

भारतीय प्रौद्योगिकी संस्थान धारवाड

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INDIAN INSTITUTE OF TECHNOLOGY DHARWAD



॥ सा विद्या या विमुक्तये ॥

भारतीय प्रौद्योगिकी संस्थान धारवाड

Indian Institute of Technology Dharwad

**TENDER DOCUMENT**

**Tender No. IITDh/GA/ME/030/2018-2019**

TENDER DOCUMENT FOR SUPPLY, INSTALLATION,  
DEMONSTRATION and TRAINING OF FLUID MECHANICS  
LABORATORY EQUIPMENTS AS PER ANNEXURE-I to VI

**Tender Notice for Supply, Installation, Demonstration and Training of Fluid Mechanics  
Laboratory Equipments**

1	Date of Tender Publishing	: 22 <sup>nd</sup> November 2018
2	Start date for Submission of queries via email to pro@iitdh.ac.in	: 22 <sup>nd</sup> November 2018
3	End date for Submission of queries via email to pro@iitdh.ac.in	: 30 <sup>th</sup> November 2018
4	Date of rebuttal of pre-bid queries (to be uploaded on the website) and publishing revised RFP (as the case may be)	: 05 <sup>th</sup> December 2018
5	Last Date and Time for Submission of Tender	: 20 <sup>th</sup> December 2018 at 11:00 am
6	Opening of Technical Bid	: 20 <sup>th</sup> December 2018 at 3:00 pm
7	Address for submission of bid documents	: The Assistant Registrar IIT Dharwad Off Pune Bengaluru Highway Near High Court Dharwad, Karnataka – 580011, INDIA
8	Venue for opening of Technical Bid	: Same as above
9	Time of completion of Work	: <b>13 weeks</b> from the date of issue of purchase order
10	EMD	: <b>Rs. 95,000.00 (Rupees Ninety five thousand Only)</b>
11	Schedule of Opening Commercial Bids	Schedule for opening of Commercial Bid will be announced through notification link on <a href="http://iitdh.ac.in/announcements_tenders.php">http://iitdh.ac.in/announcements_tenders.php</a> after evaluation of the Technical Bid and declaration of the list of bidders qualifying the Technical Bid.  Presence of the bidder or his/her authorized representative at the time of opening of the Commercial bid is highly preferable.

**Detailed tender notice can be downloaded from the website of the Institute at:  
[http://iitdh.ac.in/announcements\\_tenders.php](http://iitdh.ac.in/announcements_tenders.php)**

The right to suspend the tender process or part of the process, to accept or reject any or all the tenders at any stage of the process and/or to modify the process or any part thereof at any time without assigning any reason thereto vests with IIT Dharwad without any obligation or liability whatsoever.

## **Tender Notice for Supply, Installation, Demonstration and Training of Fluid Mechanics Laboratory Equipments**

Indian Institute of Technology Dharwad invites sealed tenders (under two bid system) from Original Equipment Manufacturer (OEM) OR their authorized Dealers for the **Supply, Installation, Demonstration and Training of Fluid Mechanics Laboratory Equipments** as per the Technical Specification given in the schedule annexed to the tender.

The detailed specifications of the equipment are given in the Annexure-I and the same should be complied with. In case there is any deviation from the specifications, the bidder should clearly state the deviation(s) in the technical bid. Technical literature/leaflet showing the compliance of the specification may also be attached with the bid.

The bidder should note that the technical specifications mentioned in Annexure-I form the core of the product. **The offers must strictly be as per the specifications given in Annexure-I to VI.** At the same time it must be kept in mind that mere copying of our specifications in the quotation shall not make the technical bid eligible for consideration. A bid has to be supported with original catalogue (not of photo copy) of the quoted model duly signed by the principals and the same must be sent along with the technical bid. The quoted model should not become obsolete for a minimum period of 5 years (This is for the availability of spares). Therefore, the model quoted should invariably be highlighted in the leaflet/literature enclosed with the quotation. Non-compliance with above shall be treated as incomplete/ambiguous and the bid may be ignored without giving an opportunity to the bidder for further clarification/negotiation etc.

In order to specify/modify technical specifications of the equipments and clarify various issues as may arise, a pre-bid clarification is provided w.e.f. 20/11/2018 to 28/11/2018. Resultant rebuttal/re-publishing of modified RFP (as the case may be) will be published on 05/12/2018. Prospective bidders will be given a period of 15 days to submit their bids post rebuttal/modification in RFP (as the case maybe).

The technical bid shall be evaluated for acceptability by the technical committee and the committee may invite the bidders for discussion. If necessary, the committee may modify the technical specification to suit the requirement of IIT Dharwad. In such case the opportunity shall be given to all the participating bidders for submitting the revised bid as per modified specifications, if any.

