

**Tender for “AUTOCLAVABLE FERMENTOR OF 5 LITERS WORKING VOLUME
CAPACITY FOR MICROBIAL CULTURES”**

Organisation Chain : Delhi University||Department of
Microbiology - DU

Tender Reference Number : BioNest-UDSC/PI-2022-1

Tender ID : 2022_DU_670601

Last Date: 28th February 12:00PM



UNIVERSITY OF DELHI SOUTH CAMPUS

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No: BioNest-UDSC/PI-2022-1

Date: 28.01.2022

Tender specification for “**AUTOCLAVABLE FERMENTOR OF 5 LITERS WORKING VOLUME CAPACITY FOR MICROBIAL CULTURES**” purchase through e-procurement portal.

The quotations are invited under a Two-bid system for **one Unit** of “**AUTOCLAVABLE FERMENTOR OF 5 LITERS WORKING VOLUME CAPACITY FOR MICROBIAL CULTURES**” **The quoted price should be FOR destination in INR** (Indian Rupees only) upto Department of Microbiology, University of Delhi South Campus, both supplying, installation and training included. The last date of bid submission is **28th February 2022 by 12:00 PM as per the tender specifications mentioned below**

1. Process Controller

Latest Generation P.I.D. based Microprocessor controller for Process monitoring, control, and operation with minimum 10 inches Touch Screen with manual and external/software control. The controller must automatically control various process parameters like pH, DO, anti-foam / level, temperature, air, oxygen supply, etc. The control should have alarms setting for different process parameters. The controller should have a cascading system of Air, Oxygen, and Stirrer speed to maintain the dissolved oxygen concentration.

Process control parameters and measurement range:

- Temperature (5 °C-80 °C or broader range with 0.1 °C resolution)
- pH (2-12 pH with 0.01 pH resolution)
- DO (0-100% with 0.1% resolution)
- Foam and level: (Electrical conductivity sensor, stainless steel, ceramic insulated)
- Air (5% to 100%)
- Oxygen (0% to 100%)

External Signal Inputs: Minimum two External Signal Inputs (4-20mA & 0-10V) to attach other accessory pieces of equipment. The controller must have USB, Ethernet, and RS232/485 ports for external communications and control.

2. Culture Vessel (Head Plate, Ports and other accessories) and Stirrer Motor

- a. **Culture Vessel:** Double-wall Borosilicate Glass Vessel with Flexibility of interchangeable culture vessel in range of 2L,5L and 10L with a stainless steel Head plate (2 x Handles) containing 14ports (12mm and 6.3mm ports) (The port's size may vary as per manufacturer specifications). Sampling and harvest tubes
- b. **Working volume:** Working volume in the range of 1.0 L to 5.0 L
- c. **Culture vessel Stand:** Stainless steel stand to support the culture vessel
- d. **Impellers:** 2x6 Blades Ruston type disk impeller and 2 marine impeller with minimum 4 blades
- e. **Air Sparger:** 1 x Ring sparger with holes, Hose nozzle for hose connection, ID = 3.2 mm
- f. **Stirrer and Mechanical Seal:** Stirrer assembly with Single mechanical seal and direct coupling.
- g. **Stirrer Motor:** Top Driven Maintenance-free Brushless Motor with RPM range of 50 to 1,200 RPM
- h. **Motor Power:** 200W-400W with **noise level <55dB**
- i. **Exhaust condenser:** 1 Stainless steel Exhaust condenser assembly with inlet and outlet of chiller connection with autoclavable air filter (0.2 µm PTFE)
- j. **Thermowell for temperature sensor:** Thermowell (glycerol compatible) to support Temperature sensor PT100
- k. **Blanking Plugs:** Port blanking plugs (5x 12mm and 5 x 6.3mm). The size may vary as per manufacturer specifications.
- l. **Baffles Assembly:** One Baffles Assembly for 5-liter vessel with ~1/10th of the vessel diameter (Minimum 4 Baffle Blades)
- m. **3-way inlet port:** 2X3way inlet port connection for Acid, Base and Antifoam
- n. **Dip tubes:** 2 long (325mm) & 1 (225mm) short Stainless steel dip tubes for feed addition and CSTR apart from sampling and harvest tubes
- o. **Dip tubes variable height:** 2 Variable height Stainless steel sampling port tube with suitable adapters for CSTR and overflow feed control
- p. **Sampling kit:** One sampling kit for sample analysis from the fermentor with autoclavable assembly
- q. **Connectors:** Quick release connectors (SS or Brass) for glass vessel, Chiller, air supply and condenser

3. Sensors (Autoclavable)

- a. **Temperature Sensor:** One PT 100 range of minimum 0-140 °C (Temp. Control: Minimum 0-80 °C) with appropriate cable and housing assembly. The sensor should be Autoclavable
- b. **pH Electrode:** One Gel-filled pH Electrode (**Mettler Toledo**), 12mm diameter with an appropriate height of culture vessel(~325mm), with PG13.5 thread and **connector cable** (Mettler Toledo) with 250ml each standard reference Buffer (4,7 &10). The sensor should be Autoclavable

- c. **Dissolved oxygen Electrode: One Dissolved Oxygen electrode (Amperometric or optic from Mettler Toledo)**, stainless steel, 12mm diameter, with an appropriate height of culture vessel (~325mm) with PG13.5 thread with **connector cable**, electrolyte, and four pieces of DO membrane and 26ml Electrolyte. The PG13.5 thread can vary as per the make and supply of vendors. The sensor should be Autoclavable
- d. **Foam Sensor:** Stainless steel, Electrical conductivity based foam sensor with ceramic insulation
- e. **level Sensor:** Stainless steel, Electrical conductivity based level sensor with ceramic insulation

4. Integrated and additional pumps for Acid, Base, Antifoam, and Substrate supply:

- a. **Pumps:** Minimum 4 pumps must be supplied with complete integration to a main controller unit for precise supply of different liquid to maintain different process parameters: Minimum 2 fixed Speed peristaltic pumps (Acid & Base) and 2 variable speed peristaltic pumps (substrate Addition, RPM range 5 to 50 with 1 RPM resolution, fluid feeding rate of 5 ml/min to 5L/min with different size silicon tubing).

5. Gas Supply and Air/Oxygen Mixing (Air, Oxygen, and Nitrogen/Carbon dioxide)

- a. **Rotameters for manual gas flow control:** Minimum three rotameters for Air, Oxygen, and Nitrogen/Carbon dioxide. Capacity 1 to 10LPM or higher in the increments of 1LPM
- b. **Thermal mass flow controllers for automatic Gas mixing:** Minimum of two TMFC for Air and Oxygen must be supplied to control a precise gas flow in the bioreactor. The TMFC provided must be sufficient for air with O₂ Enrichment or Gas Flow Ratio mixing or Additive Flow 2-gas mixing
- c. **TMFC flow Range:** The TMFCS must have the gas flow of 10 litres/min or more having an accuracy of $\pm 5\%$.

6. Process Control Software (SCADA with following Specification and PC)

- a. **Software (1 No.):** One SCADA software should have a user-specific life-long license and accessibility for Data logging and programming of various process parameters. The quoted SCADA software should provide online and off-line sample data management, visualization, evaluation, expanded data recording, and data archiving capabilities, Alarm recording and transmission to multimedia devices, and a flexible device connection facility. USB interface for data transfer is a must. Data on multiple parameters to be presented numerically in line graphs & bar charts. The PC should have three years warranties.
- b. **Computer to run SCADA software:** To run SCADA software a Branded PC (Either Dell, HP, or Acer) with original windows 10 professional, core i7 10th generation processor, antivirus, 22-inch monitor, 1 TB HDD, 8 GB RAM or better specifications must be included in the quotation.

The computer system should run the software for proper management of fermentor to control various parameters from remote.

7. Accessories items require to run fermentor

- a. **Chiller Circulator:** To control temperature during the process, a high capacity water chiller must be provided with a minimum temp Range: -10 °C to +40 °C. The chiller must be from an internationally reputed brand. CFC-free (R404A), Closed-loop circulation, 12 l/min; 2,5 bar and Minimum 8-12 Litre tank capacity
- b. **Air Compressor:** An oil-free and Noise free Air compressor to be supplied, Capacity 40LPM with control for back-pressure release., Flow control valve, safety valves, NRV and Pressure gauge with moisture trap and suitable connectors
- c. **Online UPS:** 3KVa inbuilt battery online UPS with at least 30 minutes power backup (APC, Emerson Liebert).

8. Following Spares item must be included/quoted by the vendor with the final offer price

Additional spares to run fermenter trouble-free:

- a. **Glass vessel:** Double-wall Borosilicate Glass Vessel 5L working volume as mentioned in the culture vessel specification above (one)
- b. **Membrane Kit:** One complete DO membrane kit for DO probe with 4 membranes and min. 25ml electrolyte (one complete Set)
- c. **Mechanical Seal (complete):** Company assembled Complete mechanical seal with housing assembly, bearings, mechanical seal, C-clamps, springs, and SS shaft to install impellers (One)
- d. **pH electrode:** One as mentioned in the specifications of sensors (Mettler Toledo) (one)
- e. **Addition peristaltic Pumps:** 2 additional fluid transfer peristaltic pumps with flow transfer capacity upto 5 ml/min to 3L/Min with an increment of 1 rpm (RMP range 1 rpm to 100rpm) Watson Marlow, or Masterflex Make

9. Startup kit with following items:

- a. 6 x 500 ml Feed Bottles complete with assembly,
- b. Exhaust Outlet Filters: Material PTFE, Autoclavable, Pore Sizes 0.2 µm Filtration Area 3 square inch or higher (6 No.),
- c. Air Inlet Filter: Material PTFE, Autoclavable, Pore Sizes 0.2 µm Filtration Area 3 square inch or higher (6No.),
- d. Tubing for water, air & gas with regulation valves,
- e. Silicon tubing (Four types, 25 Meter each): 1.6mm, 3.2 mm, 4.8mm, and 6.4mm internal diameters
- f. Set of Inoculation septa (25 no.),
- g. Inoculation Needles suitable for 12mm and 6.3mm ports (2 each)
- h. Set of O rings suitable for 12 mm and 6.3 mm ports (25 no. each)

- i. Set of extra Allen screws (10 No.)
- j. Six sampling glass bottles for withdrawing the sample
- k. Connectors (Quick release autoclavable): 4 pair of Quick release connectors (SS or Brass) for glass vessel and condenser

Very Important Note: Nothing is optional in this tender, So quote your FOR price in INR in BOQ, (Autoclavable Fermentor of 5 Liters Working Volume Capacity For Microbial Cultures). The BOQ price must include everything that has been asked above in the tender documents.

Important: For technical compliance, read the complete tend document very carefully before bidding.

1. Nothing is optional in this tender, so quote the final price, including all the above requirements **FOR destination price in Indian Rupee must be quoted.** Quotations are invited under two-bid system
2. Should carry Certification of US or European standard for the quoted equipment. Documentary proof to be submitted.
3. The vendor should have at least 15 years of track record of supplying **Fermentors to academic institutes and industries.** Documentary proof must be submitted.
4. **The vendor/manufacturer should enclose user list with the address of atleast 20 users of the same model/Configurations of Fermentor or higher installed throughout India in various reputed government Institutes/Academic institutes/Universities/ICAR/CSIR/ICMR/IITs/Reputed industries other research labs in government-funded institutions.**
5. **Note: Documentary proof of at least 20 users in terms of purchase orders and installation reports for same or higher model required, with phone no and complete address of the buyer.**
6. The vendor should submit an authorized distributor certificate issued by the original manufacturer for the quoted item. The manufacturer or vendor must have a post-sale service provider in Delhi in case of any technical or functional issue with the machine.
7. The vendor should also enclose the original literature/catalogue/company brochure **and fill out a compliance sheet, with the relevant page number** and line number of the brochure mentioned against each point of the technical specifications given above. The quoted specifications/features should be available on the company website **(Please provide the original manufacturer website showing the requested technical specification).**
8. The fermentor should be under 2 Years of "Comprehensive warranty" from the installation date.


Important Information:

1. Bidder should be Manufacturer/ Authorized Partner/ Reseller of the manufacturer and a Letter of Authorization from the manufacturer for the same and specific to the tender should also be enclosed. The bidder should also be the Authorized Service Provider. (attach the required certificate)

2. All vendors are requested to attach original technical literature/ catalogue in support of the mentioned specifications & highlight the above features. The same features should be available on the company website (**Please provide the link of original manufacturer website showing the specification**).
3. Please note: IGST/CGST+SGST@5% would be applicable for supply to University of Delhi South Campus under Custom notification of 47/2017. DSIR Certificate/CDEC would be provided on request.
4. The quotations should be addressed to **Prof. Swati Saha**, BioNEST, Department of Microbiology, University of Delhi South Campus, Benito Juarez Road, New Delhi-110021, and should be **uploaded on the e-procurement portal, latest by 28th February, 2022 by 12:00 PM**
5. Quotations have to be submitted in a **two-bid system**. The first part, **Technical bid**, should consist of all technical details and supporting documents with terms and conditions. **A Compliance Sheet must be filled by the vendor** against each point and give reference of the same (page number, line number) in the supporting company brochure/document.
6. The second part, **Financial bid**, should contain item-wise pricing of items mentioned in the technical bid.
7. The bidder will have to quote all the required items together: partial quotes will not be accepted. For each item, make and model, have to be mentioned clearly. (Nothing is optional)
8. The quote should be valid for 90 days from the due date.
9. Payment will be made by wire transfer or through an online system as per University rules after the installation of the instrument.

Commitment to Accept Lowest or Any Tender

- Demonstration of the equipment with all accessories (mentioned in the tender document) will be required on the recommendation of the Purchase Committee at the Department of Microbiology, University of Delhi South Campus, New Delhi-110021.
- The University of Delhi shall be under no obligation to accept the lowest or any other offer received in response to this tender notice and shall be entitled to reject any or all offers. The University of Delhi will not be obliged to meet and have discussions with any vendor and or to listen to any representations..


Project Investigator
Entitled "BioNEST Fostering.....BioIncubation"
No: BT/BIRAC/BI-DU/2019
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