हरियाणा केन्द्रीय विश्वविद्यालय
CENTRAL UNIVERSITY OF HARYANA

(संसद अधिनियम 25 (2009) के तहत स्थापित)
(Established vide Act No. 25 (2009) of Parliament)
गांव: जांट–पाली, जिला–महेन्द्रगढ (हरियाणा) . 123029
Village: Jant-Pali, Distt: Mahendergarh (Haryana)-123029

F. Ref: CUH/SOET/CE/02/2020/78 5/03/2020

TENDER NOTICE

Central University of Haryana (CUH) invites techno-financial proposals, for the item(s) mentioned in tender document, from reputed firms having expertise and experience in the relevant field. The interested parties /firms/OEM desirous of supplying, installing and integrating the system(s) as given in tender documents, may send their sealed offers addressed to the **Registrar, Central University of Haryana**, at the following address:

Academic Block No. 3 (Ground Floor)
E& GA Branch ,Room No.37
Central University of Haryana
Mahendergarh (Haryana)
PIN-123031

Complete tender details are available on the University website: www.cuh.ac.in or may be obtained in person from the office of the Registrar.

The last date for submission of Tenders: 20/03/2020 up to 12 Noon
Date of opening of Technical Bids and Financial Bid: **20/03/2020** at 2 PM
Place of Opening the Tender: **Room No: 136 (Seminar Hall) in Academic Block-III, CUH, Mahendergarh (Haryana).**

The interested parties should carefully read the tender document and accordingly submit their bids

Registrar
Central University of Haryana

Copy to:
1. AR To VC (For Kind information of Hon'ble Vice Chancellor)
2. Finance officer ,CUH
3. Assistant Registrar(E&GA) ,CUH
4. PRO ,CUH(for Necessary Advertisement)
5. STA (To upload the tender on the Website)

Tender (Proposal/Bid Document)
For the purchase of Items/Equipment(s) in
Various Laboratories of Department of Civil Engineering
Under School of Engineering and Technology in
Central University of Haryana,
Mahendergarh, Haryana

Under Two Bid System (Technical and Financial)

No. CUH/SOET/CE/02/2020

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Check List for submission of documents:

Sl No	Description	Yes /No	Page No	Remarks if any
1	Whether Tender Fee paid?			
2	Whether EMD / Tender Fees attached?			
3	If EMD exempted, Valid Exemption Certificate attached?			
4	Whether Firm Registration attached?			
5	Whether GSTIN certificate attached			
6	Whether PAN attached?			
7	Whether affidavit duly attested by the Oath Commissioner/Executive Magistrate regarding non-black listing of supplier attached?			
8	Whether tender document along with all Annexures (1 to 8) duly signed & stamped by the authorized signatory attached?			
9	Whether copy of Turnover and ITR attached?			
10	Whether orders executed in last Five years from as IIT/NIT/Institutes of National Importance/ Government Universities/Government Engineering Colleges attached?			
11	Whether technical specifications of the quoted equipment attached?			
12	Whether catalog of the equipment attached?			
13	In case of authorized agent/distributor whether certificate/ authorization letter for the same issued by the manufacturer attached?			
14	Whether list of Institutes/Organizations where the quoted model of equipment supplied by the tenderer in India is attached?			
15	In case of foreign suppliers quoting directly, whether, the name of Indian agent mentioned?			
16	Whether past performance certificate from reputed Client such as IIT/NIT/Institutes of National Importance/ Government Universities/Government Engineering Colleges have been attached			
17	NABL certification /ISO 14001 attached?			

18	Any other certification or Manufacturing licence			
19	Whether a Certificate of supplying spare parts for 5 years after warranty attached?			
20	Whether Self-certificate that the firm has never been debarred or indicted in corruption case(s) attached?			
21	Whether certificate that no complaint of poor performance have been received by the firm from suppliers attached?			
22	Whether drawing and calibration attached? Wherever necessary			
23	Any other General information			

1. Instructions to bidder

Submission, Receipt, and Opening of Proposals

a) The bidder shall read the instructions, technical specifications and the bid documents carefully before filing and submission of bidding documents.

b) The bidder shall sign on each page of the bidding documents and assign serial number in integer value starting from one and submit the proposal/bid strictly as per the instructions.

c) The original Technical and Financial Proposals/bids shall be prepared and submitted in separate sealed envelopes and both the envelopes should be kept in third envelope.

d) The envelope should be super subscribed ***"Tender for Civil Engineering Labs under School of Engineering and Technology"***. The proposal/bid shall be sent by post so as to reach at the address mentioned on invitation to bid letter, on or before the due date and time (upto **20/03/2020 12 Noon**), as specified in the tender notification or as per the corrigendum if issued any.

e) Bids received late will not be accepted and the CUH will not be responsible for any delay due to whatever reasons.

f) **Bid Processing Fee:** Each bidder shall pay the bid processing fee for Rs. 1000 in the form of *DD drawn in favour of Central* ***University of Haryana****, Payable at Mahendergarh,* Haryana.

