



Directorate of Research
Navsari Agricultural University, Navsari-396450, Gujarat.

Tender Document

For

Purchase of Scientific Instruments/Farm Machineries

NAU/DR/01-2015-2016

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Chapter 1: Tender Notice - NAU/DR/01-2015-2016

Purchase of Scientific Instruments/Farm Machineries

Bids from manufacturer/supplier/company are invited for the purchase of Scientific Instruments/Farm Machineries for Navsari Agricultural University. The list of purchase items under this tender are given underneath. The bids are invited by e-tender through website www.nprocure.com or au.nprocure.com.

Tender Fee	Rs. 1000
Period for Bid Document Downloading	24/07/2015 to 17/08/2015 up to 18:00 Hrs.
The Last date for online tender submission	17/08/2015 up to 18:00 Hrs
Last date for submission of tender fee, EMD and other documents by RPAD / Courier / Speed post	21/08/2015 up to 17:00 Hrs
Bid Validity Period	120 Days
Earnest Money Deposit (EMD)	As per Chapter-5 of tender document
Technical documents available on	www.nprocure.com / au.nprocure.com

List of Purchase Items:

No.	Item Name
1	SPECTRORADIOMETER (300 to 1100 nm)
2	CALIBRATED DENSITOMETER WITH ACCESSORIES
3	2D-PROTEIN POLYACRYLAMIDE GEL ELECTROPHORESIS WITH ACCESSORIES
4	NITROGEN ANALYZER (N-ANALYZER)
5	AUTOMATIC FIBRE ESTIMATION SYSTEM (760x620x390 mm, 230 v/50 Hz)
6	AUTOMATIC ABSORPTION SPECTROPHOTOMETER (740x490x300mm, (185-900 nm)
7	CENTRAL WATER FILTRATION PLANT
8	COOLING CENTRIFUGE-TABLETOP REFRIGERATED CENTRIFUGE
9	SONICATOR-ULTRASONIC HOMOGENIZER WITH BATH
10	DOUBLE-BEAM –SPECTROPHOTOMETER
11	ATOMIC ABSORPTION SPECTROMETER
12	LYOPHILIZER
13	FLUORESCENCE MICROSCOPE
14	RT- PCR
15	CAPILLARY ELECTROPHORESIS SYSTEM
16	OZONE ANALYZER
17	BULK MILK COOLER WITH ACCESSORIES
18	POUCH PACKING MACHINE
19	ATOMIC ABSORPTION SPECTROPHOTOMETER
20	SPECTRORADIOMETER with computer interface and software for spectral analysis (190-730nm)
21	SOLAR WATER PUMP- Solar photovoltaic water pumping system
22	DG SET (25 kva)
23	AUTOMATIC WASHER & DRIER (GLASSWARE)
24	PREPARATIVE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY with accessories
25	TREE (PLANT) CANOPY ANALYZER
26	LEAF AREA METER
27	ATOMIC EMISSION SPECTROMETER for Elemental Analysis

Director of Research

Chapter 2: Instructions to bidders for Online Tender Participation

1. All tender documents can be downloaded free from the website **<http://au.nprocure.com>** or **<http://www.nprocure.com>**
2. All bids should be submitted online on the website **<http://au.nprocure.com>** or **<http://www.nprocure.com>**
3. All bids should be digitally signed. For the details regarding digital signature certificate and related training involved the below mentioned address should be contacted

(n)Code Solutions
A division of GNFC
301, GNFC Infotower, Bodakdev,
Ahmedabad 380054 (India)
Tel. : +91 79 26857316 / 17 / 18
Fax : +91 79 26857321
Toll Free Number : 1-800-233-1010
www.ncodesolutions.com

4. The user can get a copy of instructions to online participation from the website **<http://au.nprocure.com>** or **<http://www.nprocure.com>**
5. The service provider should register on the website through the "New User" link provided at the home page, the registration on the site should not be taken as registration or empanelment or any other form of registration with the tendering authority.
6. The application for training and issue of digital signature certificates should be made at least 72 hours in advance to the due date and time of tender submission.
7. For all queries regarding use of digital signature certificate should be addressed to personnel in M/s. (n)Code Solutions.
8. For all queries regarding tender (except item specification) should be addressed to personnel in tendering office address provided below.

Director of Research,
Navsari Agricultural University,
University Bhavan, Eru Char Rasta,
Navsari – 396 450 (Gujarat)
E-mail: dr@nau.in
Phone / Fax No.: 02637 283160(O)

9. For queries regarding item specifications, contact concerned person as per chapter 7

Chapter 3: List of Purchase Item

No.	Item Name
1	SPECTRORADIOMETER (300 to 1100 nm)
2	CALIBRATED DENSITOMETER WITH ACCESSORIES
3	2D-PROTEIN POLYACRYLAMIDE GEL ELECTROPHORESIS WITH ACCESSORIES
4	NITROGEN ANALYZER (N-ANALYZER)
5	AUTOMATIC FIBRE ESTIMATION SYSTEM (760x620x390 mm, 230 v/50 Hz)
6	AUTOMATIC ABSORPTION SPECTROPHOTOMETER (740x490x300mm, (185-900 nm)
7	CENTRAL WATER FILTRATION PLANT
8	COOLING CENTRIFUGE-TABLETOP REFRIGERATED CENTRIFUGE
9	SONICATOR-ULTRASONIC HOMOGENIZER WITH BATH
10	DOUBLE-BEAM –SPECTROPHOTOMETER
11	ATOMIC ABSORPTION SPECTROMETER
12	LYOPHILIZER
13	FLUORESCENCE MICROSCOPE
14	RT- PCR
15	CAPILLARY ELECTROPHORESIS SYSTEM
16	OZONE ANALYZER
17	BULK MILK COOLER WITH ACCESSORIES
18	POUCH PACKING MACHINE
19	ATOMIC ABSORPTION SPECTROPHOTOMETER
20	SPECTRORADIOMETER with computer interface and software for spectral analysis (190-730nm)
21	SOLAR WATER PUMP- Solarphotovoltaic waterpumpingsystem
22	DG SET (25 kva)
23	AUTOMATIC WASHER & DRIER (GLASSWARE)
24	PREPARATIVE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY with accessories
25	TREE (PLANT) CANOPY ANALYZER
26	LEAF AREA METER
27	ATOMIC EMISSION SPECTROMETER for Elemental Analysis

Note:Detail specifications with special terms and conditions of all above listed 27purchase items are described under respective files mentioned in above list.

Chapter 4: Terms and Conditions

Note: Terms and Conditions listed under chapter 4 are applicable to all purchase items. In addition to this, the product specification document of items may contain additional terms and conditions applicable to respective items.

1. **General:**

- 1.1 Navsari Agricultural University (hereinafter referred to as "NAU"), for its various Departments (hereinafter referred to as "the purchaser") for their requirement of Items (as mentioned in Chapter-3) intend to invite offers for supply and installation of Scientific Instruments/Farm Machineries across the various offices at Head Quarter as well as its sub centers across the seven districts (Surat, Bharuch, Navsari, Dang, Narmada, Tapi and Valsad) of South Gujarat region of Gujarat state. The scanned copy of the demand draft of the Tender Fee and Earnest Money Deposit (EMD) as well as other relevant documents as per check list of the tender are required to be submitted online with the commercial bid on the website **www.au.nprocure.com / www.nprocure.com**. It is compulsory to submit the original / attested photocopies of these all the documents (**except commercial bid**), company printed literature / catalogue and other necessary documents physically in hard copy to the Office of the Director of Research, Navsari Agricultural University, University Bhavan, Eru Char Rasta, Navsari-396 450, Gujarat State on or before 21/08/2015 up to 17.00 hrs.
- 1.2 Authorized dealers can quote their rates provided they attach a certificate of authorized dealership issued during current financial year: 2015-16 from the manufacturer / principal company. Authorized dealers representing the same company / instrument are free to compete for price, terms, warranty period etc.

In case the vendor is a distributor authorized by an OEM (Original Instrument/Machinery Manufacturer), the following documents must be additionally provided

- **Certificate from OEM that the dealership/channel partnership arrangement with the bidder is in force for a minimum of 2 years.**
- **A letter by the OEM stating that they shall honor the supply/warranty/ AMC commitments independent of continuation of the dealership/ channel partner arrangement with the authorized dealer/channel partner.**

Irrespective of whether the bidder is an OEM or a distributor authorized by the OEM, the following eligibility criteria must be fulfilled

- The bidder should have made a positive operating profit
- The bidder should not be blacklisted by any Government or Government entity.
- The bidder should be in existence for a minimum of three years.

- 1.3 Technical Supporting Documents (TSD) should contain original Demand Drafts of Tender Fee and Earnest Money Deposit (EMD). In addition to these, TSD should also contain the original / photocopy of relevant documents as per check list of the tender (except commercial bid), company literature / catalogue, VAT/CST registration certificate. The envelope must be marked as "**E-tender-1, 2015-16 :Technical Supporting Documents (Technical bid)**". If bidder fails to submit the TSD offline within time limit, the commercial bid will be disqualified. Please note that the scan copy of any document uploaded must tally with physical submission of original / attested photocopies.
- 1.4 The prices shall be inclusive of all freight, packaging and forwarding, transit insurance, installation charges, applicable taxes like Central Sales Tax, VAT, Excise Duty, Other prevailing taxes / charges as per government rules & regulations as well as FOR destination. The rate should be quoted per unit as specified in Chapter 3.
- 1.5 The bid is non-transferable.
- 1.6 Amendment of bidding documents (corrigendum)
 - 1.6.1 At any time prior to the deadline for submission of bids, NAU may, for any reason, whether its own initiative or in response to the clarification request by a prospective bidder, modify the bidding documents.
 - 1.6.2 The corrigendum will be published on website <http://www.nau.in> and www.nprocure.com only.
 - 1.6.3 In order to allow prospective bidders reasonable time to take into consideration the amendments while preparing their bids, at its discretion, NAU may extend the deadline for the submission of bids.
- 1.7 Bid currency - Prices shall be quoted in Indian Rupee only.
- 1.8 The items shown in the Chapter-3 are subjected to requirements and the same may be purchased or may not be purchased without assigning any reason.
- 1.9 The successful bidder shall have to execute the purchase orders placed on any date during the validity of the tender at the rate, terms and conditions of the tender.
- 1.10 All the electronics items should comply to international standards for safety, Electromagnetic Emissions, Electromagnetic Immunity etc.
- 1.11 NAU may not issue 'C' or 'P' form of sales tax or any other type of tax relaxation form of Government and the bidders are therefore requested to quote the rates of sales tax or any other taxes payable in absence of such forms/declarations.
- 1.12 Rate should be quoted along with excise duty / custom duty and other taxes. However, NAU being educational institute, therefore, NAU is eligible for exemption of such duty from final payment.

- 1.13 The lowest price is not the criteria and emphasis is placed on quality and specifications of the material. The NAU has right to reject any or all the offers and invite fresh quotations if need arises. The NAU further reserves the right of selecting the brand and accepting or otherwise any of the conditions stipulated by bidder.
- 1.14 If in any case the quoted item is not available in the market, the successful bidder will have to supply higher version/replacement of that item in the quoted cost in the same time duration with prior approval of NAU.
- 1.15 The successful bidder will held responsibility for the items sufficiently and properly packed for transport so as to ensure their being free from loss / damage / injury on arrival of destination NAU premises. The material should be supplied in the original company's packing which shall indicate packing details and other particulars as required under the statutory provisions. Inner and outer packing of boxes / cartons should be of standard design. The final packing of cartons of corrugated boxes shall be complying with ISS standards. A packing slip shall indicate clearly and legibly the name of the product, batch number, quantity, date of manufacturer, date of expiry, gross and net weight, and consignee's name & address and other particulars as required. In the event of breakages or loss of items during transit / installation against requisition order the said quantity will have to be replaced/supply by the supplier (Selected bidder) without any additional charges.
- 1.16 Tender Supporting Documents (TSD) received late and/or not submitted in the prescribed formats or in the prescribed manner, incomplete in any respect or not accompanied by prescribed documents are liable to be rejected. NAU will not be responsible for non-receipt of tender within the specified date and time due to any reason including postal delays.
- 1.17 **All rights are reserved with the University Authority to accept or reject any or all the tenders received without assigning any reasons thereof.**
- 1.18 The NAU may place repeat orders against the acceptance of tender within a period of validity, subject to the same terms and conditions originally provided in advertised tender and selected bidder shall accept the same.
- 1.19 Successful bidder failing to provide after sales services would be permanently blacklisted.

2. Payment:

Advance or part payment will not be entertained.

