST, MK, NORISYS
FACE VELOCITY AND CONTROLS:	TEL, TROX, PHOENIX
CENTRIFUGAL BLOWERS:	SEAT, COLASIT
WORK TOP:	TRESPA TOP LAB ^{PLUS}
INNER LINING:	TRESPA TOP LAB ^{VERTICAL}
TOUGHENED GLASS:	SAINT GOBAIN, MODI, ASAHI INDIA, GSC, ATUL

General Standards to be followed for Fume hood:

Air Flow

Proper air flow at the face of the hood is probably the most common cause of confusion regarding fume hood operation. Here are what the codes and standards say:

OSHA: "General air flow should not be turbulent and should be relatively uniform throughout the laboratory, with no high velocity or static areas; air flow into and within the hood should not be excessively turbulent; hood face velocity should be adequate. (Typically 60-110 fpm.)"

ANSI/ AIHA Z9.5: "Each hood shall maintain an average face velocity of 80-120 fpm with no face velocity measurement more than plus or minus 20% of average."

SEFA: "Face velocities of laboratory fume hoods may be established on the basis of the toxicity or hazard of the materials used or the operations conducted within the fume hood. Note: Governmental codes rules and regulation may require specific face velocities. A fume hood face velocity of 100 fpm is considered acceptable in standard practice. In certain situations, face velocity of up to 125 fpm or as low as 75 fpm may be acceptable to meet required capture velocities of the fume hood."

Monitoring/Alarms



OSHA: "each hood should have a continuous monitoring device to allow convenient confirmation of adequate hood performance before use. If this is not possible, work with substances of unknown toxicity should be avoided or other types of local ventilation devices should be provided."

ANSI/AIHA Z9.5: "New and remodeled hoods shall be equipped with a flow-measuring device."

NFPA 45: "New and remodeled hoods shall be equipped with a flow-measuring device."

Maintenance/Inspection

As with all equipment maintenance is important to proper operation.

OSHA: "Quality and quantity of ventilation should be evaluated on installation, regularly monitored (at least every 3 months), and re-evaluated whenever a change in local ventilation devices is made."

ANSI/AIHA Z9.5: "A routing performance test shall be conducted on every fume hood at least annually or whenever a significant change has been made to the operational characteristics of the system"

NFPA 45: "When installed or modified and as at least annually thereafter, laboratory hoods, laboratory hood exhaust systems, and laboratory special exhaust systems shall be inspected and tested."

NFPA 45: "Special use laboratory hoods and special use local exhaust systems shall be identified to indicate their intended use." "A sign shall be affixed to each hood containing the following information from the last inspection: Inspection interval, Last inspection date, Average face velocity, location of fan that serves hood, Inspectors name. Exception: In lieu of a sign, a properly maintained log of all hoods giving the above information shall be deemed acceptable."

Exhaust

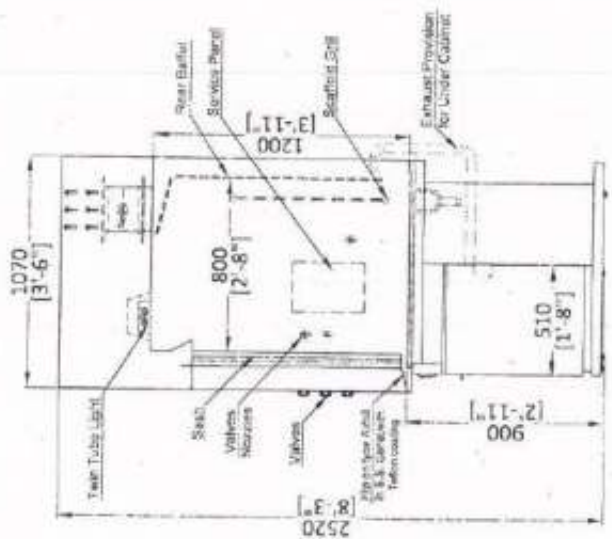
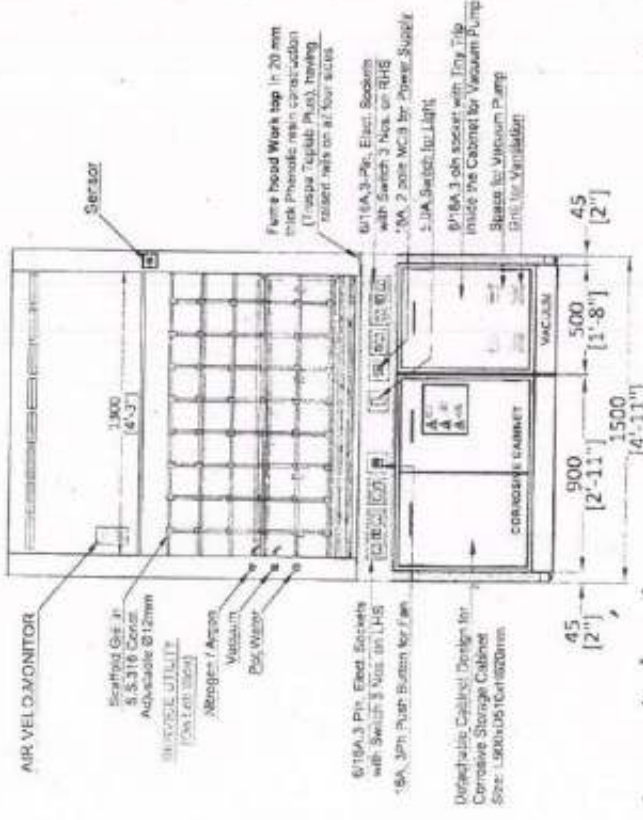
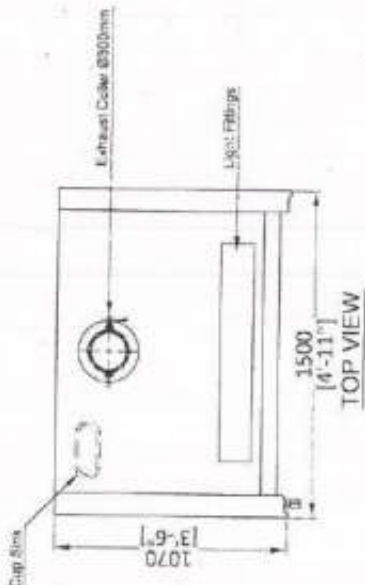
ANSI/AIHA Z9.5: "Discharged in manner and location to avoid re-entry into the laboratory building or adjacent buildings at concentrations above 20% of the allowable concentrations inside the laboratory under any wind or atmospheric conditions." Exhaust stack: "Be in a vertical up direction at a minimum of 10 feet above the adjacent roof line as so located with respect to opening and air intakes of the laboratory or adjacent buildings to avoid re-entry."