g) Earnest Money Deposit (EMD): Each bidder shall pay EMD of Rs 50,000(Fifty Thousand rupee) of the quoting value in the form of ***Demand Draft drawn in favour of "Registrar Central University of Haryana, payable at Mahendergarh*****.**

h) Valid NSIC and MSE Certificates will be accepted for relaxation of EMD and tender fee. Presently EMD/Tender Fee exemptions and price preference are applicable to only Micro and Small Industries. In view of the above, if the vendor will claim for EMD/Tender Fee exemptions, the vendor should meet all the criterias for Micro and Small Industries. The vendor must have to submit the supporting documents like NSIC registration certificate, MSE registration certificate issued by competent government bodies to become eligible for the tender fee/EMD exemptions. The certificates of the vendor (NSIC/MSE) shall cover the items tendered to get EMD/Tender Fee exemptions. NSIC certificate shall be valid as on due date/extended due date of the tender. This is not applicable for non NSIC unit. Note – In case the bid is submitted as an Indian arm of a foreign bidder and the eligibility criteria conditions were met through foreign company, then the EMD exemption cannot be claimed under the MSME status of India arm/subsidiary. Thus a bidder who solely on its own, fulfills each eligibility criteria condition as per the tender terms and conditions and who are having MSE status, can claim EMD exemption/tender fee.

i) Technical Bid format: The bidder shall confirm that the product quoted (by the bidder) shall be in conformance with the conditions/criteria as specified herein**.**

j) **Financial Bid Format:** Bidders shall quote items with inclusive prices (i.e. price inclusive of taxes and all other expenses) for delivery and installation.

k) Successful Bidder has to provide irrecoverable Performance Bank Guarantee to the tune of 10% of the order value for the warranty period in the form of ***Demand Draft/FDR/Banker's cheque drawn in favour of "Registrar Central University of Haryana, payable at Mahendergarh*****.** The paying document of the performance Bank Guarantee should be valid till 60 days after the end of warranty/Guarantee period.

l) **Payment Schedule**. 100% payment will be released on delivery, satisfactory installation, and integration and commissioning of said system as applicable to the procurement after deduction

of taxes as applicable or as per the university norms.

m) **Delivery Schedule:** The equipment(s)/good(s) are required to be supplied within 60 days (or mutually agreed time- period) on issue of the Purchase Order by the university. In case successful tenderer fails to complete the order in part or whole in the stipulated period of 60 days (or mutually agreed time-period) of a penalty @ 1% of the order value will be imposed per week subject to maximum penalty of 10% the order value. In case the delay is more than six weeks (after the expiry of the stipulated period) the purchase order may be cancelled and the EMD will be forfeited

n) **Validity of quotation**: The quotation should be valid for 90 days after the date of the opening of the bids.

o) All the equipment's should have an onsite warranty for minimum three years. The warranty shall take effect from the date of successful installation of machine/item and handing over of the system to the user department satisfaction**.**

p) The maintenance services, including spares parts shall be free of cost during the warranty/ guarantee period.

q) The supplier shall provide assurance to give spare parts of the items/Goods at least for 7 years' time from the date of commissioning.

r) The University reserves the right to place order or not to place order to finally selected vendor(s), depending upon the availability of the funds with the university at that point in time.

2. General Conditions of the contract

a) The Manufacturer/Bidder should not be associated or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the purchaser to provide consulting services for the preparation of the design, specification, and other documents to be used for the procurement of the goods to be required under this invitation of tender.

b) Manufacturer/Bidder shall not be under any declaration of ineligibility for corrupt and fraudulent practices issued by any State Government/Government of India (GOI)/Union territory. The Manufacturer/Bidder should not be a defaulter of any financial institute or Bank and their assets should have never been put on auction for recovery of debts.

c) The Manufacturer /Bidder should be in the business in India for more than 3 years as on 31-12-2019. This should be supported by the certificate of registration issued under the companies act by a competent authority.

d) The Manufacturer/Bidder who deal with machines/equipments for the laboratories should have executed/implemented work/purchase order for any Central Universities/IIT/NIT/IISc/IIIT/Research Organization and Institute of National importance/ Government Universities / Government Engineering Colleges should furnish the details as per Performa given in **Annexure-1.**

e) Bidder should be having at least five orders minimum of Rs.10 Lakhs or a single order of Rs. 30 Lakhs and above in last five years for similar items being supplied to any Central Universities/IIT/NIT/IISc/IIIT/Research Organization and Institute of National importance/ Government Universities / Government Engineering Colleges. The bidder should furnish the information supported by Purchase order or Work done certificates from the concerned department(s) OR Institution.

f) The Manufacturer /Bidder should have the cumulative turnover of Rs. 5 Cr in last five financial year towards supply of machines/equipment for the relevant laboratories taken together or for individual items. They should furnish the details as per performa given in **Annexure-2**. This should be supported by audited balance sheet of the company for that

particular year. Bidder should have experience to supply of atleast 75% similar items to different institutions as mentioned in (e) above.

