TECHNICAL SPECIFICATIONS

1.0 GENERAL DESCRIPTION

The following technical specifications, code of practice etc. referred herein are part of the Item Specification and work shall be executed accordingly. The technical requirements given hereunder are only indicative and not descriptive and the Supplier shall ensure that the equipment and accessories supplied are complete in all respects for the smooth operation of the plant and should be suitable for the rated output.

Items which are not covered under Technical Specification shall be carried out as per relevant IS Specification or as per manufactures specification approved by Accepting Authority or as directed by Engineer-in-charge. In case of discrepancy between technical specification and item specification provided along with Bill of Quantities, the Item Specification shall prevail.

2.0 SCOPE OF WORK

The scope of work shall include supply, erection, testing, commissioning of mechanical, instrumentation and electrical works for Procurement of **Biosafety Cabinet** for Oushadhi Plant at Kuttanellur, Thrissur. All electrical and necessary instrumentation and controls for smooth and safe operation of various systems of plant shall be in the scope of the Supplier. These shall conform to the specifications and standards laid down by the Kerala State Electrical Inspectorate. The Supplier would do all necessary activities to get prior advice/approval from the Inspectorate for the design/ schematic diagrams of all power/control wiring of all equipment, including those supplied by other manufacturers prior to commencement of manufacture in order to avoid rework and consequent delay.

3.0 CODES AND STANDARDS

The design, manufacture and testing of the equipment shall comply with the latest editions of appropriate standards.

Unless mentioned otherwise, all applicable codes and standards in their latest editions as published by the Bureau of Indian Standards shall govern in respect of design, workmanship and properties of materials and methods of testing. In case where suitable Indian Standards are not available, generally accepted codes and practices shall be adopted.

All equipment shall comply with the statutory requirements of the Govt. of India and Government of Kerala. The equipment fabrication and installation shall conform to the provision of statutory and other regulations in force such as the Indian Factories Act, Indian Explosives Regulations, Kerala State Pollution Control Board, etc. Approval of

drawings by statutory agencies, if required, shall be arranged by the successful Contractor at no extra cost to the Purchaser.

In cases where the offer deviates from the specified standards, the Tenderer shall indicate clearly in his offer the reasons for deviation, standards proposed to be adopted by him and the details thereof.

4.0 SPECIAL REQUIREMENTS

4.1 SITE FACILITIES

The Tenderer shall indicate clearly the proposed work and procedure to be carried out at the Purchaser's site and take approval prior commencement of works at site.

Electricity for work to be executed at site will be made available near the work site free of cost. The Contractor shall ensure that the facilities are not misused or wasted. The Purchaser will not be responsible for the delays arising from non-availability of power due to reasons beyond the control of the Purchaser.

Only open area at work site will be allotted to the Contractor for carrying out site work. The Contractor shall indicate approximate space requirements.

Accommodation, transportation and food of workmen and supervisors of the Contractor shall be the responsibility of the Contractor.

4.2 STORAGE

All equipment and material to be stored at site in Contractor's risk. The Contractor shall store the equipment, commissioning spares etc. in a place which is dry and free of dust and frost. He shall also ensure that there is no penetration of impurities in the equipment, damage or rusting during storage.

4.3 SAFETY AND ENVIRONMENTAL ASPECTS

The total system should have adequate built-in precautions to prevent any fire or explosive hazards.

Safety systems should be as per relevant IS codes.

4.4 STATUTORY APPROVALS

Obtaining all statutory approvals shall be in the scope of the Supplier. These include but not restricted to approvals from Electrical Inspectorate, Pollution Control Board, Inspectorate of Factories and Boilers, Inspector of Explosives, etc. including prior approvals, wherever required.

5.0 SPECIFICATIONS

Technical Specifications for the Purchase of Biological Safety Cabinet

The Biological Safety Cabinet (BSC) shall be suitable for safe handling of infectious, toxic, and potentially hazardous biological materials in microbiology, biotechnology, pharmaceutical, and research laboratories. The system shall provide personnel, product, and environmental protection and shall comply with international biosafety standards.

The Biological Safety Cabinet shall consist of a main cabinet unit, airflow system, HEPA filtration system, control panel, lighting system, accessories, and safety monitoring features. The detailed technical requirements are as follows.

I. System Application

- Suitable for routine microbiological work, cell culture, and handling of biohazardous samples.
- Designed for personnel, product, and environmental protection.
- Suitable for continuous laboratory operation under ambient conditions.
- Model number and country of origin of the equipment offered shall be clearly mentioned.

