

TENDER DOCUMENT

FEA and CFD Analysis

FLUID CONTROL RESEARCH INSTITUTE

KANJIKODE WEST – 678 623, PALAKKAD, KERALA

(Under Ministry of Heavy Industries & Public Enterprises – Govt. of India)

Phone: (91) 491-2566120 / 2566206 / 2569009 Fax: 2566326

E-mail: purchase@fcriindia.com, fcri@vsnl.com

Website: <http://www.fcriindia.com>

I. Scope of Work

i. Scope of Work For FEA :

To verify design of pressure vessel, motor, diffuser, motor and blower supports and to carry out stress and dynamic response analysis to determine any changes that may be necessary to meet the specified design standards.

FEA is for analysis of mechanical stresses and structural dynamic response of the system to ensure that operation will be safe throughout the speed range. FEA shall be done minimum at 100 %, 60 % and 30 % of design duty conditions and any other conditions as deemed necessary. Proposed analysis conditions shall be specified.

Methodology:

- i. Acquiring and studying the standard available codes.
- ii. Verification of mechanical design of pressure vessel, motor, diffuser, motor and blower supports and process gas passages for effective cooling of motor and stresses.
- iii. If necessary, complete motor shall be included for dynamic analysis.
- iv. To prepare a solid model such as ,Pro-E CAD, solid works etc file for **FE** analysis
- v. Suitably meshing of the above finalized CAD model for FE analysis using suitable mesh Import the meshed file into ANSYS/Ideas, pro E, and Algor etc software and provide necessary input along with material properties, boundary conditions, etc.
- vi. Carry out model analysis to determine the robustness of the FE model and also to identify natural frequencies and mode shapes.
- vii. Carry out stress and dynamic response analysis under different boundary conditions as required.
- viii. Study the stress and dynamic response to verify the margins or otherwise with respect to the expected performance (permissible stress levels)
- ix. Consider modifications in consultation with the **M/S FCRI** to enable the structure to meet the stress and dynamic response limits as per ISO 10816 and carry out re-analysis to determine the new result, iterate this step, if necessary.
- x. Prepare the finalized geometry and a report containing the details of analysis and the finalized results.
- xi. Production of manufacturing drawings

FCRI Inputs

- i. Preliminary drawings from FCRI
- ii. Inputs from Design Standards with respect to preferred specifications with regards to materials used.
- iii. Any relevant details required during the course of the project.

ii. Scope of Work for CFD

To obtain the performance of the given blower geometry to optimize the same using CFD at duty conditions of speed, flow, pressures etc and shall include following Methodology

- i. Scrutiny of the following preliminary drawings of various components of the blower system that will be submitted by FCRI along with order.

- a. Impeller
 - b. Vaned static diffuser
 - c. Blower housing vessel
 - d. Any other relevant drawings
- ii. Study of assembly drawings for interference of various components if any, inside the blower vessel
 - iii. Computational modeling of the impeller, vaned diffuser and other essential flow paths to verify stall/surge if any and undesirable flow phenomena inside the flow passages
 - iv. Based on the 2D drawings of the preliminary design of blower, generate the 3D model of the blower using Bladegen/equivalent and Pro-E software equivalent. Extract the fluid domain and create an appropriate MESH file using CFD software. Specifying the given boundary conditions, carry out the CFD analysis using software. The converged solution will provide the performance details of the blower.
 - v. **Suggesting design / structural modifications in design drawing if any for the blower, motor, impeller, diffuser system to meet the desired performance and to minimize the losses.**
 - vi. From the detailed flow field pictures of the CFD solution, change the blade geometry in terms of inlet, outlet and wrap angles, in order to optimize the blower performance. Carry out modeling and CFD analysis as above **to obtain the performance of the blower at design duty conditions.**
 - vii. Predicting the performance of the blower at following flow conditions to generate the flow characteristics

Case	Inlet Pressure bar a	Inlet Temperature C	Flow rate, m ³ /h	Blower Speed rpm	Media
1	47	30	2100	6000	Natural Gas
2	47	30	1575	4500	Natural Gas
3	47	30	840	2400	Natural Gas
4	47	30	525	1500	Natural Gas
5	47	30	210	600	Natural Gas
6	47	30	105	300	Natural Gas
7	27	30	2100	6000	Natural Gas
8	27	30	1575	4500	Natural Gas
9	27	30	840	2400	Natural Gas
10	27	30	525	1500	Natural Gas
11	27	30	210	600	Natural Gas
12	27	30	105	300	Natural Gas
13	6	30	2100	6000	Natural Gas
14	6	30	1575	4500	Natural Gas
15	6	30	840	2400	Natural Gas
16	6	30	525	1500	Natural Gas
17	6	30	210	600	Natural Gas
18	6	30	105	300	Natural Gas
19	1	30	2100	6000	Air
20	1	30	1575	4500	
21	1	30	840	2400	Air
22	1	30	525	1500	Air
23	1	30	210	600	Air
24	1	30	105	300	Air

CFD Predictions (Sl.No 19-24) with a tolerance of 10 % shall constitute the acceptance criteria at atmospheric test at Factory and field test at FCRI. Contractor should demonstrate the predictions during the testing of blowers and are responsible in achieving the above performance.

FCRI Inputs:

- Preliminary design drawings / sketches of the blower
- Normal operation conditions like RPM, fluid properties, boundary conditions etc.
- Limitations, if any on Geometric parameters
- Any relevant details required during the course of the project.

Deliverables

1. Complete report in soft copy, containing the details of analysis, stress and dynamic response details, finalized geometry, details of recommended geometry in CAD and .dwg format.
2. Complete report in soft copy, containing the details of CFD analysis, optimized Performance data, 3D model of the final blower configuration in formats such as .iges with flow domains.