g) The Manufacturer/Bidder should submit catalogue with complete Technical details with Make and Model for technical evaluation purpose. Bids without Catalogue or with incomplete information are liable to be rejected.
h) There should be no complaint against the Manufacturer/Bidder for poor performance of the equipment's supplied by any institute or customer. The self-certified certificate to be attached with bid in this regard on firms letter head.
i) The Manufacturer / Bidder should submit copy of ITR of last five years.
j) Installation, Demonstration and Testing of equipment is to be done by the supply firm in the presence of subject expert of the concerned Electrical lab of SOET.
k) The University reserve the right to inspect manufacturing facility including Testing unit/R&D division of any or all of the technically responsive bidder before opening the financial bids. The opening of financial bids is/are subjected to satisfactory report by the inspection committee. The inspection committee is not liable to clarify regarding inspection report.
l) The vendor should provide the satisfactory training to our technical staff after installation/commissioning. The trainer should be a permanent employee of the company with a minimum of 3 years' experience in demonstrating such equipments. The details about the training programs and a brief bio-data of the trainer should be submitted along with the technical bid.
m) Original catalog (not a photocopy) of the quoted model duly signed by the principals must accompany the quotation. The model quoted should be highlighted in the catalog enclosed with the quotation. Merely copying the specifications in the quotation without any proof shall not make the parties eligible for consideration of the quotation.
n) The CUH is reserves not to place the order for one or any of the item quoted in this tender even after finalization of tender without assigning any reason for not doing so.
o) The Manufacturer must have NABL or ISO 14001 certification.
p) The Bidder should have Authorization certificate from Manufacturer for this ender with tender No. mentioned in it for Software License and other equipments, if required.
q) The Manufacturer / Bidder should be ready for demonstration of the product quoted on short notice as per the tendered specifications.
r) The Manufacturer / Bidder may quote any or all the products/items as per the Tender.
s) CUH is the final authority to judge the tender and has every power - to accept or reject the same without assigning any reasons.
t) Technically qualified bidders should demonstrate the machine/item functionality during the installation and training.
u) The bidder should undertake to provide after sale-service whenever needed by the purchaser.
v) CUH reserves the rights to accept/reject any offer in full or in part or accept any offer other than the lowest offer without assigning any reason thereof. Any offer containing incorrect and incomplete information shall be liable for rejection.
w) Any effort by a supplier to influence CUH's tender evaluation, tender comparison or contract/order award decisions may result in the rejection of the supplier's tender and forfeiture of the supplier's EMD.
x) After opening of bids, information relating to the examination, clarification, evaluation and comparisons of bids and recommendations concerning the award of contract shall not be disclosed to bidders or other persons not officially concerned with such process.
y) Technical bid should include the details as per performa given in **Annexure-2**
z) Financial bid should include the details as per performa given in- **Annexure-**5
aa) Acceptance letter by bidder -**Annexure -6**
bb) Warranty certificate-**Annexure- 7**
cc) Undertaking of support from OEM **–Annexure 8**

3. Special conditions of the tender

(*To be returned by Tenderer along with the Tender duly signed)*

a) **GENERAL**: Tenderer, who are Indian Agents of OEMs, should furnish a clear declarati on as follows: We declare that I am/we are Accredited Agents of the suppliers aboard. DGS&D enlistment certificate needs to be attached (applicable only for the Indian Agents)

b) **DEVIATION FROM SPECIFICATIONS**: It is in the interest of the tenderer to study the specifications in the tender schedule thoroughly before quoting so that, if the tenderer makes any deviations, the same are prominently brought out in the body of the tender. If you need to add any optional items
your system in order to meet our specifications, you are requested to quote for the total in cluding the option required to suit our requirements.
Otherwise, your tender will not be considered at all.

c) The bidder shall submit the following :

i. Complete address of the dealing person along with all the details such as mobile no, e-mail id, and correspondence address.
Address of the OEM's Banker and their swift code.
Name and designation of the person whose name the purchase order to be placed.

ii. Bidder shall also give the certificate that the goods for which bidding is done in this tender are of good quality and produced as per the industry specifications and best workmanship.

iii. Jurisdiction –All the question, dispute, or differences arising under or out of or in connection with this contract, the Jurisdiction will be Narnaul Mahendergarh).Acceptance to this affect shall be signed by the bidder at the time of bidding.

iv. The bidder shall provide the Acknowledgement that they have gone through the whole tender documents and have thoroughly understood all the conditions, provisions, specifications and we abide by all the conditions and have understood that violation or concealment any information essential will be liable for penal action from the university and may even result in cancellation of bid and/or forfeiting of EMD.

v. The bidder shall give the certificate that they will supply the spare parts as an when required by the university during the warranty, AMC and post AMC period for at least seven years after the warranty is over.

4. Schedule of requirement

Within 60 days of placing of purchase order by the university or the period as decided mutually by the CUH and supplier.