Any item not specifically mentioned in the tender document but essential in the opinion of the bidder for successful implementation of Fluid Mechanics Laboratory equipments, should be brought to the notice of the IIT Dharwad well in advance before 28/11/18. On clearance from our side, the same may be included in the modified RFP (as the case may be). However, the decision as to whether to consider such items or not rests with the Institute.

The bidder shall ensure that the bid submitted by him includes all equipment, hardware and software for full execution of contract. The bidder shall not charge extra for additional hardware and software items required to meet the operational requirement at the stage of installation and commissioning.

**Quantity requirements of each item as per the specification enclosed at Annexure-I.**

Sl No.	Particulars of the item(s)	Requirement
1	<b>Supply, Installation, Demonstration and Training of Fluid Mechanics Laboratory Equipments</b>	Individual item requirements as per Annexure - I

**Only those bidders fulfilling the following Eligibility Criteria are expected to participate in the Tender**

1. The Bidder must be an Original Equipment Manufacturer (OEM) or his Authorized Dealer/Authorized Distributor/ Authorized Stockist/ Channel Partner having a Direct Purchase and Support agreement with the OEM. In case, if the Bidder is a Dealer/Distributor, a valid LETTER OF AUTHORIZATION from the Original Equipment Manufacturer for Dealership should be enclosed.
2. The Average Annual Turnover of the Bidder for the last three years should be at least Rs.10 Cr. (Rupees Ten crores). A Printed copy of the Annual Accounts duly audited and certified by the Chartered Accountants must be enclosed with the technical bid.
3. Similar make machines should have been supplied in Premium educational institutions preferably in other IIT's and Public sector undertakings or large Industries. Bidder has to provide at least 05 or more of such customer references and users. The Bidder should provide a list of customers with contact details from IIT's/NIT's/IISc/Other Central Govt. Reputed National Organisations to whom similar/same range of equipment is supplied previously. Copies of orders received from these reputed firms on the bidding firm need to be submitted.
4. The Bidder should furnish **Minimum 3 satisfactory performance certificates** from the parties concerned to whom supplies were affected.
5. The Successful bidder shall provide **Minimum 5 Years warranty** after the completion of installation.
6. One free of charge re-location and re-commissioning of the supplied Fluid Mechanics Laboratory Equipment from the present Walmi campus of IIT Dharwad to the permanent campus of IIT Dharwad should be provided.
7. A Certificate/Undertaking on the letter head of the Company to the effect that the bidder/Manufacturer had not been blacklisted anywhere in India or abroad by any organization.
8. They should provide convincing evidence that equipment in the bid is capable of performing the experiments that might have been specified. The evidence could be in terms of manuals or videos. Any other technical specifications should be supported with documents like drawings and catalogues.
9. The bidder should have an ISO 9000 series standards certification.
10. The Bidder should be registered with concerned statutory authorities for GST/Income Tax etc. the bidder should furnish relevant GST registration documents and PAN/TAN copies.

**Special Conditions and additional clauses for Successful bidding/participation**

1. The quality of the earlier supplies of similar nature of items to the Institute by any of prospective bidder during last five years will be kept in view for qualification in the Technical Bid.
2. No payment shall be made for any damage caused during the execution of work. The damages to the work will be made good by the Manufacturer at his own cost and no claim on this account shall be entertained.
3. The manufacturer shall at his own cost shall arrange for necessary licenses/permission/clearance including **Certificate of Origin** etc. if required to import the material for completion of work within the stipulated period.

4. If the materials used or finished works are not found acceptable, the Manufacturer shall arrange for the replacement of material required for re-execution of the work as per the contract.
5. Installation and training shall have to be provided on-site by supplier within the quoted price.
6. Material handling like unloading and Installation arrangements etc. shall have to be arranged by supplier within the quoted price.
7. Oil, foundation bolts etc shall have to be arranged by supplier within the quoted price.
8. Post-delivery maintenance support should be available (both spares and services) within the quoted price.
9. The rate quoted shall be inclusive of expenditure on the requisite approval/quality assurance tests/certification to be carried out on the materials and/or work as may be decided by the Competent authority for which nothing extra shall be payable.

#### **Further Criteria for Qualification in the Technical Bid**

1. The tenderer must submit all documents required for evaluation of technical bid and sought in the RFP as forming part of technical evaluation with signature and seal of the competent authority of the firm. In the event of non-receipt of any of the documents forming part of Technical Bid, tenderer will be disqualified from the process. Any paper relating to the documents will not be received during the Technical Bid meeting. **Further, any separate correspondence in the matter shall also not be entertained.**
2. During evaluation of the Technical Bid, the Committee as would be constituted for the purpose will scrutinize the documents mentioned above and may forward any or all the documents to the concerned authorities for verification and authentication. In case of any document(s) as submitted by the tenderer found/reported to be fake, the tenderer will be out of the tendering process besides any legal action that may be initiated against the tenderer, as per rules. Further, the Committee may visit the factory site of the Manufacturer to inspect and assess the capability etc.
3. Besides, scrutinizing the documents submitted with the Technical Bid, the tenderer may be interviewed by the Committee to assess the eligibility, capability, and suitability of the tenderer. As such, the presence of the tenderer or any authorized representative of the tenderer in the Technical Bid meeting is preferable.