3. Delivery:

The application for extension of delivery period shall be sent to concerned ordering office of Navsari Agricultural University at least 5 days prior to the expiry of delivery period of each items. The officer in charge, who is placing the order may grant extension or reject the application and their decision in the matter shall be final and binding to all.

4. Warranty:

- 4.1 Period of Warranty: The bidder must provide comprehensive onsite warranty for minimum 2 years from the date of installation for all items. Please clearly mention the parts, which are not covered under warranty, separately.
- 4.2 If any instrument(s), properly not working and repetitively fault is found, say twice a week during the warranty period, the bidder shall replace the item with new item without any additional cost to the purchaser.

5. Demonstration:

Supplier has to perform on-site live demonstration as per trial requirements of concerned scientist with bidders'/ suppliers' consumables and reagents.

6. Dispute:

In case of any dispute, final decision of The Executive Engineer, Navsari Agricultural University, Navsari – 396 450 will be binding upon all. In case of any dispute arises in respect of this tender, a suit in that behalf shall be subject to Navsari Jurisdiction.

Chapter 5: Tender Fee, EMD and Security Deposit

Bidder has to submit non refundable Tender Fee Rs. 1000 in the form of Bank Draft in favor of "Navsari Agricultural University Fund A/c", payable at Navsari.

Earnest Money Deposit Calculations:

The bidder shall calculate Earnest Money Deposit (EMD) Amount is depending upon the items quoted. EMD for the respective items is listed in below table.

No.	Item Name	EMD Amount inRs.
1	SPECTRORADIOMETER (300 to 1100 nm)	42000
2	CALIBRATED DENSITOMETER WITH ACCESSORIES	30000
3	2D-PROTEIN POLYACRYLAMIDE GEL ELECTROPHORESIS WITH ACCESSORIES	45000
4	NITROGEN ANALYZER (N-ANALYZER)	22500
5	AUTOMATIC FIBRE ESTIMATION SYSTEM (760x620x390 mm, 230 v/50 Hz)	18000
6	AUTOMATIC ABSORPTION SPECTROPHOTOMETER (740x490x300mm, (185-900 nm)	21000
7	CENTRAL WATER FILTRATION PLANT	18000
8	COOLING CENTRIFUGE-TABLETOP REFRIGERATED CENTRIFUGE	36000
9	SONICATOR-ULTRASONIC HOMOGENIZER WITH BATH	24000
10	DOUBLE-BEAM –SPECTROPHOTOMETER	15000
11	ATOMIC ABSORPTION SPECTROMETER	45000
12	LYOPHILIZER	30000
13	FLUORESCENCE MICROSCOPE	75000
14	RT- PCR	36000
15	CAPILLARY ELECTROPHORESIS SYSTEM	90000
16	OZONE ANALYZER	37500
17	BULK MILK COOLER WITH ACCESSORIES	15000
18	POUCH PACKING MACHINE	36000
19	ATOMIC ABSORPTION SPECTROPHOTOMETER	60000
20	SPECTRORADIOMETER with computer interface and software for spectral analysis (190-730nm)	42000
21	SOLAR WATER PUMP- Solarphotovoltaic waterpumpingsystem	15000
22	DG SET (25 kva)	18000
23	AUTOMATIC WASHER & DRIER (GLASSWARE)	33000
24	PREPARATIVE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY with accessories	90000
25	TREE (PLANT) CANOPY ANALYZER	42000
26	LEAF AREA METER	15000
27	ATOMIC EMISSION SPECTROMETER for Elemental Analysis	105000

Example (for learning purpose only): If bidder is quoting for Item No.1 and Item No. 2, then EMD will be 42000+30000=72000.

Earnest Money Deposit: Tender shall be accompanied by an Earnest Money Deposit, without which tenders will not be considered. The amount should be deposited in the form of Bank Draft only, in favor of "Navsari Agricultural University Fund A/c", payable at Navsari.

Refund of Earnest Money: The earnest money of unsuccessful Bidder will be refunded.

Forfeiture of Earnest Money: The earnest money will be forfeited in the following cases:

- When Bidder withdraws or modifies the offer after opening of tender but before acceptance of tender.
- When Bidder does not execute the agreement if any, prescribed within the specified time.

Security Deposit: Successful bidder has to submit 5 % of purchase order as a Security Deposit in the form of Bank Draft only, in favor of "Navsari Agricultural University Fund A/c", payable at Navsari.

Refund of Security Deposit: The amount of security deposit will be refunded after successful installation/demonstration of the instruments/ machinery and same will be released after two years of installation.

Forfeiture of Security Deposit: The security deposit will be forfeited if,

1. Successful bidder fails to supply the items within the delivery period.
2. Supplier fails to comply specifications of instruments, installation/demonstration of the instruments/ machinery.
3. Supplier is not providing satisfactory post sale services and support.

Tender Fee, EMD and Tender Supporting Document Submission Address:

Director of Research,
University Bhavan,
Navsari Agricultural University,
Eru Char Rasta, Navsari- 396450 (Gujarat)

Chapter6: Technical Bid Document (TBD) Submission

This chapter consists of forwarding letter, company detail, declaration and signed terms and conditions.

All these pages required to be submitted in hard copy with physical document submission. While Company Detail page is also required to be submitted in n-procure as well.

Do not provide other unnecessary documents like explaining company profiles, nature of the company, services and miscellaneous things which is not inquired.

Do not put financial bids of the Items anywhere in the Technical Bid Document submission under physical submission.

From :

To,
The Director of Research
Navsari Agricultural University,
Navsari 396 450, Gujarat

Subject: Submission of tender for the purchase of Scientific Instruments/Farm Machineries [NAU/DR/01-2015-16]

Sir,

I/We hereby submit the offer (duly filled) in response to the advertisement/tender notice for **Scientific Instruments/Farm Machineries [NAU/DR/01-2015-16]** in accordance with the terms and conditions of such supply and declare as under:-

I/We hereby offer to supply to Navsari Agricultural University, Navsari in accordance with the terms and conditions, hereto annexed and at the prices given by me/us in commercial section of online tendering.

I/We enclose herewith Tender Fee and EMD in favor of "Navsari Agricultural University Fund Account" drawn on State Bank of India, Navsari [Branch Code No. 3889.] with following details.

	Amount (Rs.)	Amount in Words	DD No. and Date
Tender Fee	1000	Rs. One Thousand only	
EMD			

EMD against Item Nos.: _____,

(Specify Items Nos. exactly you are bidding as per chapter-3)

I/We carefully read and understood and agree to abide by the said terms and conditions set in the tender document hereto annexed and the description/ specifications of the items.

I/We agree to hold this **offer open till 120 days** from the date of due date of opening of the tender.

I/We agree that in case of dispute, if any, the decision of the TheExecutive Engineer, Navsari Agricultural University, Navsari 396 450 shall be final and binding upon me/us.

Signature of bidder
(with Stamp, Name and Designation)

COMPANY DETAIL

1. Name of supplier / firm :

2. Complete postal address :

3. Telephone Number :

4. FAX Number (if any) :

5. E-mail address (if any) :

6. Sales Tax No. :

7. VAT / TIN No. :

8. PAN No. :

9. Registration No. :

10. Any other details:

We agree to abide by the terms and conditions of supply mentioned in this tender document.

Signature of Bidder
(With Stamp, Name & Designation)

Checklist

Sr. No.	Document / Certificate	Attached Yes / No
1	Tender Fee: Demand draft of Rs. 1000/- (Non-Refundable)	
2	EMD : Demand draft as applicable (Refundable)	
3	Company details (only in tender format given)	
4	Valid Registration Certificate of bidders firm. (Shop Act Registration / Partnership deed /Memorandum of article/Registration of firm / Small Scale Industry Registration)	
5	Original affidavit from the bidder that business entity is not blacked listed (notarized on Rs. 100 stamp paper)	
6	IT returns of financial year 2012-13,2013-14, 2015-16	
7	Manufacturer certificate / subsidiary company certificate / Fresh Authorization Certificate (whichever is applicable)	
8	Specification Supporting Documents with color catalogue	
9	Valid quality certificates like ISO/CE/EN/UL certification or equivalent	
10	Performance certificate from different institute regarding the performance of the instrument	

Note: All photocopied documents must be attested with seal and signature.

DECLARATION

I/We solemnly declare that we have attached all the documents mentioned here above and mentioned in the tender. It is verified that all the certificates / permissions/ documents are valid and current as on date and have not been withdrawn / cancelled by the issuing authority.

I/We further undertake to produce on demand the original certificate / permission / document for verification at any stage during the processing of the tender.

I/We also understand that non-compliance of any documents will be treated as non-respective tender and we will loose our claim to participate in the Tender Enquiry automatically and our tender will be liable to reject.

Name of the Firm:

Signature of Bidder
(With Stamp, Name & Designation)

Chapter 7: Contacts and Correspondence details

Physical Submission of Tender and Correspondence Address:

Director of Research,
University Bhavan,
Navsari Agricultural University,
Eru Char Rasta, Navsari- 396450 (Gujarat)
Mo. 9712203938 (For Overall queries related to tender, Contact in office hours only)

Item wise Contact Persons

(For queries related to item specifications, Contact in office hours only)

1	SPECTRORADIOMETER (300 to 1100 nm)	09974583890
2	CALIBRATED DENSITOMETER WITH ACCESSORIES	09825992766
3	2D-PROTEIN POLYACRYLAMIDE GEL ELECTROPHORESIS WITH ACCESSORIES	09825992766
4	NITROGEN ANALYZER (N-ANALYZER)	09227421212
5	AUTOMATIC FIBRE ESTIMATION SYSTEM (760x620x390 mm, 230 v/50 Hz)	09227421212
6	AUTOMATIC ABSORPTION SPECTROPHOTOMETER (740x490x300mm, (185-900 nm)	09227421212
7	CENTRAL WATER FILTRATION PLANT	09725001518
8	COOLING CENTRIFUGE-TABLETOP REFRIGERATED CENTRIFUGE	07600059128
9	SONICATOR-ULTRASONIC HOMOGENIZER WITH BATH	07600059128
10	DOUBLE-BEAM –SPECTROPHOTOMETER	07600059128
11	ATOMIC ABSORPTION SPECTROMETER	07600059128
12	LYOPHILIZER	09662030836
13	FLUORESCENCE MICROSCOPE	09662030836
14	RT- PCR	09662030836
15	CAPILLARY ELECTROPHORESIS SYSTEM	09974362405
16	OZONE ANALYZER	09898842199
17	BULK MILK COOLER WITH ACCESSORIES	09974061973
18	POUCH PACKING MACHINE	09974061973
19	ATOMIC ABSORPTION SPECTROPHOTOMETER	09408720173
20	SPECTRORADIOMETER with computer interface and software for spectral analysis (190-730nm)	09408720173
21	SOLAR WATER PUMP- Solarphotovoltaic waterpumpingsystem	09408720173
22	DG SET (25 kva)	09537797532
23	AUTOMATIC WASHER & DRIER (GLASSWARE)	09537797532
24	PREPARATIVE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY with accessories	09825768508
25	TREE (PLANT) CANOPY ANALYZER	09408851342
26	LEAF AREA METER	09998747299
27	ATOMIC EMISSION SPECTROMETER for Elemental Analysis	09724304673

Detailed specifications

1. SPECTRORADIOMETER (300 to 1100 nm)

Specifications

High resolution hyper spectral field portable spectroradiometer with Inbuilt memory, screen display, long life battery, white reference panel, tripod stand, indoor lamp assembly, GPS capability, fiber optic along with data acquisition and analysis software; carrying case, can be used for monitoring of ecosystems, measuring leaf/canopy reflectance and quantifying Chlorophyll in leaves. along with Standard accessories

Technical specifications:

Spectral wavelength: VIS/NIR (300 to 1100 nm), Spectral resolution min. 3.5nm, Noise Equivalence Radiance, Field of view (FOV): 4⁰, 6⁰, 12⁰ or 20⁰ along with fore optic and fibre optic, reflectance probe, operating temperature (0- 40⁰C or more), Internal memory (>1000 spectrum files), Integration period min. 4 ms, host communication interface for data sharing, long life internal battery, Cosine receptor, tripod stand, assembly for radiance and irradiance measurement, data acquisition and analysis software. Provide other optional information on absorption /transmittance sensor separately.