5. **Specifications of machines/items are given as under :**

List of Instruments for CIVIL Engineering Lab

1 TILTING FLUME/ ADJUSTABLE CHANNEL

Description:

Total Length of flume should be 10Meter (m). Test section should be 8 m long having transparent 10 mm thick toughened glass on either sides of the flume. Width and depth should be 0.5 m. x 0.75 m. respectively. Flume Bed should be made from 3 mm thick SS 304 grade sheet & height should be 1.5 m from the floor. Inlet & Outlet Tanks should be made from 2 mm thick SS 304 grade sheet.

The re-circulating system should consist of L-shaped MS tank (capacity: 8000-9000 ltrs) made out of 3.0mm MS Sheets and 50 x 50 x 6mm MS angles and having four or five detachable segments and it shall be covered by checker plate . The water is circulated from the tank to the flume by a Crompton Greaves / Kirloskar/Havells Electric Pump of 10 HP with a 70-75 LPS at 6 m head run at Variable Frequency Drive with variation of 15 LPS to 75 LPS. Discharge Measurement to be done by pipe line should have a 6" dia orificemeter made of stainless steel 304 grade/GI with manometer.

The Flume should be able to accommodate any of the following model given below for experimentation:

1. Venturi flume
2. Broad crested weir
3. Manning's Coefficient of roughness
4. Free hydraulic jump.
5. Crump Weir
6. Ogee Weir
7. Suppressed Rectangular notch
8. Rectangular Notch
9. Circular Notch
10. Triangular Notch (90°)/Triangular Notch (60°)
11. Cipolletti Notch
12. Straight drop spillway
13. Straight drop spillway (with overhanging lip)
14. Bridge pier model of Perspex

The channel should provide for the movement of three pointer gauge trolley. Instrument carrier having stainless steel three pointer gauges with least count of 0.1 mm made of SS 304 grade fitted on SS 304 grade rail throughout the top of the flume. Flume Stand to be made from heavy duty rectangular steel hollow section grade YST 310 as per IS 4923 painted with corrosion resistant PU paint. All the piping to be made from corrosion resistant GI. Two Honeycomb sheets on upstream side made of stainless steel 304 grade to be provided at inlet tank to have laminar flow conditions. Sliding Tail gate to be made of SS 304 thickness 5 mm to be provided at outlet of the flume. Drain Valves to be provided at inlet tank, sump tanks etc. Working Platform having width of 1.2 m and length 8 m along the length of the flume on one side having height of 1.5 m from the floor level to be provided. Two Staircase having Rise =0.25m and tread=0.25m to be provide on one side of the platform above the sump tank.

Platform to be made from 4 inch heavy duty Channel section and top to be covered with checker plate, Painted with Corrosion Resistance PU paints.

The flume is to be pivoted at the centre and supported through rollers on movable wedged angle frames at four pairs of points on each side of the pivot along the length of flume. The five-point suspension system is to be provided to reduce the deflection of flume. Tilting is done by moving the wedges by a screw rod mechanism driven by an electric motor. The drive for the tilting mechanism consists of electric motor, speed reduction mechanism, limit switches, reverse forward switch and starter with complete wirings. Tilting Arrangement should be with motorized twin screw jack system with limit switches and having slope of -0.5 to ±2.0%.

Control Panel to be provided on the platform which must include AC drive for pump, up and down switch for tilting arrangement, single phase protection relay, MCB mains indicator and other safety features.

All the valves should be made of stainless steel. Maximum deflection of the bed to be in the range of 3mm and side wall deflection to be in the range of 2mm.

Drawing and layout of the flume to be submitted with tender document.

Note: Provision for wave generator to be made in flume for future expansion while supplying the flume.

2 FREE AND FORCE VORTEX APPARATUS

Free Vortex Apparatus

- Apparatus consists of a close circuit through which water is circulated continuously by means of a centrifugal pump of 25mm x 25mm with 0.5 H.P. motor to make the supply from sump tank.
- A sump tank fabricated with 1.5mm thick S.S. sheet is provided. A drain valve of 15mm size is provided in the bottom of the tank.
- The experimental consists of a circular cylindrical perspex tank of 30cm dia and 40cm height.
- Four circumferential jets have been placed along the circumference of the cylinder near its bottom which helps in the formation of free vortex.
- A pointer gauge 40cm long is provided to measure the depth of vortex formation at various points.
- The whole set up is mounted on a stand.

Forced Vortex Apparatus

- The experimental set up consists of an open circular cylindrical perspex tank 30cm dia and 40cm high which is mounted on a M.S. plate.
- The plate is rotated with the help of a variable speed D.C. motor
- A variable speed drive with A.C. to D.C. converter is also provided.
- A pointer gauge 40 cm long is provided to measure the depth of vortex formation at various points.
- The whole set up is mounted on a stainless steel 304 Grade frame.
  Conditions were allowed to steady state and the depth of flow at any particular point was observed not to change over a period of time.
  The system is closed circuit type contains their sump tank, collecting tank, supply tank, pump, motor, pipe line etc. The tanks are duly painted to protect from rust and corrosion.

RANGE OF EXPERIMENTS

To plot the surface profile of a forced vortex by measurement of the surface profile coordinates.
To plot the surface profile of a free vortex by measurement of the surface profile coordinates.