II. Technical Deviations

I. Deviation

List of deviations from requisition / specifications / standards / drawings.

SI No.	Documents		Deviation
	No. Title	Clause	

II No Deviation is required

Place:

Name & Designation

Date:

Authorized Signature

Office Seal

III Similar Orders executed

Sl. No	Description	Name & Postal Address	Phone	Value of order	Delivery date as per Contract	Actual Delivery Date

Note:
Copies of purchase order/completion certificate for the above supply to be enclosed. Later 5 years need to be indicated here.

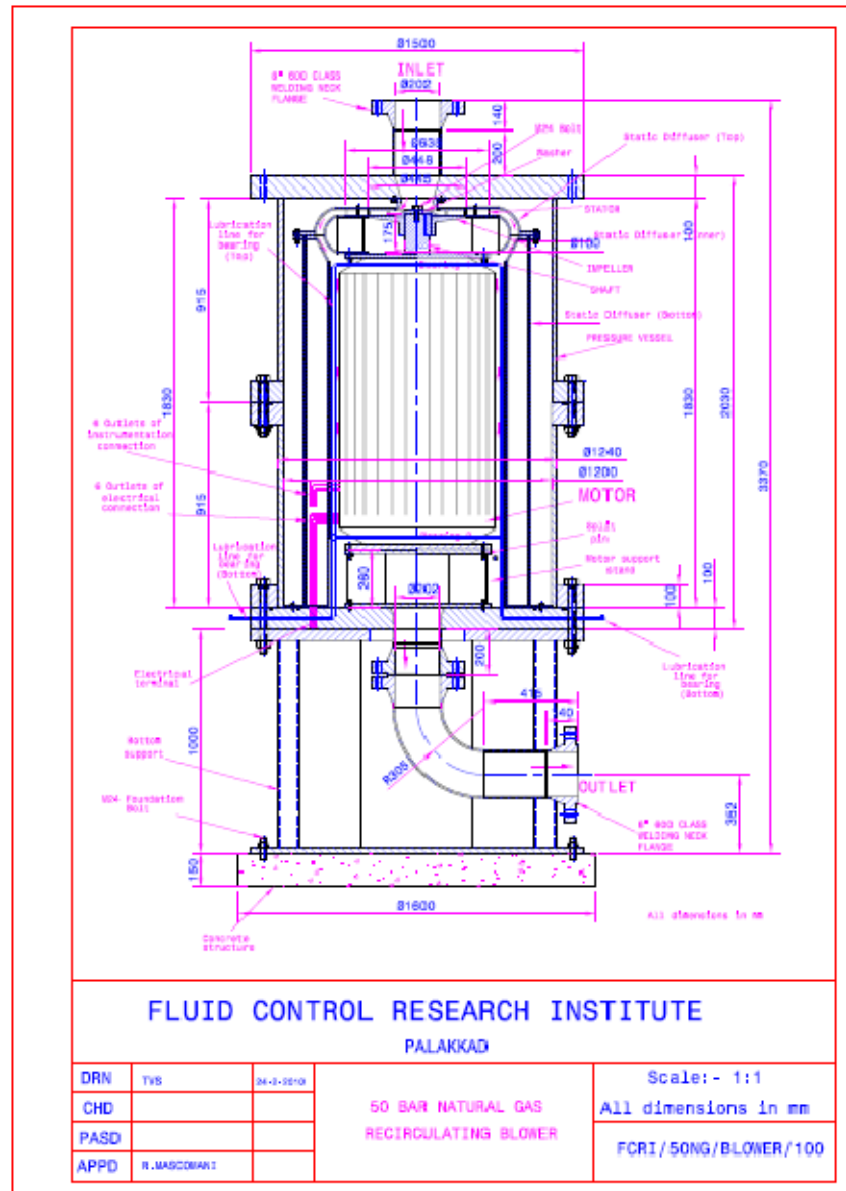
Place: _____ Name & Designation

Date: _____
Authorized Signature

Office Seal

IV Tender Drawings

(For reference and estimation purpose only. Preliminary design drawings will be given along with order)



GENERAL CONDITIONS

CONTENTS

Sl. No.	Description
I	Bidders Eligibility Criteria
II	General Information to Tenders
III	Instructions to Tenders
IV	Tender Notice
V	Form for Bank Guarantee
VI	Format - Letter of Authority
VII	Form for Contract cum Performance Bank Guarantee
VIII	Details of Indian Agent
IX	Commercial Check List
X	Scope of Contract
XI	General Rules and Directions for Guidance
XII	Award of Contract
XIII	Preambles

I. Bidders Eligibility Criteria:

1. Invitation for Bids is open to bidders who qualify the eligibility criteria.
2. **The bidder should have executed at least one job of similar nature either in India or abroad in the preceding 3 years reckoned from bid due date.**
3. The bidder shall not have been declared as ineligible by FCRI for corrupt or fraudulent practices as defined in ITB.
4. Bid should be from original contractors.

II. General Information To Tenderers

Name of the Institution : M/s. Fluid Control Research Institute, Kanjikode West

Name of work : FEA and CFD Analysis

Tender reference : Document No.FCRI/NG50/ FEA/CFD/2009 -2010

EMD (Rs) : 30000.00

Tender Cost (Rs) : 1500.00

Due date for submission : 5 pm on 05.04.2010

Signature of the tenderer :

Name :

Designation :

Address :

Date :

Place :

III. Instructions to Tenderers

1. The following three documents constitute the complete tender specifications
 - ❑ Technical Tender Specification
 - ❑ Tender Document – General Specifications
 - ❑ Price Schedule
2. Full signatures are required in the following:
 - a) Index Page
 - b) Tender Form
 - c) Price Schedule
3. Initials are required in all other pages including preambles.
4. The rates should be quoted in words also.
5. The conditions of tender ought to be read carefully.
6. The tender should be submitted in two (2) parts in separate sealed envelope superscribing the tender reference, name of work, due date and nature of bid (priced or unpriced).