2. CALIBRATED DENSITOMETER WITH ACCESSORIES

Specifications

- Capable of performing densitometry and calibrated colorimetric gel and blot quantitation.
- Offer automatic self-calibration before every run using built-in NIST-traceable step tablets for in internal calibration to ensure the accuracy of every scan.
- Equipped with 16-bit precision, 36.3 μm (700 dpi) resolution, and three color red, green, blue – LED imaging, Should offer the highest quality images for accurate, reproducible quantitation of colorimetrically stained gels.
- Transmissive absorption range of 0.0 to 3.4 OD and a reflective absorption range of 0.0 to 2.7 OD.
- 29 x 33 cm imaging area for both transmissive and reflective scanning.
- Friction hinge design allows for self-supporting opening mechanism.
- Imaging area should be sealed to accommodate wet samples of variable thickness.
- Offer effortless image acquisition with the one-touch operation button.
- Imaging and Analysis Software should offer automated workflow from image capture to analysis recorded in a protocol file allowing repeatability of the workflow by any user.
- Produce publication-ready images and deliver image data that is optimized and reproducible for superior image uniformity and quantitation. Intuitive analysis and customizable reports.
- Ability to copy lane analysis parameters to use on multiple gel images.
- Sound software support for Image capture, Image analysis, and Report generation and interpretation.
- System with CE,UL,ISO compliance
- **Power pack power supply:** Output of 20-5,000 V, 1-500 mA, 1-400W, Maintains constant voltage, constant current, constant power or constant temperature, timer control 1 min to 99 hr, 59 min.
- Programmable methods :Stores up to 9 basic and 9 IEF methods, each with up to 9 steps.
- Temperature control : via temperature probe; 30–90°C ± 2°C

- Safety features: Load detection, sudden load change detection, ground leak detection, overload/short circuit protection, overvoltage protection.
- Automatic recovery of setup values maintained after power failure.
- CE,UL,ISO compliance
- Accessories:
- **Computer:** Computer must be of Standard and Reputed manufacturer loaded with Latest configuration of preferably, Intel i3,3.4 GHz processor with minimum 4GB DDR3 RAM, minimum 500GB SATA Hard drive, with USB 3.0 and USB2.0 port, DVD reader and writer, standard keyboard, mouse, speaker set etc. with licensed antivirus. Monitor must be LCD with wide screen HD display preferably 22 inch size. Computer must be supplied with two year warranty period.
- **Note:** Supplier has to supply all required consumables and perform all claimed parameter with on site wet lab demonstration with our samples and company's consumables.

3. 2D-PROTEIN POLYACRYLAMIDE GEL ELECTROPHORESIS WITH ACCESSORIES

Specifications

First dimension Iso-electric focusing - Qty 1 Unit

- System should include individual lane control for running different samples, pH Gradients and focusing protocols in a single run.
- System should have touch screen User Interface for easy easily creating and editing protocols and setting up the program rapidly.
- System should include dedicated site for online data interpretation for graphing data, Comparing lanes and generating reports.
- System with USB Port to export data. Should come with opaque lid
- System should include run mode flexibility- to run IPG strips gel Side Up, Gel Side Down and with cup loading configuration.
- Voltage : 0–10,000 V, 1 V increments (50-10,000V)
- Current range: 0–100 μ A per lane, 1 μ A intervals
- Power range of 0–1 W per lane.
- Should come with all required accessories.
- Peltier based cooling platform.
- Temperature range: 10–25⁰C \pm 1.0⁰C@ max ambient 23⁰C 18–25⁰C \pm 1.0⁰C@ max ambient 31⁰C
- Focusing trays made of polycarbonate for contaminant free process.
- System should include channels in the focusing tray hold IPG strips for IEF. Each focusing tray accommodates up to 12 IPG strips.
- System should accommodate IPG strip length 7, 11, 13, 17, 18, and 24 cm.
- Display QVGA resolution (320 x 240) touch screen or mouse control
- System should have ramping Step, linear, gradual, and hold voltage ramping for each focusing step. Hold mode as a final step to prevent diffusion when IEF is complete.
- System with 2GB capacity for storing protocols.
- Data collection should be in .dat format
- System with following regulatory compliances:
- Safety EN 61010-1:2001, IEC 61010-1:2001 Use NRTL to test for compliance to UL61010-

1:2004 and CAN/CSA C22.2 No. 61010-1-04

- EMC EN61326 (1997 w/A1:98) Class A FCC Code of Federal Regulations, Title 47, Part 15, Subpart B, Class A
- Other approvals RoHS/WEEE Research Materials to determine level of EFUP
- System should have CE,UL,ISO compliance

Consumables

- IPG Strips of 7, 11, 13, 17, 18, and 24 cm. each with two pack should be provided with the system
- 2-D Starter kit – with equilibration buffer, rehydration buffer and ampholytes etc.
- Focusing tray for 7, 11, 13, 17, 18, and 24 cm. should be provided with the system
- Inclusive of all consumables requires to Run the whole protocol

Second dimension SDS PAGE Unit- Qty 1 Unit

SDS PAGE Unit Large 20x20cm – 1 Unit

Specifications:

- Number of gels :1–4 Handcast gels, 1.0 mm thickness
- Gel size (W x L) :Hand cast: 18.3 x 20 cm (Compatible with all size of strips)
- Total buffer volume :1.2L
- Inclusive of Gel plates (min. 4 set) and Spacers, Combs, power cord etc .of said unit

Software for 2-D analysis – Qty 1 unit

- Automatic Spot Detection & Quantification.
- Simultaneous analysis of more than 15 gels
- Automatic matching without manual land marking
- Ability to detect and separate merged, overlapping spots.
- Background removal algorithm for most accurate representation of faint abundance proteins.
- Ruby Gel Filter for noise removal.
- Gel Normalization with total quantity in valid spots or total density in gels or local regression levels
- Gel land marking and automatic spot matching
- Can Export XML data and JPEG file format
- Group consensus feature to review consensus data for individual gels classes or replicate groups
- Unbiased standard deviation formula to calculate coefficient of variation for groups and classes
- Different analysis tool : Spot review tool, Scatter plot tool, Student t-Test, Fold changes, Boolean analysis etc.
- Interactive review analysis tool for analysis of sets of gels – *Page of Graphs*.
- Creates analysis sets which integrate the functioning of spot cutter.
- Can be integrated with data from IMAGING SYSTEM, SPOTCUTTER etc.
- GLP/GMP Compliance, facility for future advance upgrade.
- System should have CE,UL,ISO compliance

Gel Documentation System- Qty 1 Unit

- Image resolution >4 mega pixels for resolving closely spaced bands on a gel or blot.
- Imaging system with Automatic capabilities with Application driven, user selected or recalled

by a protocol.

- 100 % repeatability via recallable protocols.
- System with pre-calibrated focus for any zoom settings & sample height.
- Appropriate flat fielding correction automatically & consistently applied to image data for every application.
- Versatile system to support wide range of applications like- Fluorescent dye like Ethidium bromide, Sybr green, Sybr safe, Western blotting, 2-D, 1-D, Dot Blotting, Nucleic acid detection , Quantitation etc.
- True 12 bit CCD camera.
- System can take max. Sample size 28 X 36 cm.
- System with pre calibrated & optimized dynamic image flat fielding
- Universal dark hood & upgradeable to chemiluminescence.
- UV light source and filter compatible for Nucleic Acid (DNA,RNA) gel documentation and analysis.
- Motorized zoom lens with numerical feedback value to reduce the experimental variation - Capable of Optimizing, saving, and quickly recalling the imaging acquisition settings
- Safe DNA Imaging without UV exposure- using the Blue Conversion screen
- Reproducibly position or center the sample on the image platen by using gel alignment templates.
- With 1 D analysis software with following features
- Single mouse click from image capture to results and reports, very fast and efficient.
- Comprehensive automated quantitative analysis of proteins & DNA samples in seconds.
- Intuitive and well organized (efficient) selection of workflows based on applications
- 3D viewer
- Calculate precisely continuous focus curves that are consistently and automatically applied for every zoom position and sample height. No user intervention for focusing. All calculations are done at setup, once and for all image captures
- Software capable to load in multiple PC for use of multiple users.
- CE,UL,ISO compliance
- System supplied with computer with accessories as mentioned below ::

Computer specifications: Computer of Standard and Reputed manufacturer loaded with Latest configuration of preferably, Intel i3,3.4 GHz processor with minimum 4GB DDR3 RAM, minimum 500GB SATA Hard drive, with USB 3.0 and USB2.0 port, DVD reader and writer, standard keyboard, mouse, speaker set etc. with licensed antivirus. Monitor must be LCD with wide screen HD display preferably 22 inch size. Computer with two years warranty.

Note: Supply of all required consumables and perform all claimed parameter with on site wet lab demonstration with our samples and company's consumables.

4. NITROGEN ANALYZER (N-ANALYZER)

A) UDK 129 Distillation Unit – 385x780x416 mm

B) VELP DK Digesters- Digester model DK 6, 230 v/50-60 Hz

With following Accessories

-Support system

-Sample rack with Heat Shield

-Suction cap

-Test tubes

5. AUTOMATIC FIBRE ESTIMATION SYSTEM (760x620x390 mm, 230 v/50 Hz)

Raw Fiber Extraction system should meet for AOAC, AACC compliance.

Construction material	epoxy painted stainless steel structure
Type of extractions	cold and hot extractions
Number of samples	6 positions
Samples	individually processed
Sample quantity	from 0.5g to 3 g
Sample removal	Air Pump
Reagent discharge	Peristaltic Pump
Digital timer	0 - 99 minutes with acoustic signal at the end
Temperature	electronic regulation
Reagents and cooling water	separated outlets
Reproducibility (RSD)	± 1%

6. AUTOMATIC ABSORPTION SPECTROPHOTOMETER (740x490x300mm, (185-900 nm)

Accessories

- 4 number of lamp-Copper, Zinc, Iron and manganese
Cylinder with regulator and burner – nitrous oxide and Acetylene)

7. CENTRAL WATER FILTRATION PLANT

No.	particular	Capacity/Make	Details
1	R.O.Plants	2000Ltr/Hr	1 Nos.
2	Row water Storage Tank @ 4 per/Ltr.	10000 Ltr	2 Nos.
3	Row water Storage Tank @ 5.5 per/Ltr	5000 Ltr	1Nos.
4	Water Cooler	100 Ltr / Storage	4Nos.

01 SAND FILTER:

Qty.offer
Type

One Set
Down Flow

Size of Vessel	16* 65
Operating philosophy	Driven by non electrical four way Multi-port valve
Operating Flow rate	2000/Hr
Operating Pressure	3.5 Kg.cm [^] 5
Type of Media	Quartz sand and Anthracite sand
Supporting Media	Gradated gravels & Silex
M.O.C.OF Shell	FRP (AVENTURA)
03.CARBON FILTER:	
Qty.offer	One Set
Type	Down Flow
Size of Vessel	16* 65
Operating philosophy	Driven by non electrical four way Multi-port valve
Operating Flow rate	2000/Hr
Operating Pressure	3.5 Kg.cm [^] 5
Type of Media	Quartz sand and Anthracite sand Activated Carbon 900 iodine value
M.O.C.OF Shell	FRP (AVENTURA)
04.ANTISCALANT DOSING SYSTEM WITH LVEL INDICATOR;	
Qty.offer	One Set
Type	Electronic Diaphragm type.
Size of Vessel	2-4 LPH at 3.5 Kg/cm [^] 2
Dosing rate	650 PPM Total Hardness
Make of pump	NUTAN (USA)
Operating Flow rate	2000 /Hr
Make of chemical	SAI CARE-9000
05. MICRON CARTRIDAGE FILTER (MCF-01):	
Qty.offer	One Set
Type	Disposable Cartridge
Size of Vessel	16* 65
Operating Flow rate	2000/Hr
Operating Pressure	3.5 Kg.cm [^] 5
M.O.C. Housing	10" long BB
M.O.C.of Cartridge	Polypropylene
Micron Rating	5 Micron
06..HIGH PRESSURE PUMP:	
Qty.offer	One
Type	VERTICAL
Operating Flow rate	1200/Hr For HP
Operating Pressure	12-15 Kg.cm [^] 2
Make of Pump	GUNFOSH (USA) C.R.I
07.DESALINATION BY R.O.SYSTEM:	
Qty.offer	One Set
Item	R.O Modules containing Memberane with FRP, Pressure Tube with Membrane Element mounted on MS Structural Steel Skind

Type	Thin Film Composite (Polyamide)
Make	Hydronotics.(USA)
Size of Membrane	80” Dia 2 40 Long
No	2 Nos.