The above mentioned basic eligibility conditions and additional clauses are broad guidelines for pre-qualification and the Director, IIT Dharwad hereby reserves the right to relax/alter/modify/add any or all the conditions.

## Procedure for Bid submission

Following are the procedure for submission of Bid, and other important conditions to be fulfilled by the bidder.:

Every page, containing the said procedure for submission of bid and other important conditions, are to be **signed** by the bidder and to be submitted along with their Technical bids towards their acknowledgement that they have gone through all the contents in these pages and in the Annexure as well and they are agreeing to comply to all of the conditions mentioned there. NON ADHERENCE TO THIS MAY LEAD TO THE DISQUALIFICATION OF THE BID WITHOUT FURTHER NOTICE.

### **TWO BID SYSTEM:**

The offers/bids are to be submitted under a two bid system, namely **(i) Technical Bid** and **(ii) Commercial Bid**. The Technical Bid must contain all the details as specified in the Annexure along with the terms and conditions whereas Commercial Bid must indicate the quantity & rate only. THERE MUST NOT BE ANY PRICE ELEMENT IN THE TECHNICAL BID.

### **SEALING & MARKING OF BID:**

The tender should be submitted in a proper manner with index for easy identification i.e.:

Envelope Number	To be Super scribed as
A	EMD for Tender
B	Technical Bid
C	Commercial Bid

**Envelope – A (duly sealed):** should contain the Demand Draft / BG towards **Earnest Money Deposit**.

**Envelope – B (duly sealed):** should contain the documents as listed under **Technical Bid** below.

**Envelope – C (duly sealed):** should contain the document as listed under **Commercial Bid** below.

All the above three envelopes should clearly be marked on top of envelopes about the type of envelopes (i.e., A, B, & C), details of contents in envelopes, name of agency submitting the bid.

The envelopes (A, B & C) including the bigger envelopes shall be addressed to:

**The Assistant Registrar (Purchase)**

**IIT Dharwad, Off Pune Bengaluru Highway,**

**Next to High Court, Dharwad - 580011, Karnataka, KA, INDIA**

The bigger envelopes must be sealed and must bear the following identification on top:

a) Tender for '**Supply, Installation, Demonstration and Training of Fluid Mechanics**

**Laboratory Equipments**

b) Tender Number: \_\_\_\_\_ Date: \_\_\_\_\_, and

c) Name and Address of the Bidder. (on bottom left of the envelopes)

If the outer envelope is not sealed and not marked as above, the Institute will assume no responsibility for the misplacement or premature opening of Bid.

### **SUBMISSION OF TENDER:**

The tender can be personally dropped in the box to be kept in on all working days (except Saturday, Sunday & Holidays) between 10.00am and 1.00pm in the forenoon and 3.00pm and 5.00pm in the afternoon session before the date and time as specified in the Tender Notice and up to **11.00am** on the last date of submission of tender. The tender can also be sent by registered post to **The Assistant Registrar, (Purchase), Indian Institute of Technology Dharwad, Off Pune Bengaluru Highway, Next to High court, Dharwad - 580011, Karnataka, INDIA**. Tender shall not be received after expiry of the time as specified on the 1<sup>st</sup> page of the tender notice.

**EARNEST MONEY DEPOSIT (EMD):**

Rs. **95,000.00 (Rupees Ninety-five Thousand Only)** in the form of a **Demand Draft or Bank Guarantee** drawn in favour of “Dean, IIT Dharwad” and payable at any nationalized or scheduled bank with a branch at Hubballi - Dharwad. Photocopy/Fax copy of the demand draft / BG will not be accepted.

Bidders registered with NSIC / MSME are exempted from EMD, provided the certificate from the body clearly mentions the equipment/item/store/services which is / are being procured.

However, EMD shall be paid in cases where the registered vendor seeks payment in currencies other than INR and / or a non OEM supplier represents a foreign firm.

Any tender without original EMD (other than where exempted) would be considered **“DISQUALIFIED”** and hence would be **REJECTED**.

**RETURN OF EMD:**

- The EMD of the unsuccessful bidders will be returned to them without any interest on receipt of written request from them within thirty days after awarding the contract to the successful bidders.
- The EMD of the successful Bidder will be returned after receiving Performance Bank Guarantee covering the contract & the warranty period.

**FORFEITURE OF EMD:**

After receiving the Purchase Order, if the OEM/Bidder is unable to execute the order satisfactorily, the Earnest Money Deposit will be forfeited and the Institute will be constrained to take necessary action against the OEM/Bidder.