Part I – The Unpriced Bid

- a) Tender documents duly completed along with unpriced schedule of quantities, all technical and commercial details.
- b) List of Deviations / modifications or variations, if any, to the specifications and terms & conditions.
- c) Profile of the Firm / Company.
- d) An affidavit stating, "None of the supply/works carried out by me were not cancelled owing to my fault".
- e) All necessary documents mentioned in Scope of Contract (X) & General Rules (XI)
- f) All necessary items mentioned in Volume – I
- g) EMD by way of Demand Draft in favour of Fluid Control Research Institute, payable at Palakkad or Bank Guarantee for the equal amount.

Part II – The priced bid

One set of the schedule of quantities and rates duly signed on all pages
(To be submitted in the Priced Bid format).

IV. Tender Notice

To

Dear Sir,

Sub:

1. Sealed item rate tenders are invited from reputed agency for the following work intended vide technical tender enclosed
2. The following documents have been enclosed:
 - a) Technical tender specification
 - b) Tender document – General specifications
 - c) Price Schedule
3. The unpriced bids will be opened and evaluated by FCRI authorities. The priced bids will be opened at FCRI in presence of the qualified tenderers or a single authorized representative of the tenderer. The exact date of opening will be informed later.
4. No consideration will be given to any tender received after due time and date.
5. An amount of @10% of the total tendered value must be deposited by the successful tenderer as '**Security Deposit**' for the due fulfillment of the contract, before releasing the order. The Security Deposit will be returned to the successful contractor along with final payment.

The Earnest Money will be retained as a part of the Security Deposit and balance amount must be deposited by the way of Demand Draft in favour of Fluid Control Research Institute, payable at Palakkad.
6. The security deposit will bear no interest.
7. The tenderer will submit his tender after carefully examining all the Tender Documents.
8. The tender shall be valid for acceptance for a minimum period of three months from the date of its opening.

Place:
Date:

Name & Designation

Office Seal

Authorized Signature

**V. Form for Bank Guarantee for Security Deposit/Earnest Money
Deposit/Materials issued by FCRI**
(Stamp in accordance with the Stamp Act)

Ref.....

Bank Guarantee No.....

Date.....

To,
Fluid Control Research Institute
Kanjikode West, Palakkad,
Kerala, India – 678623

Dear Sir(s),

TENDER NO. _____ FOR _____

WHEREAS.....(hereinafter called the Bidder has submitted his Bid no. Dated.....for(hereinafter called 'the bid')

KNOW ALL MEN by these presents that WE..... are bound unto FCRI Kanjikode West, Palakkad, Kerala, India – 678623 (herein after called FCRI) IN THE SUM OF.....for which payment well and truly to be made to FCRI, the Bank binds itself its successor and assigns by these presents. Sealed with the Common Seal of the Bank this... day of...

THE CONDITIONS OF THIS OBLIGATION ARE:

1. Bidder takes delivery of raw materials to his site
2. If the Bidder withdraws his Bid during the period of Bid validity specified by the Bidder on the Bid Form ; or
3. If the Bidder, having been notified of the acceptance of his bid by FCRI during the period of bid validity but
 - a) Fails or refuses to execute the Contract Form, if required; or
 - b) Fails or refuses to furnish the PERFORMANCE SECURITY in accordance with the instructions to bidder.

We undertake to pay FCRI upto the above amount upon receipt of its first written demand, without FCRI having to substantiate its demand, provided that in its demand FCRI will note that the amount claimed by it is due to it owing to the occurrence of one or both of the two conditions specifying the occurred condition or conditions.

The Guarantee will remain in force upto _____and any demand in respect thereof should reach the BANK not later than the above date.

(Signature of the BANK)

Signature of the Witness

Name & Address of Witness:

Date:

Instructions for Furnishing Bank Guarantee

1. The Bank Guarantee by bidders will be given on non-judicial stamp paper as per stamp duty applicable. The non-judicial stamp paper should be in the name of the issuing bank. In case of foreign bank, the said banks guarantee to be issued by its correspondent bank in India on requisite non-judicial stamp paper.
2. The expiry date as mentioned in bid document security should be 6 months from the bid due date.
3. The bank guarantee by bidders will be given from bank as specified in ITB
4. A letter from the issuing bank of the requisite Bank Guarantee confirming that said bank guarantee / all future communication relating to the Bank Guarantee shall be forwarded to FCRI its address as mentioned at ITB.
5. Bidders must indicate the full postal address of the bank along with the bank's E-mail/ Fax. From where the bonds has been issued.
6. If a bank guarantee is issued by a commercial bank, then a letter to FCRI confirming its net worth is more than Rs. 1,000,000,000/- (Rupees one hundred Crore) or equivalent along with documentary evidence.

VI. Letter of Authority for Attending Price Bid Opening and Subsequent Negotiations.

Date:

Fluid Control Research Institute,
Kanjikode West, Palakkad,
Kerala, India – 678 623

Dear Sir,

Sub:

Bid No.....for

M/s hereby authorize following personnel to attend the price bid opening and for subsequent discussions/registration/correspondence and communication against above Bid.

1. Name & Designation Signature
2. Name & Designation Signature

We confirm that we shall be bound by all commitments made by aforementioned authorized representatives.

Tanking you

Yours faithfully,

Place:
Date:

Name & Designation
Authorized Signature

Office Seal

Note: -

This letter of authority should be on bidder's letterhead and should be signed by a person competent having the power of attorney to bind the bidder.

Not more than two persons are permitted to attend techno-commercial negotiations/price bid opening.

