

# TATA INSTITUTE OF FUNDAMENTAL RESEARCH

Autonomous Institution of the Department of Atomic Energy, Government of India  
HOMI BHABHA ROAD, NAVY NAGAR, COLABA, MUMBAI - 400 005.

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**Ref.: TIFR/PD/CF18-37/181282**

**November 29, 2018**

NIT cum Tender Document (TWO PART PUBLIC TENDER) for the following works:

**Repairing & Replacement of Insulated Air-conditioning ducting of Library & Labs at 1<sup>st</sup> floor , Central Store at TIFR, Colaba, Mumbai - 400 005**

|  |   |
|--|---|
| Tender No.                               | <b>TIFR/PD/CF18-37/181282</b>   |
| Estimate Cost                            | Rs. 12 Lakhs  |
| Tender Fee                               | Rs. 500/- by way of Demand Draft in favour of Registrar, TIFR, Mumbai   |
| EMD                                      | Rs. 24,000/- by way of Demand Draft in favour of Registrar, TIFR, Mumbai  |
| Type of Tender                           | Two Part Public Tender  |
| Time of Completion                       | 12 weeks from the date of award of contract   |
| Contact Persons                          | <b>Shri Rajesh Sharma .H. Jagtap (Tel : 22782553)</b><br><b>Shri Sangam Sinha ( Tel. No. 22782325)</b><br>Technical Service for any technical clarifications. |
| Last Date for Submission of Tender       | <b>14.12.2018 on or before 1730 Hours</b>   |
| Date of Opening Technical Bid (Part II") | <b>17.12.2018 at 1500 Hours (Only Technical Bid Part II")</b>   |

Both Technical Bid (Part II) and Financial Bid (Part I) to be submitted within the due date and time in separate envelopes and marked on top as Part I and Part II. These two sealed envelopes should be further put in one Master Envelope superscribed with the Tender No., Due Date in Bold Letters.

**The Bidders who had submitted EMD / TENDER FEE against the first round of this tender ( i.e Ref No. CF18-37/181282 dt. 3/10/2018) are exempted from re-submission of cost of EMD / Tender Fee against this tender. However, they will have to resubmit fresh bid against this tender.**

All prospective bidders are requested to visit our website regularly for any such updates/corrigendums.

Please see attached sheet for conditions of tender.

TATA INSTITUTE OF FUNDAMENTAL RESEARCH  
**Technical Services**

TENDER DOCUMENT

Repairing & Replacement of Insulated Air-  
conditioning ducting of Library & Labs at 1<sup>st</sup> floor ,  
Central Store at TIFR, Colaba, Mumbai - 400 005

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# 1.0 CONDITION OF CONTRACT

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1.0 GENERAL CONDITION OF CONTRACT

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## GENERAL INFORMATION TO BIDDER

1. On behalf of Tata Institute of Fundamental Research (hereinafter referred to as the Institute) quotations are invited for Repairing & Replacement of Insulated Air-conditioning duct of Library & Labs at 1<sup>st</sup> floor, Central Store at TIFR, Homi Bhabha Road, Navy Nagar, Colaba, Mumbai-400 005.
2. **Eligibility Criteria :** Bidders are required to comply with the following eligibility criteria:
  - a) Registration with GST is mandatory. Those not registered with these authorities shall be disqualified.
  - b) **Should have** experience in execution of similar nature of works.
  - c) **Tenderers who wish to quote for this work should have done minimum three similar nature of job having comparable value in government/private organizations. Out of the three jobs one job should be of value not less than Rs. 8.0 Lakhs or two jobs should be of value not less than Rs. 6 Lakhs each or three jobs should be of value not less than Rs. 4 Lakhs each , executed during last 3 years. Only those bids satisfying this condition shall be processed.**
  - d) **Service Support, Spares and Tools:** Bidder should have Service Support Set-up like required tool, office, qualified technical personnel, etc. in metropolitan region of Mumbai to ensure minimum time for mobilization for work.
  - e) Bidder should visit the site before quoting to ascertain the nature of job. Only those bidders, who visited the site prior to quoting, shall be entertain and their bids shall be opened.
  - f) **Bidders who have not accepted the order/job awarded to them or withdrawn from the tender process OR whose EMD/Security deposit has been forfeited in the past, their bid will not be considered and treated as ineligible/disqualified.**
3. The Bids should be valid for 90 days from the closing date of the Tender.
4. There are two separate sealed envelope for Financial (Part-'I') & Technical Bid (Part-'II'). Both the sealed envelopes should be put in another envelope duly sealed. Tenders in sealed envelopes duly superscribed with the Financial or technical part as the case may be, Tender No. and due date, etc. and shall be addressed to the Purchase Officer, Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai - 400 005.
5. Technical Bid i.e. part 2 should contain;
  - a) **Earnest Money Deposit (EMD) of Rs.24,000.00 and tender fee Rs. 500/-**
  - b) Proof of Experience in carrying out **similar nature of work i.e. Installation of insulated Air-conditioning ducting.**
  - c) List of similar work in hand and works carried out by them for last 3 years indicating annual turnover, the agency for whom executed, value of work, etc.
  - d) Performance Certificates/ Copy of Pos
  - e) **PAN No.**
  - f) **Duly filled in technical details & questioner**
  - g) Details of local office & list of Technical Staff and tools & machinery