FEATURES

Clear Acrylic test section
Industrial PU Paint structure

TECHNICAL SPECIFICATIONS

Product	**FREE AND FORCE VORTEX APPARATUS**
Cylindrical Tanks 2 No.	Material Transparent Acrylic, Dia. 200 mm (approx.)
Hook/Pointer Gauge	To measure X-Y co-ordinates of Jet
Orifice	Set of 3 different Sizes, Material SS
Flow circulation	Pump FHP capacity Crompton Greaves / Kirloskar/Havells
Sump tank	Stainless steel 304 Grade Capacity 50 Ltrs
Drive Motor	FHP variable speed motor with drive with RPM Indicator
Piping	MOC GI
Control panel	Standard make on/off switch, mains indicator & fuse etc.

3 REYNOLD'S APPARATUS

Test section tube should be made of Borosilicate Glass having Internal Diameter 14 mm approx., Length: 600 mm approx. Water circulation should be done by Magnetic Drive Pump, Crompton/standard make, Sump tank, 1.5 mm thick, Capacity 60 liters to Constant head water tank, 1.5 mm thick, capacity 40 liters, made of stainless steel 304 Grade and flow measurement should be done by measuring cylinder and electronic stop watch. Dye injection should be done by using capillary tube made of Stainless Steel 304 grade, from Dye vessel having capacity 1 liter, made of stainless steel 304 grade.

The whole set-up should be well designed and arranged on a rigid structure made of MS square pipe 32 mm × 32 mm × 2 mm thickness and painted with industrial PU Paint.

Test Results at the time of demonstration at our campus should match with sample calculations provided along with the bid.

EXPERIMENTS:

To determine the Reynolds's number and hence the type of flow either laminar or turbulent
To study transition zone

FEATURES:

Visible Test Section & Closed loop water circulation
Compact &stand alone set up
Stainless Steel tanks and wetted parts
Industrial PU Paint structure

TECHNICALDETAILS:

Product	**Reynolds' Apparatus**
Tube	Material Borosilicate Glass
Dye vessel	Material Stainless Steel, Suitable Capacity
Capillary Tube	Material Copper/Stainless Steel
Constant Head Water Tank	Capacity 30 Ltrs
Water Circulation	FHP capacity make Crompton Greaves / Kirloskar/Havells
Piping	MOC GI
Flow Measurement	Using Measuring Cylinder
Sump Tank	Capacity 50 Ltrs MOC SS
Stop Watch	Electronic
Control Panel	On/Off Switch, Mains Indicator, etc.

4 IMPACT OF JET ON VANES APPARATUS

The visible test section should be fitted with a nozzle made of brass and jet enclosure should be made of Acrylic. Two targets i.e. 90° Flat Plate and 180° Hemispherical Cup should be provided for study. Water circulation should be done by FHP Pump, Crompton/standard make, from sump tank, 1.5 mm thick, Capacity 50 liters made of stainless steel 304 Grade and flow measurement should be done by measuring tank, 1.5 mm thick, Capacity 30 Ltrs, made of stainless steel 304 Grade with piezometer tube and electronic stop watch. Dead weights set should be provided with set-up.
The lift of stem and weight added to the pan on other side gives the calculation of corresponding force. The flow rate of water is measured using measuring tank and stop watch provided.

EXPERIMENTS:

- To study the force developed by impact of jet on different surfaces.

FEATURES:

Visible Test Section & Closed loop water circulation
Compact &stand alone set up
Stainless Steel tanks and wetted parts
Industrial PU Paint structure

TECHNICALDETAILS:

Product	**IMPACT OF JET ON VANES APPARATUS**
Test surface	Set of 2 Flat Plate & Hemispherical Cup
Nozzle	Material Brass/SS
Enclosure	Clear acrylic
Supply Tank	Capacity 50. MOC SS
Measuring tank	Capacity 30 Liters MOC SS fitted with Piezometer Tube & scale
Pump	FHP capacity make Crompton Greaves / Kirloskar/Havells
Piping	MOC GI
Stop Watch	Electronic

5 STUDY OF HEAD LOSS IN PIPE FITTINGS, SUDDEN ENLARGEMENT & CONTRACTION APPARATUS

Two Pipe Test sections of Dia. ½", ¾" with pressure tapping length 1.0 m should be made of stainless steel 304 Grade. The set up should consists of a 1/2 bend and elbow, a sudden expansion & sudden contraction fitting from 15mm to 25mm, ball valve and gate valve. Water circulation should be done by FHP Pump, Crompton/standard make, from sump tank, 1.5 mm thick, Capacity 50 liters made of stainless steel 304 Grade and flow measurement should be done by measuring tank, 1.5 mm thick, Capacity 30 Ltrs, made of stainless steel 304 Grade with piezometer tube and electronic stop watch. Pressure measurement should be done by Inverted U-Tube Manometer (no Mercury needed). Pressure tapings are provided at inlet and outlet of these fittings under test. Present set-up is self-contained water re-circulating unit, provided with a sump tank and a centrifugal pump etc. Flow control valve and by-pass valve are fitted in water line to conduct the experiment on different flow rates. Flow rate of water is measured with the help of measuring tank and stop watch.