08. INSTRUMENTATION LCD PANEL

a.) PRESSURE GAUGES:

Qty.offer	One lot
Type	Borden type tube
Mounating	Bottom entry & Back Entry
Connection	½ “ BSPT
Range	0-150 PSI- Low Pressure 0-600 PSI- High Pressure

b.) FLOW INDICATOR:

Qty	Two
Type	On line
Location	R.O.product & Reject
Material of Construction	Acrylic

c.) PRESSURE SWITCH:

Qty	One set.
Type	S,S Below Type
Make	Indfoss/orion/Equiv
Location	H.P pump – Inlet /Discharge

d.) CONDUCTIVITY INDICATOR:

Qty	One
Type	One line.
Location	Outlet of R.O Product & Reject

SALIENT FEATURES IF RO SYSTEM:

1. Based system for auto tripping and fault display.
2. Cost competitive compare to any semi automatic RO offered by our competitors.
3. Capable to operate continuous 10 hrs.
- 4.Low operating cost due to low pressure, high recovery and semi skilled operators Required
5. semi Automatic Ro Systems

The system is provided with for safety interlocks, which will trip the system and display the fault in case low suction pressure at HHP, high discharge pressure at HHP , low in dosing tank and conductivity cross the specified limit.

R.O system are designed considering the pre-treatment based on filtration and using highly effective liquid Anti-scaling formulated with the help of dispersing power of polymers to prevent hardness scale formation and deposition on RO membranes.

We have offered semi automatic which can be operated continuously for 8 hours without any skilled operators help means a net saving on the wage bill.

8. COOLING CENTRIFUGE-TABLETOP REFRIGERATED CENTRIFUGE

- * Table top compact refrigerated centrifuge with CFC free refrigerant.
- * Max. capacity of not less than 1000 ml.
- * Max. speed of 15,000 rpm with RCF of 24,400 g.
- * Ability to spin for a time of 1 sec - 99 h : 59 min : 59 sec, short and continuous run.
- * The size: not be more than H x W x D: 34.6 x 40.1 x 69.5 cm.
- * Temperature control from -20°C to +40°C & infinitely variable.
- * Certified with MED CERT (DIN EN ISO 13485:2003) and GLC & (ISO 9001) certified,
- * Should have international standards such as IEC 61010 or the CE conformity.

Offering following features:

- * Centrifuging chamber made of stainless steel.
- * Viewing port in the lid.
- * Provide optimal safety to users.
- * Powered lid locking.
- * Quick-entry foil keypad
- * Easily changeable rotors
- * Able to store at least 10 programs.
- * Fast cool function.
- * Lid locking and holding function.
- * Emergency lid lock release function.
- * Lid dropping protection.
- * Automatic rotor recognition function.
- * Imbalance switch-off function.
- * Motor and chamber overheating protection.
- * Fixed angle Rotor for 6 x 15 ml and 6 x 50 ml tubes with speed: 11,000 rpm.
- * Fixed angle rotor with capacity of 30 x 2.0 ml tubes and speed: 14,000 rpm.
- * Upgradable to Microtitre plate rotor for 2 x 4 Microtitre plates.
- * ISO/CE/any other certificate is mandatory

9. SONICATOR-ULTRASONIC HOMOGENIZER WITH BATH

System capable of handling samples from 1ml to 250 ml volume or better. The complete systems with the facility of additional bath of 2-3 Ltrs, based on the principle of ultrasonication. Systems capable for Crushing and solubilize of protein expressing bacteria, Random fragmentation of DNA and emulsification of sample, and Noncontact ultrasonication by cup horn. Easy to operate interactively and having LCD screen. Auto tuning/auto tuning operation. All necessary tips/probes to handle samples from 1 mL to 250 mL The system with 12mm standard horn Monitor output via RS-232C should be available.

The system should offer the following Features:

- Stand using high output type with a lot of options
- Digitally output adjustment, easily viewable monitor and easy operation
- LCD screen which displays each digital display can be used to monitor operating condition. It is easy to operate interactively by viewing LCD screen. Auto tuning/ auto tuning operation
- Pre-use tuning can be done quickly by just pushing button.
- There is mode to apply auto tuning during operation automatically so please use when

sample viscosity changes during process or operating for long time.
Auto power operation

- There is operation mode to keep constant output by auto adjustment independent to sample viscosity change.
- It is possible to use both auto tuning and auto power at same time.

Technical Specification:

High frequency output Max. 300W or More

Transducer normal output 10 - 200W

Oscillation frequency range 19 - 21Hz

Tuning Auto tuning

Oscillation function Auto tuning operation, auto power operation, timer operation (1sec - 120min), programmed interval operation (5 - 60 sec for ON/OFF)

Digital display Output value %, output setting %, output at oscillation start %, oscillation frequency

Equipment component Main body, converter, 12mm standard horn (tip attached)

Oscillation switch On main body and optional foot switch is also available

Monitor output via RS-232C should be available.

Instrument should be installed in working configuration.

The instrument should be imported and ISO/CE/any other certificate is mandatory

10. DOUBLE-BEAM –SPECTROPHOTOMETER

A new type of optical structures and CT Monochromator, Coupled with special PC and software.

Function

- Automatically deducted cuvette error
- automatic wavelength: keyboard input minimum interval is 0.1 nm.
- Photometric Measurements: Testing given wavelength transmittance, absorbance coefficient and energy absorbance measurements.
- Quantitative determination: single-wavelength method, 1-3 order linear standard curve fitting, curve up to establish a standard 9 standard points.
- Multi-wavelength measurement: having set up five wavelength can be set for continuous determination of the same sample.

Feature

- Automatic eight joint pool: one can put seven samples greatly improved measurement

sample analysis speed.

- Automatically deducted cuvette error: photometric accuracy (measured at low sample concentration) is more accurate.
- Spectral bandwidth is small: pure instrument monochromatic high resolution. Ultra-low stray light: the high-concentration samples test more accurate.
- Lasting stability: the ratio of monitored double-beam optical, electrical systems, ensure long-term stability instrument.
- Display and Operation: LCD display, menu-based interface work, user-friendly design, simple user actions.
- Light source replacement is simple and convenient: deuterium lamp base flange structure, deuterium lamp replacement without special tools, replacing road lamp replacement time debugging steps, the instrument commissioning and maintenance easier.
- With USB interface: coupled with special software can be connected to a PC, extended to a variety of test functions (spectral scanning, power measurement, etc.) including the number of stored data.

Standard Specification:

Optical system	Monitoring the proportion of double-beam
Spectral Bandwidth	1.8nm
Wavelength range	190 ~ 1100 nm
The wavelength of maximum	$\pm 0.5\text{nm}$
permissible error	
Wavelength repeatability	$\leq 0.2\text{nm}$
Photometric Range	T: 0 ~ 200.00% TA: -0.301 ~ 4.000Abs
Transmittance than the maximum	$\pm 0.3\% T$
permissible error	
Transmittance Repeatability	$\leq 0.1\% T$
Stray light	$\leq 0.05\% T$ (220nm, 340nm Office)
Baseline flatness	$\pm 0.002A$
Drift	$\leq 0.001A / h$ (500nm Office)
Noise	100% (T) line noise $\leq 0.1\% (T)$ 0% (T) line noise $\leq 0.05\% (T)$
Monitor	128 × 64 large-screen LCD
Dimensions	540x445x230 (mm)

The imported version with 8 Quartz cuvette, PC and software is preferable.

ISO/CE/any other certificate is mandatory

11. ATOMIC ABSORPTION SPECTROMETER

Design

- All connections on the side of the instrument
- Easy access lamp carousel
- Debris collection tray under flame compartment
- Furnace vision system included as standard

Operation

- Automatic operation and multi-element capability
- Flame atomic absorption/emission measurement
- True dual atomization
- No operator intervention needed to change over from flame to furnace analysis

Optics & Background

- 6 lamp auto-aligning turret with dedicated power supplies for each lamp
- 2 sets of auto-aligning turret for agriculturally important minerals and heavy metals (Fe, Mn, Zn, Cu, Co, Bo, As, Pb, Cd, Mg, Ag, Ni) should be supplied
- Can accommodate un coded or data coded and single or multi-element lamps
- Double beam Stockdale optics
- High energy, silica coated, sealed optical system with self calibrating Echelle monochromator
- Reciprocal Linear Dispersion 0.5 nm/mm at 200 nm
- Wavelength range 185-900 nm
- Spectral bandpass of 0.1, 0.2, 0.5 or 1.0 nm should be automatically selectable
- Deuterium lamp background correction system modulated at 200/240 Hz,
- Guaranteed background correction for up to 2 Abs of background with maximum error of 2%.

Flame System

- Universal Finned Titanium 50mm burner suitable for air/acetylene and nitrous oxide/acetylene flame types supplied as standard
- Inert fluoro-plastic spray chamber incorporating externally adjustable inert impact bead and flow spoiler.
- An inert over-pressure membrane housed in the rear of the spray chamber.
- Automatic gas system using binary flow control and programmable array state logic for reliability
- Full safety interlocks, including pressure sensors on both lines, power failure protection, burner interlock and flame sensor
- Fuel and oxidant flow rates software controllable
- Automatic flame ignition
- One spray chamber configuration and burner for all gas mixtures and sample types
- Automatic flame optimization

Furnace System

- Choice of Deuterium background correction furnaces
- Mount directly in dedicated compartment
- Furnace head is in an all graphite containment with end loaded contacts
- Cuvettes are self aligning and can be rapidly exchanged with a single lever movement
- Binary flow controlled internal gas system

- Choice of alternate or inert gases
- Uses voltage feedback control
- Furnace cycle to allow up to 20 phases to be programmed
- Cuvette firings counter
- Furnace auto-sampler with furnace head and power supply
- Sample collected and dispensed via an inert PTFE capillary tip
- Slow injection and uptake options
- 'Fast' furnace operation with concurrent operation of furnace, spectrometer and auto-sampler.
- Wash and waste vessels as part of the auto-sampler system and not occupy extra floor space

Software:

- Operating AA software supplied as standard
- Compatible with latest Windows OS.
- Wizard based interface
- Complete user help facility with comprehensive AA Cookbook for all elements.
Context sensitive help

- Automatic programming of up to 16 elements
- Operable through an appropriate data station
- Facility to record lamp usage
- Capable of automatically switching lamps on and off in an intelligent manner.
- Normal, standard addition and standard curve calibration methods supported
- Flexible and comprehensive results database filters
- Export of data to other applications possible
- Integrated Quality Control protocols
- Language options

Additional items:

- Choice of single coded lamps
- Hydride generation analysis
 - Operating on the continuous flow principle
 - Software controlled
 - Mercury and heated hydride measurements
 - Electrically heated atomization cell to be accommodated

ISO/CE/any other certificate is mandatory

- Required PC and software's should be provided

Instrument should be installed in working configuration

12. LYOPHILIZER

Compact, multi-tasking unit with 5 ltr sample capacity, with work surface of 375 mm diameter and can accommodate variety of drying accessories used for flasks/vials/ampoules and bulk tray etc. All the accessories are modular in construction, independent, drop-on type and do not require any fastening.

Instrument	<ul style="list-style-type: none"> • Condenser volume: 7.2 litres. • Max ice capacity: 5kg. • Condenser Temperature $\leq -105^{\circ}\text{C} \pm 5^{\circ}\text{C} @ 200$ • Digital display of vacuum, with provision for set point vacuum control thru manual
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	<p>fine control needle valve.</p> <ul style="list-style-type: none"> • Continuous digital display of ice condenser temperature • CFC Free cascade refrigeration system. • 2 X 1/3 HP hermetically sealed compressors. • Single ice bank SS chamber with smooth walled vertical, corrosion resistance • Condenser chamber with hot gas defrost. • Independent switch control. A solenoid acting isolation valve is provided between the pump and the ice condenser chamber. • Independent bench top unit with caster wheel.
Drum	<ul style="list-style-type: none"> • Drying chamber/drum manifold: Fully functional Drying chamber /drum manifold and full set of compatible adaptors for different applications. • Other Manifold: Fully functional standalone manifold with changeable Rubber adapter for 50ml, 100ml, 250 ml Flasks and Vials. • Chamber with a top lid and sealing gaskets. • Suitable for freeze drying pre-frozen bulk samples in Petri dishes and trays <i>etc.</i> • Accessories for freeze-drying in large quantity of ampoules and sealing under vacuum (Spin Freezer for primary drying, >24 port secondary drying manifold, Hand Held Sealing Torch)
Accessories	<ul style="list-style-type: none"> • quick seal rubber valves, Rubber adapters, shelf heated bulk rack assembly, shelves, trays, accessories for freeze drying pre frozen samples (Bulk rack assembly, Heatable shelves, SS product trays Acrylic cylinder, Top cover, Heater control unit)
Application	<ul style="list-style-type: none"> • Lyophilization of bacterial cultures, biomolecules, Chemicals <i>etc.</i>
Warranty	<ul style="list-style-type: none"> • Five years extended warranty.
Training	<ul style="list-style-type: none"> • One pre and post installation at company's training facility and one onsite training each year up to warranty period for the three persons for three days
Other	<ul style="list-style-type: none"> • Any accessories and necessary requirement for the installation and to perform our application tenderer has to provide all such facilities like housing and temperature control requirement (AC, table <i>etc.</i>), electrification and specific power supply requirement, sample preparation tools and any other requirement for IQ/OQ/PQ of the instrument <i>etc.</i> • Any glassware, plastic ware chemicals, standards or any other consumables required at the time of installation and checking of the OQ/PQ must be provide by the tenderer. • 5.0 KVA UPS of 1 hour backup