**REJECTION OF TENDER:**

In the event of the following, the Technical Bid of a bidder will not be considered at all and will in fact be summarily rejected and all the documents will be returned on a subsequent date as would be found suitable by the Committee –

- a. If the Demand Draft / Bank Guarantee towards payment of EMD is not put separately in the bigger envelopes as instructed; and/or
- b. If it is to be presumed that the Demand Draft / Bank Guarantee towards EMD is kept inside the sealed envelopes containing Technical Bid/Commercial Bid; and/or
- c. If the Demand Draft / Bank Guarantee towards EMD is not valid and acceptable; and/or
- d. If without breaking seal of the other envelopes it cannot be detected which envelopes contains Technical Bid; and/or
- e. If any price element is found understandable in any way from any paper other than Commercial Bid.

On verifying each and every point as mentioned above, the Technical bid will be opened to examine all the documents and to decide on all related aspects as per Institutes specification and requirements.

**PERFORMANCE BANK GUARANTEE (PBG) FOR SUCCESSFUL BIDDER**

The successful bidder(s) should provide a performance bank guarantee amounting 10% of the order value in the format provided by IIT Dharwad within 15 days of receiving the order. The PBG should be valid for the period of contract covering the entire warranty period of five years plus two months.

If the successful bidder(s) is/are unable to provide PBG within the stipulated period, his/their EMD will be forfeited by IIT Dharwad with or without consulting.

**OPENING OF COMMERCIAL BID:**

The offer/bid will be opened by a Committee, as would be constituted by the competent authority, at a pre-defined place, time and date in the presence of all such bidders and/or their authorized representatives. The Commercial Bid of the technically qualified bidder(s) will ONLY be opened. The Commercial Bid should be submitted as per the format enclosed with the tender document on the letter Head of the Firm/Agency. The rate should be clearly submitted with breakup of Basic Price, GST, Custom Duty etc. **Commercial Bid in any other form will not be accepted and be SUMMARILY REJECTED.**

**BID VALIDITY:**

- The Bid shall remain valid for the period not less than six (6) months after the last date set for bid submission.
- A bid submitted for a bid validity of shorter period may be rejected as non-responsive.

**LATE BID:**

Any bid received after the dead line as prescribed in the tender notice will be treated as a late bid and will not be considered.

**ACCEPTANCE AND REJECTION:**

The right to shortlist/reject any or all the tenders and/or to accept the whole or any part of the tenders without assigning any reason whatsoever would vest with the management of IIT Dharwad.

**DELIVERY PERIOD:**

13 Weeks from the date of placement of Purchase Order. On completion of the manufacturing of the item ordered for, the OEM/Bidders will have to inform the same to the Assistant Registrar, IIT Dharwad, Off Pune Bengaluru Highway, Next to High Court, Dharwad – 580011, Karnataka, India in writing, who will instruct the OEM/Bidder about the location for delivery of the materials and date of delivery.

**DELIVERY TERMS:** Items should be delivered DDP at IIT Dharwad (KA) 580011. The supplier should arrange for entire process from unloading to commissioning, demonstration and training within the quoted price.

**FREIGHT & INSURANCE:**

**No freight and insurance charges will be provided and the materials are to be delivered at IIT Dharwad Walmi Campus, as may be desired by the IIT Dharwad at the cost and risk of the OEM/Bidder within quoted price.**

**WARRANTY DECLARATION:**

- The Bidder/OEM must give a comprehensive on-site FIVE YEAR WARRANTY of the items from the date of delivery/installation and acceptance of the item against any manufacturing defect and also give the warranty that everything to be supplied by them shall be free from any defects and fault in materials, workmanship and shall be of the highest quality and materials of the type ordered shall be in full conformity with the specifications. A Bond is to be signed /executed by the supplier to this effect.
- Any deviation in the equipment, and the specification from the accepted terms and conditions may be liable to be rejected and the bidder/manufacturer need to supply all the items in the specified form to the satisfaction/ specifications specified in the order and demonstrate at their own cost. The payments shall be made only after receiving the materials as per required specification and quality to the satisfaction of the competent authority of IIT Dharwad.

**FAILURE OF ORDER EXECUTION:**

If a successful bidder after receiving the order fails to execute the order within the stipulated period or does not fulfill any of the terms and conditions in any respect, IIT Dharwad reserves the right to cancel the order unilaterally and forfeit the EMD amount.



**INSTALLATION, TRAINING & DEMONSTRATION:**

Bidders, at their cost, need to provide adequate training to the nominated persons of IIT Dharwad. IIT Dharwad will not bear any training expenditure. The supplier is required to carry out the installation and demonstration of the equipment within **one month** of arrival of materials at the IIT Dharwad installation site; otherwise the penalty clause will be the same as per the supply of material (refer to the liquidated damages below).