VII. Form of Contract Cum Performance Bank Guarantee
(ON NON-JUDICIAL PAPER OF APPROPRIATE VALUE)

TO:

M/s. Fluid Control Research Institute
Kanjikode West, Palakkad – 678 623
Kerala

THIS DEED OF GUARANTEE executed by registered under the Nationalised Bank, constituted under the Banking Companies (Acquisition and Transfer of Undertakings), Act, having its registered office at.....and one of its branch at (hereinafter referred to as "the Bank") in favour of M/s. Fluid Control Research Institute (hereinafter referred to as "The Beneficiary") for an amount of not exceeding Rs..... (Rupees..... only) at the request of M/s.....(hereinafter referred to as the contractors / contractor s).

This guarantee is issued subject to the condition that the liability of the Bank under this Guarantee is limited to a maximum of Rs..... (Rupees. only) and the guarantee shall remain in full force upto (date of expiry) and cannot be invoked otherwise than by a written demand or claim under the guarantee served on the Bank on or before the (last date of claim).

Whereas the Fluid Control Research Institute (A government of India Project under UNDP Assistance) Kanjikode West, Palakkad – 678 623, Kerala (hereinafter called the Company) has placed a purchase order No. (called the order) with M/s.....(hereinafter called as the contractors/contractor s) for the work of for Fluid Control Research Institute, Palakkad, Kerala and whereas it is one of the conditions of the order that the contractor shall submit a performance Bank Guarantee of 10% of the total order value, 10% of the order value being Rs..... (Rupees... only).

We hereby undertake that we will pay to the Company without any demur, merely on a demand from the Company any sum or sums which may from time to time demanded by the company upto maximum of Rs..... (Rupees..... Only).

We do hereby undertake to pay the amount demanded under this guarantee without any demur, merely on a demand from the company. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee.

We undertake to pay to the Company any money so demanded notwithstanding any dispute or disputes raised by the contractor/contractor in any suit or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment there under and the said contractor/contractor shall have no claim against us for making such payment.

We further agree that the guarantee herein contained shall remain in full force until (a) payment has been made to the company by the Bank of the aggregate amount payable hereunder or (b) all the items of work/supply as per the order has been completed in accordance with the conditions of the order or till the expiry of this guarantee and the company discharges the guarantee accordingly whichever shall first occur.

We, further agree with the Company that they shall have the fullest liberty without consent and without affecting in any manner our obligations hereunder grant time or other indulgence to or compound with the contractor/contractor or enter into any agreement or composition or agree to forebear to enforce any of the terms and conditions of the said order, against the contractor/contractor or agree to vary any of the terms and conditions of the said order or by any such matter or thing which under the law relating to sureties but for this provision have the effect of so relieving us.

This guarantee shall not be affected by any change in the constitution of the bank or the company of the contractor/contractor nor shall this guarantee be affected by any change in the constitution of the company or said contractor by absorption with any other body or corporation and this guarantee shall be available to or enforceable by such body or corporation.

Our guarantee shall remain in force until Unless a claim or demand is made within one month after the expiry of the above date, all the company's right under the guarantee shall be deemed as waived/forfeited and we shall be relieved and discharged from all liabilities there under.

We lastly undertake not to ~~revoke~~ this guarantee during its currency except with the previous consent of the company in writing.

Notwithstanding anything to the contrary contained herein.

- a. Our liability under this Bank Guarantee shall not exceed of Rs..... (Rupees..... only).
- b. This Bank Guarantee shall be valid upto
- c. We are liable to pay the guaranteed amount or any part thereof under this bank guarantee if and only if you serve upon us a written claim or demand on or before
- d. The original Bank Guarantee is to be returned back to us on expiry thereof or else it shall be deemed to have been automatically cancelled.

Yours faithfully,

.....Bank
By it's Constituted Attorney
Signature of a person duly
Authorized to sign on behalf of the Bank.

VIII Details of Indian Agent /Consultant/ Representative

Not Applicable

Place:

Authorized Signature

Date:

Name and Designation

Office Seal

IX. Commercial Check List

SI No.	Description	Response Yes/No
1	BEC Documentary Evidence	
2	Priced Bid	
3	Un priced bid	
4	Price Schedule	
5	Completion Period	
6	Bid validity	
7	EMD	
8	Tender Cost	
9	Bank Guarantee	

X. Scope of Contract

1. General

- 1 Scope of contract shall be as defined in the Order and Technical Specifications, Drawings and Annexure.
- 2 Completeness of the work shall be the responsibility of the contractor. Any accessories not specifically mentioned in the specifications, but necessary for the satisfactory completion shall be provided by contractor.
- 3 Contractor shall follow the best modern practices in erection/commission notwithstanding any omission in the specifications.
4. All dimensions and weight should be in metric system.
5. All items to be supplied and work to be carried out shall conform to and comply with the provisions of relevant regulations/Acts as may be applicable to the type of items/work carried out and necessary certificates shall be furnished.
6. Specifications, design and drawings issued to the contractor are not soled or given but loaned. They remain property of FCRI. Contractor and his employees shall not make use of the drawings, specifications and technical information for any purpose at any time except for erection and shall not disclose the same to any person, firm or corporate body.

2. Standards

Work under the CONTRACT shall conform to the standards mentioned in the Technical Specifications, or such other standards which ensure equal or higher quality.

3. Use of Contract Documents

Contractor shall not, disclose the Contract or any provision thereof, or any specification, plan, drawing, pattern, sample or information furnished therewith, to any person other than a person employed by the contractor in the performance of the Contract. Disclosure to any such person shall be made in confidence and shall extend only so far as may be necessary for purpose of such performance.

