Notice Inviting Tender

Supply, installation, testing and commissioning of a facility for analysis of flow transitions, thermo-physical properties, materials testing and heat transfer coefficient in Supercritical Steam based open loop.

Tender No: ICER/2019-20/1

INDIAN INSTITUTE OF SCIENCE

Interdisciplinary Centre for Energy Research (ICER)

Indian Institute of Science, Bangalore

Bangalore – 560012

June 2019

Table of Contents

SECTION 1 – BID SCHEDULE

1	Tender No	ICER/2019-20/1
2	Tender Date	28th June 2019
3	Item Description	Supply, installation, testing and commissioning of a facility for analysis of flow transitions, thermo-physical properties, materials testing and heat transfer coefficient in Supercritical Steam based open loop.
4	Tender Type	Two Bid System a) Technical Bid (Part-A) b) Commercial Bid (Part-B)
5	Place of Submission and tender opening	The Chair Interdisciplinary Centre for Energy Research (ICER) Indian Institute of Science, Bangalore – 560012, India
6	Last Date & Time for submission of tender	16th July 2019, 1700 hours
7	For further clarifications	Prof. Saptarshi Basu Associate Professor Indian Institute of Science, Bangalore – 560012, India Email: sbasu@iisc.ac.in

SECTION 2 – ELIGIBILITY CRITERIA

Prequalification criteria:

1. The Bidder's firm should have been in existence for a minimum of 1 year. (Enclose Company **Registration Certificate**).
2. The Bidder should have qualified technical service personnel with documented and adequate experience in an Indian or abroad Office.
3. If the Bidder is a local distributor or dealer or agent, it is mandatory to attach authorization certificate along with the bid from the original equipment manufacturer.
4. The bidder should sign and submit the declaration for Acceptance of Terms and Conditions as per -Annexure 4.
5. The Bidder must not be blacklisted or banned or suspended or have a record of any service-related dispute with any organization in India or elsewhere. A declaration to this effect has to be given as per Annexure 3.
6. **The Bidder should have at least 3 years of proven experience of working and commissioning supercritical fluid systems in reputed organization(s) in India/abroad.**
7. **The Bidder should have proven experience of design and manufacturing of very high temperature and very high pressure fluid systems with optical windows (view cells) and must have implemented the same in reputed organization(s) in India/abroad.**
8. **The Bidder has to furnish testimonial(s), work completion certificate and purchase orders of their previously completed work in supercritical fluid systems and optically accessible high pressure, high temperature systems.**

The bidder has to furnish a compliance certificate indicating that they meet the above mentioned criteria.

SECTION 3 – TERMS AND CONDITIONS

A) Submission of Tender:

1. All documentations in the tender should be in English.

2. Tender should be submitted in two envelops (two bid system).

   a. **Technical Bid (Part-A)** –
   Technical bid consisting of all technical details, check list for conformance to specifications, format in which the price bid is quoted without the actual prices (suppliers who include any indication of prices in the technical bid will be automatically disqualified).

   b. **Commercial Bid (Part-B)** –
   Commercial bid indicating item wise price for the items mentioned in the technical bid , as per the format of quotation in section 6 provided in tender, and other commercial terms and conditions

3. The technical bid and price bid should each be placed in a sealed cover, superscripting on both the envelopes the tender no. and the due date and Both these sealed covers are to be placed in a bigger cover which should also be sealed and duly superscripted with the Tender No & Due Date.

4. The SEALED COVER superscripting tender number / due date & should reach Prof. Saptarshi Basu, Department of Mechanical Engineering, Indian Institute of Science, Bangalore – 560012, India on or before due date mentioned in the tender notice. In case due date happens to be holiday the tender will be accepted and opened on the next working day.

   If the quotation cover is not sealed, it will be rejected.

5. **All communications are to be addressed to- Prof. Saptarshi Basu, Department of Mechanical Engineering, Indian Institute of Science, Bangalore – 560012, India.**
6. GST/other taxes, levies etc., are to be indicated separately. The BIDDER should mention GST Registration and PAN in the tender document (Indian Bidders only).
7. The Institute reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time prior to the award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders.
8. Incomplete bids will be summarily rejected.

B) Cancellation of Tender:

Notwithstanding anything specified in this tender document, IISc Bangalore, in its sole discretion, unconditionally and without having to assign any reason, reserves the right:

a. To accept OR reject lowest tender or any other tender or all the tenders.

b. To accept any tender in full or in part.
c. To reject the tender offer not confirming to the tender terms.

C) Validity of the Offer:

The offer shall be valid 90 Days from the date of opening of the commercial bid.