In case of any mishandling/damage to equipment and supplies during carriage from the origin of equipment to the installation site, the supplier has to replace it with new equipment/supplies immediately at his own risk of cost. Supplier will settle his claim with the insurance company as per his convenience. IIT Dharwad will not be liable for any type of losses in any form.

**PAYMENT TERM:**

90 % Payment shall be made after the successful delivery, installation, commissioning, demonstration and acceptance of the equipment at IIT Dharwad and 10% after the submission of PBG. The PBG should cover the entire warranty period plus two months. WBG should be of any Nationalised / scheduled bank with a branch at Hubballi-Dharwad. No request for change in terms of payment will be accepted. Nil advance will be paid.

**LIQUIDATED DAMAGES:**

The equipment should be delivered/dispatched to destination and ready for use not later than the delivery period specified. If the OEM/Bidder fails to deliver any or all the stores or perform the service by the specified date, liquidated damages @2% per month or part thereof in respect of the value of the delayed stores will be deducted from the bill subject to a maximum of 10%. Same terms are applicable for installation, training and demonstration clause mentioned above.

**FINAL SELECTION AND AWARD CRITERIA:** L-1 Criteria. The L<sub>1</sub> will be decided on the base price of **Supply & Installation of Fluid Mechanics Laboratory Equipments as per Annexure – I to VI, five years comprehensive on-site warranty including the** cost after relocation and recommissioning. Therefore, all levies/taxes (i.e. Custom Duty, GST etc.) must be clearly mentioned separately (as per format of commercial bid) However, the decision of the Competent authority will be final and binding in awarding the order. In case of any clarification required, the same can be clarified from IIT Dharwad before submission of the bids

**DISPUTE AND JURISDICTION:**

Any legal disputes arising out of any breach of contract pertaining to the whole process of this tender shall be settled in the court of competent jurisdiction in the district of Dharwad, Karnataka.

**ACKNOWLEDGEMENT BY THE BIDDER:**

It is hereby acknowledged that we have gone through all the schedules as well as the conditions mentioned above and we agree to abide by these.

Date:

Signature of the Bidder along with  
official seal.

Place:

CANVASSING OR OFFER OF AN ADVANTAGE OR ANY OTHER INDUCEMENT BY ANY PERSON WITH A VIEW TO INFLUENCING ACCEPTANCE OF A BID WILL BE AN OFFENSE UNDER LAWS OF INDIA. SUCH ACTION WILL RESULT IN THE REJECTION OF BID, IN ADDITION TO OTHER PUNITIVE MEASURES.

Encl: Technical Specifications at Annexure-1

Format of Commercial Bid at Annexure-2

Assistant Registrar, IIT Dharwad (For and on behalf of Director, IIT Dharwad)

## Annexure-I

### List of Fluid Mechanics Equipments and Specifications

#### 1. Base module/Hydraulic Bench for Fluid Mechanics experiments:

(Qty.: 02 Nos.)

Objective of the base module is to provide following for individual experiments:

- a) The supply of water in the closed circuit with storage tank, submersible/centrifugal pump and measuring tank for high and low volumetric flow rate measurements
  - i. Tank and base should be made up of robust, corrosion resistant plastic material
  - ii. Water pump must have self-priming capability
  - iii. Storage tank: Min: 120 Litres, Max: 250 Litres
  - iv. Pump discharge: Min: 50 Litres/min, Max: 150 Litres/min
- b) The determination of volumetric flow rate
  - i. Rotameter or Piezometer for flow rate measurement and valve to control water flow rate
- c) The positioning of the experimental unit on the working surface of the base module
- d) The collection of dripping water in case of dripping.
- e) Total setup:
  - i. Should have measuring tank and a scale
  - ii. Should be a mobile unit with lockable wheels
  - iii. Should have open channel in bench top with quick release outlet fitting
  - iv. All necessary pipe connections should be supplied
  - v. Overall dimensions: Min: 0.5 m, Max: 1.5 m
- f) Required accessories
  - i. Stop watch
  - ii. Measuring beakers of 1 Litre and 2 Litre should be supplied with bench for very low flow rate measurements
  - iii. Operation Manual
  - iv. Should have compatibility to accommodate and conduct following fluid mechanics experiments through quick release fittings
    1. Stability of floating bodies and determining the metacentre
    2. Reynolds experiment for laminar/turbulent flow visualisation
    3. Measurement of discharge coefficient for different shaped orifices with varying head
    4. Demonstration of Bernoulli's principle
    5. Visualisation of free and forced vortices
    6. Demonstration of linear momentum and impact forces of Jet for different deflection angles
    7. Pressure loss in pipe friction for laminar/turbulent flow

## Item IA. Stability of floating bodies for determining the metacentre

(Qty.: 01 Nos.)

The experimental set up should be capable of conducting experiments to study concept of buoyancy, stability and determine centre of buoyancy, centre of gravity, metacentre .