4. Modification

1. Modifications with respect to technical and/or commercial aspects including terms of delivery shall be considered valid only when accepted in writing by FCRI.
2. FCRI shall not be bound by any printed conditions or provisions in the contractor 's Bid Forms or acknowledgment of Contract, invoices, packing list and other documents which purport to impose any conditions at variance with or supplemental to Contract.

5. Patent Rights, Liability & Compliance of Regulations

Not Applicable

6. Time Schedule

1. Contractors shall submit to FCRI, his time schedule .
2. The time schedule shall be in the form of network/a bar chart clearly indicating all main or key events as above.

3. Contractors shall advise FCRI, at the earliest possible date of any anticipated delay in progress.
4. In case progress at various stages are not as per phased time schedule and are not satisfactory. FCRI may give notice of the same in writing to the contractor to make good the failure, neglect or contravention. Should contractor fail to comply with such notice FCRI shall have the option and be at liberty to take the contract wholly or in part out of the contractor's hand and make alternative arrangements to obtain the requirements and completion of contract at the contractor's risk and cost and recover from the contractor all extra cost incurred by FCRI on this account. In such event FCRI shall not be responsible for any loss, contractor may incur and shall not be entitled to any gain. FCRI shall, in addition, have the right to encash Performance Guarantee in full or part.

7 Subletting & Assignment

The contractor shall not without previous consent in writing of FCRI authority, sublet, transfer or assign the contract or any part thereof or interest therein or benefit or advantage thereof in any manner whatsoever. Provided, nevertheless, that any such consent shall not relieve the contractor from any obligation, duty or responsibility under the contract.

8 Termination

1. If the contractor fails to deliver the works within the time specified, If the contractor fails to perform any other obligation and If the contractor does not cure his failure within a period of 30 days after receipt of the default notice, FCRI may terminate the contract in whole or in part.
2. FCRI shall procure services similar to those undelivered and the contractor shall be liable to FCRI for any excess costs. However, contractor shall continue performance of the contract to the extent not terminated.
3. In case of termination of contract, FCRI shall not be issued any type of enquiry to the party for three years from the date of termination.
4. Termination for Insolvency FCRI may at any time, terminate the contract by giving written notice to the contractor , without compensation to the contractor , if the contractor becomes bankrupt or otherwise insolvent, that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to FCRI.

9 Force Majeure

1. Force Majeure shall be limited to
 - a) War/hostilities
 - b) Riot or Civil commotion
 - c) Earthquake, flood, tempest, lightening or other natural physical disaster.
 - d) Restrictions imposed by the Government or other statutory bodies
2. Contractor shall inform FCRI duly certified by the local chamber of commerce or

Statutory authorities, causes of delay within seven days of the occurrence and cessation of such Force Majeure Conditions. FCRI reserves the right to cancel the contract if the delay lasting over one month.

3. Contractor shall specify the extent of Force Majeure Conditions at the time of submitting their bid and shall take into consideration in bid. In the event of Force Majeure cause, the contractor or FCRI shall not be liable for delays in performing their obligations and delaying period will be extended.

10 Resolution of Disputes/Arbitration

1. FCRI and contractor shall make every effort to resolve amicably by direct negotiations any disagreement or dispute
2. If FCRI and the contractor have been unable to resolve amicably within thirty days, either party may require that the dispute be referred for resolution to the formal mechanism.
3. The Contract shall be construed and operated as an Indian Contract in accordance with Indian Laws as in force for the time being and is subject to and referred to Indian Court.

11 Arbitration

1. All disputes, controversies, or claims between the parties, where the decision of the Engineer-in-Charge is deemed to be final and binding, which cannot be mutually resolved time shall be referred to Arbitration. FCRI shall suggest a panel of three independent and distinguished persons to select one to act as the sole Arbitrator. In the event of failure of the Contractor to select within 30 days, FCRI shall have discretion to proceed with the appointment of the Sole Arbitrator. The award of the Sole Arbitrator shall be final and binding on the parties and unless directed/awarded otherwise by the Sole Arbitrator, the cost of arbitration proceedings shall be shared equally by the parties.
2. The arbitration proceeding shall be in English and the venue shall be at Palakkad, Kerala India. Subject to the exclusive jurisdiction of the Courts situated in the State of Kerala, India.
3. The work shall continue during the Arbitration proceedings and no payment shall be withheld during arbitration.

12 Notices

1. Any notice given by one party to the other shall be sent by email and confirmed by fax.
2. A notice shall be effective when delivered or it's effective date, whichever is later.

13 Taxes & Duties

1. Foreign Contractor is entirely responsible for taxes, stamp duties, license fees, and other such levies imposed in foreign country.
2. Indian contractor shall be entirely responsible for all taxes, licence fees etc. incurred until the delivery of items to FCRI. FCRI is permitted Excise duty exemption with

reference to Govt. Notification No. 10/97-Central Excise dated 1st March 1997. If Excise duty is applicable, the same may be indicated separately.

3. Income tax payable for services rendered by contractor shall be as per the Indian Income Tax Act and shall be borne by contractor. Bidder/contractor shall ascertain the amount of these taxes and to include them in bid price.

14 Books & Records

1. Contractor shall maintain adequate records and shall make them available for inspection and audit by FCRI or their authorized agents or representatives during the terms of Contract until expiry of the performance guarantee.

15 Permits & Certificates

1. Contractor shall procure all necessary permits, certificates and licenses required by virtue of all applicable laws, regulations, ordinances and other rules in effect at the place where any of the work is to be performed, and contractor agrees to hold FCRI harmless from liability or penalty which might be imposed by reason of any asserted or established violation of such laws, regulations, ordinances or other rules.