D) Evaluation of Offer:

1. The technical bid (Part A) will be opened first and evaluated.
2. Bidders meeting the required criteria as stated in Section 2 of this document shall only be considered for Commercial Bid (Part B) opening. Further, agencies not furnishing the documentary evidence as required will not be considered.
3. Pre- qualification of the bidders shall not imply final acceptance of the Commercial Bid. The agency may be rejected at any point during technical evaluation or during commercial evaluation. The decision in regard to acceptance and / or rejection of any offer in part or full shall be the sole discretion of IISc Bangalore, and decision in this regard shall be binding on the bidders.
4. The award of contract will be subject to acceptance of the terms and conditions stated in this tender.
5. Any offer which deviates from the vital conditions (as illustrated below) of the tender is liable to be rejected:
    a. Non-submission of complete offers.
    b. Receipt of bids after due date and time and or by email / fax (unless specified otherwise).
    c. Receipt of bids in open conditions.
6. In case any BIDDER is silent on any clauses mentioned in these tender documents, IISc Bangalore shall construe that the BIDDER had accepted the clauses of the tender and no further claim will be entertained.
7. No revision in the terms and conditions quoted in the offer will be entertained after the last date and time fixed for receipt of tenders.
8. Lowest bid will be calculated based on the total price of all items tendered for items section 6

E) Pre-requisites:

The bidder will provide the prerequisite installation requirement of the equipment along with the technical bid. The bidder also should let IISc know other pre-requisites as electrical requirement, space requirement, ventilation requirement, any sort of safety measures for safe operation of facility.

F) Mode of Shipment:

In case of foreign bidders, the consignment must be airlifted, insured and transported to the installation site by the bidder. In case of India bidders, the consignment must be insured and transported to the installation site by the bidder.

G) Customs clearance:

IISc Bangalore will provide the end-user certificate and necessary supporting documents for the import of items into India to facilitate necessary custom duty exemption.

H) Warranty and Annual Maintenance Contract:

The complete system/ facility is to be under warranty period of 2 years including free supply of spare parts and labour from the date of functional installation. The individual equipment shall have warranty as specified by the Original equipment manufacturer (OEM). If the facility or any part of it or any equipment in it malfunctions or doesn't operate according to the requirement in the domain of the operating conditions as specified in the technical tender document, then the bidder has to replace it within 30 days. If the facility or any part of it or any equipment in it breaks or gets damaged during operation, then the bidder shall not be responsible.

If the instrument is found to be defective, it has to be replaced or rectified at the cost of the bidder within 30 days from the date of receipt of written communications from IISc, Bangalore. If there is any delay in replacement or rectification, the warranty period should be correspondingly extended.

After 2 years of warranty period, annual maintenance contract for 1 year on contractual basis shall be negotiated mutually between bidder and IISc.

I) Support: After installation and commissioning of the system the bidder has to station one personnel at Indian Institute of Science, Bangalore for a period of 2 months to provide support and assistance in any debugging, maintenance and operational issues during the facility operation.

J) Purchase Order:

1. The order will be placed on the bidder whose bid is accepted by IISc based on the terms & conditions mentioned in the tender document.
2. **The quantity of the items in tender is only indicative. IISc, Bangalore reserves the right to increase /decrease the quantity of the items depending on the requirement.**
3. If the quality of the product and service provided is not found satisfactory, IISc, Bangalore reserves the right to cancel or amend the contract.

K) Delivery and Installation:

The bidder shall provide the lead time to delivery, installation and made functional at IISc, Bangalore from the date of receipt of purchase order. The system should be delivered, installed and made functional within less than 180 days from the date of receipt of purchase order. The supply of the items will be considered as effected only on satisfactory installation and inspection of the system and inspection of all the items and features/capabilities tested by the IISc, Bangalore. After successful installation and inspection, the date of taking over of entire system by the IISc, Bangalore shall be taken as the start of the warranty period. No partial shipment is allowed.

All equipment and entire facility have to be shipped and installed at pre-determined location set by IISc personnel by the bidder. The bidder should ensure supply and setup of the facility at the location inside IISc campus, Bangalore.

L) Payment Terms:

Option 1) The payment shall be made in two installments – 50% of total value of purchase order on completion of design, Hazop and P&ID and fabrication and 50% of total value of purchase order after complete supply, installation and commissioning of entire system. The second half or complete payment shall be done after validation from IISc, Bangalore personnel of the entire loop or system.

Option 2) The payment shall be made in three installments – 20% of total value of purchase order on completion of design, P&ID studies and hazop studies and 40% of total value of purchase order after complete supply of all materials, equipments and fabrication of the system and remaining 40% after installation and commissioning of entire system. The last installment or complete payment shall be done after validation from IISc, Bangalore personnel of the entire loop or system.

M) Statutory Variation: Any statutory increase in the taxes and duties subsequent to bidder's offer, if it takes place within the original contractual delivery date, will be borne by IISc, Bangalore subject to the claim being supported by documentary evidence. However, if any decrease takes place the advantage will have to be passed on to IISc, Bangalore.