### Technical specifications

The experimental setup or apparatus should consists of-

- a. A floating body with rectangular frame cross-section which is less than 3 kg
- b. One horizontally movable clamped weight for adjusting the heel which should be less than 200 g
- c. One vertically movable clamped weight for adjusting the centre of gravity which should be less than 600g
- d. Clinometer with scale for displaying the heel: Min:  $\pm 30^\circ$ , Max:  $\pm 40^\circ$
- e. Other floating bodies with different shapes of frame available as accessories less than 4kg
- f. All floating bodies: Mast height: Min: 200 mm, Max: 500 mm
- g. Height scale of the floating body: Min: 100 mm, Max: 150 mm
- h. Required accessories
  - i. Different shapes of frame (**hard chine and round hull**) which are less than 4.0 kg.
  - ii. Operation Manual.

## **Item IB. Reynolds experiment for laminar/turbulent flow visualisation**

(Qty.:01 Nos.)

The Reynolds experiment should be able to display laminar and turbulent flows. It should be possible to observe the transition from laminar to turbulent flow after a limiting the water flow velocity. The streamlines are observed during laminar/turbulent flow & transition to turbulence with the aid of a visible injected ink.

The objective is to following sets of requirements

1. Dye injection system
2. Quick release fitting for easy connection to hydraulic bench/Base module as item (1)
3. Bellmouth entry to promote smooth flow into the test section

Required Accessories

- a. Water as flowing medium and ink as contrast medium
- b. Horizontal Vertical glass pipe section
- c. Stabilise the flow at the entry to the test section e.g. Water tank with glass beads
- d. Flow rate in the pipe section can be adjusted via a valve
- e. Flow rate determined by base module
- f. water supply using base module

Technical Specifications

- g. Water Tank Capacity: Min: 2000 ml, Max: 2500 ml
- h. Pipe section length: 500 mm to 675 mm
- i. Inside Diameter: 10 mm to 20 mm
- J. Tank for ink capacity: Min: 250 ml, Max: 300 ml

**Item 1C. Measurement of discharge coefficient for different shaped orifices  
with varying head  
(Qty.: 01 Nos.)**

The experimental setup in conjunction with basic module should facilitate

**Specification:**

- a. Study of horizontal flows from tanks
- b. Determination of the contraction and velocity coefficients
- c. Panel for recording and visualizing the trajectory of the jet
- d. Jet profile velocity determination at the point of discharge
- e. Demonstrates the influence of Reynolds number
- f. Interchangeable inserts with different diameters and contour
  - i. Rounded and Square contour variation for jet with 3-4 mm and 8-9 mm in size
- g. Movable rods for visualisation of the jet path suggested for recording the trajectory
  - i. Point gauges with 8 to 10 movable rods, length in range of 330 mm - 380 mm
- h. Tank with adjustable overflow and scale

## Item ID. Demonstration of Bernoulli's principle

(Qty.:01 Nos.)

Objective is to demonstrate Bernoulli's Theorem and its limitations

Required accessories:

- The experimental unit should include a pipe section with a transparent Venturi nozzle and a movable pitot tube for measuring the total pressure
- The pitot tube should be located within the Venturi nozzle with provision for axial displacement
- The position of the pitot tube should be observed through the Venturi nozzle's transparent front panel
- The Venturi nozzle should be equipped with pressure measuring points to determine static pressures
- Quick release fitting for easy connection to hydraulics bench
- The level differences (pressure) are displayed on the six tube manometers
- The total pressure should be measured by the pitot tube and displayed on another single tube manometer
- Should have quick release fitting for easy connection to hydraulics bench (Item 1)

**Technical specifications:**

- Manometer range: 0 to 450 mm
- Number of manometer tubes: 6 to 11

Venturi Nozzle

- Area: 84 - 338 mm<sup>2</sup>
- angle at the inlet: 10°, 5°
- angle at the outlet: 4°
- Throat diameter: 10.0 mm ± 2 mm
- Upstream diameter: 25.0 mm ± 2 mm
- Upstream taper: 14° ± 20
- Downstream taper: 21° ± 20

Pitot tube

- Movable range: 0 to 200 mm
- Diameter: 4 mm ± 2 mm
- Pipes and pipe Connectors: PVC

Measuring ranges (minimum Static pressure up to 290 mm WC and Total pressure minimum up to 350 mm WC)

- Static pressure: 0 to 290 mm WC
- Total pressure: 0 to 350 mm WC

## Item IE - Visualisation of Free and Forced vortices

(Qty.: 01 Nos.)

In conjunction with basic hydraulic test bench, the experimental setup should be capable of conducting experiments on free and forced vortices. Objectives are generation and investigation of free and force vortices.