16 General

1. Losses due to non-compliance of Instructions: Losses or damages occurring to FCRI owing to the contractor's failure to adhere to any of the instructions shall be recoverable from the contractor.
2. All costs, damages or expenses which FCRI may have paid, for which contractor is liable, may be recovered by FCRI from any money due to or becoming due to the CONTRACTOR under this Contract. If the same due to the CONTRACTOR be not sufficient to recover the recoverable amount, the CONTRACTOR shall pay to FCRI, on demand, the balance amount.
3. No sum paid by FCRI nor any extension of the date for completion granted by FCRI shall affect or prejudice the rights of FCRI against the contractor or relieve the contractor of his obligation for the due fulfillment of CONTRACT.
4. No claims or correspondence shall be entertained by FCRI after 90 days after expiry of performance guarantee

17 Publicity & Advertising

1. Contractor shall not make a reference to FCRI or any Company affiliated with FCRI or to the destination or the description of Items or services supplied under the contract in any publication, publicity or advertising media without the written permission of FCRI.

18 Limitation of Liability

1. **Total liability of contractor under the Agreement shall be limited to 100% of Agreement / Order price. However, neither party shall be liable to the other party for any indirect and consequential damages, loss of profits or loss of production.**

XI. General Rules and Directions for Guidance

1. Bid Submission

1. Tenders shall be submitted in sealed covers superscribing the Tender Number and name of the work due date and nature of bid (priced or unpriced), and addressed legibly to officer inviting the tender. Full name and address of the tenderer should be written on the envelope as well as on the tender below the signature.
2. All the pages of the tender documents and any other enclosures submitted by the tenderer must properly signed or initialed and dated on each page, and also signed and dated at the places mentioned in the documents by the tenderer or such person or persons on his behalf as are legally authorized or required to sign for the tenderer. The tenderer shall in particular satisfy the Institute that he is competent and authorized to submit the tender and to enter into a legally binding contract with the Institute on behalf of himself, his firm, Company or Corporation as the case may be. A person signing the tender or any document forming part of the tender on behalf of another shall be deemed to warrant that he has the requisite authority of sign for other, and if, on enquiry, it appears that the person so signing has no authority to do so, the Institute may, without prejudice to any other Civil and Criminal remedies, cancel the contract and hold the signatory liable for all costs and damages.
3. Schedule of quantities and rates should be carefully and properly filled in. All rates should be indicated in words as well as in figures. Erasures and alterations in the tender documents should be avoided. If any corrections are necessary the original entry should be scored off and new entry legibly made duly attested by the full signature of the tenderer with date. Failure to do so may cause rejection of the tender by the Institute at its discretion. Any statement and/or letters signed separately and issued to the Institute either before or after the tender may not be considered.
4. In case of firms, all partners of the firm or such person or persons as may be legally competent to sign for the firm should sign the tender documents. In case of company, the official seal of the company should be affixed in the tender documents and should be signed by such person(s) as may be authorized by the articles of Association of the Company to sign for and on behalf of the Company. A copy of the Articles of Association should be sent with the tender. In any case, the tenderer should disclose his constitution and copies of all necessary legal documents in support thereof such as the duly registered partnership deed in the case of partnership firm should be produced as and when called for by the Institute.
5. Each tenderer, shall submit a declaration as to whether he is an individual, firm or association of firms, company or corporation and that he has successfully carried out works of the type and magnitude covered by these tender documents and has the requisite organization including technical and other personnel and financial and other resources to handle the work. Full information, supported by documentary evidence shall be furnished by the tenderer in regard to the following, among other things, so as to demonstrate his ability to undertake the work as specified.
 - a) In the case of firm, company or corporation: -
 1. The legal name, the nature of the business and the date and place of registration (including the state of incorporation where it is a corporation).
 2. The authorised, subscribed and paid-up capital and

3. The names and addresses of all directors including those of the chief executive, president, secretary or the person authorised to bind the firm, company or corporation in the matter.
- b) In the case of partnership the names and addresses of all the partners.
- c) In the case of an association of firms, the details of all participating firms.
- d) Previous experience, with details of work of the type and magnitude covered by those tender documents executed already together with a certificate of satisfactory execution of the works from a person not less than a rank of the executive engineer.
- e) Details of other works, if any, tendered for and in hand on the date of submission of the tender.
- f) Full details of technical personal of the tenderer who will be assigned to this work.
- g) Complete details (with full specifications) of items which will be employed by him on the works covered by those tender documents.
- h) Sufficient facts concerning financial resources with a certificate from his bankers regarding his credit worthiness and financial standing.
- i) Certified copies of the registration as a contractor

Non submission of documentary evidence on any of the aforementioned aspects may render the tender liable to summery rejection. The institute will be the sole judge as to the merits of the tenderer's ability to perform the work.

6. Total amount of tender should be written in the same language that the tender signed and also in English .
7. The specified amount of Earnest Money must be deposited either by a Demand Draft crossed "Account payee" drawn in favor of "Fluid Control Research Institute" payable at Palakkad 'or' Bank for the same amount. The EMD should be enclosed with the Technical Bid. *Cheque will not be accepted.*
8. The Earnest Money of the successful tenderer will be retained towards 'Security Deposit' and in the case of others, will be returned on application after finalization of the purchase.
9. The Earnest Money shall be liable to be forfeited without prejudice to the other rights and remedies of the Institute in the event of the tenderer failing (a) to keep his tender valid and open for acceptance by the Institute for and during the period of three months reckoned from the date of opening of tenders; or (b) to furnish, the requisite documents, etc. within the specified time.
10. The Security Deposit shall liable to be forfeited without prejudice to the other rights and remedies of the Institute if the successful tenderer is failing to accept the purchase order placed by the Institute, within 15 days of its issue. The Institute shall also have the right to forfeit the Security Deposit in case the contractor s fail to execute the order as per the terms & conditions of the order.
11. Should the tenderer have relative or relatives, or in the case of a firm or company or contractors, one or more of its shareholders employed in any capacity in the Institute, the tenderer should furnish complete information to that effect at the time of submission of the tender.