The whole set-up should be well designed and arranged on a rigid structure made of MS square pipe 32 mm × 32 mm × 2 mm thickness and painted with industrial PU Paint. Test Results at the time of demonstration at our campus should match with

sample calculations provided along with the bid.

EXPERIMENTS:

- To determine loss of head in the fittings at various water flow rates
- To measure the loss coefficient for the pipe fittings

FEATURES:

Visible Test Section
Closed loop water circulation
Compact &stand alone set up
Stainless Steel tanks and wetted parts
Industrial PU Paint structure

TECHNICAL DETAILS

Product	**Study of Head loss in pipe fittings, sudden enlargement & contraction apparatus**
Test Section	**Sudden Enlargement** From 15mm to 25mm **Sudden Contraction** From 25mm to 15mm **Fittings** Size ½" **Bend, Elbow, Meter Bend, Ball valve, Gate valve Straight pipe section for Study of friction in pipe.**
Water Circulation	FHP capacity make Crompton Greaves / Kirloskar/Havells
Flow Measurement	Capacity 30 Ltrs. MOC SS fitted with Piezometer Tube & scale
Piping	MOC GI
Sump Tank	Capacity 50 Ltrs MOC SS
Stop Watch	Electronic
Control Panel	On/Off Switch, Mains Indicator etc.

6 CURRENT METER

Cup Type (Pygmy type) Current Meter with direct velocity Counter

As per IS Specifications Cup type (Pygmy type) current meter consist of wedding rod of 120cm long with stand to hold with direct digital velocity counter.

Sensor

Type : Magnetic/Optical sensor with one pulse per revolution.
Accuracy : ±1% for range 0.03 - 0.3 m/s and ±0.5% for 0.3 - 4 m/s.

Range

Pygmy Cup type : 0.03 to 2.0 meters per second.

Velocity Log Model Riv-Mc

Display : 16 character X 1 line alphanumeric LCD Display with good visibility in daylight.
Clock : Highly stable, quartz controlled clock.
Input power : aline battery.
Operating temp. : 0-50 ^{0}C.
Enclosure : Splash proof, Hand held cabinet.
Mode : Direct Velocity.
Data storage : 99 data values can be stored along with the mode of measurement.
Calibration equation :The calibration multiplier and constant can be changed as and when required.

7 HYDRAULIC RAM

- Self-contained water circulation unit.
- A sump tank fabricated on 1.5 mm thick S.S. sheet is provided. A drain valve of 15 mm size is provided in the bottom of the tank.
- A supply tank fabricated with 1.5 mm thick S.S. sheet with over flow arrangement and gauge glass tube is provided. Supply tank has the provision for fixing the supply pipe of 50 mm dia of which other end is connected to the ram.
- For the supply head of 2.5 m, the discharge head of the ram will be 15 m (approx.) the discharge will be 360 LPH.
- A pressure gauge is provided with a regulating valve on the delivery side of the ram (delivery pipe is of 15 mm dia)
- Lifted water can be collected by the help of a collecting tank fabricated from 1.5 mm thick S.S. sheet. The tank is provided with gauge glass tube, flow diverting arrangement and a drain valve of 25 mm size.
- Waste water can be measured by the help of another collecting tank fabricated from 1.5mm thick S.S. sheet. The tank is provided with gauge glass tube, flow diverting arrangement and a drain valve of 15 mm size.

Experimental Capabilities:

To determine the efficiency of ram.

8 ELECTRICAL ANALOGY APPARATUS

- The Electrical Analogy Instrument shall have following facilities:-

  The Apparatus is in two parts namely:-

  (a) Experimental Setup

  (b) Analogue Field Plotter
- The experimental set up consists of a transparent tank of 500 mm area and 100 mm depth.
- In this tank the model under study is to be installed.
- The model is to be designed as per the requirement out of copper plates.
- Control Panel should comprising of variable Power Supply 0 - 24 V DC, 5 Amp. And Digital Voltmeter 0 - 200 V DC.
- A Sample model arrangement shall be given with the set up.
- A probe is mounted on a trolley, which can traverse in two planes fitted on tray to locate equipotential lines,
- Cross-Slide should be with scale and transverse movement in X & Y direction 0 to 480 mm.
- Necessary potential can be given with the help of analogue field plotter can be displayed on the meter provided.

Test Results at the time of demonstration at our campus should match with sample calculations provided along with the bid.

Equipment should be capable of performing following experiment: •

To draw the equi-potential lines on the graph. •

To draw the streamlines with the help of equi-potential lines for different models.

To draw flow net around different models

9 PITOT STATIC TUBE APPARATUS

Self contained water circulation unit.