**Required** accessories:

1. Transparent tank to allow visualisation of vortex formation
2. Two nozzles for radial water supply (free vortex)
3. Two nozzles for tangential water supply (forced vortex)
4. Different inserts for the water drain to generate free vortex
5. An impeller for generating a forced vortex
6. Point gauges detect the surface profile

**Technical** specifications

- a. Tank with diameter of the range 200 mm to 250 mm
- b. height of the range 175 to 225 mm
- c. 3 or 4 inserts for the water drain
  - Diameter: 8, 12, 16 and 24 mm
- d. Impeller with 2 or 3 blades
- e. Vertical point gauge with a minimum of 6 movable rods
- f. Horizontal point gauge with a minimum of 2 movable rods
- g. Measuring tube, movable
  - Horizontal 0 to 90 mm, vertical 70 to 190 mm
  - Diameter: 4 mm

**Item IF: Demonstration of linear momentum and impact forces of Jet for different deflection angles**

**(Qty.: 01 Nos.)**

The experimental set up in conjunction with basic hydraulic bench/ water supply unit should be capable of conducting investigation of jet forces and demonstration of the principle of linear momentum and must have following features.

1. Using the setup, one should be able to study influence of flow rate, flow velocity and influence of different deflection angles on jet forces
2. Tank must be made up of transparent material
3. Should contain nozzle for generating the water jet
4. Should have provision to adjust jet force adjusted via flow rate
5. Should come with four different shaped deflectors: flat surface, oblique surface, semi- circular surface, conical surface
6. Should be able to measure the jet forces via the weight-loaded scale or balance mechanism
7. Should have quick release fitting for easy connection to basic hydraulics bench/ water supply

**Technical specifications**

- a. Dimensions of Tank
  - Inner diameter: 200 mm to 250 mm
  - Height: 300 mm to 350 mm
- b. Nozzle diameter: 8 mm -12 mm
- c. Target plates
  - Flat surface:  $90^\circ$
  - Oblique surface:  $45^\circ/135^\circ$
  - Semi-circular surface:  $180^\circ$
  - Conical surface:  $135^\circ$
- d. Different balancing weights ranging from 0.2 N to 5 N, each 3 nos.



## **Item 1G: Pressure loss in pipe friction for laminar/turbulent flow (Qty.: 01 Nos.)**

The experimental set up in conjunction with basic hydraulic bench/ water supply unit should be capable of conducting investigation of the pipe friction in laminar or turbulent flow, measurements of the pressure loss in laminar flow and turbulent flow and must have following features

1. Transparent tank with overflow to maintain constant water inlet pressure in the pipe section for experiments with laminar flow
2. valves for flow rate adjustment
3. Twin tube manometers for measurements in laminar flow
4. Dial-gauge or Digital manometer for measurements in turbulent flow

### **Technical specifications**

Pipe section

1. Length: 300 mm - 450 mm
2. Inside diameter: 2 mm -4 mm
3. Tank: 1.5 L - 2.5 L
4. Measuring ranges  
differential pressure: 2x 370 mm WC, 1x 0 to 0.4 bar

**Annexure-II**  
**Commercial BID Format**

TO BE TYPED ON THE LETTER HEAD OF THE BIDDER/OR MANUFACTURER

To  
The Assistant Registrar  
IIT Dharwad

Subject: Supply, Installation, Commissioning, Demonstration and Training of Fluid Mechanics Laboratory  
Equipments

Ref.: Tender Notice No. \_\_\_\_\_, Date \_\_\_\_\_.

Sir,

I/We do hereby submit our Commercial Bid for each of the items mentioned in the tender notice under reference.

[Mention all figures in Indian Rupees, Include all charges]

Sl No.	Description of item (1 to 8) (as per tender technical specifications)	No. of Units	Basic Rate per Unit	GST	Other Charges, if any (Customs Duty etc.)	Total Price per unit
1	<b>Supply &amp; Installation of Fluid Mechanics Laboratory Equipments</b> <b>Mentioned as per Annexure - I</b>	Quantity as specified in Annex-I				
Validity of Offer:						
Any other conditions:						

Declaration: I/We do hereby accept all the terms and conditions laid down in the tender notice for the above said supply. I/We also agree to the condition that the right to suspend the tender process or part of the process, to accept or reject any or all the tenders at any stage of the process and/or to modify the process or any part thereof at any time without assigning any reasons thereto is reserved by the Competent authority of the Institute without any obligation or liability whatsoever.

Date:

Signature of the Bidder along with official seal.