N) Disputes and Jurisdiction:

Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in a court of competent jurisdiction located within the city of Bangalore, India. The purchase shall be governed by the laws of India

O) General Instructions to bidders:

1. All amendments, time extension, clarifications etc., within the period of submission of the tender will be communicated electronically. No extension in the bid due date/time shall be considered on account of delay in receipt of any document(s) by mail.
2. The bidder may furnish any additional information, which is necessary to establish capabilities to successfully complete the envisaged work. It is however, advised not to furnish superfluous information.
3. The bidder may visit the installation site before submission of tender, with prior intimation.
4. All imported equipment should be quoted in the currency of the country of origin, and all locally sourced items should be quoted in Indian Rupees.
5. Any information furnished by the bidder found to be incorrect, either immediately or at a later date, would render the bidder liable to be

debarred from tendering/taking up of work in IISc, Bangalore

6. Bidder should provide technical specifications of the quoted product/s in detail.

7. Bidder should attach product brochures along with technical bid.

8. Bidders should provide a table summarizing compliance or non-compliance of the technical specifications provided in the tender document.

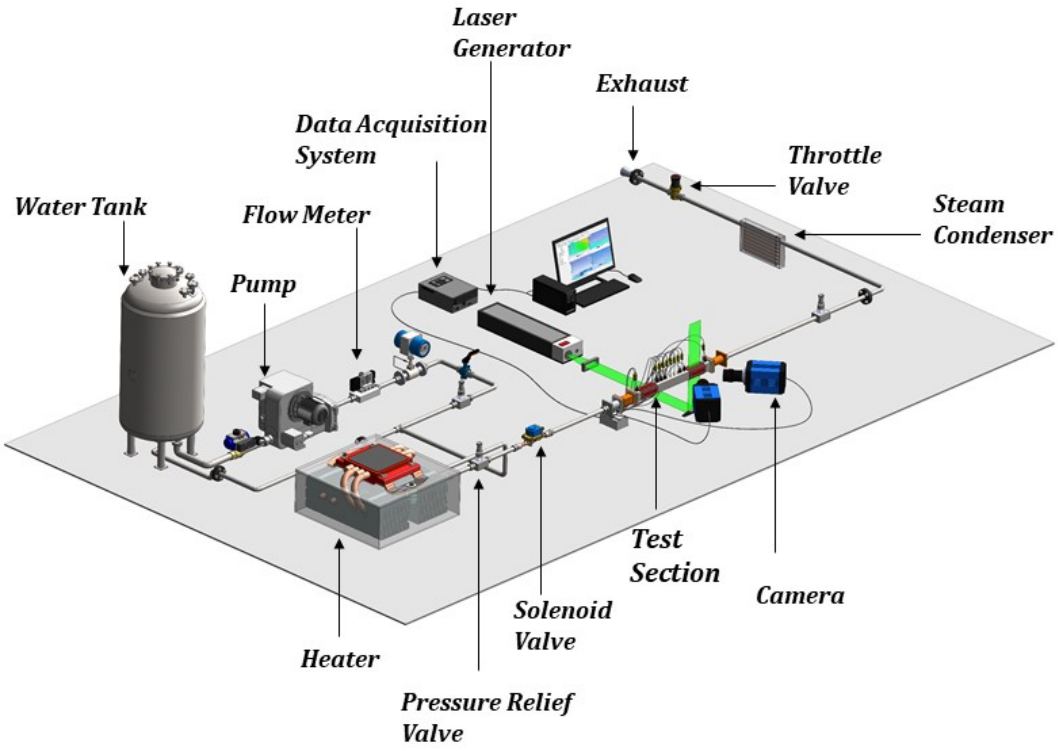
P) LIQUIDATED DAMAGES

1. In the event of a delay to the delivery and Installation Completion Date as per the Purchase order schedule for which supplier/Contractor is solely responsible, Supplier/Contractor shall pay Liquidated Damages to IISc, Bangalore at a rate of a quarter of a percent (0.25% of total value according to purchase order) per day of delay, subject to a maximum of ten percent (10% of total value according to purchase order) of the Initial Contract Price.

2. Such Liquidated Damages shall be deemed to be a genuine pre-estimate of the foreseeable damages incurred by IISc, Bangalore due to delay and shall be IISc, Bangalore sole recourse for late performance by Contractor under the Contract.

3. For the purpose of calculating such Liquidated Damages, a grace period of ten (10) days may be considered only on compassionate grounds, and the Purchase order / Contract Schedule shall be extended by any additional time or delays outside the sole control of supplier/contractor or delay not caused by supplier/ Contractor, including but not limited to suspension by IISc, Bangalore or Contractor in accordance with the purchase order or Contract, weather downtime, delay due to Force Majeure, and any time spent or lost on additional work or standby.

Section – 4

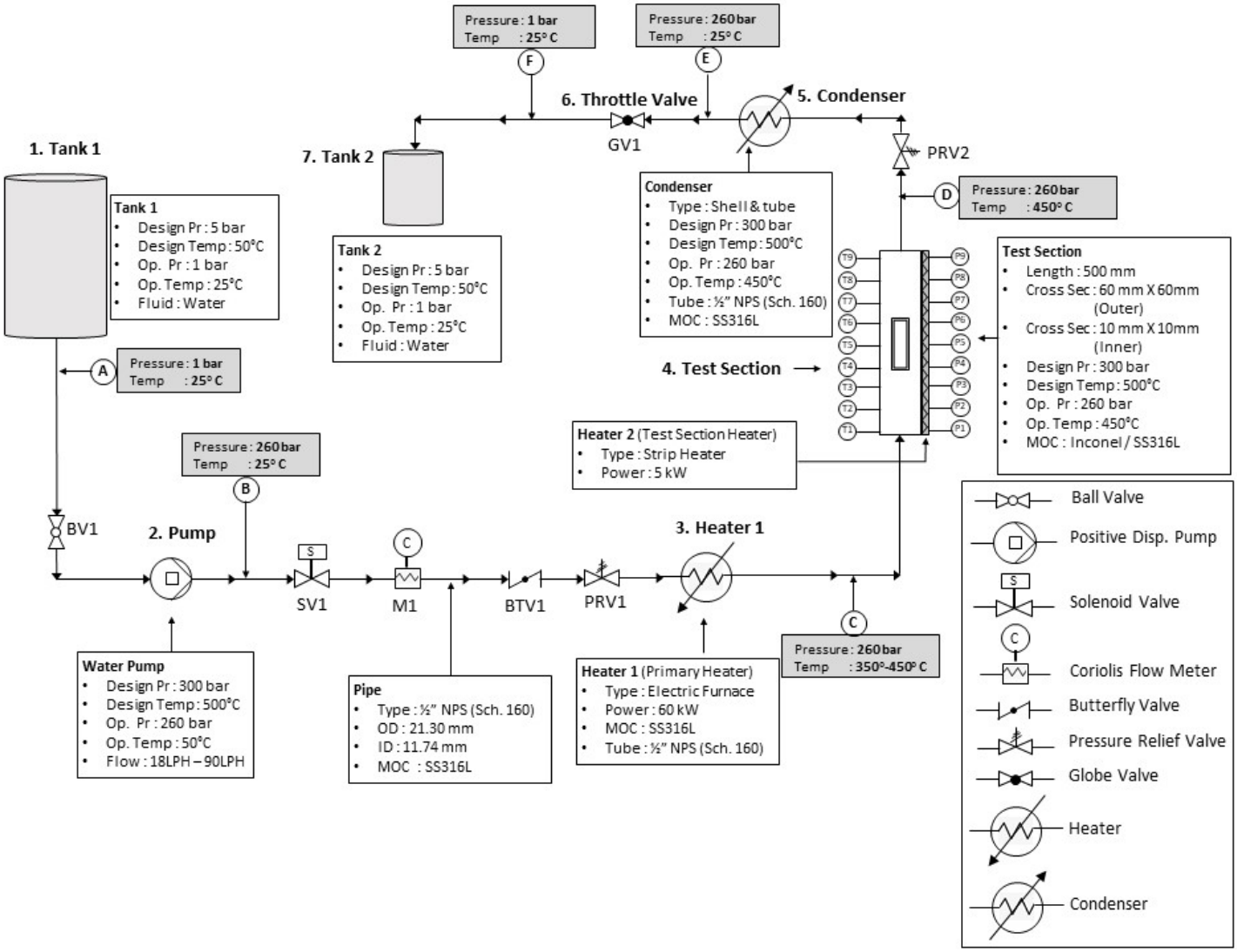


The above is a 3D artistic rendering of the facility. This is a non-technical schematic solely intended to provide a visual perspective of the completed loop, where certain equipment(s) have not been mentioned. The bidder is hereby let known that exactly those type of certain equipment(s) must not be necessarily supplied, instead any type which shall meet the required criterion of operating conditions as mentioned in P&ID diagram shall be accepted.

Loop/Facility description: -

The Supercritical Steam facility being developed is an open loop system for the study of supercritical steam, operating at 280 bar and 700°C at the flow rate ranging from 5 g/s to 25 g/s. The facility requires a robust and failsafe design to allow study of steam at these extreme operating conditions that are necessary due to the high critical pressure and temperature of the steam. The objective of the work is to study the complex heat transfer modes that occur in the steam during transition from subcritical to supercritical regime, primarily because of the strong variation of the thermophysical properties in the pseudo critical region. This knowledge of the heat transfer modes, empirical correlations and variation of thermophysical properties in the critical and supercritical regimes of the steam is extremely vital for the development of fail safe and optimized design of supercritical and ultra-supercritical boilers which can operate at much higher efficiency as compared to their conventional counterparts.

Technical Specifications



The above shown figure is the piping and instrumentation diagram (P&ID) of the supercritical steam based open loop. The conditions mentioned in the P&ID correspond to primary experimental conditions, however general range of operating conditions at various points in the loop are given below.

Point A: Pressure – 1 bar (ambient), Temperature – 25 °C (ambient).

Point B: Pressure – 220 bar – 280 bar, Temperature – 25 °C.

Point C: Pressure – 220 bar – 280 bar, Temperature – 350 °C – 450 °C.

Point D: Pressure – 220 bar – 280 bar, Temperature – 380 °C – 500 °C.

Point E: Pressure – 220 bar – 280 bar, Temperature – 25 °C (ambient).

Point F: Pressure – 1 bar (ambient), Temperature – 25 °C (ambient).

The entire facility along with all necessary individual equipment has to be supplied, installed and commissioned by the bidder, so that operational objective of the loop/system/facility is met. The specifications of the equipment mentioned in the P&ID diagram are the most preferred ones, but possible alternatives have been provided in the subsequent details of individual component's requirements. Also, complete technical specifications of the all the equipment shall be generated

during detailed engineering at the later stage. Certain accessories are not shown in the P&ID, may be added later.

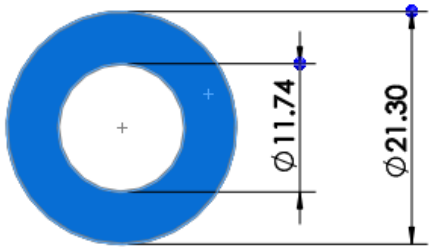
All the equipment should be electronically controlled, and the facility will be operated remotely from an isolated and safe chamber.

The individual component(s) with their technical specification is as follows:

1. **Pipe** – The material of the pipe should be SS316L or any other equivalent material, so that it can withstand the design pressure of 300 bar and design temperature of 700℃. The pipe should be able to withstand the cyclic thermal loading and corrosion that it will be subjected to during all the mentioned operation regimes. If any additional coating is required for enhanced corrosion resistance, then it shall be provided. The piping should conform to ASME B31 piping standards or any equivalent standard.

   Technical Specification of pipe is as follows:

Standard –	½" NPS Schedule 160
Outer diameter –	21.30 mm
Pipe thickness –	4.78 mm
Inner diameter –	11.74 mm



   Quantity - The length of pipe required shall be according the requirement in the system facility.

2. **Gaskets** – High temperature gaskets with following technical specifications should be supplied. The gaskets should conform to ASME B16.21 gaskets standards or any equivalent standard. We recommend using graphite gaskets, but any other equivalent alternatives shall be acceptable.

   Quantity – According to the requirement in the facility.

3. **Absolute Pressure Sensor –** The absolute pressure sensor should sense pressure with a resolution of at least 0.1 bar. The operating pressure range should be between 0 to 500 bar. The operating temperature range should be 20 to 700℃. If cooling adapter is used, then operating temperature should go up to 800℃. Maximum deviation from pressure allowable is ±5%.

   Quantity – 1 or as per requirement in the facility.

4. **Differential Pressure Gauge –** The differential pressure gauge should measure pressure range with a digital pressure transmitter. The operating pressure range should be between 0 to 700 bar. The operating temperature with silicon oil cooling adapter should be 0 to 500℃. Maximum deviation from pressure allowable is ±5%.

   Quantity – 1 or as per requirement in the facility.

5. **Pumps (Item no 2 according to P&ID) –** A metering pump which should continuously maintain flowrate between 18 LPH to 90 LPH i.e. 5 g/sec to 25 g/sec. The discharge pressure of pump should vary from 200 bar to 300 bar. The pump should conform to ASME B73.1 process pump standard or any equivalent standard. The pump should have in-built dampener for suppressing flow rate fluctuations or else if the pump doesn't have a dampener, then a separate dampener shall be provided after the pump.

   Quantity – 1.

6. **Thermocouple –** It should be K-type and should be able to measure temperature between 30℃ to 1200℃.

   Quantity – 15-20 (approx.), according to the requirement in the facility.

7. **Heater I (Upstream) (Item no 3 according to P&ID) – The heater should be able to heat water within the range of 5 g/sec to 25 g/sec from 25℃ to maximum temperature of 500℃ at pressures ranging from 200 bar to 300 bar**. We recommend using furnace heater with steam flowing through the spiral metal pipe, but the bidder can supply any other heater which shall fulfill the aforementioned heating requirement.

   For furnace heater the following technical specification is recommended:

Length of spiral metal tube:	$\leq$ 5 meters
Total power:	$\geq$ 60 kW
Insulation width:	$\geq$ 200 mm
Insulation Material:	Ceramic fiber coating
Heating chamber material:	Stainless Steel or equivalent

   Quantity – 1.

8. **Sapphire block –** The sapphire material for optical window in the test section shall have an optically accessible area of 100 mm X 10 mm, with a thickness of 15 mm. The optical window quality shall be $\leq$ 40/20 (scratch and dig), with surface flatness value of $\geq \lambda/5$ (λ= 633nm at CA). Parallelism should be <10 arc sec.

   Quantity – 3.

9. **Test Section (Item no 4 according to P&ID) –** The test section should be made up of Inconel. The length of test section should be 500 mm. The test section of square cross section of 60 mm X 60 mm with either a square hole of 10 mm X 10 mm dimension or with a circular hole of 10 mm diameter across the longitudinal axis, but a square cross section will be preferred over the circular one. However, the outer cross section should be square of 60 mm X 60 mm only. It should be able to withstand design pressure of 300 bar and design temperature of 700 °C. The area around the test section in the loop should be clear from all four sides (except the inlet and the outlet) and should not be occupied by other equipment. This is a mandatory requirement for the experimental studies to be performed using optical scientific instruments like laser and camera.

   Quantity – 1

10. **Heater II (Test Section) –** The heater fitted on the test section should supply sufficient amount of heat to compensate for the heat loss across the length. The minimum power supply by the heater should be 5 kW. We recommend using strip heaters or cartridge heaters for the purpose, but strip heaters will be preferred.

    Quantity **–** According to the requirement in the facility.

11. **Nuts/Bolts/Fasteners/Threads –** M6 Bolts of grade 12.9, shall be preferred in the test section for mounting of optical windows. The sapphire should be clamped to the test section so as to withstand design pressure of 300 bar and design temperature of 700 °C. All other bolts used in the other parts of the facility should be grade 12.9 and their size will vary as per the requirement. The bolts and fasteners should conform to ASME B18 standards or any equivalent standard. The threads should conform to ASME B1.20 standards or any equivalent standard.

    Nuts, fasteners & threads should be supplied according to the requirement.

    Quantity – According to the requirement in the facility.

12. **Throttle valve (Item no 6 according to P&ID) –** Throttle or pressure reducing valve which shall be capable of reducing pressure from 230 bar to 1 bar (ambient) pressure at 450 °C operating temperature. The valves should conform to ASME B16.34 valve standards or any equivalent standard.

    Quantity – Number of throttle valves shall depend on number of stages in which the bidder wants to reduce the pressure from 230 bar to 1 bar.

13. **Safety Valve –** Safety valve shall be supplied and placed wherever required in the loop. It should be able to withstand design pressure of 300 bar and design temperature of 700 °C. The valves should conform to ASME B16.34 valve standards or any equivalent standard.

    Quantity – According to the requirement in the facility

14. **PLC –** Since the entire loop has to be remotely operated for safety reasons, ergo a comprehensive programmable logic controller should be supplied for complete automation of the entire system/loop. We should be able to monitor and sense all essential variables remotely from a system. The bidder should supply the entire user interface for the same along with PLC program which shall work according to the operating instructions from IISc personnel. PLC program should also include the safety shut off systems to meet the safety standards.

    Quantity – 1 system.

15. **Heat Exchanger (Item no 5 according to P&ID) –** Heat exchanger for cooling purpose has to be supplied after the test section that shall reduce the temperature of the **steam flowing within the range of 5 g/sec to 25 g/sec at pressures ranging from 200 bar to 300 bar, from 450 °C to ambient temperature of water 25 °C**. It should be able to withstand pressure of 300 bar & temperature of 500 °C. The heat exchanger, a type of condenser (a pressure vessel) should conform to ASME Boiler pressure vessel code, section VIII standards or any equivalent standard.

    Quantity – Number of heat exchangers shall depend on number of stages in which one wants to reduce the temperature from 450 °C to 30 °C. The type of heat exchanger shall also be according to the need.

16. **Insulation –** Insulation on pipes, sections and wherever necessary shall be supplied according to the requirement of the loop.

    Quantity – According to the requirement in the facility.

17. **Frame/Structure –** The entire system/loop has to be placed on a table-top facility with approximate footprint area of the tabletop not more than 4-meter X 3-meter in size. The entire frame/structure along with vibration pads and mufflers has to be supplied for the installation of the facility.

    Quantity – 1.

18. **Water Tank (Item no 1 & 7 according to P&ID) –** A water tank of approximately 50-liter size has to be supplied, which shall act as a sump for storage of water before supplying it to the loop. The water tank, a pressure vessel should conform to ASME Boiler pressure vessel code, section VIII standards or any equivalent standard.

    Quantity – 2.

19. **Deaerator –** Deaerator shall be supplied to reduce the oxygen content in the loop to less than 5 ppb. It should be able to withstand design pressure of 300 bar and design temperature of 700 °C

    Quantity – 1.

20. **Flow meter –** Digital flowmeter to measure the flowrate should be supplied according to the mentioned flow rate requirement of 5 g/sec to 25 g/sec.

    Quantity – According to the requirement in the facility.

21. **Check valve (NRV)** – Check valve shall be supplied and placed wherever required in the loop. It should be able to withstand design pressure of 300 bar and design temperature of 700 °C. The valves should conform to ASME B16.34 valve standards or any equivalent standard.

    Quantity – According to the requirement in the facility.

22. **Flanges** – Flanges shall be supplied and placed wherever required in the loop. It should be able to withstand design pressure of 300 bar and design temperature of 700 °C. The flanges should conform to ASME B16.5 valve standards or any equivalent standard.

    Quantity – According to the requirement in the facility.

23. **Flow Conditioner –** A honeycomb section followed by a convergent flow passage will be employed just before the inlet in the test section for generating a uniform flow. Honeycomb preferably should be from Hastelloy, however any other equivalent material meeting the requirement shall be accepted. Convergent section material should be SS316L or any other equivalent material.

    Quantity – Honeycomb: According to the requirement in the facility.
    Convergent section: 1

24. **Seeder Ports –** Two seeder ports should be made in the loop for the bypass seeding circuit. The location of the ports will be just before the inlet & after the heater.

SECTION 5 – TESTING

1. All **joints, seals and bolts** must be **X-Ray and radiography tested**, all test reports of that shall be provided to IISc and for validation by IISc personnel.

2. **Pressure and Temperature rating certificate** – The facility including all essential equipment must be first tested according to its requirement and then certified. The facility should also undergo pressure and temperature testing with both water and supercritical steam as working fluids, the test report and certificates must be provided to IISc personnel.

3. HAZOP (**hazard and operability study**) - The bidder shall undertake HAZOP study as per standards for identifying hazards and problems associated with the operating & safety procedures, to ensure safe operation of the facility. Applicable software (to be specifically mentioned by bidder) shall be used for recording the proceedings of the HAZOP study. The study will be conducted on the recent and updated P&ID provided by IISc. Flow, Pressure, Temperature, Level, quality etc. of individual systems with identical design intentions is to be thoroughly analyzed for possible causes and consequences and required action plan to eliminate/reduce the hazards is to be suggested on the basis of existing protective systems.

   The key aspects of the study are:
   - Intention - The intention defines how the section of the plant under study is expected to operate.
   - Deviation- These are departures from the intention which are discovered by systematically applying the guide words.
   - Cause- These are the reasons for which deviations might occur.
   - Consequences- These are the results of the deviations should they occur.
   - Safeguards- These are the protections provided and operating instructions or design review requirements for smooth operation of the system.

   The report of HAZOP study shall be submitted in a report and validated by IISc personnel.

SECTION 6 – CLAUSES

1. The bidder shall conduct and participate in bi-weekly skype meeting with IISc personnel, so that the progress of development of the facility can be monitored.

2. The bidder is liable to share all design and calculations with IISc personnel at every stage of development of the facility.

3. All design and calculations should be validated by IISc personnel on regular basis and as the facility is being developed.

4. If there is any deviation from the design as prescribed in the tender technical document, then that shall be validated by IISc personnel.

5. There shall be an onsite visit by a team of IISc every 6 weeks, to the bidders manufacturing facility where the facility is being developed for progress monitoring.

6. All documents related to design and calculation should be kept on a common online repository so that both the bidder and IISc personnel can have access to it.

7. If there are any minor modifications to the design done by the bidder, then that shall be communicated to IISc personnel on an urgent basis and the bidder should get it validated by IISc personnel on the change.

8. If there are any major modifications to the design, then the change shall be decided on a mutual basis between IISc and bidder.

9. The modification to the design done by the bidder from the tender document, shall be classified as major or minor, shall be under the discretion of IISc.

Section 7: Technical Bid

The technical bid should furnish all requirements of the tender along with all annexure in this section and submitted to

Prof. Saptarshi Basu
Associate Professor
Indian Institute of Science
Bangalore – 560012, India

Annexure-1:

Details of the Bidder

The bidder must provide the following mandatory information & attach supporting documents wherever mentioned:

Details of the Bidder		
Sl. No	**Name of the Bidder**	
1	Nature of Bidder (Attach attested copy of Certificate of Incorporation/ Partnership Deed)	
2	Registration No/ Trade License, (if any attach copy)	
3	Registered Office Address	
4	Address for Communication	
5	Contact person- Name and Designation	
6	Telephone No	
7	Email ID Website	
8	PAN No.(attach copy) -if applicable	
9	GST No.(attach copy) -if applicable	

Signature of the
Bidder Name
Designation, Seal Date:

Annexure-2:

Declaration of experience

To,

Prof. Saptarshi Basu
Associate Professor
Indian Institute of Science,
Bangalore – 560012, India

Ref: Tender No: **ICER/2019-20/1**
Dated: 28th June 2019

Supply, installation, testing and commissioning of system loop for analysis of flow transitions, thermo-physical properties, materials testing and heat transfer coefficient in Supercritical Steam based open loop.

Sir,

I have carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company / firm has XXX years of experience in **Supply, installation, testing and commissioning of system loop for analysis of flow transitions, thermo-physical properties, materials testing and heat transfer coefficient in Supercritical Steam based open loop.**

(Signature of the
Bidder) Printed Name

Designation, Seal Date:

Annexure-3:

Declaration of track record

To,

Prof. Saptarshi Basu
Associate Professor
Indian Institute of Science,
Bangalore – 560012, India

Ref: Tender No: **ICER/2019-20/1**
Dated: 28th June 2019

Supply, installation, testing and commissioning of system loop for analysis of flow transitions, thermo-physical properties, materials testing and heat transfer coefficient in Supercritical Steam based open loop.
Sir,

I have carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company/ firm is not currently debarred / blacklisted by any Government / Semi Government organizations / institutions in India or abroad. I further certify that I'm competent officer in my company / firm to make this declaration.

Or

I declare the following

Sl.No.	Country in which the company is Debarred /blacklisted / case is Pending	Blacklisted / debarred by Government / Semi Government/Organizations /Institutions	Reason	Since when and for how long

(NOTE: In case the company / firm was blacklisted previously, please provide the details regarding period for which the company / firm was blacklisted and the reason/s for the same).

Sincerely

(Signature of the
Bidder) Name
Designation, Seal Date:

Annexure – 4:

Declaration of acceptance to tender terms and conditions

To,

Prof. Saptarshi Basu
Associate Professor
Indian Institute of Science,
Bangalore – 560012, India

Ref: Tender No: **ICER/2019-20/1**
Dated: 28th June 2019

Supply, installation, testing and commissioning of system loop for analysis of flow transitions, thermo-physical properties, materials testing and heat transfer coefficient in Supercritical Steam based open loop.

Sir,

I have carefully gone through the Terms & Conditions as mentioned in the above-referred tender document. I declare that all the provisions of this tender document are acceptable to my company. I further certify that I'm an authorized signatory of my company and am, therefore, competent to make this declaration.

Sincerely,

(Signature of the
Bidder) Name
Designation, Seal Date:

Annexure – 5:

Details of items quoted:

Company Name	
Product Name	
Part / Catalogue number	
Product description / main features	
Detailed technical specifications	
Remarks	

Annexure – 6:

Declaration of submission of test reports

To,

Prof. Saptarshi Basu
Associate Professor
Indian Institute of Science,
Bangalore – 560012, India

Ref: Tender No: **ICER/2019-20/1**
Dated: 28th June 2019

Supply, installation, testing and commissioning of system loop for analysis of flow transitions, thermo-physical properties, materials testing and heat transfer coefficient in Supercritical Steam based open loop.

Sir,

I have carefully gone through the tests required to be done as mentioned in the above-referred tender document. I declare that all the test procedures of this tender document are acceptable to my company. I shall supply compliance certificate of all the afore mentioned tests attached along with the letter. I further certify that I'm an authorized signatory of my company and am, therefore, competent to make this declaration.

Sincerely,

(Signature of the
Bidder) Name
Designation, Seal Date:

Annexure – 7:

Declaration of acceptance of clauses

To,

Prof. Saptarshi Basu
Associate Professor
Indian Institute of Science,
Bangalore – 560012, India

Ref: Tender No: **ICER/2019-20/1**
Dated: 28th June 2019

Supply, installation, testing and commissioning of system loop for analysis of flow transitions, thermo-physical properties, materials testing and heat transfer coefficient in Supercritical Steam based open loop.

Sir,

I have carefully gone through the Clauses as mentioned in the above-referred tender document. I declare that all the provisions of this tender document are acceptable to my company. I further certify that I'm an authorized signatory of my company and am, therefore, competent to make this declaration.

Sincerely,

(Signature of the
Bidder) Name
Designation, Seal Date:

Section 8: COMMERCIAL BID

The commercial bid should be furnished with all requirements of the tender with supporting documents as mentioned under:

Sl. No	Description	Catalogue Number	Quantity	Unit Price	Sub Total
1	Instrument price (Including hardware & software)				
2	Accessories for operation and installation				
3	All safety equipment and protective gear				
4	List and cost of consumables				
5	Warranty (2 years) + 1-year AMC on contractual basis				
6	Cost of Insurance and Airfreight				
8	CIP IISc, Bengaluru				

Addressed to:

Prof. Saptarshi Basu
Associate Professor
Indian Institute of Science,
Bangalore – 560

SECTION 9 – CHECK LIST

(This should be enclosed with technical bid- Part A)

The following items must be checked before the Bid is submitted:

1. Envelope "A": Technical Bid

a) Section 5- Technical Bid (each page signed by the authorized signatory and sealed) with the below annexures:

Annexure 1: Bidders details

Annexure 2: Declaration regarding experience

Annexure 3: Declaration regarding clean track

record

Annexure 4: Declaration for acceptance of terms and

conditions

Annexure 5: Details of items quoted

Annexure 6: Declaration for submission of test reports

Annexure 7: Declaration for acceptance of clauses

b) Copy of this tender document duly signed by the authorized signatory on every page and sealed.

2. Envelop "B": Commercial Bid

Section 6: Commercial Bid

Your quotation must be submitted in two envelopes: Technical Bid (Envelope A) and Commercial Bid (Envelope B) super scribing on both the envelopes with Tender No. and due date and both of these in sealed covers and put in a bigger cover which should also be sealed and duly super scribed with Tender No. & Due Date.