- Pump giving adequate flow for meaningful experiments.
- Electrical supply - Single phase, 0.5 H.P. Cap.
- Water is drawn from the sump tank and delivered to a pipe line of 50 mm diameter of sufficient length
- A pitot tube of standard design made of stainless steel or brass pipe of 6 mm size is
- provided.
- The pitot tube is fixed below a pitot static gauge of 30 cm size.
- An inclined U tube manometer of 50 cm size is provided to determine the velocity head.
- Discharge of water can be collected by the help of a collecting tank

Equipment should be capable of performing following experiment :

• To find the point velocity for different flow rates of Water and calibrate the Pitot tube.

• To find the co-efficient of Pitot tube between 0.95 to 0.98

• To study the velocity distribution in open channel

10 STOKES LAW

Single column of internal Diameter 75 mm and Length 120 mm should be made of Borosilicate Glass. Electronic Stop Watch, Steel and glass balls of different sizes should be provided. Tube light arrangement should be provided for visualization.

The whole set-up should be well designed and arranged on a rigid structure painted with industrial PU Paint.

Test Results at the time of demonstration at our campus should match with sample calculations provided along with the bid.

Equipment should be capable of performing following experiment:

• To verify the stocks law and measure the drag Coefficient.

• To plot the graph between drag coefficient Vs Reynolds number.

• To study the motion of a solid particle through a liquid.

11 Water Absorption test(Density Bucket)

The buoyancy balance (Electronic) system shall consist of a rigid support frame, incorporating a water tank mounted on a platform. A mechanical lifting device is used to raise the water tank through the frame height immersing the specimen suspended below the balance. The balance supplied may also be used as a standard weighing device, thus providing a versatile and comprehensive weighing system in the laboratory, 6000 g x 0.1 g supplied with frame, water tank, wire basket and suspension hook.

12 Charpy and I-Zod Impact Test Machine-

Pendulum Drop Angle: (140 Degree for Charpy Test) & (90 Degree for IZOD Test)
Pendulam Effective Wt.: (21.400 Kg for Charpy Test) & (21.300 Kg for IZOD Test)
Pendulum impact energy : 300J (Charpy Test) & 168 J for IZOD Test
Striking Velocity of Pendulum: 2.45 m/sec for Charpy Test & 3.857 m/sec for Izod TestMin

Scale graduation: 2J
Max Permissible loss by friction etc.: 0.50% of impact Energy. The apparatus is provided with antirust attractive powder coating.

13 Two-Hinged Arch Apparatus-

The model should have a span of 100cm and rise 25cm. Both ends should have hinge but one of the ends should also be free to move longitudinally. A lever arrangement may be fitted at this end for the application of known horizontal inward force for measuring the horizontal thrust. Along the horizontal span of the arch various points are marked at equidistant for the application of load. This being a statically indeterminate structure of the first degree. A dial gauge with 25mm travel (with magnetic base) should be supplied with the apparatus. Mild steel apparatus supplied should be complete with a supporting stand and a set of weights. The apparatus is provided with antirust attractive powder coating.

14 Redundant Joint Apparatus-

Apparatus should consists of three suspension members (spring balances) of different stiffness which are jointed at a point to form the redundant joint. The upper end of the suspension members being tied in a position to a vertical wooden board. Arrangement is provided to apply a vertical load at the joint and to measure its horizontal and vertical displacement on a paper and also elongations and forces in the suspension members by the help of dial gauges. Two dial gauges with 25mm travel (with magnetic bases) are supplied with the apparatus. Apparatus to be supplied should be complete with a supporting stand and a set of weights. The apparatus is provided with antirust powder coating.

15 Unsymmetrical Bending Apparatus-

Apparatus consists of an angle of size 1" x 1" x 1/8" or in equivalent metric units of length 80cm is tied as a cantilever beam. The beam is fixed at one end such that the rotation of 450 intervals can be given and clamped such that the principal axis of its cross-section may be inclined at any angle with the horizontal and vertical planes. Also arrangement is provided to apply vertical load at the free end of the cantilever and to measure horizontal and vertical deflection of the free end. The apparatus is provided with antirust powder coating.

16. Elastic Coupled/Continuous Beam Apparatus-

The apparatus consists of beam (Max. span 1 mtr, section 25 X 3 & 25 X 5 mm) provided with various supports & loadings. Support arrangement to be there for simply supported, fixed, continuous & cantilever beam. The support bracket is cast and machined at the top. Different support conditions can be had by mounting suitable support fixture at the top of the support bracket. These fixtures can be conveniently connected to the beam as well as base frame. The beam is rectangular in section. An upward load arrangement is achieved by using a chord and a double pulley bracket. Application of known moment at any point on the beam is possible by moment application fixture. The whole arrangement is mounted over a sturdy frame. Two dial gauge measures slope and deflection at various lengths. The apparatus is provided with antirust powder coating. A technical manual describing the apparatus & experiment accompanies the unit.