6. Tenders are to be on the prescribed form of TIFR. Tenderers should quote in figures as well as in words the rates and amounts tendered by them. All correction shall be attested by the dated initials of the tenderer.
7. When a contractor signs a tender in an Indian language, the total amount tendered should also be written in the same language.
8. The competent authority on behalf of T.I.F.R. does not bind himself to accept the lowest or any other tender and reserves to himself the authority to reject any or all the tenders received without assignment of a reason. All tenders in which any of the prescribed conditions are not fulfilled or any condition including that of conditional rebate is put forth by the tenderer, shall be summarily rejected.
9. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the vendors who resort to canvassing will be liable to rejection.
10. All rates shall be quoted on the proper form of the tender alone & It will be obligatory on the part of the tenderer to tender and sign the tender document for all components/parts.
11. On acceptance of the tender, the name of the authorised representative(s) of the vendor, who would be responsible for taking instructions from the Chief Engineer, shall be communicated to the Chief Engineer.
12. The total amount should be written both in figures and in words. In case of figures the words `Rs.' Should be written before the figures of rupees and the words `P' after the decimal figures e.g. Rs. 1.15 paise and in case of words, the words `Rupees' should be preceded and the word `Paise' should be written at the end. Unless the rate is in whole rupees and followed by the word `only' it should invariably be upto two decimal places. While quoting the rates in schedule of quantities, the word `only' should be written closely following the amount and it should not be written in the next line.
13. Goods & Service Tax (GST) or any other tax on material in respect of this contract shall be payable by the vendor & TIFR will not entertain any claim whatsoever in this respect. **The bid should be inclusive of GST. The required Tax shall be deducted at applicable rates from each bill.**
14. The owner reserves the right to postpone the date of submission and opening of Quotations.
15. The parties shall quote in English their rates/prices both in figures, as well as the Words against each item of the work as detailed in the enclosed Schedule of Quantities. In the event of any discrepancy between the quoted rates/prices in words and that quoted in figures, the rates/prices quoted in words shall govern.

## GENERAL CONDITIONS OF CONTRACT

### 1.0 Definition of Terms :

1.1. In construing these general conditions and the specifications the following works shall have the meanings herein assigned to them unless there is something in the subject or context inconsistent with such works.

The term `Contractor' / `Bidder' / `Vender' shall mean the party whose quotation has been accepted by the Owner.

The `Owner/Purchaser/Client' shall mean Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai - 400 005.

The term `Sub-Contractor' shall mean the firm or persons named in the contract for any part of the work or any person to whom any part of the work has been sublet with the consent in writing of the Engineer-In-Charge and shall include his heirs, successors and assignees approved by the Purchaser.

The Term `Inspector' shall mean any person appointed by/or on behalf of the Purchaser to inspect work under the contract or any person deputed by the Inspector for the purpose.

The term `Engineer' shall mean Engineer, Technical Services, Tata Institute of Fundamental Research, Colaba, Mumbai or some other person for the time being or from time to time duly appointed in writing by the Owner to act as Engineer for the purpose of the Contract or in default of such appointment the Purchaser.

The term `Specification' shall mean the specifications annexed to or issued with these Conditions of Contract.

The term `Site' shall mean the place or places at which the work is to be done by the Contractor.

The `Contract' shall mean acceptance of the work order placed on contractor.

`Tests on Completion' shall mean such tests as prescribed by the specifications or have been mutually agreed to between the Contractor and the Purchaser to be made before the site is taken over by the Purchaser.

`Writing' shall include any manuscript, typewritten or printed statement under or over signature or seal as the case may be. Words importing `person' shall include firms, companies, corporations and association of individuals whether incorporate or not.

2. Words importing singular shall also include plural and vice versa where context requires. Quotations must be submitted in duplicate giving complete details; in particular, the offers should clearly specify applicable taxes, warranty/guarantee terms, completion period, etc.
3. **Quotation should be valid for a period of 90 days from the date of receipt. Completion period shall be 12 weeks**
4. Quotations containing erasures or alterations will not be considered.
5. Quotations which do not comply with the above conditions are liable to be rejected.
6. The Institute shall be under no obligation to accept the lowest or any quotation received in response to this inquiry and shall be entitled to reject any quotation without assigning any reason whatsoever.
7. Contract:  
Contractor should send their acceptance letter on receipt of 'Letter of Intent' or work order within stipulated period. On expiry of said period or exorbitant delay in commencing or executing the work, the Purchaser shall not be liable to any claim from the Contractor for work entrusted to and may revoke the contract.
8. Work at Site:  
Access to the works shall be allowed only to the Contractor, Sub-Contractors or his duly appointed representatives. The Contractor shall not object to the execution of work by other contractors or tradesman and shall afford them every facility for execution of their several works simultaneously with his own.

Work at the Purchaser's premises shall be carried out at such time as the Purchaser may approve but the Purchaser shall give the Contractor all reasonable facilities for the same. The Contractor shall provide sufficient fencing, notice boards etc. to guard the works and warn the public.

The Contractor shall obey Central, local and State regulations and enactment pertaining to workmen and labour and the Engineer shall have the right to enquire into and decide all complaints on such matters.

9. Delays:  
The Contractor shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, whatever the cause for such delays may be, including delays in procuring Government controlled or other materials and delay in obtaining instructions and decisions from Engineer-In-Charge. The Contractor shall, however, merit extension of time as hereinafter mentioned.



10. Taking Over:

The site shall be deemed to have been taken over by the Purchaser when the Engineer will have certified in writing that the equipment has fulfilled the contract conditions.

Extension of Time:

If the Contractor is delayed in the progress of work by changes ordered in the work, or by any cause, which the Engineer shall decide to justify the delay, then the time of completion shall be extended by a reasonable time. No such extension shall be allowed unless requested for extensions are made in writing by the Contractor/Supplier to the Engineer within 15 days from the date of occurrence of the delay.

Other Damages:

The Contractor shall be responsible for all injury to persons, animals or things and for all damage to the works, structure of, and decorative work in the property which may arise from operation or neglect of himself or any of his Sub-Contractor or of his or Sub-Contractor's employees, whether such injury or damage may arise from carelessness, accident or any other cause whatever in any way connected with the carrying out of this contract. This clause shall be held to include any damage to buildings, whether immediately adjacent or otherwise, any damage to roads, streets, foot paths, as well as all damage caused to the works forming the subject of this contract by frost or other inclemency of weather. The Contractor shall indemnify the Purchaser and hold him harmless in respect of all and any expenses or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of Government or otherwise and also in respect of any award of compensation or damages consequent upon such claim.

The Contractor shall reinstate all damage of every sort mentioned in this clause, so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of third parties.

The Contractor shall indemnify the Purchaser against all claims which may be made against the Purchaser, by any member of the public or other party, in respect of anything which may arise in respect of the works or in consequence thereof and shall, at his own expense, effect and maintain, until the work has been 'taken over'.

The Contractor shall also indemnify the Purchaser against all claims which may be made upon the Purchaser whether under the Workmen's Compensation Act or any other statute in force during the existence of this contract or at common law in respect of any employee of the Contractor or of any of his sub-contractor and shall at his own expense effect and maintain until the work has been 'Taken Over', with an approved office.

12.5.1 The Purchaser, with the concurrence of the Engineer, shall be at liberty and is hereby empowered to deduct the amount of any damages compensation costs,

Charges and expenses arising or accruing from or in respect of any such claims or damages from any sums due to or become due to the Contractor.

- 13.0 **Terms of Payment:** Following payment terms shall be followed;  
65% payment will be made against pro-rata delivery of material  
25% payment against completion of erection  
5 % Payment on final inspection and testing at the site.  
5% Payment to be released against appropriate Bank Guarantee valid for entire defect liability period of 12 months reckoned from the date of handing over as certified by the Chief Engineer or after the expiry of the defect liability period.
- 14.0 You will provide contractor's all risk insurance for your men, material and machines and absolve us of all risk and liabilities whatsoever pertaining to your men , materials and machines.
- 15.0 You may require to arrange for photo passes for your personnel and get the same verified by the police department as per the procedure by our Establishment Department before beginning the work. You will have to follow the security guideline of institute.
- 16.0 You will ensure that your workmen follow safe practices at works.
- 17.0 You will ensure that your supervisor is present at site at all times when the works in progress.
- 18.0 As and when called for by us you will provide all necessary details/ test reports.
- 19.0 **Performance guarantee:** The tenderer, whose tender is accepted, will be required to furnish a performance guarantee of 5% of the tendered amount within 7 (seven) working days from the date of intimation. This guarantee shall be in the form Demand Draft / Pay Order / Banker's cheque / FDR issued by a Scheduled Bank .
- The Performance Guarantee shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case the time for completion of work gets enlarged, the contractor shall get the validity of performance Guarantee extended to cover such enlarged time for completion of work. The performance guarantee shall be returned to the contractor, without any interest, after recording of the completion certificate for the work by the competent authority.
- In the event of the contract being determined under provisions of any of the relevant clauses of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of the Director, TIFR.
- 20.0 **Earnest Money Deposit (EMD):**  
Every Bidder has to pay EMD of Rs. 24,000/- by Demand Draft in favor of the Registrar, Tata Institute of Fundamental Research along with the offer. Quotation received without EMD shall be rejected and no correspondence whatsoever will be entertained.

For successful tenderer the EMD shall be returned to the contractor, without any interest, after receiving of Performance Guarantee and placing order on successful bidder. Unsuccessful Tenderers EMD will be refunded after placing the order on successful tenderer.

21.0 **Security Deposit:** Deductions towards Security Deposit shall be made from running bills @ 2.5% of the billed amount. The Security Deposit shall be released after the defect Liability period of 12 months reckoned from the date of completion as certified by Chief Engineer.

# DESCRIPTION OF WORK & TECHNICAL SPECIFICATION

## Description of Work

- 1.0 The tendered work is mainly has two parts i.e. supply & installation of new insulated air-conditioning duct after removing existing insulated duct and repairing of existing insulated air-conditioning duct.
- 2.0 The proposed new insulated supply air-conditioned ducting will be put after replacing the old corroded insulated ducting connected to Library AHU at 'A' block basement & Mezzanine floor. The existing ducting in basement is visible and supported from the basement ceiling. The new ducting shall come at the same place after removal of existing ducting. Care to be taken while working as there are heavy armoured electrical cables & chilled water pipe around the ducting.
- 3.0 The ducting of Library at 'A' block Mezzanine floor is outside the building and covered by boxing. The openings are narrow and vendor to show the innovative way during replacement of these ducting.
- 4.0 The proposed repairing of insulated AC ducts is for Laboratories at 1<sup>st</sup> floor, Central Stores. These ducting runs on terrace as well as within roof & truss structure. The AC ducting within roof & terraces structure is above the false ceiling. There is limited access for men & material in this area.
- 5.0 The new ducting shall be well insulated and weather protected to long last in humid atmospheric condition (near the Sea). All the support with anchoring should be design considering the limited available space & other services like electrical cable, etc. running around the duct
- 6.0 Before quoting, the contractor should inspect the site and ascertain for himself the nature, character and extent of work to be executed and should include all items and services necessary, whether specially mentioned or not in the specifications, scope etc. to meet with the intent and purpose of these specification.
- 7.0 **Contractor to measure the size of existing ducting before removal of duct. The new duct shall be similar to existing duct.** After award of work contractor should make ducting sketch clearly indicating the size of duct, Insulation thickness, details of supports, duct joints, etc. He shall start the fabrication only after the approval by TIFR engineer.
- 8.0 All the incidental civil work related to installation of new ducting shall be in the scope of the contractor.
- 9.0 The ducting under replacement is part of round the clock running air-conditioning system. The activity of replacement shall be carried out during shut down of AC system. The contractor has to plan the work and keep everything ready before asking for shut down. The contractor shall have to carry out the work in short span of time and ready to work day and night.
- 10.0 All the necessary preventive measure & care should be taken by contractor while working. The duct under replacement is covered with chilled water piping, other piping, electrical cabling, etc. These are very old but operational and utmost care should be taken while working in this area.

# Technical Specification

## A. DUCTING & DAMPERS:-

### 1. SCOPE:

The scope of this section comprises the supply and installation of all sheet metal ducts .

### 2. MATERIAL:

Ducts shall be made of galvanized steel sheets. The galvanized steel sheets shall conform to IS 277-1965 with 200gsm Zink coating.

The thickness of sheets shall be as given below:

| Dimensions of ducts | Gauge G.I. | Type of Joints   | Type of Bracings  |
|---------------------|------------|--|---|
| Upto 600            | 24         | G.I. Flange at 2.5 centre  | Cross bracings.   |
| 601 to 750          | 24         | 25x25x3mm Angle iron   | 25x25x3mm MS angles bracing at 1500 mm from joints  |
| 751 to 1000         | 22         | 25 x 25 x 3 mm Angle iron frame                                    | 25 x 25 x 3 mm MS angles bracing at 1500mm from joints  |
| 1001 to 1500        | 22         | 40 x 40 x 5 mm Angle iron frame                                    | 40 x 40 x 3 mm MS angles bracing at 1500 mm from joints   |
| 1501 to 2250        | 20         | 50 x 50 x 3 mm Angle iron to be Cross braced                       | 40 x 40 x 3 mm MS angle bracing at 1200 mm from joints  |
| 2250 & above        | 18         | 50 x 50 x 6 mm Angle iron 10 mm dia. nuts and bolts at 125 centre. | 50 x 50 x 3 mm MS angle bracing at 1200 mm from joints or 50 x 50 x 3 mm angle diagonal bracing |

### 3. HANGERS FOR DUCT:

| Duct Size<br>[mm] | Spacing<br>[M] | Size of MS equal angle<br>[mm x mm] | Size of rod<br>dia<br>[mm] |
|-------------------|----------------|-------------------------------------|----------------------------|
| Upto 750          | 2.5            | 40 x 3                              | 10                         |
| 751 to 1500       | 2.0            | 40 x 3                              | 12                         |
| 1501 to 2250      | 2.0            | 50 x 3                              | 15                         |
| 2251 to above     | 2.0            | 50 x 3                              | 15                         |

**All the MS angle, use for duct support & brazing etc, shall be painted with two coat of anti-corrosive layer like Zink Chromate based paint.**

### 4. INSTALLATIONS:

The duct fabrication & installation shall generally conform to I.S. 655-1963. The contractor shall provide and neatly erect all sheet metal work or as may be required to carry out the intent of these specifications and this shall meet with the approval of the Engineer in all its parts and details.

All necessary allowances and provisions shall be made by the contractor for beams, pipes or other obstructions in the building. Where necessary to avoid beams or other structural work or plumbing or other pipes or conduits the ducts shall be transformed, divided or curved to one side, as approved or directed by the Engineer.

All metal work in dead or furred down spaces shall be erected in time to cause no delay to other contractors in the building.

Ducting over furred ceiling shall be supported from the slab above, or from beams. In no case shall a duct be supported from the ceiling hangers or be permitted to rest on a hung ceiling.

If a duct cannot be run as decided, the Contractor shall install the duct between the required point by any path available, subject to the approval of the Engineer.

All ducts shall be rigid and shall be adequately supported and braced where required with standing beams, tees or angles of ample size to keep the ducts true to shape and to prevent buckling, vibration or breathing.

All joints shall be made tight and all interior surfaces shall be smooth. Bends shall be made with radius not less than ½ the width of the duct or with scientifically designed interior curved vanes, as approved. The vanes shall be so spaced that the aspect ratio of each of the individual elbow formed by the vanes will be about five.

All sheet metal connections, partitions & plenums required to confine the flow of air to and through the filters and fans, shall be constructed of 18 G galvanized Iron, thoroughly stiffened with 1" x 1" angle Iron braces and fitted with all necessary doors as required by the Engineer, to give access to all parts of the apparatus. Doors shall be not less than 18" x 24" in size.

Where metal ducts or sleeves terminate in wood work, brick or masonry openings, tight joints shall be made by means of closely fitted heavy flanged collars.

Air handling units shall be connected to duct work by inserting at air inlet and air outlet a double canvas sleeve. Each sleeve shall be minimum 4" long securely bonded and bolted to duct and units. Each sleeve shall be made smooth and the connecting duct work rigidly held in line with unit inlet or outlet.

5. DAMPERS:

All dampers shall be louver dampers of robust construction & tightly fitted. The design, method of handling and control, shall be suitable for the location and service required.

Dampers shall be provided with suitable links, louvers and quadrants as required for their proper operation, control or setting in any desired position. Dampers & their operating devices shall be made robust, easily operable and accessible through suitable access doors in the ducts. Every damper shall have an indicating device clearly showing the damper position at all times. Dampers shall be placed in ducts & on main supply or return air duct for the proper volume control and balancing the system.

B. INSULATION

The insulation material shall be Closed cell EPDM/Nitrile Based Elastomeric Thermal Insulation. The insulation material shall be Non-thermoplastic or does not melt when heated and is made of non-polar elastomer material.

The thermal conductivity shall be < 0.26 BTU-in/Sq.Ft. Hr. DegF at a mean temperature of 24 Degree C.

**Thickness of Duct insulation shall be minimum 44mm as the duct passes through non air-conditioned area having very high humidity**

(Note: Vendor are to decide the thickness being proposed from their end in consultation with the manufacturer of insulation material based on the thermal & other characteristic as the thickness shall depend on the properties of insulation materials and properties varies from manufacturer to manufacturer)

Insulation shall be applied as follows:

- a) The surface shall be thoroughly cleaned and allowed to dry. The regular uneven surface on the joint area shall be made smooth.
- b) Insulation sheet shall be cut into proper size before installation. A cold adhesive (shall have resistance to fire, water and vapour, etc.) as recommended by insulation manufacturer should be applied on both the surfaces.
- c) Insulation joints shall be cut straight to ensure proper adhesion. Apply the adhesive on the joints, wait until the adhesive dries to touch and press the joints together firmly and cover the joints with self adhesive EPDM rubber tape which fuses chemically with base material and makes an air tight joint.
- d) Insulated surface shall be covered with anti rust metal sheet **40 gauge (0.12 mm ) AL sheet in case of duct insulation** . The joints of metal sheet covered are properly overlapped and grooved fit.



# DATA SHEET & QUESTIONNAIRE

(To be submitted along with Technical Bid)

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**Project:** Repairing & replacement of insulated Air-conditioning Duct

**Location:** TIFR ,Mumbai

|     |   |  |
|-----|---|--|
| 1.0 | To Confirm that the bidder had ascertained the nature of site & surrounding, and all local condition and restriction likely to affect the execution of the contract work. |  |
| 2.0 | To confirm that the bidder has seen HVAC system of Library at 'A' block & Laboratories at 1 <sup>st</sup> floor, Central Store.   |  |
| 3.0 | To confirm that necessary PO's & Work completion certificates are attached in technical bid as per point no. 2 of General conditions of contract                          |  |
| 4.0 | To confirm the offered make of following items<br>Galvanized Plane Sheet<br>Nitrile Rubber Insulation<br>HVAC Grills<br>Tar Felt  |  |
| 5.0 | To confirm that the fabrication & installation of duct follows IS 655 stipulations.   |  |
| 6.0 | To confirm the following in regards to Fiber cloth<br>thickness of fiber cloth<br>Make of Fiber Cloth<br>Density of fiber cloth   |  |