13. FLURESCENCET MICROSCOPE

<ul style="list-style-type: none"> • Fluorescent Trinocular Motorized Microscope with Imaging attachment • High quality optics with latest Infinity Colour Corrected System (IC2S) for high brightness, rich contrast and superb colour correction. All optics coated with anti- reflection / anti-fungal treatment. • Fully Apochromatically Corrected light path • Microscope stand with Z-drive motorized with TFT monitor for microscope control. <ul style="list-style-type: none"> ➤ Z-drive mot. basic, stepsize 25 nm, with fine drive knob and fine drive disk, flat with scalable, changeable

- Key Ring Function: Configurable to control shutter, RL, TL Shutter, Objective change, work/load position of stage, changing of reflector cubes.
- transmitted-light illumination motorized.
- Light Control motorized.
- main controller incl. USB, RS 232 and TCP/IP interface
- stage/condenser carrier, detachable
- external 12V DC 100W power unit, stabilized, 100V...240V AC/ 50...60Hz/ 230VA
- USB cable and country-specific line cable
- Seven position Motorized objective nosepiece
- 6-position reflector turret motorized
- Continuous Luminous field diaphragm with Apochromatic beam path
- Filter set transm. light with neutral-density and color filters, d=25mm consisting of 4 neutral-density filters 1x25%, 2x6% and 1x1.5% transmission, as well as 1x green filter and 1x conversion filter 3200-5500K. For integration in filter wheels, discrete, motorized
- Binocular phototube 15°/23 (100:0/0:100), upright image adjustable stop, camera port with interface 60N
- Shutter for transmitted-light illumination
- Mechanical stage 75x50 R basic,
- Hard coat anodized surface 220 x 170 mm stage plate, covered X-guide positioned at bottom, right drive 135 mm (extendable by 15 mm) with friction setting
- Halogen Illumination of 100W
- Objectives should be A-Plan "A-Plan" 5x/0.12 (WD=9.9mm), "A-Plan" 10x/0.25 Ph1 (WD=4.2mm), "A-Plan" 20x/0.45 Ph2 (WD=0.5mm), "Plan-Neofluar" 40x/0.75 Ph2 (WD=0.71mm), "Plan-Neofluar" 100x/1.30 Oil Ph3 M27 (WD=0.20mm), incl. , oil 20 ml
- 8 Position Achromatic-aplanatic universal condenser 0.9 BF, DF, Phase DIC motorized with motorized front lens, Motorized aperture diaphragm and motorized turret disk, with centerable Ph1, Ph2, Ph3 and DF stops integrated, 3 mounts for DIC condenser modules, 1 separate position for bright field For objective magnifications 1.0x-100x, WD=1.2mm
- Achromatic/Aplanatic 0.9 condenser for Bright field, Dark field and DIC. The darkfield condenser for 2.5X to 100X.

14. RT- PCR

- Technical**
- Real time PCR with block of 96 x 0.2 ml tubes or plate to run typical 0.2ml tubes, strips, and plates.
 - Peltier Cooling and Heating for uniform temperature control.
 - The base thermal cycler for standard PCR.
 - Gradient capacity to run eight different temperature with Dynamic Ramping in Real-time.
 - Detection of 5 or more different fluorescent reporters in the same tube.
 - Capable of Detecting Cy5, FAM/SyBR Green, VIC/JOE, TAMRA/Cy3, Texas Red, Quasar705, ROX
 - Maximum Ramping speed : ≥ 4.5 °C/Sec
 - With one channel dedicated for FRET experiments.
 - Excitation – Emission range: 450 – 730 nm
 - No internal reference dye required. True 5 Color Multiplexing with use of 5

	<p>different fluorophores without the need of addition of any internal reference dye.</p> <ul style="list-style-type: none"> ➤ LED excitation source with Photodiode detector. ➤ Dynamic range of 10 orders. ➤ Open system capable of running various chemistries using TaqMan, Molecular Beacon, SYBR green <i>etc.</i> ➤ Open system to accommodate universal plastic wares like tubes, strips and plates. ➤ Temperature range 0 – 100 °C with accuracy of ±0.2 °C and uniformity of ±0.4 °C within 10 sec of arrival at 90 °C ➤ Automatic allelic discrimination by end point fluorescence or threshold cycle. ➤ Gene expression analysis by relative quantity (ΔCt) or normalized expression ($\Delta\Delta Ct$). ➤ End point analysis for up to 5 fluorophores ➤ Mode for Melt curve analysis ➤ The amplification traces viewed on the LCD screen in real time while a run is in progress with touch screen facility. ➤ Software with express load feature which allows entry of data after experiment. ➤ Should be licensed for Research and IVD applications. ➤ Compliance with the MIQE Guidelines. ➤ Option of software which is RDML compliant and compatible with all computer operating systems including Microsoft windows, Mac and Linux. ➤ Software for absolute and relative quantification, primer design software, Tm calling, melting curve based genotyping and endpoint genotyping, HRM Analysis software, Q base (unlimited time), normfinder, genorm ➤ Software with features for automatic master mix calculations and provision of suitable Desktop (Intel 4th Gen Processor: i5,8GB RAM, 1TB HD) PC, printer and scanner and 5.0 KVA online UPS with 2 hours back up.
Application	➤ Gene expression analysis, absolute quantification, plus-minus assay, allelic discrimination, end point analysis, SNP genotyping,
Additional accessories	<ul style="list-style-type: none"> ➤ Micropipette set (10µl, 50µl, 100 µl) ➤ Pathogen detection kit of <i>E. coli</i> O157:H7 Kit, <i>Listeria monocytogenes</i> II Kit, <i>Salmonella</i> II Kit, ➤ 1 kit for QC, 1 kit Control Run ➤ SybrGreen Mastermix with ROX for 1000 reactions of 50 µl final volume. ➤ System Compatible Strips with sealing caps for 1000 Reactions ➤ System Compatible plates with Sealing film, applicator for 2500 Reactions ➤ Consumable : RNA isolation kit, cDNA synthesis kit
Warranty	➤ Five years extended warranty.
Training	➤ One pre and post installation at company's training facility and one onsite training each year up to warranty period for the three persons for three days
Other	<ul style="list-style-type: none"> ➤ Any accessories and necessary requirement for the installation and to perform our application tenderer has to provide all such facilities such as housing and temperature control requirement (AC, dehumidifier, non-vibrating table <i>etc.</i>), electrification and specific power supply requirement, sample preparation tools and any other requirement for IQ/OQ/PQ of the instrument <i>etc.</i> ➤ Any glassware, plastic ware chemicals, standards or other consumables required at time of installation and checking of the OQ/PQ must be provided by the tenderer.

15. CAPILLARY ELECTROPHORESIS SYSTEM

Detail specifications:

1. Fully automated high-throughput capillary electrophoresis system with robotic handling, ready to run gel cartridges or micro chip based microfluid technology, 12 separation micro channels. System should give high resolution DNA and RNA separation with analysis software.
2. System should be high throughput and should be able to accommodate 12 PCR strip format as well as 96 well PCR plates.
3. The gel cartridge or micro chip must have at least six months self-life. The system should support green environment and minimizes the use of the hazardous materials.
4. The system should work on multiplexed fluorescence detection design including an array of light-emitting diodes and micro-optical collectors.
5. The resolution capability of the system should be at least 3–5 bp.
6. Sample consumption should be 0.1 – 1.0 μl per analysis.
7. The system should allow analysis of DNA fragments between 15 bp and 10 kb. Fragments of less than 500 bp in size should be separated with a resolution of 3–5 bp.
8. The system should have robust detection sensitivity of 0.1 ng/ μl DNA in undiluted PCR solution.
9. Limit of detection or dynamic range should be at least 2.5 ng – 250 ng / μl .
10. The analysis workstation should be of branded Lap Top with Licensed Windows operating systems, recent high speed processor and high data storage capacity.
11. The analysis workstation must have the powerful and intuitive software solution which should support compliance with 21 CFR part11 regulations, enabling use of an electronic records system.
12. The software must provide user-friendly tools for data collection, data analysis, generation of comprehensive reports and easy data export. The software should provide flexibility to view data in electrophoregram and gel image format.
13. The system should offer a broad range of applications. There should be provision for analysis of single or multiplex PCR fragments, restriction digested DNA or plasmid inserts, synthesized oligonucleotides, total RNA and single stranded cDNA, as well as cRNA quality checking.
14. To make high-throughput system along with this system following accessories should be provided:
 - a. **Nucleic acid extraction system:** An automated high-throughput nucleic acid extraction and purification system. Aspirating, dispensing, filtering and sequential transfer of liquids should be with robotic arm. System should accommodate 24–96 samples per run with increments of 8 samples. Purification of nucleic acids from various types of samples should be using vacuum based spin column technology. To prevent contamination there should be facility of UV lamp and HEPA filter inside the instrument. There should be provision to stop cross contamination during purification and dispose of waste. The instrument should be operated through a compatible laptop provided by the vendor. The software should be user friendly. The standard protocol for the nucleic acid purification should be scripted.

- b. **Nucleic acid quantification system:** The system should be UV/VIS polychromatic system and with a reference channel. The System should be able to do nucleic acid quantification of up to 16 samples in as little as 90 seconds. The system should have ability to discriminate between molecules of interest using unique spectral protocols. The system should have ability to use micro cuvette based technology through micro fluidic slides. The system should provide the specific quantification of DNA, RNA, and other contaminating fractions through spectral content profiling ensuring complete profile of back ground and impurities. The system should use μ -fluidics based technology and require minimal sample input of 1-2 μ l with LOD 1.5ng/ μ l. The system should use ultrasensitive photodiode array for detection and Xenon flash lamp as a light source. The system should cover the wavelength range from 230-750nm with the resolution of < 3nm and accuracy 0.5 nm. The system should cover the Photometric range: 0.0005–2.0 OD and should provide the absorbance precision: 0.003 OD or less. The system should provide comprehensive reports that can be viewed on any computer. The system should provide the facility of data analysis and sharing and the data should be exportable to USB stick, networking device or a small device.

Other conditions:

- i. The vendor should provide UPS, which can give two hours backup for uninterrupted operation.
- ii. There should be two year warranty for instrument (Capillary electrophoresis system) and accessories (Nucleic acid extraction system and Nucleic acid quantification system).
- iii. After installation one hands on training should be provided by company persons at our site.
- iv. One set of consumables (DNA extraction kit, RNA extraction kit, DNA quantification kit, RNA quantification kit, DNA electrophoresis kit for high, medium & low molecular weight and RNA electrophoresis kit) should be provided by vendor.
- v. The machine should run on standard 220 V electric supply or pre-electric arrangements should be made by vendor.
- vi. For generation of vacuum if there will be need of some extra gas then it should be pre-arranged by the vendor.

The machine should be installed in a full working condition.

16. OZONE ANALYZER

Specifications:	
Use:	For measuring ozone concentration from ambient air
Method of measurement	US EPA approved UV absorption technology/UV photometric method
Minimum detectable concentration	0.5 ppb
Noise	< 0.25 ppb
Resolution	0.5 ppb

Linearity	< 1%
Ranges:	0-20 ppm
Concentration unit	ppm, ppb, mg/m ³ , µg/m ³
Sampling flow rate:	500 to 750 cc/min
Zero drift	< 0.3 ppb
Span drift	< 0.5 %
Response time	25 to 30 seconds
Auto-ranging function	0-50 ppb to 0-20 ppm
Temperature range	0 – 40 °C
Power requirement	230-240 V 50/60 Hz (Indian residential power supply)
Uninterrupted Power Supply (UPS)	to run ozone analyser
Digital Inputs/Outputs	USB/ Bluetooth/ RS232
Read Out Device (ROD)	Digital display. Separate ROD, like computer workstation/laptop and tablet equipped with required software.
Data storage	USB flash drive/ data cards provided with analyzer
Consumable	Minimum required consumables etc should be supplied
Others	Particulate filter, additional separate pump (for drawing air from the distance), cables and other tunings for sampling of ambient air, connections etc provided with analyzer.

17. BULK MILK COOLER with accessories

1) Bulk milk cooler with milk pump, balance tank and accessories CAPACITY: 1000L

The tank shall meet the requirements of ISO 5708 Type 2A II (Latest version) for milk collection cycle of two times in a day with not more than 3.0 hours cooling time from 35 to 4⁰C for all milking and not more than 1.5 hours for second milking i.e. from 10 to 4⁰C.

