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 **Gas Chromatograph-Mass Spectrometer (GC-MS/MS)** 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 Triple Quadrupole Gas Chromatograph Mass Spectrometer

Triple Quadrupole Gas Chromatograph Mass Spectrometer for analysis of fatty acid content, phytochemical profiling, pesticide residues etc. of Ayurvedic formulations, Siddha formulations and raw drugs with following items: Column oven, Sample injector, Autosampler, Capillary Column, Quadrupole Mass Analyzer, Mass detector, Specific Software System, Vacuum System, FID Detector and compatible accessories for gas supply, system cooling and routine maintenance. The specific requirements with respect to each component are as follows.

I. Gas Chromatograph

- The complete system shall be supplied with fully modular injector and detector assemblies, which shall be user-interchangeable, user-replaceable, and user-upgradable.
- The integrated system of Gas Chromatograph comprising of Auto samplers and detectors must be of same original equipment manufacturer (OEM).
- The GC must provide easy accessibility to the GC instrument control, health check, consumable management, and other parameters like associated with it.
- The GC must be able to house and operate with three or more detectors simultaneously, including a mass spectrometer and more than three injectors.
- Provision for fully automatic and integrated electronic control of carrier gas pressure and gas flow.
- The GC-MS/MS system shall support low-bleed, MS-certified capillary columns suitable for the analysis of herbal and botanical matrices.

II. Column oven

- Temperature Range: Up to 450 °C
- Resolution: 0.1 °C
- The GC oven shall support advanced temperature programming with 28/30-ramps/plateaus
- Maximum heating rate: 125 °C·min^{-1} or better
- Oven cool-down (22 °C ambient): 450- 50 °C in less than 4 minutes
- Retention time repeatability < 0.008% or <0.0008 min or better
- Provision for oven column overheat protection
- The GC oven shall have provision for integrated internal lighting for ease of operation.

- The electronic pneumatic controls must be integral part of injector and detector modules and must not be installed into the oven mainframe.

III. Injector - Split/Splitless

- Maximum temperature: 400 °C
- Provision for setting the split ratio of the SSL injector between 0 and 12000 or better
- The injector must be user-swappable in less than 3 minutes without requiring a field-service engineer or any special tools.
- Provision for 1000 kPa, digitally controlled carrier gas with gas saver and septum purge.
- Capable of connecting micro-bore column and wide bore columns and packed columns.
- Provision for Helium Saver module wherein Helium is used as carrier only during data acquisition and Nitrogen as split gas and purge gas flow throughout the data acquisition mode as well as during standby mode without any manual intervention.

IV. Autosampler /Autoinjector

- The sampler should be able to accommodate minimum 150 vials capacity or more for 2 mL liquid vials.
- The System should be able to access the injector ports without any manual intervention
- Provision for upgradability to Head Space
- Vial Size: 2 mL
- Provision for injecting a Sampling Volume in the range -0.1-100 µL as well as large volume injections.
- The system shall be capable of performing programmable multi-layer (multi-plug) injections, comprising discrete liquid layers separated by air gaps, with complete user control over individual segment volumes, to facilitate applications such as sandwich injection, internal standard addition, and in-needle derivatisation.

V. Ionisation

- Latest version of Electron Impact Ionization (EI) technology
- EI ion source must be wireless, made of solid, non-coated, inert material.
- The connections should be tool free and wire free for easy operations and user-friendliness.

- The ion source must be heated by a block heater up to 350 °C
- There should be dual filament assembly for EI and spare dual filaments should also be quoted.
- The electron energy must be user-definable, adjustable from 0-150 eV.
- GC transfer line must have a settable temperature limit of up to 400 °C, for ideal transfer of components from GC to MS.
- An off-axis ion guide must be provided after the ion source and before the analysing quadrupole.

VI. Quadrupole Mass Analyzer

- Triple Quadrupole Mass Spectrometer
- Mass Range: 1.2 –1100 u (unified atomic mass units) or broader
- Mass resolution – ≤ 1.0 u over the entire mass range
- The quadrupole analyser must support fast scanning at 20,000 $\mu \cdot s^{-1}$ (unified atomic mass unit per second) for the entire mass range.
- The quadrupole mass analyzer rods shall be constructed of inert, non-coated material, and the design must be user-friendly for routine maintenance and cleaning.
- The quadrupole assembly shall be of metallic or quartz monolithic construction, or equivalent robust design, suitable for long-term GC-MS/MS operation.
- Provision for a pre-quadrupole (pre-filter / pre-rod) or equivalent mechanism, to prevent non-volatile contaminants/unwanted matrixes from entering and depositing on the main quadrupole rods.
- The acquisition rate for SRM mode shall be more than 800 SRM transitions$\cdot s^{-1}$
- The minimum SRM dwell time must not be greater than 0.5 ms (milliseconds).
- Installation Specifications - both the specifications to be demonstrated during installation, and shouldn't be a reference specification.