12. Unless specifically exempted, every tenderer shall enclose with the tender a proper income tax clearance certificate and sales tax certificate from the approved authority without which the tender may not be considered.
13. The quantities of work given in the schedule of quantities are approximate and are subject to variation depending upon site requirements. The engineer also reserves the right to add, substitute or delete any of the items in the schedule of quantities and no extra claim on this account shall be entertained. Such variations shall from part of the contract and shall not called in question.
14. Item-rate Tenders:
- a) The total amount calculated on the basis of the unit rates should be shown against each component item of works in the schedule of quantities and rates, and the final total of the contract price indicated at the end, as those are required for the purpose of comparing various tenders received. Tenderers are informed that the unit rates quoted by them will from the basis of payment for the actual quantities of work done and that no alternation therein or corrections thereto will be allowed after the tender has been delivered to the Institute.
 - b) Unit rates should be expressed in words as well as in figures.
 - c) If it is found on examination of a tender that there is any discrepancy in the total amount inserted in the schedule of quantities and rates. The Institute will correct the said details in accordance with the unit rates which will be binding on the tenderer as if set down by him.
 - d) The unit rates inserted in the schedule of quantities and rates shall be all inclusive, covering the cost of personal items, materials, and other facilities and operations necessary for the satisfactory completion of the work and shall include all charges for handling, transport, land, lift, labour housing, sanitation and medical facilities for labour, erection tools and plant, electric power and water, consumable stores, workshop, insurance, payment of taxes and duties, watch and ward arrangements, lighting, and all other expenses of every description which under the contract act are to be borne by the contractor.
 - e) Tenders must cover the entire schedule of quantities and rates and addenda if any thereto. The institute will not entertain tenders for individual items of schedule.
15. The contractor to whom the contract is awarded shall so arrange and plan the progress of work that the entire work is completed in all respects and handed over to the Institute within the period specified in the tender reckoned from the date of the written order. On this respect the time as against the contractor shall be of the essence of the contract.
16. The earnest money shall be liable to be forfeited without prejudice to the other rights and remedies of the Institute in the event of the tenderer failing (a) to keep his tender valid and open for acceptance by the Institute for and during the period of **three months** reckoned from the date of opening of tenders, or (b) to execute a formal instrument of agreement governing the contract within 15 days of the date of intimation of acceptance of tender, or (c) to furnish, the requisite certificates etc. within the specified time limits, or (d) to commence the work within fifteen days from the date of order. In the event of default

on the part the successful tenderer as at (b) and (d) above the acceptance of the tender by the Institute may at the discretion of the company be demand to have been with drawn and cancelled. The Institute shall have the right to make other arrangements for execution of the work covered by the contract at the risk and cost of the selected contract or without prejudice to such other rights and remedies as the company may have against the contractor.

17. Successful and unsuccessful tenders will be advised of the result by the institute by a letter.

18. The work shall be executed as per the schedule. The contractor may however, submit a phased programme for the approval of the engineer and such an approved programme shall be strictly adhered to by the contractor or his representative at site who will also fix up with the engineer for a review of the progress of erection work daily and weekly. Not withstanding the approved programme, the contractor shall carry out the work as per instructions from time to time for completing the works or part of the work of times of work required urgently, failing which the same will be got done through other agencies at the cost and responsibility of the contractor. Relevant clauses for compensation for delay may also be refunded to.

19. The Institute reserves the right to consider the tender as a whole or split up tender at its discretion and award the work / works to different contractors for which the contractors shall have no additional claims what so ever on that account.

20. Receipts for payment made on account of a work, when executed by a firm must also be signed by the several partners, except where the contractors are described in their tender as a firm in which case the receipts must be signed in the name of the firm by one of the partners, or by some other person having authority to give such receipts for the firm.

21. Tenders which do not fulfil all or any of the above conditions or are incomplete in any respect are liable to be rejected.

22. The right of accepting any tender or rejecting any or all tenders without assigning any reason is reserved.

23. The successful tenderer shall be required to execute an agreement in the prescribed proforma on a stamped paper of requisite value (at his cost) within 15 days from the date of issue of the letter of acceptance of his tender.

24. The contract, agreement or instrument, executed by the successful tenderer is subject to the General Condition of contract set out by the Institute which is a priced publication of the Institute and can be had on payment of Rs.50/- (Rupees fifty only).

25. For the work being tendered through these papers, all expressions therein as 'Institute' shall be considered as referring to 'Fluid control Research Institute', Kanjikode West, Palakkad – 678 623, Kerala.

26. COMPENSATION FOR DELAY – LD (Liquidated Damages) Clause

The time laid down for carrying out the work as entered in the time schedule for completion of work attached to the tender shall be strictly observed by the contractor and the work shall be completed in all respects within the dates stipulated therein. The work shall throughout the stipulated period in the contract be proceeded with all due diligence, (time being deemed to be of the essence of the contract on the part of the Contractor) and the contractor shall pay as compensation an amount equal to one percent or such smaller amount as the Engineer, whose decision in writing shall be final, may decide, of the tendered amount for the whole work for every week, or part there of, the work remains un-commenced or unfinished after the proper dates as aforesaid. The contractor shall further ensure that the work is executed with due diligence throughout so as to maintain a uniform

rate of progress. Provided always that the entire amount of compensation to be paid under this clause shall not exceed 10% of the estimated cost as shown in the tender.

2. Withdrawal and Modification of Tender

Bidder can modify or withdraw his bid after the bid submission, but before the due date of submission provided that the written notice of the modification, including substitution or withdrawal of the bid is received by FCRI prior to the due date for submission of bids.