For design of condensing unit for BMC ARI Standard 520-2004 (air-conditioning & Refrigeration Institute, Arlington, Virginia) for ambient temperature condition shall be applicable.

The refrigeration system shall be designed to meet performance ratings of positive displacement of condensing units specified in ARI Standard 520-2004. & ISO 5708 Type 2A II.

Accessory items viz. Diesel generator set, electric & control cables, control panel, temperature sensor, electrical switch gears, control valves & fittings etc. shall be of approved make only meeting requirement of the latest relevant Indian Electricity Rules, ISO/BIS Standards.

Scope of the bidder

The bidder's scope starts from SS 304 tray, having an outlet connection, for receiving the milk. The milk shall flow through SS 304 pipe by gravity into bulk milk cooler. Wherever gravity flow is not possible, the milk from the tray shall be collected in a balance tank and from the balance tank it shall be pumped to bulk milk cooler. The balance tank shall be of AISI 304 construction and minimum capacity of tank shall be 100 litres. From BMC, the milk shall be transferred to Road Milk Tanker (RMT) through flexible hose and milk transfer pump either installed on the RMT or through the pump supplied along with BMC. Bidders should furnish separate prices for gravity fed system as well as for pumped system.

Supply

The bulk milk cooler shall be a complete unit with the refrigeration system, agitator(s), lockable inlet & outlet valve with strainer. Also includes supply of tank with SS 304 filter for pumped system, SS piping & milk hose, unions and milk transfer pump of 5000 LPH, SS 304 pipes & fittings, food grade quality flexible hose of adequate length, erection materials, pipe supports, floor interconnecting cables, cable conduits shall also be supplied, earth pit CI covers & earthing as required by local electrical regulation.

The indicative distances between SS collection tray to balance tank - 2 m, between balance tank to bulk milk cooler - 5 m, BMC to Mains power point & DG set – 20 m may be considered for calculating cable & SS piping requirement supports etc. However the exact distances shall be as per site conditions and the complete piping & cabling necessary for installation shall be supplied.

Installation & Commissioning

The total job is on turnkey basis and includes supply, installation, testing, commissioning and training of the field personnel. Minor civil works, providing & grouting supports are included in the scope. Giving satisfactory training to the staff of the collection centre and trial runs for the complete unit. Moreover, supplier has to demonstrate performance trial runs after commissioning of the unit.

Tank Evaporator

Laser welded with Operating pressure of 30 bars and crash test pressure of 60 bars. In case of rectangular/circular type bulk milk cooler, the evaporator shall be fixed at the bottom plate of the inner tank. For closed tank of 3000/5000 litre, the evaporator shall be up to 1/3 height of the tank. For 2000, 3000 & 5000 litre tanks, two condensing unit complete with compressor shall be provided & hence total evaporative area shall be divided and separated into two sections. Each section shall have separate suction & discharge connecting to each compressor.

Tank Fittings & Accessories

Top cover with locking arrangement, top cover lifting handle, outlet valve and blank union **with locking arrangement**, inspection window, agitator. All SS fittings shall be of SMS standard. "No-foam" type inlet (For Close Type). Tank with gravity feeding system shall be provided with one AISI 304 funnel with SS fine wire mesh. The preferred shape of the tank shall be circular /horizontal rectangular with an open-able top cover. The shape of the BMC tank shall conform to international sanitary design. For closed type Tanks, proper SS Ladder to be provided for approaching top manhole.

Ball Feet

An AISI 304 adjustable ball feet tamper proof & lockable with 50mm height adjustment.

Constructional Features

1) Bulk Milk Cooling Tank

Material of construction (MOC)

Tank inner, outer, intermediate dimpled jacket & top openable cover shall be fabricated from Stainless Steel AISI 304 material. All piping, fittings, filter, lockable cover, agitator shaft &

blade adjustable ball feet made out of AISI 304 for 50 mm height adjustment. Also Dip stick, outlet & inlet valves & blank flanges, ladder, manhole of about 45 cm diameter for closed type milk cooling tank etc shall also be made out of AISI 304.

The filter screen shall be from AISI 304 fine wire mesh. All the gaskets shall be of food grade nitrile or neoprene rubber material. The skid on which tank & refrigeration unit is mounted shall be of galvanized steel. The bottom evaporation surface in contact with milk shall be passivated by standard treatment to impart corrosion resistance.

The skid made out of heavy MS box section & shall be hot dip galvanized on which tank & refrigeration unit.

Shape & Orientation

The preferred shape of the tank :vertical cylindrical / horizontal rectangular or U-shape.

Milk Cooler Tank & Evaporator

The AISI 304 tank for the BMC should be either in rectangular, circular or elliptical orientation,

Inner Vessel:

All joints welded, any filler rod being suitable for the parent metal. All welds ground smooth and free from crevices, porosity and brittleness. All Milk contact metallic surfaces for the inner vessel and its attachment finished not less than 150 grit finish.

Any permanent attachment to the inner vessel welded with fillet radii not less than 6 mm. All parts of the inner vessel drain directly to the outlet.

Internal corner from round the bottom of the inner vessel and outlet of not less than 25mm in radius.

In case of rectangular type of BMC, the evaporator dimpled jackets fixed as the bottom plates of the inner tank. The Evaporator plate imported laser welded. Whereas in cylindrical/elliptical tank the jackets at least upto 1/3 height of the tank. In case of double compressor total evaporator divide and separated into two sections. Each section with separate suction and discharge connecting to each compressor . the evaporator surface in contact with the Milk should be passivated by standard treatment to impart corrosion resistance.

Tank Fittings & accessories

The tank provided with SS inlet with special “ no foam” design, outlet 38 mm butter fly valve & blank union with locking arrangement, inspection window/manhole with locking arrangement for closed tanks, agitator and top cover with locking arrangement.

At the bottom of the outlet cup on the outer surface, a temperature sensor permanently fixed. It shall sense the temperature of the surface at the outlet and transmit the signal to the digital indicator. The digital type temperature indicator shall be provided in the control panel.

The tank provided with SS calibrated dipstick to measure the volume of milk inside the tank. The dip stick graduated from 10% or less to not less than 100% of the rated volume. Each division on dip stick represent a volume not greater than 0.5% of the rated volume. The tank

equipped with agitator(s) capable of producing a uniform distribution of fat in the milk. All fittings shall be of SMS standard.

The BMC provided with AISI 304 filter with SS fine wire mesh suitable to filter extraneous matter such as dust particles, hay, flies, cow dung pieces/particles etc., placed on the balance tank. The filter designed & installed in frequently and easily cleaned manner.

The tank provided with AISI 304 adjustable feet tamper proof type having provision of 50 mm height adjustment. Minimums 4 feet for all capacities.

Tank cleaning Brushes (One tank cleaning brush and one pipe cleaning brush. 4no. SS pipe hooks provided for 1kl/2kl BMC and 6 nos, for 3kl/5kl BMC for keeping SS pipe and milk hose pipe

2) Stainless Steel Sanitary Milk Pump

Where the gravity flow from milk reception tray to the BMC is not possible due to insufficient level difference, a suitable capacity milk pump supplied for pumping of milk from balance tank to BMC. Pump impeller & casing made out of SS AISI 304 material. All milk contact surface finished to min 150 grit. The pump of sanitary design. Inlet & outlet of the pump shall ends with SMS union.

The pump provided with approved make motor having 'E'/'F class insulation and IP 55 protection. The flanged end motor have stainless steel shaft having hygienic mechanical sealing arrangement. SS adjustable ball fitted Pump covered with SS shroud having air ventilation grill.

Insulation

The insulation of the tank done by injection, in situ, of high density (minimum 40 kg/m³, CFC free and environmental friendly) polyurethane foam without having any imperfection and hygroscopicity. 50 mm thickness in the walls & 90mm below the evaporator. The efficiency of insulation is such that at max 50 degree C. ambient temperature, the rate of rise of the mean temperature of the milk, initially at about 4 Deg. C shall not exceed by one Deg. C in four hours when the rated volume is allowed to stand undisturbed as per the requirement of ISO 5708 2A II (latest version) when the refrigeration unit is not working. Efficiency of Insulation 0.019 w.m/k.

Cleaning In Place (CIP)

For closed type configuration, facilities for Cleaning- In- Place shall be provided which include CIP spray ball (s) or deflector plate and piping from milk reception/balance tank through milk transfer pump to bulk milk cooler.

Welding & Finishing

Inner, outer, intermediate dimpled jacket and nozzle connections welded with TIG process only. The inner shell and all other product contact surface polished up to minimum 150 grit finish. The outer surface to be polished with 150 grit dull finish or a circle finish.

Refrigeration System

The refrigeration system designed to meet performance ratings of positive displacement of condensing units specified in ARI Standard 520-2004 and with not more than 3.0 hours

cooling time from 35 to 4⁰C for all milking and not more than 1.5 hours for second milking i.e. from 10 to 4⁰C.

The refrigeration system of direct extension type, with Freon-22 (R-22) or CFC free environment friendly as refrigerant to cool the raw frame described above. The evaporator(s) of the refrigeration system form a part of the milk tank body as dimpled jacket in the bottom plate in case of rectangular tank or at least up to 1/3 height of the cylindrical/elliptical tank. It would be better in case the system is compatible for the refrigerant R 407C. The refrigeration system with direct expansion type to perform cooling function in an ambient temperature of 46⁰C with air cooled condenser.

3) Compressor

The refrigeration compressor adequate enough to ensure that milk is cooled to 4⁰C in the prescribed time limit and suitable to operate at 0 Deg C suction temperature and 60⁰C condensing temperature (air-cooled condenser) assuming 46⁰C ambient temperature. Should also comply ISO 5708 Type 2AII (latest version).

The compressor (s) scroll / reciprocating hermetically sealed type essentially suitable for refrigeration application in hot & humid Indian climatic conditions. The motor of the compressor should have a thermistor temperature sensor embedded in windings for protection from excessive heating due to overloading or short circuiting. Similarly, a protection against off cycle migration of refrigerant to the compressor is necessary in the refrigeration unit, preferably a self regulating PTC crank case heater.

The compressor selected should be energy efficient and consume least power to meet the cooling load requirements.

The bulk milk cooler up to capacity of 1000 L provided with single compressor, however for higher capacity two compressors system will be preferred. In case for a particular capacity, single as well as double compressor systems are available, bidder should quote for both. Similarly, in the offer bidder shall clearly mention whether the offered system shall work on single phase or three phase mains supply. Looking into the non-availability of three phase supply in most of the rural areas, single-phase systems will be preferable at least upto 2000 lit.

4) Condenser

The condenser is air cooled finned tube type having sufficient heat transfer area. For each compressor separate condenser and air cooling fan. The air circulation pump preferably induced draft type throwing not air out. The condensing temperature not be less than 60⁰C operating ambient temperature of 46⁰C.

5) Receiver

A suitable size liquid receiver of minimum capacity of 6 ltr. to assist system during pump down cycle as well as to store refrigerant incase of maintenance should be provided duly mounted on the skid near compressor(s), as per requirement for different capacity BMC.

6) Thermostatic Expansion Valve

Suitable size and capacity Thermostatic valve should be provided in the refrigeration circuit of the bulk milk cooler. The TX valve should be Maximum Operating Pressure type of reputed make and of adequate capacity to feed optimum quantity of refrigerant to the evaporator.

7) Refrigerant pipe, fittings & controls

All pipes, valves, fittings & controls shall comply with the latest relevant code applicable. Isolation valves at suction & discharge sides of the compressors should be provided for compressor isolation, during maintenance of the system. The make of each item shall be approved by the client. Copper/ SS tubing shall be routed in such a way that if any leakage occurred during operation can easily be detected and the defective portion can be repaired/replaced without dismantling the whole system.

8) Electrical Control Panel

Control Panel

Three control panels shall be provided, one for the main power supply tapping, second for the refrigeration unit and the third for the milk tank. Each panel shall be provided with MCB's of suitable ratings for switching and protection as per the system requirement. The incoming and outgoing power supply terminals shall be covered and secured with a lead seal to prevent tampering. The door of the panels should be provided with lockable handles.

Main Control Panel

This panel should be suitable to tap the incoming State Electricity Board supply and feed the refrigeration unit, agitator motor and milk unloading pump (from balance tank) and dispatch pump. The DG set should be hooked up with this panel through a 'change-over-switch' in order to operate the DG set in place of State Electricity Board supply as & when required. It should be provided with necessary phase indication lamps (LED type), contactors, MCBs, ammeter, voltmeter, energy-meter, frequency-meter, push buttons, DG set running hour meter etc. A battery charger to trickle charge the battery when the DG set is in operation (charge indications shall be displayed on the panel) should be provided.

Note: the switch gears used in all the panels should be of reputed makes. The makes for individual items are specified in Appendix of the specifications.

Voltage stabilizer (servo type) and single –phase preventer.

The system should have voltage stabiliser conforming to following features and single phase preventer of suitable rating:

- Input Range- 130 to 300
- Output A.C Voltage correction for wide input variations Output voltage –230 VAC/400
- No output waveform distortion VAC, Fast correction of output voltage: 20V/sec
- Output self adjustable for a range of $\pm 5\%$
- Auto / manual operation facility
- Supply Frequency-47 to 53 Hz
- Under-voltage and over- voltage cut out arrangement
- Load &Line Regulation-1%
- Voltmeter with facility to read input or output voltage

- Compact and modular construction for ease in servicing
- High efficiency
- M.C.B on input circuit

Accessories for 1 phase stabilizer:

63A MCCB for incoming, 63A phase selector, change-over and bypass switch, LED lamps, Servo controlled correction transformer, Digital V,I,F indicator for input & output, 63A terminal blocks, OV/UV trip with delay time, single phase preventer, static type energy meter with 10-60A capacity. Brass metal glands, MCB's (DP 63A - 2 nos., DP 32A -1 no, DP 16A-1 no), Metallic pump socket, Servo Motor.

Accessories for 3 phase stabilizer:

40A MCCB for incoming, 40A phase selector, change-over and bypass switch, LED lamps, Servo controlled correction transformer, Digital V,I,F indicator for input & output, 63A terminal blocks, OV/UV trip with delay time, single phase preventer, static type energy meter with 10-A capacity.

Brass metal glands, MCB's (TPN 40A - 2 nos., TPN 32A -1 no, TPN 16A-1 no), Metallic pump socket, Servo Motor.

Operating features

Cable entry from top, response time-5 milliseconds, should withstand 150% load on surge duty, capacity of terminals should be 150% of rated current, Dimmer with CRGO core, separate Auto/manual facility, plug in type control card for each phase, correction speed-105v/s, Efficiency-99.5%.

Domestic Power distribution board

Operating features:

It would get single / three phase power from grid supply directly as well as stabilized power from main control panel and feed power for lighting, electric geyser/solar water heating system, testing equipment/computers.

8. Refrigeration Control Panel

The refrigeration unit shall be provided with a control panel made out of Stainless Steel suitable for wall mounting near the unit. The panel shall be provided with motor starters, ON/OFF push buttons & necessary MCBs, control wiring, line voltage controller to guard the compressor against the supply voltage fluctuations. Wall / Tank mounted To be specified by bidder MOC of Panel & Thickness AISI 304 / 1.6mm

In case more than one compressor is provided in the refrigeration system, the control panel shall be provided with a sequence controller & timer to start one compressor at a time to avoid surge on power supply. The panel shall also have facility to operate refrigeration unit on auto/ manual mode. In the auto mode, as soon as the milk temperature reaches to pre-set value, the compressor should be switched off to avoid freezing of milk.Milk Tank

Control Panel

The milk tank shall be provided with a control panel with inbuilt-timer to control the intermittent operation of the agitator & a digital temperature indicator to indicate the milk temperature to one decimal place with least count of 0.10 C on continuous basis. In case of

power failure alternate arrangement should be available to know the temperature(stem thermometer). The agitator (s) shall have interlocking arrangement with top cover opening limit switch. The limit switch shall put off the agitator as soon as the top cover opens up.

Temperature Display LCD 0 to 100 Deg. C with one decimal accuracy; Management & control of cooling and agitation ; provision for cut-off/ restart, intermittent operation of agitator, auto & manual facility required ; RS232 port for temperature data backup of minimum last 90 days & main cooler faults analysis; in case of open type coolers, agitator should switch off when the lid is opened for safety purpose.

All the pipes shall be clamped properly with fixed support. In case of double compressor system, pipe, fitting & control should be designed in such a way that both the compressors can run independently. The tubing shall be insulated wherever necessary.

Cables & Electrical Switch gears

All electrical switch gears and controls required for the complete system shall be of reputed make and of suitable rating.

All permanent wiring installed on the tank or associated unit shall be carried out using PVC cable in heavy gauge, screwed galvanized steel conduit or plastic conduit, or in mineral-insulated copper- sheathed cable. Flexible connections shall be made.

Earthing

As per IS: 3043 - 1987 (reaffirmed 2001) - "Code of practice for earthing". Pipe type earthing - 4 nos. to be used. Suitable G I Strip (minimum 25x3 mm) to be used for connecting earth pit with nearest equipment earthing point. From this point earthing to other points can be looped by suitable GI Strip or PVC insulated copper conductor cable of green color (size minimum 1x 4 Sq mm) The chassis, framework and fixed parts of the metal casing of the tanks where used shall be provided with two separate earthing terminals, Earthing for Alternator & Panels. These terminals shall be provide over metallic coverings) of current carrying cables.

The earthing terminal shall be readily accessible and so placed that the earth connection of the tank are maintained when the cover or any other movable part is removed.

The earthing terminal shall be of adequate size, be protected against corrosion and shall be metallically clean. Under no circumstance shall a movable part of the enclosure be insulated from the part carrying the earthing terminal when the movable part is in place.

The earthing terminal shall be identified by means of the ‘ ‘ marked in a legible and indelible manner on or adjacent to the terminals.

Accessories

Isolation valves at suction & discharge sides of the compressors, All pipes, valves, fittings & controls shall comply with the latest relevant BIS code applicable, Copper piping between tank and CDU shall be supported/routed by cable tray and cable tray supports.

Accessories for 1 kl BMC

MS Powder coated 1.6 mm enclosure, 32 DP Change over switch, 32 A DP MCB as incoming, 3 nos. 10 A MCB SP for lighting, 3 nos. 20 A MCB SP for geyser/Solar water heater, AMCU etc.

40 A DP MCB for incoming, 32 A DP MCB for feeding refrigeration panel, 20 A DP MCB for feeding starter of milk pump, 32 A DP MCB for feeding Domestic power DB, 20 A DP MCB as spare.

Other Required Accessories

Isolation valves at suction & discharge sides of the compressors, All pipes, valves, fittings & controls shall comply with the latest relevant BIS code applicable, Copper piping between tank and CDU shall be supported/routed by cable tray and cable tray supports.

Optional Item

Heat recovery Unit for 1000L capacity BMC with necessary piping (Estimated 10 meter)

This system shall be for heating water using heat of one condensing unit of BMC & to store this hot water. It shall consist of evaporator type heat recovery unit. Tank shall be of 200 litre capacity in SS 304, Outlet with 38 MM Butterfly valve with Union. All controls shall be manual.

Installation, Commissioning & Training

The installation work should be carried in the best workman like manner in conformity & electrical installation.

Installation of all equipment & interconnecting piping, including minor civil works such as providing galvanized steel supports, SS base plates, clamps etc. required to secure the equipment & piping to walls and floors is included in the scope. Necessary cable trays, GI pipes/ conduits, cable gland sockets at both ends, insulators, junction boxes etc are included in the scope of the contract to lay & connect all electrical and control cables. Cable trays and supporting steel members such as Galvanized angles/channel/ flats, supply of CI covers for the pits etc shall be used and fixed/ installed at appropriate places to ensure safe installation. The laying of cables on the floor or under the floor should be not permitted.

The owner will undertake major civil works. The supplier shall make all tools & tackles required to execute the job available.

Commissioning

Supplier shall arrange commissioning & performance trial runs of the bulk milk cooling system to the satisfaction of client. The supplier shall supply all the consumables required during commissioning of the plant. Along with the bulk milk cooler & DG Sets etc, the bidder shall quote for supply of spares along with prices for the complete system. A set of essential spares for the total installation as required by the user shall be worked out and finalized at the time of finalization of contract.

The cost of spares should not be included in the main bid.

Tool Box

A standard tool box is required with necessary tools for normal maintenance. It should include Electric Tester, Screw Driver Set, Allen Key 3mm & 6mm, Pipe Wrench 12" Long, Screw Spanner 6", Fix spanner Set 6-27, Gasket for SS Unions/valves- 3 sets

Manual

Two sets of operation & maintenance manuals in English containing complete details of starting up , putting off , critical checks and day to day maintenance of the complete system shall be supplied . The manual should also have the required electrical circuit diagrams.

Training

Supplier shall arrange for training of the team of DCS staff for efficient operation and maintenance of the complete system.

After Sales Service, Service Centre and Service Contract(optional) obligation of BMC package supplier for providing after sales service/warranty claims for BMC package components supplied.

It would be the responsibility of the contractor, for bought-out components of critical nature such as DG Set and voltage stabilizer, to identify dealers/ agency located in the region where BMC package would be installed. This is to facilitate fulfilling of the warranty obligations as per the contractor and availing timely services by milk collection centers in view.

Service Centre

Each bidder is required to quote for setting up a service centre in one district of south Gujarat & for providing service cover on a continuing basis. The quoted price for service cover will be valid for three years. This is to be established preferably near to (name of location), with all facilities to maintain a continuous service to the village collection centres having milk cooling systems. This includes:

Telephone connections and communications to call the service team round the clock.

Transport facilities: The centre is to have transport (owned or hired) available round the clock of adequate capacity to;

Provide rapid replacement of complete milk cooling unit or DG set, if necessary.

Ensure regular & continuous visits of the service team(s) to the collection centers.

Maintenance workshop, including essential machine tools and hand tools to tackle any repair that may be required for the system and for regular dismantling and overhauling of diesel engines that would be necessary on a continuous basis.

Stock of spare parts. (the list should be provided by the bidder.)

We have a right to inspect all the components of the bulk milk cooling system during fabrication / manufacturing stage. Before starting the fabrication work supplier shall submit QAP & QIP for approval from client. The milk cooling tank shall be checked with dye penetration test for welding defect, surface roughness check, water tightness test / hydraulic test.

General Requirement

Technical Details

The bidder shall provide all the technical details, as per the format enclosed as appendix over and above the general description in each section.

Makes of Items

The bidder shall provide makes of all the items fitted in the bulk milk cooling system as provided in technical details. It is to be ensured that all the makes considered shall be of internationally / nationally reputed and of proven quality. The bidder should mention at least one alternative make with complete details. Bidder shall obtain necessary approval from us for makes of all bought out items.

P & I Drawing

Bidder shall submit a detailed general arrangement drawing for complete system giving complete details with bill of materials, size, capacity, quantity, material of construction, thickness etc.

Equipment Selection criteria

Bidder shall submit alongwith the offer detailed calculations with proper justification for selection of compressor (s), evaporator (s), condenser (s), fan (s), thickness of tank, milk pump, insulation material and thickness, DG Set etc.

Format for technical details: (Details to be furnished by the bidder) TECHNICAL SPECIFICATIONS FOR BULK COOLING TANKS CAP.1000L DX-TYPE WITH SINGLE PHASE POWER SUPPLY AND ONE CONDENSING UNIT (OPEN TYP).

S.NO	DESCRIPTION	TECHNICAL REQUIREMENT
A.	Milk tank	
1	Rated Capacity	1000 Ltr.
2	Make and model.	To be specified by the bidder
3	Material used for construction	AISI 304
4	Type	Open Type Vertical / Horizontal/ Rectangular / Cylindrical / Semi-cylindrical.
5	Overall dimensions and weight.	To be specified by the bidder
6	Thickness of inner and outer shells	1.0 mm for inner 1.0 mm for outer shell
7	Number and RPM of agitator(s).	1 no.25 RPMs (approx).
8	CIP facility: Manual or auto	Manual
9	(a) Insulation. type (b) Thickness	By injection in situ of High Density (min.40 kg/m ³) CFC free polyurethane foam without any imperfection and hygroscopicity Minimum 50 MM.