Place:

**ANNEXURE-III**

**INFORMATION TO BE ENDORSED ALONG WITH THE TECHNICAL BID BY THE BIDDER ON THE FIRMS LETTER HEAD**

No.	Description	Information		
1	Name			
2	Address (with Contact number and mail ID)			
3	Address of the Factory site (with contact number)			
4	Name of the Proprietor with Mobile Number			
5	Name of the authorized Representative with designation and Mobile Number			
6	Trade license Number (copy to be enclosed)			
7	Permanent Account Number (copy to be enclosed)			
8	GST Registration Number (copy to be enclosed)			
9	Up to date VAT & GST (copies to be enclosed)			
10	Audited Statement of Accounts submitted for last three years (copies to be enclosed)			
11	Proof of bulk supply of similar stores as per eligibility criteria in the last three years enclosed?			
12	Average annual turn-over during last three years (Rupees to be shown in crores)	2015 – 16	2016 – 17	2017– 18
14	Details of EMD	Rs. Bank : DD / BG No. : Date :		
15	Any other information			

**Acknowledgement:** It is hereby acknowledged that I/We have gone through all the schedules as well as the terms and conditions laid down in the tender notice for procurement of the items for IIT Dharwad. I have also duly filled and submitted the compliance statement as per Annexure-IV of the tender document.

**Declaration:** I/We do hereby declare that the above information submitted by me/us are true to the best of my/our knowledge and I/We have submitted the documents in support of all the information asked for. I/We also agree to the condition that the right to suspend the tender process or part of the process, to accept or reject any or all the tenders at any stage of the process and/or to modify the process or any part thereof at any time without assigning any reasons thereto is reserved by the Competent authority of the Institute without any obligation or liability whatsoever.

Date:

Signature of the Bidder along with official seal.

Place:

## ANNEXURE-IV

### INDIAN INSTITUTE OF TECHNOLOGY DHARWAD KARNATAKA - 580011

#### COMPLIANCE STATEMENT

Ref: Tender Notice No. \_\_\_\_\_, Date \_\_\_\_\_.

#### Instructions:

1. You have to fill in all the columns and ensure that you furnish all the required information accurately and unambiguously.
2. If our specification contains any values, you have to provide your values against the column in the same unit as specified.
3. Deviation in values, materials etc. from our specification may be explained in the remarks column.

Sr. No.	Check list of documents/ Undertakings ?	YES/NO	Remarks (Give explanation if answer is No)
1	Is Tender fees / EMD attached?		
2	Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
3	If authorised dealer, a recent dated certificate to this effect from OEM, attached or not?		
4	Undertaking from OEM regarding technical support & extended warranty period		
5	Validity of 180 days for the bid given or not?		
6	Undertaking from bidder regarding acceptance of tender terms & conditions		
7	Whether special educational discount for Indian Institute of Technology Dharwad, Karnataka given.		
8	Whether training of the nominated persons without any charges offered.		
9	Does the Fluid Mechanics Laboratory Equipment Complies with all the required specifications as per Annexure I. Attach a separate sheet showing compliance with the specifications and explanations thereto if the equipment's varies from the requested specifications?		
10	Whether free Installation, Commissioning and Application Training offered.		
11	Whether five years comprehensive onsite warranty offered.		

**ANNEXURE- V**  
**SELF-DECLARATION – NO BLACKLISTING**

(Date)

To,

The Assistant Registrar  
IIT Dharwad

Dear Sir/Madam,

**REF: TENDER FOR SUPPLY, INSTALLATION of SUPPLY & INSTALLATION OF FLUID MECHANICS LABORATORY EQUIPMENTS MENTIONED AS PER ANNEXURE - I**

In response to the Tender Document for Supply, Installation and performance demonstration of \_\_\_\_\_ for IIT DHARWAD, I/ We hereby declare that presently our Company/ firm \_is having unblemished record and is not declared ineligible for corrupt & fraudulent practices either indefinitely or for a particular period of time by any State/ Central Government/ PSU/Autonomous Body.

We further declare that presently our Company/ firm \_\_\_\_\_ is not blacklisted or debarred and not declared ineligible for reasons other than corrupt & fraudulent practices by any State/ Central Government/ PSU/ Autonomous Body on the date of Bid Submission including violation of relevant labour laws.

If this declaration is found to be incorrect then without prejudice to any other action that may be taken, our security may be forfeited in full and the bid, if any to the extent accepted may be cancelled at any stage and the contract may be terminated and we shall be barred from bidding in future against any other tender.

Yours faithfully,

Place:

Signatures\_\_\_\_\_

Date:

Name\_\_\_\_\_

Seal of the Organization

**ANNEXURE-VI**

**PROFORMA FOR SUBMISSION OF EMD IN FORM OF BANK GUARANTEE**

(To be submitted on non-judicial stamp paper of appropriate value purchased in the name of the issuing Bank)

1. 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. ....

2. 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.....

3. CONDITIONS OF THIS OBLIGATION ARE:

- (i) If the tenderer withdraws or amends, impairs or derogates from the tender in any respect within the period of validity of this tender.
- (ii) 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.

4. WE undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser 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 to the occurrence of one or both the two conditions, specifying the occurred condition or conditions.

5. 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 of the officer  
.....  
Designation of the officer  
.....  
Seal, name & address of the Bank and address of the Branch