7.Anenexure(1-8)

Annexure 1

PROFORMA FOR PAST PERFORMANCE

Tender No…….Date of Opening……..... Time .....hours

Sl No	Orders placed by (Full address of Purchaser)	Order No. and Date	Description and Quantity of ordered items	Value of Order in Rs	Date of completion of delivery as per contract/actual	Remarks if any
1	2	3	4	5	6	7

Authorized signatory

Name of the Firm: ……

Signature and Seal of the Tenderer: ……

Annexure-2

The bidder should fill in the below format to be submitted in Technical Bid

S. No	Brief Description of Equipment's	Quantity to be Supplied	Delivery and installation period in days from date of issue of purchase order	Warranty in years

Authorized signatory

Name of the Firm: ……

Signature and Seal of the Tenderer: ……

Annexure-3
Evaluation of the Tenders

1.

a) Central University of Haryana, Mahendergarh shall first evaluate the technical bids. The commercial bids of only those bidders who happened to be responsive/qualified in the technical bids, will be opened.

b) Decision of the University in the evaluation of the Technical bids shall be final.

2. Financial bid evaluation

The financial quotes submitted by technically responsive/qualified bidders will be opened. Then Contract will be awarded to the successful Bidder whose Bid has been determined to be substantially responsive and has been determined as the Best Value Bid. The bidding will be done based on lowest price quoted item wise.

3. **Bid submission timelines:** The timelines for bid-submission etc., will be as it is given in the Tender Schedule published.

4. University reserves the right to cancel any or all tenders partially or fully, without assigning any reasons.

Annexure-4

Terms & Conditions

PAYMENT SCHEDULE
Payment: 100% payment will be released on delivery and satisfactory installation and commissioning of goods after deduction of taxes as applicable.

DELIVERY SCHEDULE:

The equipment(s)/good(s) are required to be supplied within 60 days (or mutually agreed time- period) on issue of the Purchase Order by the university. In case successful tenderer fails to complete the order in part or whole in the stipulated period of 60 days (or mutually agreed time-period) of a penalty @ 1% of the order value will be imposed per day subject to maximum penalty of 10% the order value. In case the delay is more than four weeks (after the expiry of the stipulated period) the purchase order may be cancelled and the EMD will be forfeited.

VALIDITY OF QUOTATION:
The quotation should be valid for 90 days after the date of the opening of the bids.

GARANTEE/WARRANTY
All the equipments should have an onsite warranty for minimum three years. The warranty shall take effect from the date of successful installation of machine/item and handing over of the system to the user Dept. to its satisfaction**.**

The maintenance services, including spares parts shall be free of cost during the warranty/ guarantee period.
The supplier shall provide assurance to give spare parts of the items/Goods at least for 07 years' time from the date of commissioning.

Annexure 5:

FINANCIAL BID/PRICE BID

Sl No	Item	Rate	Qty	Total in Rs Excluding GST

Grand Total

Total in words:

Terms and conditions if any:

Annual Maintenance Contract.

The Bidder should quote the charges for Annual Maintenance Contract (AMC) for 03 (Three Years) . The charges to be quoted pen annum.

S. No.	AMC Charges (after the warranty period)	**Rate**
1	First Year	
2	Second Year	
3	Third Year	

Note: The Anuual Maintenance Contract (AMC) may be awarded along with Purchase Order but will come into force after the expiry of Warranty period. Payment will be made annually and will be paid after the end of each year after the expiry of warranty period.

Annexure - 6

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

Date:

To,
_____The REGISTRAR _____
_____
_____
Sub: Acceptance of Terms & Conditions of Tender.
Tender Reference No: _____ Name of Tender / Work: -
_____
_____
_____
_____
_____
_____
_____
_____
_____ Dear Sir,

1. I/ We have downloaded / obtained the tender document(s) for the above mentioned 'Tender/Work' from the web site(s) namely:
_____
_____ as per your advertisement, given in the above mentioned website(s).

2. I / We hereby certify that I / we have read the entire terms and conditions of the tender documents (including all documents like annexure(s), schedule(s), etc .,), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.

3. The corrigendum(s) issued from time to time by your department/ organisations too have also been taken into consideration, while submitting this acceptance letter.

4. I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety. 5.

I / We do hereby declare that our Firm has not been blacklisted/ debarred by any Govt. Department/Public sector undertaking/Govt. Autonomous organisations.

6. I / We certify that all information furnished by the our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/ organisation shall without giving any notice or reason therefore can summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.

Yours faithfully,

(Signature of the Bidder, with Official Seal)

Annexure-7

Warranty Declaration
{Submitted on Letterhead of bidder/supplier)

The warranty declaration states that "everything to be supplied by us hereunder shall be free from all defects and faults in material, workmanship and shall be of the highest quality and material of the type ordered, shall be in full conformity with the specification and shall be complete enough to carry out the experiments, as specified in the tender document."

Sign of authorised person of bidder: -_____
Date: - _____
Name of the authorised Person of bidder:-__

Annexure-8
Undertaking
{Submitted on Letterhead of Original Equipment Manufacturer (OEM)}

An undertaking from the Original Equipment Manufacturer (OEM) is required and stating that they would facilitate the bidder on a regular basis with technology/product updates and extends support for the warranty as well.

Sign of authorized person (OEM):-

_____ Date: -

_____

Name of the authorised Person (OEM):-___