## SCHEDULE OF QUANTITIES

| Sr. No. | Description of Items   | Qty.      | Rate | Amount |
|---------|--|-----------|------|--------|
| 1.      | Removal & shifting of following as per the instruction of TIFR engineer  |           |      |        |
| 1.a)    | existing insulated ducting of Library  | 1 Job     |      |        |
| 1.b)    | Pieces of damaged Tar felt from insulated exposed duct of Labs at Workshop terrace   | 1 Job     |      |        |
| 2.      | Design, fabrication, supply, installation, testing and commissioning of GSS ducting made of <b>Jindal/Tata make GI sheet</b> of following size as per IS655 with all the accessories like turning vanes, elbows, flange, epoxy painted supports, gaskets, nuts and bolts, all the hardware etc. as per technical specifications in totally.  |           |      |        |
| 2.a)    | Size - 24G   | 300 Sqft  |      |        |
| 2.b)    | Size - 22 G  | 1300 Sqft |      |        |
| 2.c)    | Size - 20G   | 250 Sqft  |      |        |
| 2.d)    | Size - 18 G  | 400 Sqft  |      |        |
| 3.      | Supply & installation of <b>Aeroflex /Armaflex /Vidoflex</b> make thermal insulation for <b>supply air ducting (Basement Corridor - Non AC area) with 44mm thick (a layer of 25mm thick with another layer of 19mm thick)Nitrile based rubber having Class 'O' rating</b> backed with factory laminated Aluminum foil including sealant between duct and insulation & Aluminum tape between joints, complete in all respects to the entire satisfaction of the department as per technical specifications in totality. | 1300 Sqft |      |        |
| 4.      | Supply & installation of <b>Aeroflex /Armaflex /Vidoflex</b> make thermal insulation for <b>supply air ducting (Library at Mezz. floor) with 19mm thick Nitrile based rubber having Class 'O' rating</b> backed with factory laminated AL foil including sealant between duct and insulation & Aluminum tape between joints, complete in all respects to the entire satisfaction of the department as per technical specifications in totality.  | 650 Sqft  |      |        |

| Sr. No. | Description of Items   | Qty.      | Rate | Amount |
|---------|--|-----------|------|--------|
| 5.      | Providing & fixing Fiber cloth 10 Mil (thickness) GSM 200 (density) quality on insulated duct with 1 coat of UV coating on the cloth. The cloth to be applied after repairing of existing insulation, wherever necessary, on air-conditioning duct running in roof & truss structure of store 1 <sup>st</sup> floor area.  | 2600 Sqft |      |        |
| 6.      | Providing & Fixing 2mm thick Tar Felt including Hot Priming on exposed insulated Air-conditioning duct after repairing of sand cement plaster at Work shop terrace. The work includes applying 2 coat of STP/equivalent make paint of Silver/Al shade on finished surface of Tar felt with PVC stripping with SS clamps after every 6" distance of insulated duct. | 1350 Sqft |      |        |
| 7.      | Supply & Installation of <b>Cosmos/ Dynacraft /S.R. Aircon / Air Master make four side flanged end with 25mm thick flange</b> , extruded AL powder coated, Double deflection, adjustable type, <b>Supply Air Grills</b> of approved color anodized black color volume control dampers of following size<br>132mm x 290mm   | 16 Nos.   |      |        |
| 8.      | Supply & Installation of <b>Cosmos/ Dynacraft /S.R. Aircon / Air Master make four side flanged end with 25mm thick flange</b> , Fixed face bar type, extruded AL powder coated <b>Return Air Grills</b> of approved color of following sizes<br>132mm x 290mm  | 16 Nos.   |      |        |
|         | <b>Total</b>   |           |      |        |
|         | <b>GST@ 18%</b>  |           |      |        |
|         | <b>GRAND TOTAL AMOUNT</b>  |           |      |        |