VII. Flame Ionisation Detector

- The **FID detector shall be of instant-connect, plug-and-play modular design**.
- **Detection Limit: 1.2 pg C$\cdot s^{-1}$**
- or better facilitated by Electronic **/ Advanced Flow Control mechanisms**.
- **Dynamic Range: 10^7** or better.
- **Operating Temperature Range up to 400 °C or higher**.
- Provision for Automatic **flame-out detection and re-ignition.**
- **Data Acquisition Rate:** Minimum **600 Hz** or higher.

VIII. Collision cell

- The collision cell must use high-speed optics for maximum ion transmission.
- The collision energy must be adjustable in the range of 0 – 60 eV in user-programmable increments of 1 eV.
- The collision cell must support minimum SRM dwell time of 500 μs (microseconds).
- The collision cell must be compatible with **Argon as collision gas,** and the system shall support Selected Reaction Monitoring (SRM / MRM) acquisition using Argon collision conditions.

IX. Detection system

- The detection system must utilize digital electronic noise discrimination and a new generation discrete dynode electron multiplier.

- The detection system must provide an electronic dynamic range greater than seven orders of magnitude ($>10^7$).

X. Vacuum System

- Vacuum system should comprise of an air-cooled high vacuum pump ($> 280\ L \cdot s^{-1}$).
- Safety interlocks integrated to the GC system
- 3.3 m3/h rotary-vane oil fore-pump.
- Provision for control and safety interlocks integrated into the GC-MS system
- Automatic venting and pump-down
- The system should have a provision for locking the vacuum, allowing maintenance without breaking the vacuum.
- The system must be designed to allow the removal of the complete ion source and GC capillary column without venting the system.
- The system shall enable removal of filaments while maintaining vacuum integrity.

XI. Instrument Control /Data acquisition modes

- The instrument control must have the ability to acquire data in centroid, profile or nominal modes.

- The instrument control must support the following scan modes:
  - MS Mode: full scan (FS), SIM, and FS/SIM simultaneous within a single sample injection.
  - MS/MS Mode: full scan (FS), SRM, and FS/SRM simultaneous within a single sample injection.
  - Product ion scan
  - Precursor ion scan

- Constant neutral loss scan

- The instrument control must have the ability to alternate between Full Scan MS and SRM/SIM target analysis on successive scans.

- The instrument control software shall include an automated SRM method development tool, enabling user-defined, criteria-based generation and optimization of SRM transitions.

XII. Performance Specifications

- ✓ Electron Ionization MRM/SRM: 1 µL of 1 fg·µL^{-1} (femtograms per microliter) octafluoronaphthalene (OFN) should produce the following minimum signal-to-noise for the transition from m/z 272 to m/z 222 S/N: 300:1 or better.
- ✓ **Instrument detection limit:** ≤ 0.4 fg OFN, derived at the 99 % confidence level from the area precision of eight sequential injections of 1 µL of 1 fg·µL^{-1} OFN, acquired in EI SRM/MRM mode.
- ✓ The detection system must utilize digital electronic noise discrimination and a new generation discrete dynode electron multiplier.
- ✓ Typical retention time repeatability :< 0.0008 min.
- ✓ Typical peak area repeatability:<0.5 % RSD
- ✓ Sensitivity specifications should be demonstrated and validated for the sample category specified by the user viz. ASU formulations, raw drugs
- ✓ Detection limits must conform to prescribed Pharmacopeia standards
- ✓ Instrument Detection Limit must be demonstrated at the time of installation
- ✓ Provision to facilitate reduced helium consumption without compromising the sensitivity.

XIII. Software requirements for data evaluation

- Compatible System manager software for access and control of all electronic parts of the instrument
- System software should be user friendly and simple for data handling with feature like easy-to-use report publisher, online help and answer wizard,
- 32/64 Bit Advanced Chromatographic integration software
- The system should be provided with latest & licensed original copy of NIST library.
- Relevant database related to food applications to be quoted.
- It should have easy automatic method development feature.
- On-line help with quick steps to reference entire manual.
- Software up gradations should be free of cost.
- Secure data handling - data security and auto back up facility.
- System should have 21 CFR Part 11 compliance and GLP, GMP compliant
- Data validation (IQ/OQ/PQ for Software).

- Self-diagnostics
- It should have Automated MRM Development
- It should have Automated acquisition window adjustment based on retention time
- It should have Compound based MRM Library
- Built in system suitability as per USP/BP etc.
- Excel like Spread sheet for online calculation.
- The system shall provide flexible, user-configurable reporting, enabling generation of complete chromatographic information as per user requirements.
- Fully automated data acquiring & processing software with original CD should be quoted with catalogue number.
- Desirable: Artificial intelligence integration for method development and data analysis.

XIV. Accessories

- System bundled Branded PC i5, 18 GB RAM, 1 TB HDD, Optical mouse, 24" LCD/LED – 1 No, with Monochrome laser Printer
- Exhaust unit
- Gas cylinders: Helium Gas Cylinder with high pure gas - 3 Nos
- Argon Gas cylinder with high pure gas- 2 Nos
- Hydrogen Gas Cylinder with high pure gas – 1
- Zero Air Cylinder
- Nitrogen cylinder
- Regulator for the above cylinders- 1each
- Gas purification panel- 1 No
- UPS 10 KVA with 1hr back up
- Operation kit comprising all required items pump tubings, transfer Tubing's, work coils etc., for start-up/regular operation of instrument.
- Operation and maintenance manual for each unit in both hard copy and soft copy.
- Service manual with set of required tools for each system/unit
- Autosampler syringe - 5 Nos. of 10 µL readings
- Autosampler vials with cap and septa – 200 Nos.
- Septa for Injector – 50 Nos.
- Graphite/Vespel ferrule for 0.25mm ID Column Qty 5
- Graphite/Vespel ferrule for 0.32mm ID Column Qty 5
- Graphite ferrule for 0.1mm to 0.32mm ID Column Qty 5
- Graphite/Vespel ferrule for 0.53mm ID Column Qty 5
- 1 column each- polar, mid-polar, and non-polar, application specification columns for EtO analysis
- GC columns (MS-grade, low bleed)
  - DB- 1 or equivalent MS column 30m X 0.25 mm X 0.25 – 2 Nos.
  - DB- 5 or equivalent MS column 30m X 0.25 mm X 0.25 – 2 Nos.
- Injector Septa - Qty 100
- Capillary Column nut for S/SL Injector – each Qty 5
- 10 µL Liquid Auto Sampler Syringe – Qty 2
- 2mL size vial with cap & septa – Qty 200

- Vacuum Pump Oil 1 litres – Qty 1
- Filament – Qty 2
- Liner sealing ring for S/SL– each Qty 5
- Split & Splitless Liner for S/SL– each Qty 5
- Inlet seal for Split & Splitless mode- each Qty 5
- Capillary column cutter – Qty 2
- Calibration compound FC-43 – Qty-1
- Replacement Filter – 1
- Aluminium Oxide – 1
- Ferrule for MS – 1
- NIST 2023 library.
- Syringes and autosampler vials
- All relevant accessories/ consumables
- Pesticide standards GC-MS mixes
- EI source cleaning kit
- Filaments (minimum 2)
- Collision cell consumables
- Vacuum pump service kit
- Column installation kit
- Suitable Table with Granite Top for Instrument – 1 No

XV. **Comprehensive maintenance contract -5 year with preventive maintenance kits.**

XVI. **IQ/OQ/PQ of the system is required**

XVII. General conditions

- The system should be a complete functional unit in terms of hardware and software to demonstrate the intended specifications and applications to be supplied with all necessary ancillaries.
- The quote should be for supply, installation, commissioning, and successful working demonstration of the instrument at the premises of M/s. Oushadhi Ltd, Kuttanellur, Thrissur, Kerala
- Specifications should be confirmed from the Technical Brochure and the website of the manufacturer.
- Standard warranty of 36 months should be provided.
- Good Service and Technical support are essential. Please provide testimonials from three reputed customers.
- The service engineer shall be available in Kerala, and contact details should be provided
- Training: 2 levels – 5 days during installation in our lab and subsequently at the supplier's application lab for 2 persons at the supplier's cost, twice over a duration of 5 years.

- A compliance statement of the specifications should be provided along with the quote before placing the order.
- The offered system shall be CE certified or equivalent, complying with internationally accepted safety and electromagnetic compatibility standards. Documentary evidence in the form of CE Declaration of Conformity or equivalent certification shall be provided with the technical bid.
- The list of installations and users of complete system in India & abroad should be provided for reference. The company must have at least five working installations of the complete instrument globally. User list for this period, current contact details of users, Supply Orders, and certificates of successful completion issued by the clients must be enclosed.
- Installation, calibration, standardization, and commissioning shall be the responsibility of the vendor.
- Pre-installation requirements, including requirements for water/power supply, should be enclosed along with the tender.

PAC: ₹ 1.20 Cr

****The bidder shall have supplied similar equipments 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.