II. Cabinet Type and Construction

- The biosafety cabinet shall be Class II Type A2.
- 70 % of air shall be recirculated and 30 % exhausted.
- The cabinet shall have dual side walls with negatively pressurized interstitial space.
- Cabinet structure shall be robust, corrosion-resistant, and suitable for long-term operation.

III. Dimensions

- Exterior dimensions: approximately 1500 (H) × 1300 (W) × 800 (D) mm
- Interior dimensions: approximately 800 (H) × 1200 (W) × 500 (D) mm

IV. Airflow and Motor System

- The cabinet shall be equipped with two DC motors with low noise operation.
- Motors shall automatically adjust airflow speed without the use of dampers.

- Continuous safe airflow shall be maintained without frequent manual adjustment.
- High power–consuming AC motors shall not be required.

V. Control System and Microprocessor

- The cabinet shall be controlled by a microprocessor-based system.
- Real-time display of inflow and downflow air velocities shall be provided.
- Display shall be through a minimum 7-inch touch-screen graphical interface.
- The system shall provide: Audible and visual alarms for HEPA filter failure, Blower failure, Airflow velocity failure, Incorrect sash position, Indication of hours of operation. The control panel shall be positioned on a slanted front panel for easy viewing and operation from a seated position.

VI. Front Window (Sash)

- Front sash opening shall be 10 inches.
- Sash shall be made of laminated safety glass.
- The interior surface of the window shall be accessible for cleaning without removal or manual support.
- The design shall ensure containment in case of accidental glass breakage.

VII. Noise Level

- Noise level shall be less than 63 dB(A) for a 4-foot cabinet.
- Measurement shall be taken 12 inches in front of the cabinet and 15 inches above the work surface in a soundproof environment.

VIII. Interior and Exterior Finish

- All interior and exterior surfaces shall be smooth-finished.
- No sharp edges shall be present to prevent injury to users and service personnel.
- Surfaces shall be easy to clean and disinfect.

IX. UV Lamp System

- The cabinet shall be provided with a programmable UV lamp enabling timed sterilisation.
- UV exposure time shall be adjustable from 0 to 24 hours.
- Automatic UV shut-off safety feature shall be provided.

X. HEPA Filtration System

- The cabinet shall incorporate HEPA filters conforming to Class H14 (EN 1822) or better.
- Minimum filtration efficiency shall be 99.995 % at 0.3 µm particle size.
- Visual and audible indication shall be provided for excessive HEPA filter loading.
- Pressure sensors shall be provided to monitor pressure drop across the supply filter.
- Sensors shall be protected from temperature and humidity variations.

XI. Work Surface and Drain Pan

- The drain pan shall be made of stainless steel.
- Painted or powder-coated drain pans shall not be acceptable.
- Design shall allow easy cleaning and decontamination.

XII. Ventilation System

- Exhaust and inflow air volume shall be approximately 300–350 CFM.
- Exhaust blower shall continue operation if the supply blower fails.
- Provision shall be available to shut down the supply blower in case of exhaust blower failure.

XIII. Accessories and Ergonomics

- Fixed or adjustable height stand.
- UV lamp.
- Three service taps/valves (vacuum, liquid, and LPG).
- One set of detachable armrests.
- One or two electrical outlets.
- Front of the cabinet shall be angled approximately **10°** to reduce glare and improve operator comfort.

XIV. Power Consumption and Energy Efficiency

- Power consumption shall be less than 200 W.
- Energy-efficient design shall be provided.
- System shall consume less than 180 W during normal operation.
- Reduced energy mode shall be available when sash is fully closed.

- Automatic reduction of blower speed to approximately 30 % during non-operational mode shall be provided.

XV. Certification and Compliance

- The biosafety cabinet shall be NSF certified and listed on the NSF website.
- The system shall comply with relevant international biosafety standards.

XVI. Interface and Communication

- The unit shall have RS-232 communication interface.

XVII. Warranty

- Comprehensive warranty of **five (5) years**.

XVIII. Additional Conditions

- Comprehensive maintenance contract for five years with preventive maintenance kits.
- NABL-traceable calibration certificate shall be provided.
- Provision for annual NABL-certified calibration for five years at no additional cost.
- cGLP-compliant system specifications.
- The Biosafety Cabinet shall be CE certified, complying with applicable EU safety and electromagnetic compatibility directives. Valid documentary evidence shall be submitted along with the technical bid.
- Complete installation, commissioning, and hands-on training by factory-trained engineers.
- Vendor shall provide testimonials and user performance certificates from at least five reputed customers.
- Vendor shall have authorized service facility in Kerala.
- Pre-installation requirements (power, space, utilities) shall be provided.
- Quoted price shall include all charges including customs duty, transportation, installation, and commissioning.

PAC: ₹ 8 L

***The bidder shall have supplied similar machines to reputed firms in the last three years**

6.0 GENERAL REQUIREMENTS

6.1 The equipment supplied shall be complete in all respects with all necessary accessories and commissioning spares for operating it for the specified application. Equipment which are either operated under pressure or are likely to develop pressure shall be provided with safety valves, pressure gauges and vents with isolation valves. Electrically operated equipment shall be complete with necessary starters, control panel, push button stations, cabling, earthing etc. The earthing shall be linked to the nearest existing earth grid which will be available within 5-10 m from the equipment.

6.2 The thickness given in the data sheets is indicative only and the Tenderer shall check and satisfy before quoting. Nozzles shall be provided with stiffeners for reinforcement.

6.4 All rotating/moving parts shall be provided with adequate guard for safety.

6.5 The Supplier shall furnish complete design calculation with backup details for review and approval by the Purchaser/Consultant.

6.6 Pressure testing shall be arranged in the presence of a competent person and their certificate shall to be issued before provisional acceptance of the equipment.

6.7 Tenderer should include the cost of all required accessories in the quoted rate.

6.8 The Purchaser reserves the right to procure all the items specified in the tender or part thereof without assigning any reason.

7.0 DESIGN IMPROVEMENT/ ALTERNATE DESIGN

7.1 The system or equipment requirements given are indicative only. The Tenderer is free to quote the equipment of their own design provided it is superior to the specifications given and it satisfies with the Pre-qualification criteria. The Tenderers are advised to examine the feed materials and quote for suitable equipment to meet the performance requirement.

7.2 The Tenderer may incorporate latest designs in any of the specifications mentioned above with the prior approval of the Accepting Authority, which in his opinion are sure to give better performance. The technical deviations shall be clearly spelt out as per the Technical Deviation Statement Form provided in this tender document.

8.0 BATTERY LIMITS

8.1 FOUNDATION AND STRUCTURAL WORKS

The civil foundation required will be in the scope of supplier. Supply of foundation bolts, anchor bolts, grouting mixture etc. and grouting shall be in the scope of the Contractor. Grouting shall be carried out as per approved specifications. The supply and erection of working platform, if required, shall be in the scope of the Contractor. The supply of bolts,

welding materials etc, for erecting those equipment to be supported on existing structural platform shall be included in the Contractor's scope.

8.2 ELECTRICAL AND INSTRUMENTATION

Based on the electrical details submitted by the Contractor, the Purchaser will arrange cabling upto the incomer of the electrical panel of the equipment. However, termination of the same will be in the scope of the Contractor. The Contractor shall also arrange the supply of electrical panels, interconnecting cables, starters, push button stations, earthing materials etc. The Purchaser will provide earthing network in the plant premises within 5-10 m. Earthing the equipment by connecting to the existing grid will be in the scope of the Contractor. The Contractor shall also provide necessary instrumentation and control systems, if specified.

9.0 SHOP INSPECTION AND TESTING

9.1 PROCEDURE

9.1.1 The Contractor shall conduct all tests required to ensure that the equipment supplied shall confirm to requirements of the applicable codes at various stages of fabrication / procurement, including raw material identification. All fabrication works, tests, test procedures and detailed quality plan proposed by the Contractor shall be submitted to the Purchaser / Consultants for approval. The Purchaser / Consultants shall be intimated well in advance regarding the testing of material / equipment so that they could witness the tests at the works. In certain cases, the Purchaser/Consultant may waiver the witnessing of the tests, but it does not absolve the Contractor for carrying out the same and submitting the test reports for approval.

9.1.2 All material used shall be tested for quality. The test certificate shall be made available to the Purchaser's / Consultant's representative. In case of non-availability of test certificates, material shall be tested by the Contractor at his own cost, to establish the conformance of the relative standards.

9.1.3 The representative of the Purchaser/ Consultant shall be given full access to the shop in which the equipment is being manufactured or tested and the Supplier shall carry out any change or modifications as pointed out by the Purchaser/ Consultants during inspection at no extra cost.

9.1.4 The Supplier shall despatch the equipment only after obtaining clearance from the Purchaser/ Consultants. However, the inspection and certification of the Purchaser/Consultant does not absolve the Supplier of his responsibilities towards the satisfactory operation and the guarantee/warranty of the system.

10.0 TESTS PROPOSED

The following are the tests that shall be arranged by the Contractor at his works.

10.1 Visual inspection for general workmanship and welding.

10.2 Dimensional check and nozzles shall be as per the approved drawings.

10.3 Hydraulic test to detect leakage:

11.0 PAINTING

11.1 SURFACE PREPARATION

All external surfaces shall be cleaned of loose substance and foreign material, e.g. dirt, rust, scale, oil, grease, welding flux, etc. so that the zinc phosphate primer coat adheres to the original metal surface. The work shall be carried out generally in accordance with IS:1477 (Part I) amended upto December 2010. The surface shall be cleaned either by sand blast to grade S.A.2.5 using graded sand or by acid pickling using dilute sulphuric or hydrochloric acid followed by thorough rinsing with fresh water.

11.2 PRIMER AND FINISH COATS

The prime coat shall be applied immediately after the surface preparation.

Paint shall be applied in accordance with manufacturer's recommendations as supplemented by this specification. The work shall generally follow IS: 1477 (Part II) amended up to December 2010.

The prime coats shall consist of two coat of Zinc phosphate primer.

Finish painting shall consist of three coats of epoxy paint as per manufacturer's specification.

Dry film thickness for each coat shall be about 25 microns and total dry film thickness shall not be lower than 125 microns.

No shipment shall be made unless clear despatch instructions are obtained from the Purchaser's representative.

All projected parts shall be properly protected to avoid damage during transit.

Touch up painting for damaged coats doing transit / erection should be done by the Contractor.

Prior to touch up painting, proper cleaning of the damaged portions shall be done.

12.0 COMMISSIONING

12.1 INSPECTION AND TESTING

After erection at the site and before commencement of commissioning, the Contractor shall arrange to demonstrate the tests as per clause 10.2 of this specification. He shall also ensure that all rotating/ moving parts of the equipment are moving freely without any undue fouling/vibration. Necessary precautions shall be taken before testing of all electrically operated equipment. The same shall be tested as per approved procedures.

12.2 PERFORMANCE TRIAL RUN

After completion of inspection and testing, the Contractor shall arrange the guarantee and performance run. The feed/ raw material required for conducting the performance run will be arranged by the Purchaser. The performance run shall include continuous operation of the equipment for a duration of 72 hours at the rated performance or operation of 6 ½ hours per day for a duration of 5 days

The performance trial run is to ensure that the system installed conforms to the required/demanded specification including the power consumption. All the parameters shall be demonstrated during the guarantee and performance run. Maximum deviation from the approved parameters shall be less than 5%. The Contractor shall arrange any spares that may become necessary during performance run or due to damage/break down free of cost and repeat the performance and guarantee run. Any consumable like grease, oil etc. required for trial run/commissioning shall be arranged by the Contractor at no extra cost.

12.3 POWER REQUIREMENT

Power required shall be quantified for two aspects: for normal operating conditions and power needed during start up conditions and peak load. The gland losses and losses in the driving system shall also be determined and submitted.

12.4 VIBRATION TESTING

The Contactor has to test and validate that the system is free of undue vibrations under normal operating mode.

12.5 The Contractor shall arrange training of the Purchaser’s operators and maintenance personnel for operating it as per standard practice/safely.

13.0 DATA TO BE FURNISHED BY THE TENDERER

13.1 AT THE TIME OF SUBMISSION OF BID

The Tenderer shall submit all detailed technical specification, catalogues etc. for the equipment being quoted. Detailed drawings showing all the design, operational and maintenance features, major dimensions, details of foundations including layout, etc., shall be submitted along with the offer. Technical data for individual items of equipment in the form of a data sheet and details of all equipment within the battery limit shall be submitted along with the tender. The Tenderer shall also submit a general arrangement drawing and approximate layout showing the space requirement etc. Other specifications and relevant data shall be furnished by the Tenderer, wherever applicable. The following details are to be submitted along with the bid.

- Data Sheets
- Tentative General arrangement (GA) drawings
- Tentative drawings with dimensions of equipment
- Equipment specifications
- Empty weight
- Any special requirement during erection
- List of customers to whom similar units have been supplied
- Compliance Statement

13.2 AFTER AWARD OF WORK

The following details have to be submitted by the Contractor within **fifteen days of receipt of Letter of Intent or Letter of Award of work** for approval by the Purchaser/Consultants.

- Foundation drawings with load details, if applicable.
- Manufacturing, inspection and delivery schedule
- GA drawings
- Drawings with dimensions of equipment
- Equipment layout and elevation
- Empty weight
- Electrical control panel and other electrical system details, if applicable.
- Safety devices provided
- Details of bought out items like motors, gear box, electrical items etc.
- List of spare parts for 1 year operation.
- Service and spare parts availability with contact details
- Erection Manual.

13.3 BEFORE COMMENCEMENT OF TESTING / COMMISSIONING

The contractor shall submit six copies of the Operation and Maintenance Manual and As-built drawings along with a soft copy before the commencement of testing/ commissioning.