Bidder's modification or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with the provisions of ITB Clause-20, with the envelopes marked "modification" or "withdrawal" as appropriate. A withdrawal notice may also be sent by fax/post, but followed by a signed confirmation copy post marked not later than due date for submission of bids.

No bid shall be modified after the due date for submission of bids.

No bid shall be allowed to be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the bidder on the Bid Form. Withdrawal of a bid during this interval shall result in the bidder's forfeiture of his bid security.

4. Process Confidentially

Information relating to the examination, clarifications, evaluation and comparison of bids and recommendations for the order, will not be disclosed to bidders or any other person officially concerned with. FCRI requires that Bidders/Contractors observe the highest standard of ethics during the procurement and execution of the order. In pursuance of this policy, FCRI defines for the purposes of this provision

5. Contacting FCRI

From the time of the bid opening to the time of the release of order, if any bidder wishes to contact FCRI for any matter relating to the bid, he should do so in writing.

SIGNATURE & ADDRESS OF

TENDERER

XII. Award of Contract

1. Post Qualification

In the absence of pre qualification, FCRI will determine to its satisfaction whether the lowest bidder is qualified to satisfactorily perform the contract.

The determination criteria will be bidder's financial, technical and service as well as such other information as FCRI deems necessary and appropriate.

Affirmative determination will be a prerequisite for award of contract to the bidder. A negative determination will result in rejection of the bidder's bid.

2. Award Criteria

FCRI will award the contract to Bidder whose bid has been determined as responsive and has been determined to be the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily.

3. Change in Quantities

FCRI reserves the right at the time of award of ORDER to increase or decrease by upto 15% the quantity , without any change in unit price or other terms and conditions. Variation beyond this limit will be subject to mutual agreement between FCRI and the Contractor .

4. Corrupt or Fraudulent Practices

"Corrupt practice" means the offering, giving, receiving or soliciting of any thing of value to influence the action of official in the procurement process or in contract execution. Any effort by a bidder to influence FCRI in any manner in respect of bid evaluation or award will result in the rejection of that bid.

"Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of FCRI, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive FCRI of the benefits of free and open competition;

FCRI will reject a proposal for award of it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question. FCRI will declare a firm ineligible, either indefinitely or for a stated period of time, if at any time FCRI determines that the firm has engaged in corrupt or fraudulent practices in competing for or in executing a contract.

XIII Preambles To Schedule Of Quantities

1. Rates quoted shall include all the operations mentioned in the specifications of respective items of work required to complete the job.
2. Rates quoted shall include all labor, tools, and other sundries etc, for workman like completion of work.
3. Rates quoted shall be firm and shall not be subject to any variation due to increase in labour wages, etc. or any other price variation whatsoever either by act of Government or otherwise whether during the stipulated period of execution or during extended period of completion if any.
4. The works "as described", "as specified", "as shown", "as directed" or "as approved" shall mean as described in the specifications, schedule of quantities and other tender documents, as shown on the drawings and as directed or as approved by the Engineer in-charge.
5. Your offer should remain valid for 90 days from the date of opening of tenders.
6. The rate of taxes should be shown in the schedules and which should cover all taxes whatever form may be applicable and as prevailing on the date of quotation.
7. Any concession in excise duty/sales tax enjoyed by you should be clearly indicated in the covering letter.
8. Liquidated damages for delay beyond the agreed delivery and commissioning schedule @1% per week subject to maximum of 10% of the total order value will be applicable.
9. Descriptive leaflets, brochures, drawings etc. showing the details should invariably be attached with your quotation.

Note: Preambles apply to all the sections of the schedule of quantities and tendered rates shall take into account all these provisions in addition to various provisions in other parts of the tender documents.

PRICE SCHEDULE

FLUID CONTROL RESEARCH INSTITUTE

KANJIKODE WEST – 678 623, PALAKKAD, KERALA

(Under Ministry of Heavy Industries & Public Enterprises – Govt. of India)

Phone: (91) 491-2566120 / 2566206 / 2569009 Fax: 2566326

E-mail: purchase@fcriindia.com, fcri@vsnl.com Website: <http://www.fcriindia.com>

TENDER FORM

I/We hereby tender for the execution of the work **FEA and CFD Analysis** specified in the under written memorandum within the time specified in such memorandum at item rate entered in the schedule of quantities and in accordance in all respects with the specifications and instructions in writing referred to in Tender Documents.

MEMORANDUM

- a) General Description :
- c) Earnest Money :
- d) Time allowed for the work from :
the date of written order to
commence.

Should this tender be accepted I/We hereby agree to abide by and fulfill all the terms and provisions of the General and Special conditions of contract so far as applicable or in default thereof to forfeit and pay to the Institute or its successors in office the sums of money mentioned in the said conditions. The sum of Rs.....(Rupees) paid as Earnest Money is to be absolutely forfeited to the said Institute or its successors in office, without prejudice to any other rights or remedies of the said Institute or its successors in office, should I/We fail to satisfy the provisions contained in the relevant paragraphs of the tender forms.

SIGNATURE AND ADDRESS
OF THE TENDERER

DATED:

From

M/s.

To

The Director
Fluid Control Research Institute
Kanjikode West – 678 623
Palakkad, Kerala.

Ref:

Sub: **FEA and CFD Analysis**

SI.No	Item	Qty	Unit	Cost (Rs)
1	Finite Element Analysis of the blower system incorporating all participating components including motor, impeller, diffuser, vessels, supports.	1	Set	
2	Computational Fluid Dynamic analysis of impeller, diffuser, diffuser casing and flow passage over the motor and other required components	1	Set	
3	Taxes if any			

Terms and conditions

We accept all terms and conditions listed in the Tender Documents.

Company's Rubber stamp:

Place:

Date: