



INDIAN INSTITUTE OF TECHNOLOGY, KANPUR
GT ROAD, KALYANPUR, KANPUR – 208016
UTTAR PRADESH, INDIA

TENDER REFERENCE NO. : IITK/AE/MIS/2020/01

BID SUBMISSION END DATE- 28.01.2020

TENDER DOCUMENTS

FOR

**“Design and Fabrication of Free piston driven expansion tunnel/ shock tunnel Facility
(Shock tube, Acceleration Tube, Dump tank, Vacuum Systems and Associated
Instrumentations)”**

BID DOCUMENT

Online bids (Technical & Financial) from eligible bidders which are valid for a period of 90 days from the date of Technical Bid opening (i.e. 29.01.2020) are invited for and on behalf of the Joint Registrar, IIT Kanpur for “**Design and Fabrication of Free piston driven expansion tunnel/ shock tunnel Facility (Shock tube, Acceleration Tube, Dump tank, Vacuum Systems and Associated Instrumentations)**”.

Name of Work	Design and Fabrication of Free piston driven expansion tunnel/ shock tunnel Facility (Shock tube, Acceleration Tube, Dump tank, Vacuum Systems and Associated Instrumentations)
Date of Publishing	<i>07.01.2020(04:00PM)</i>
Clarification Start Date and Time	<i>07.01.2020(04:00PM)</i>
Clarification End Date and Time	<i>17.01.2020(04:00PM)</i>
Queries (if any)	<i>No queries will be entertained after clarification end date and time</i>
Bid Submission Start Date	<i>08.01.2020(09:00PM)</i>
Last Date and time of uploading of Bids	<i>28.01.2020 (04:00PM)</i>
Last Date and time of submitting , EMD and other documents at IIT Kanpur (if any)	<i>NA</i>
Date and time of opening of Technical Bids	<i>29.01.2020 (04:00PM)</i>
Date and time of opening of Financial Bids	<i>Will be separately notified for Technically shortlisted/qualified bidders</i>

Interested parties may view and download the tender document containing the detailed terms & conditions from the website <http://eprocure.gov.in/eprocure/app>

(The bids have to be submitted online in electronic form on www.eprocure.gov.in only. No physical bids will be accepted.)

INSTRUCTION FOR ONLINE BID SUBMISSION

The bidders are required to submit soft copies of their bids electronically on the Central Public Procurement (CPP) Portal ie <http://eprocure.gov.in/eprocure/app> , using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

REGISTRATION

- (i)** Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL:<https://eprocure.gov.in/eprocure/app>) by clicking on the link “Online Bidder Enrolment” option available on the home page. **Enrolment on the CPP Portal is free of charge.**
- (ii)** During enrolment/ registration, the bidders should provide the correct/ true information including valid email-id & mobile no. All the correspondence shall be made directly with the contractors/ bidders through email-id provided.
- (iii)** As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- (iv)** For e-tendering possession of valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) is mandatory which can be obtained from SIFY /nCode/eMudra or any Certifying Authority recognized by CCA India on eToken/ SmartCard.
- (v)** Upon enrolment on CPP Portal for e-tendering, the bidders shall register their valid Digital Signature Certificate with their profile.
- (vi)** Only one valid DSC should be registered by a bidder. Bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse and should ensure safety of the same.
- (vii)** Bidders can then log into the site through the secured login by entering their userID/ password and the password of the DSC/ eToken.

SEARCHING FOR TENDER DOCUMENTS

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

PREPARATION OF BIDS:

- (i) For preparation of bid Bidders shall search the tender from published tender list available on site and download the complete tender document and should take into account corrigendum if any published before submitting their bids.
After selecting the tender document same shall be moved to the 'My favourite' folder of bidders account from where bidder can view all the details of the tender document.
- (ii) Bidder shall go through the tender document carefully to understand the documents required to be submitted as part of the bid. Bidders shall note the number of covers in which the bid documents have to be submitted, the number of documents – including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
- (iii) Any pre-bid clarifications if required, then same may be obtained online through the tender site, or through the contact details given in the tender document.
- (iv) Bidders should get ready in advance the bid documents in the required format (PDF/xls/rar/dwf/jpg formats) to be submitted as indicated in the tender document/schedule.
Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.
- (v) Bidders can update well in advance, the documents such as experience certificates, annual report, PAN, EPF & other details etc., under "My Space/ Other Important Document" option, which can be submitted as per tender requirements. This will facilitate the bid submission process faster by reducing upload time of bids.

SUBMISSION OF BIDS:

- (i) Bidder should log into the site well in advance for bid submission so that he/ she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay.
- (ii) Bidder should prepare the EMD as per the instructions specified in the NIT/ tender document. The details of the DD/BC/BG/ others physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.
- (iii) While submitting the bids online, the bidder shall read the terms & conditions (of CPP portal) and accepts the same in order to proceed further to submit their bid.
- (iv) Bidders shall select the payment option as offline to pay the EMD and enter details of the DD/BC/BG/others.
- (v) Bidder shall digitally sign and upload the required bid documents one by one as indicated in the tender document.
- (vi) Bidders shall note that the very act of using DSC for downloading the tender document and uploading their offers is deemed to be a confirmation that they have read all sections and pages of the tender document without any exception and have understood the complete tender document and are clear about the requirements of the tender document.
- (vii) Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document. For the file size of less than 1 MB, the transaction

uploading time will be very fast.

- (viii) **If price quotes are required in XLS format, utmost care shall be taken for uploading Schedule of quantities & Prices and any change/ modification of the price schedule shall render it unfit for bidding.**

Bidders shall download the Schedule of Quantities & Prices i.e. Schedule-A, in XLS format and save it without changing the name of the file. Bidder shall quote their rate in figures in the appropriate cells, thereafter save and upload the file in financial bid cover (Price bid) only.

If the template of Schedule of Quantities & Prices file is found to be modified/corrupted in the eventuality by the bidder, the bid will be rejected and further dealt as per provision of clause no 23.0 of ITB including forfeiture of EMD.

The bidders are cautioned that uploading of financial bid elsewhere i.e. other than in cover 2 will result in rejection of the tender.

- (ix) Bidders shall submit their bids through online e-tendering system to the Tender Inviting Authority (TIA) well before the bid submission end date & time (as per Server System Clock). **The TIA will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders at the eleventh hour.**
- (x) After the bid submission (i.e. after Clicking “Freeze Bid Submission” in the portal), the bidders shall **take print out of system generated acknowledgement** number and keep it as a record of evidence for online submission of bid, which will also act as an entry pass to participate in the bid opening.
- (xi) Bidders should follow the server time being displayed on bidder’s dashboard at the top of the tender site, which shall be considered valid for all actions of requesting, bid submission, bid opening etc., in the e-tender system.
- (xii) All the documents being submitted by the bidders would be encrypted using PKI (Public Key Infrastructure) encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology.

ASSISTANCE TO BIDDERS:

- (i) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contract person indicated in the tender. The contact number for the helpdesk is 0512-259-6345 between 10:30 hrs to 17:00 hrs.
- (ii) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24X7 CPP Portal Helpdesk. The 24 x 7 Help Desk Number 0120-4200462, 0120-4001002 and 0120-4001005. The helpdesk email id is support-eproc@nic.in

INSTRUCTION FOR e-PROCUREMENT

1. PREPARATION AND SUBMISSION OF BIDS :

- a. The detailed tender documents may be downloaded from <http://eprocure.gov.in/eprocure/app> till the last date of submission of tender. The Tender may be submitted online through CPP Portal <http://eprocure.gov.in/eprocure/app>
- b. The bidder should submit the bid online in two parts viz. Technical Bid and Financial Bid. Technical Bid should be upload online in cover 1 and Financial Bid in “.Xls” should be upload online in cover-2

2. SUBMISSION OF THE BID : All interested eligible bidders are requested to submit their bids online on CPP Portal: <http://eprocure.gov.in/eprocure/app> as per the criteria given in this document:

- a. Technical Bid should be upload online in cover-1.
- b. Financial Bid should be upload online in cover-2

Both Technical and Financial Bid covers should be placed online on the CPP Portal (<http://eprocure.gov.in/eprocure/app>).

3. TECHNICAL BID: Signed and Scanned copies of the Technical bid documents as under must be submitted online on CPP Portal: <http://eprocure.gov.in/eprocure/app> .

a) **List of Documents to be scanned and uploaded (Under Cover-1) within the period of bid submission:-**

- i. Scanned copy of Bank details. (Bank details of principal supplier in case of Import shipments)
- ii. Scanned copy of work experience.
- iii. Scanned copy of certificate of GST. (GSTIN of Indian Agent in case of Import Shipments)
- iv. Scan copy of tender acceptance letter.
- v. Scanned copy of specifications or brochures (if any).
- vi. Scanned copy of other document mentioned in tender document (if any)

b) **For Import Shipments – Shipping Terms Ex-Works/FOB are preferred.**

NOTE - no indication of the rates/amounts be made in any of the documents submitted with the TC-BID.

4. **Financial Bid**

- a. The currency of all quoted rates shall be Indian Rupees. All payment shall be made in Indian Rupees.
- b. In preparing the financial bids, bidders are expected to take into account the requirements and conditions laid down in this Tender document. The financial bids should be uploaded online as per the specified “.Xls” format i.e. Price Bid Excel sheet attached as ‘.Xls’ with the tender and based on the scope of work, service

conditions and other terms of the Tender document. It should include all costs associated with the Terms of Reference/Scope of Work of the assignment.

- c. The Financial Proposal should be inclusive of all applicable taxes, duties, fees, levies, and other charges imposed under the applicable laws. The rates quoted in the Tender are inclusive of all applicable taxes, duties etc. **except service tax**. The service tax component shall be re-immersible by the department after receipt of paid challans etc. if applicable.

5. Last Date for Submission of Tender:

- a. Online bids complete in all respects, must be submitted on or before the last date and time specified in the schedule of events.
- b. The IIT, Kanpur may, at its own discretion, alter/extend the last date for submission of tenders.

6. Bid Validity

- a. All the Bids must be valid for a period of 90 days from the last date of submission of the tender for execution of Contract. However, the quoted rates should be valid for the initial/ extended period of the Contract from the effective date of the Contract. No request will be considered for price revision during the original Contract period.
- b. A bid valid for a shorter period shall be declared as non-responsive.
- c. In exceptional circumstances, prior to expiry of the original time limit, the IIT may request the bidders to extend the period of validity for a specified additional period beyond the original validity of 90 days. The request and the bidders' responses shall be made in writing. The bidders, not agreeing for such extensions will be allowed to withdraw their bids without forfeiture of their Bid Security.

7. Modification / Substitution/ Withdrawal of bids:

- a. No Bid shall be modified, substituted or withdrawn by the Bidder after the Bid's due Date.
- b. Any alteration/ modification in the Bid or additional information supplied subsequent to the Bid's due Date, unless the same has been expressly sought for by the Authority, shall be disregarded.

8. Rejection of the Bid: The bid submitted shall become invalid and tender fee shall not be refunded if:-

- a. The bidder is found ineligible.
- b. The bidder does not upload all the documents as stipulated in the bid document.

Tender document

Department of Aerospace Engineering
Indian Institute of Technology Kanpur
Kanpur (UP) 208016 India

Enquiry No: IITK/AE/MIS/2020/01

Date: 07.01.2020

Online quotations are invited for Design and Fabrication of Free piston driven expansion tunnel/ shock tunnel Facility (Shock tube, Acceleration Tube, Dump tank, Vacuum Systems and Associated Instrumentation). The detailed specification is described below.

Specifications:

Sl. No.	Description	Qty
1	<p>Design and Fabrication of Free piston driven expansion tunnel/ shock tunnel Facility (Shock tube, Acceleration Tube, Dump tank, Vacuum Systems and Associated Instrumentation)</p> <p>A. SHOCK (DRIVEN) TUBE:</p> <p>This is a 4.5mt long (consisting of 3 tube) having ID 65mm with flanges and suitable rubber 'O' rings for sealing. Suitable inlet / outlet connections are provided for vacuum, pressurization and pressure gauges and transducers.</p> <ul style="list-style-type: none">● Configuration: Horizontally mounted cylindrical seamless pipe● Material of Construction: stainless steel SS-316● Size: 3'', XXS SCH pipes total length 4500mm from flange to flange. (14mm Thk. Min/ based on operating pressure)● Flanges: The pipe is welded with flanges having minimum thickness of 8mm with O ring groove.● Port: For vacuum, pressurization, pressure and vacuum sensor and some dummy ports with flanges etc.● Inner surface finish: 0.4 to 0.5 Microns Ra achieved by honing.● Vacuum Sealing: By Neoprene O ring <p>B. ACCELERATION TUBE:</p> <p>This is an 8mt. long (1m each) having ID 65mm with flanges on either sides and is provided suitable rubber 'O' rings for sealing. Suitable inlet / outlet connections will be provided for pressure gauges and transducers. The bore of the tube will have good honing finish and high degree of axis alignment after joining together.</p> <ul style="list-style-type: none">● Configuration: Horizontally mounted cylindrical seamless pipe● Material of Construction: SS- 316	1

- **Size:** 3'', XXS SCH pipes total length 8000 mm from flange to flange. (14 mm Thk. Min./based on operating pressure)
- **Flanges:** The pipe is welded with flanges having minimum thickness of 58 mm with O ring groove.
- **Ports:** For pressure and vacuum sensor and some dummy ports with flanges etc.,
- **Inner surface finish:** 0.4 to 0.5 microns Ra achieved by honing.
- **Vacuum Sealing:** By Neoprene O ring

C. DIAPHRAGM:

Diaphragm Assembly – 1 should be made of stainless steel SS-316 provided between the driver gas tube and shock (driven) tube. It should consist of the following:-

- Diaphragm holder made of stainless steel SS-316 with two O ring grooves on either side.
- Transition section from 220mm to 65mm made of stainless steel SS-316 with the O ring grooves on one side.
- Diaphragm made of SS-304 (Annealed).

Diaphragm Assembly - 2 is made of SS-316 material placed between the shock tube & acceleration tube. It consists of the following:

- Diaphragm holder made of stainless steel SS-316 with two O ring grooves on either side.
- Diaphragm made of Mylar paper.

D. CONICAL NOZZLE:

- **Configuration:** Horizontally mounted conical construction.
- **Material of Construction:** SS-316
- **Size:** 65 mm dia (Entry); 200 mm dia (Exit); 600mm taper length
- **Front & Back:** Front side and rear side of the cone are welded with flanges of respective sizes.
- **Sealing:** Vacuum sealing by neoprene O rings
- **Support Stand:** The conical nozzle assembly is supported on 2 Nos. of mild steel support stands. One on the front side and other on the rear side.
- **Welding:** Conical nozzle is welded using TIG welding technique for leak tight joints.
- **Inner surface finish:** Inner surface is polished to achieve surface finish of 2 A (or) 1.6-8 Microns.
- **Leak testing:** By Helium Mass Spectrometer Leak Detector to an individual leak rate of 3×10^{-9} m.bar ltrs/sec

- **Global Leak Rate:** Global leak rate of 5×10^{-3} m.bar ltrs/sec can be achieved by pressure rise method.

E. DUMP TANK CUM TEST SECTION:

Dump tank cum test section is a vacuum chamber wherein the test model will be mounted for studying of aero dynamics and this chamber will serve as the dump tank for gas after the tunnel operation.

- **Configuration:** Horizontally mounted cylindrical chamber
- **Dimension:** 500 mm ID x 2000 mm length
- **Material of Construction:** SS- 316
- **Front side:** Front side of the chamber is welded with a thick plate made of stainless steel SS-316 with opening to weld conical nozzle.
- **Rear side:** Welded with dished door hinge mounted
- **Ports:** Sufficient number of ports are provided for evacuation, glass fixture Assembly, electrical / mechanical instrumentation etc.,
- **Model mounting:** Model mounting structure as per the facility dimension. Rails with stoppers has to be provided inside the dump tank
- **Support structure:** Chamber support is made of mild steel with support legs provided to support the chamber
- **Wheel base assembly:** Chamber with its support is mounted on a plate made of SS - 304 skid with caster wheels to move the chamber on the I beam made of mild steel.
- **View port:** 2 Nos. of 6'' size toughened glass view port will be provided.
- **Welding:** Chamber and sub-assemblies are welded using TIG welding technique for leak tight joints.
- **Design code:** ASME SEC VIII, Div. I
- **Welding Procedure:** ASME Sec IX
- **Inner surface finish:** Inner surface is polished to achieve surface finish of 2 A (or) 1.6-8 Microns.
- **Leak testing:** By Helium Mass Spectrometer Leak Detector to an individual leak rate of 3×10^{-9} m.bar lit / sec.
- **Global Leak Rate:** Global leak rate of 1×10^{-3} m.bar ltrs / sec can be achieved by pressure rise method

F. VACUUM PUMPING SYSTEM FOR DRIVEN (SHOCK) TUBE:

- **ROTARY VACUUM PUMP:- 1NO:** Rotary vacuum pump having a pumping speed of $12 \text{ m}^3/\text{hr}$ needs to be provided.
- Electro pneumatically operated isolation ball valve - 1No is provided. (For

driven tube to prevent the vacuum system from getting exposed to high pressure of 250 bar).

- Electro pneumatically operated vent valve of 1'' size ball valve type - 1No.
- Vacuum plumbing lines made of stainless steel with necessary bellow adapters.
- 6'' compound dial gauge having measuring range from -1 to 300 bar - 1No.
- Absolute pressure sensor with digital indicating unit will be provided.
- **Ultimate Vacuum:** Ultimate vacuum in the shock tube (driven tube) will be in the range of 100m.bar under clean, cold, empty, degassed condition.

G. VACUUM PUMPING SYSTEM FOR DUMP TANK, NOZZLE & ACCELERATION TUBE

- **ROTARY PUMP -1 NO.:** Two stage rotary vacuum pump having displacement capacity of 60 m³/hr is provided for backing the roots pump.
- **ROOTS PUMP – 1 NO.:** Roots pump having displacement capacity of 500 m³/hr is provided for roughing operation of the chamber.
- **ISOLATION VALVE- 1NO.:** An electro pneumatically operated right angle type isolation valve is provided between roots pump and the chamber.
- **VENT VALVE- 1NO.:** An electro pneumatically operated right angle valve is provided for venting the chamber.
- **VACUUM GAUGES:** 2 no. of pirani sensors to measure the vacuum levels from 1000 m.bar to 1x 10⁻² m.bar having digital display.
- **VACUUM PLUMBING LINES:** Vacuum plumbing lines made of stainless steel are used. The vacuum lines are fitted with bellow adopter wherever necessary to arrest the vibration.
- **ULTIMATE VACUUM:** Ultimate vacuum of 1X10⁻² m.bar will be achieved inside the dump tank and acceleration tube under clean, cold, empty, degassed condition.

H. SLIDING SYSTEM FOR DRIVEN TUBE & ACCELERATION TUBE:

This system should be provided for sliding the entire pipe i.e., shock tube, acceleration tube and nozzle along the axis to facilitate replacing/changing of diaphragm. The system will be operated by a hydraulic system with a push button.

I. PIPE STAND ASSEMBLY

Suitable mounting fixtures at suitable locations are provided for the entire tubular section so that the axis of the tunnel is 1.2 m height above the ground.

Pipe stand assembly will be fabricated out of MS. The slide rest assembly will have

<p>clamp to hold the tubes. This slide rest assembly will move to and fro on slide rest pipe with slide block. Expansion bolts are provided to grout with grouting plate to the ground.</p> <p>J. CONTROL INSTRUMENTATION & CONTROL CONSOLE</p> <p>A control console is fabricated out of MS Sheet metal housing all the control instrumentations and switch gears, push buttons, ON/OFF buttons, emergency button and electrical hardware is provided for the smooth and convenient operation of the system.</p> <p>The control console is wired to operate on 415V AC, 50 Hz, and 3 Phase power supply along with power, neutral and ground connections.</p> <p>K. SAFETY DEVICES & INTERLOCKS:</p> <p>The system should be provided with safety devices to protect the unit and the operator from malfunction and possible operator's errors.</p> <p>L. Company should have prior experience in designing and fabricating high speed shock tunnels.</p> <p>M. Warranty should be one year from the data of installation.</p>	
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Terms and conditions:

- Quotations should have a validity of minimum of 90 days.
- The physical equipment should be provided with a warranty of at least one year.
- The delivery time frame should be specifically indicated.
- This equipment will be used for education and academic research purpose therefore maximum educational discounts should be applied.

Dr. Mohammed Ibrahim. S

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

Date: _____

To,

Sub: Acceptance of Terms & Conditions of Tender.

Tender Reference No: _____

Name of Tender / Work: - _____

Dear Sir,

1. I / We have downloaded / obtained the tender document(s) for the above mentioned 'Tender/Work' from the web site(s) namely:

_____ as per your advertisement, given in the above mentioned website(s).

2. I / We hereby certify that I / we have read the entire terms and conditions of the tender documents from Page No. _____ to _____ (including all documents like annexure(s), schedule(s), etc .,), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.

3. The corrigendum(s) issued from time to time by your department/ organisation 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/ terminated/ banned by any Govt. Department/Public sector undertaking.

6. I / We certify that all information furnished by 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 or summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.

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