NFPA 45: "Air exhausted from laboratory hoods and other special local exhaust systems shall not be re-circulated." "Air from laboratory units and laboratory work areas in which chemicals are present shall be continuously discharged throughout systems maintained at a negative pressure relative to the pressure of normally occupied areas of the building."



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CONSTANT AIR VOLUME FUME HOODS WITH CORROSIVE UNDER HOOD CABINETS



Signature: *[Handwritten Signature]*
Date: 21/05/20
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Research & Development

Type of Hood:	Constant Air Volume Fume Hoods with corrosive under hood cabinets.
Overall Dimensions:	W1500mm x D1070mm x H2520mm
Inner Dimensions:	W1300mm x D800mm x H1200mm
Sub:	Combination Rising type in hinged. Glass Construction
Worktop:	Fume hood Work top In 20 mm thick Phenolic resin construction (Thespa Toplab Plus) having valves runs on air flow sides. Oval Shaped P.P. Cup Sink - 1 No. (On Left Rear Side) 6 mm thick Chem. & Heat Resistant Material (Phenolic Resin Const.) Material (Phenolic Resin Const.)
Slide:	- Nitrogen / Argon valve with nozzle 1 No. - Vacuum valve with nozzle 1 No. - Portable water valve with nozzle 1 No.
Inside Lining:	Utility Service Fittings (On Left Side) - Nitrogen / Argon valve with nozzle 1 No. - Vacuum valve with nozzle 1 No. - Portable water valve with nozzle 1 No. Utility Service Tube Construction: [1.5 mts Long Flexible Tubing with End fittings] - Nitrogen / Argon - 4 ID Polyethylene tube - Vacuum - S.S. Braided Teflon Hose - Portable Water - Nylon Braided PVC Hose Electrical Fittings & Controls: [All in Run-IP Const.] - 5.0A. Plug Type Switch for Tube Light 1 No. - 18A. 2 Pole MCB for Electric Supply 1 No. - 18A. 3 Ph. Socket with Switch 6 Nos. - 18A. 3 Ph. Push Button for Fan 1 No. - Twin Tube Fluorescent light 1 No.
Accessories:	- 300mm Dia. Volume Control Damper in P.Damp. 1 No. - Scaffold Grill (1300mm x 750mm) in 316 S.S. Const. Ø12mm 1 No.
Type / Make of major Components:	- Elect. Socket - Legrand Make or Equivalent Make - Push Button - Legrand Make or Equivalent Make - MCB - Legrand Make or Equivalent Make - Switch - Legrand Make or Equivalent Make - Fume Hood Under Cabinet (Depth: 510mm) - Dedicated Design for corrosive and Vacuum Cabinet - Special arrangement for air ventilation inside the cabinet. - C-type Handle

Note - All dimensions are in mm

DIRN	NAME	DESCRIPTION
CHK		G.A. DRAWING OF LABORATORY FUME HOOD
APP.		
		CLIENT: INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY THIRUVANANTHAPURAM
SCALE:	N.T.S.	Rev. No.
		RE