S.NO	DESCRIPTION	TECHNICAL REQUIREMENT
	(c) Efficiency	It should be such that at 50 deg C ambient the rate of rise of mean temp. of Milk Initially at 4 deg. C shall not Exceed 1 dg. C in 4 hour when rated volume is allowed to stand-still as per requirement of ISO 5708 Type 2A(II)
10 11 12 13	Balance Tank with Filter, in line strainer SS Milk transfer pump Facility to Measure volume:	Minimum 200 liters capacity. Minimum 5000 LPH capacity. SS calibrated dip Stick on both sides in the BMC tank with 0.5% calibrating accuracy.
B	Refrigeration unit	
1 2 3 4	Type: Compressor: Make: (b) Model	DX-type Hermetically sealed scroll / reciprocating To be specified by the bidder. To be specified by the bidder
5 6 7	Condenser: Make: (b) Model	Air Cooled, finned Tube Type To be specified by the bidder. To be specified by the bidder
8 9	No. of compressor (b)Capacity of compressor(s). (Kcal/hr)	One Min. 5166(Kcal/hr)
10 11	No. of fans (b) Capacity of the condenser	Min. one Min. 6200(Kcal/hr)
12	Overall dimensions and weight of the unit.	To be specified by the bidder.
13	Type of refrigerant:R-22 or CFC free Environment friendly refrigerant Refrigeration Control Panel (Wall/Tank mounted)	Preferably R-22 To be specified by the bidder.
14	Power Supply	Single Phase.
C	Design Parameters	
1	Ambient temperature considered for design	46 Deg C
2	Maximum cooling time considered (a) ALL milking (b) SECOND milking.	3 hrs from 35 Deg C To 4 deg C 1.5 hrs from 10 deg. C To 4deg C
3	Temperature range considered (a) ALL Milking. (b) SECOND milking.	35 Deg C To 4 degC 10 deg. C To 4degC

NOTE: ALL THE INTER CONNECTING SS PIPES & FITTINGS FOR INSTALLATION & COMMISSIONING OF EQUIPMENTS IS IN SCOPE OF SUPPLY OF BIDDERS. SIMILARLY

ALL THE ELECTRICAL SWITCH GEAR ITEMS FOR INTER CONNECTION FOR MAIN CONTROL PANEL, REFRIGERATION CONTROL PANEL, MILK TANK PANEL, ETC. AND CABLES ARE IN THE SCOPE OF SUPPLY. THE EARTHING MATERIAL WHEREVER REQUIRED IS ALSO IN THE SCOPE OF BIDDER.

18. POUCH PACKING MACHINE

Component No 1 : Cold room

Description	Specification										
Walk-in-Cold room dimension O.D. Approx for storing milk pouches	Size O.D.: 7.50 Ft (L) X 8.00 Ft (W) X 9.00 Ft (H) Approx. Dimensions OR: 2.29 Mtrs.(L) X 2.44 Mtrs.(W) x 2.74 Mtrs.(H) Approx Dimension										
Insulation type for Walls and Ceiling	<p>Wall & Roof Panels: Sandwich panels made from Pre Coated steel sheet on both side of PUF. The total thickness of panel should be 80mm. PU Foam must be CFC free, self- extinguishing, fire retardant type having density of 40Kg/CUM. (\pm 2Kgs).wall panel shall be joined by tongue & groove method.</p> <p>Doors: (a) The main door Frame shall be made from pressed Aluminum section. Overall size of section shall be 1250 mm x 2000 mm. The section is welded at corner. The door frame will be fixed to panel with suitable fasteners. (b) Single leaf shutter shall be made out with G.I. Pre coated sheets both side of PUF. The thickness of shutter shall be minimum 80 mm. The door shutter shall be fixed with the door frame with 100 mm long hinges & fitted with suitable Rubber Gaskets to make as much Air Tight as possible. (C) Suitable locking facility is must</p>										
Insulation type for Flooring	60mm thickbare PUF slabs covered with Tarfelt both sides [kota stone / cement concrete in customers scope - Washable Floor]										
Room temperature required	+4° C										
Ambient temperature	+42° C										
Incoming product temperature	+20° C TO +25° C										
Pull down time Approx	24 hours										
Condenser unit	<table border="1"> <tr> <td></td> <td>Air Cooled Condenser with HermeticReciprocating Compressor</td> </tr> <tr> <td>Cooling Duty:</td> <td>7 KW@ 8 Deg.C TD</td> </tr> <tr> <td>SDT Temp.:</td> <td>50°C</td> </tr> <tr> <td>Ambiant.Temp.</td> <td>38°C</td> </tr> <tr> <td>Refrigerant:</td> <td>R22a</td> </tr> </table>		Air Cooled Condenser with HermeticReciprocating Compressor	Cooling Duty:	7 KW@ 8 Deg.C TD	SDT Temp.:	50°C	Ambiant.Temp.	38°C	Refrigerant:	R22a
	Air Cooled Condenser with HermeticReciprocating Compressor										
Cooling Duty:	7 KW@ 8 Deg.C TD										
SDT Temp.:	50°C										
Ambiant.Temp.	38°C										
Refrigerant:	R22a										

		2 R14 fpi, Inner Grooved Copper Tube, with Plain Aluminium fins
	Power	2.5 KW Each
	Casework:	G.I white Powder Coated With Canopy
		1000 mm Long x 450 mm Deep x 450 mm High
Evaporation unit	Product Type:	Ceiling Mounted Cooler
	Design Duty:	7 Kw
	Room Temp.:	14 to 20 Deg.C @ 8Deg.C TD
	Refrigerant:	R22a
	Air Volume:	5600 CMH
		3x 300mm Axial Fan, 2300rpm; Motor=145W
		3R 8 FPI, Inner Grooved Copper Tubes, with Plain Aluminum fins
	Defrost:	Coil = None, Tray = None, Fan = None
	Casework:	G.I WHITE POWDER COATED
		1400 mm Long x 350 mm Deep x 450 mm High
Servo stabilizer	Quote for suitable servo stabilizer with ISO specification to run all units of cold room	

Note:

1. Supply of cold room including, loading, transportation to site, unloading, onsite installation and commissioning.
2. At least 12 year warranty after installation.

Component No 2 : Automatic Pouch Filling Machine

Machine Description

1. Mechanically Operated Single Head Machine to pack MILK in Pouches.
2. Machine Body fabricated out of AISI 304 SS sheets and pipes on which aluminum alloy casting base plates and vertical plates are mounted.
3. All contact parts are of Stainless Steel SS –304 with 150 grit finish.
4. Machine is controlled through Motors. One motor is for vertical and horizontal jaw movements of both the heads and one for the Nip Roller movement.
5. **Machine Operations are electronically controlled.** All the controlled timings are set digitally.
6. The doors are fitted with Glass.
7. Spool Bearer Assembly is with a capacity to mount 20 Kgs of film Roll.
8. Machine should have Clutch brake for pulling
9. Aluminium Alloy machine base plate for mounting of machine parts.
10. Separate control for sealing voltage & timer for handling different film.
11. Positive jaws movement through motor.
12. Jaw close switch available for alignment of the sealing jaws.
13. Adjustable cooling time.
14. Directly coupled motor with Gearbox to avoid maintenance.

15. Gearbox is of reputed make for eg. Bonfiglioli/YOMA/Rotomotive etc.
16. 1 HP motor for the head.
17. Electrical control circuit in 24V.
18. Electrical motor of reputed make having atleast ISO specification.
19. Price should be including suitable servo stabilizer.

Speed – 42 pouches/ min/Machine of max.500 ml.

Accuracy - $\pm 1\%$

Dosage - 200 ml, 500 ml, 1000 ml.

19. ATOMIC ABSORPTION SPECTROPHOTOMETER

Specifications	
FLAME Model	
Optics / Monochromator	Czerny-Turner design, True Double beam, completely sealed & protected against dust, moisture & vapour. Wavelength range 185-900 nm. Beam splitter (80:20)
Background Correction	D2 Back ground correction, upto 2.5 Abs or more, clock frequency 250 Hz or more
Grating	Holographic grating, 1800 lines/mm
Slits	automatic selection , 0.2 nm, 0.5 nm, 0.8 nm & 1.2 nm
Detector	High sensitive PMT & semi conductor (185-900 nm)
Lamp Turret	8- Lamp motorized turret with auto alignment
Burner unit	All Titanium make with 10 mm slot for C_2H_2 and $N_2O - C_2H_2$ with 5 mm Slot.- 1 no. each. Software controlled cleaning device for Nitrous oxide burner. Automatic height adjustment.
Nebulizer & spray chamber	Pt-Ir capillary and acid resistant ceramic impact bead, PPS spray chamber for aqueous and organic solutions.
Flame ignition	Auto flame ignition through PC
Burner Height selection	Automatic through software with optimal height search capability.
Gas control unit	Fuel gas, oxidant gas, automatic flow rate setting, automatic search for optimal gas flow rate through software
Power requirement	230 V Ac ($\pm 10\%$), 50/60 Hz, 2100 VA
Safety features	Support for safety inspections through software. Should meet EMC standards & bear CE mark. Should check liquid level in drain vessel, correct burner type, gas pressure, flame, power failure etc.
Lamps	Iron, Zinc, Cobalt, Copper, Manganese, Molybdenum, Chromium, Boron. Coded lamps for Arsenic, Mercury & Cadmium
Windows Software	32 Bit Software based AA, Should have QA/QC Function. Full control & data processing. Self-check feature, Display of parameters, curve, graph and printing to laser printer, capable of controlling hydride generator.
Other	Noise, oil & moisture free compact air-compressor, Nitrous oxide regulator, acetylene regulator (imported).

20. SPECTRORADIOMETER with computer interface and software for spectral analysis (190-730nm)

Items	Specifications
Portablespectroradiometer	
Single channel (VIS/NIR)	High precision
Range:	190-730 nm (VIS/NIR)
Calibration	No recalibration to be required after standardization
Rapid measurement	(< 1 second)
Lightweight Field portable	Rugged aluminum enclosure with field carrying case
Interface	Flexible foreoptic
User interface and software	User friendly
Data storage	Unlimited storage
Compatibility	Should be compatible with GPS
Software Features	
capability	Manual or auto-scan
integration time	User selectable
graph scaling	Manual or automatic
Selection R/A	Switch from raw data to reflectance/absorbance data
Calculation of common vegetation indices	NDVI, mNDVI, PRI, WBI, summed green reflectance and red/green ratio
Functions	mathematical functions on stored data
Data saving	Manual or auto-save data
Compatibility	Should be compatible with GPS
Accessories with system	
Fiber Optic Cable	with 20° FOV
Leaf Clips	Standard Leaf Clips
Reference Standard	for calibration
Receptor	Cosine Receptor
FOV Lens Assembly	(°): 3°, 6° & 12°

21. SOLAR WATER PUMP- Solar photovoltaic water pumping system

Technical specification Details:

I. Solar photovoltaic (SPV) water pumping system consisting of:

1. PV Module :(PV Array)

- Minimum Capacity in the range of 200 watt peak to 5 KWp.

-PV array Capacity for 3HP Pump is 3000Wp (Minimum) &

for 5 HP Pump is 5000WP (Minimum)

-Should be mounted on a suitable structure with a provision of tracking the sun as mentioned in the specification.

2. Motor Pump set (submersible): (2 Star Rating minimum)

- A.C. Induction Motor Pump set. (230Volt/415Volt)

3. Electronics:

- Maximum Power Point Tracker (MPPT)
- Controls / Protections.
- Inverter - VFD

4. Interconnect Cables, “On-Off” switch and LCD Display showing following parameters: 1) Frequency of VFD, 2) Voltage, 3) current, 4) Output Watt and 5) Cumulative in KWH.

II. PERFORMANCE SPECIFICATIONS AND REQUIREMENTS (DUTY CYCLE)

Solar PV Water Pumps with PV array minimum capacity in the range of 200 Wp to 5 KWp to be installed at specified locations in jurisdictions of DISCOMs.

Under the “Average Daily Solar Radiation” condition of 7.15 KWh/sq.mtr. on the surface of PV array (i.e. coplaner with the PV Modules), the minimum water output from a Solar PV Water Pumping System at different “Total Dynamic Heads” should be as specified below:

For A.C. 2 star rating Induction Motor Pump Set with a suitable Inverter: (230Volt / 415Volt)

1. 90 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 metres (Suction head, if applicable, minimum of 7 metres) and with the shut off head being at least 12 metres.
2. 50 liters of water per watt peak of PV array, from a Total Dynamic Head of 20 metres (Suction head, if applicable, up to a maximum of 7 metres) and with the shut off head being at least 25 metres.
3. 32 liters of water per watt peak of PV array, from a Total Dynamic Head of 30 metres and the shut off head being at least 45 metres.
4. 19 liters of water per watt peak of PV array, from a Total Dynamic Head of 50 metres and the shut off head being at least 70 metres.
5. 13 liters of water per watt peak of PV array, from a Total Dynamic Head of 70 metres and the shut off head being at least 100 metres.

III. PV ARRAY

The SPV water pumping system should be operated with a PV array capacity in the range of 200 Watts peak to 5000 Watts peak, measured under Standard Test Conditions (STC). Sufficient number of modules in series and parallel could be used to obtain the required PV array power output. The power output of individual PV modules used in the PV array, under STC, should be a minimum of 200 Watts peak, Use of PV modules with higher power output is preferred.

Indigenously produced PV module (s) containing mono / multi crystalline silicon solar cells should be used in the PV array for the SPV Water Pumping systems.

1. Modules supplied with the SPV water pumping systems should have certificate as per IEC 61215 specifications or equivalent National or International/ Standards.

2. Modules must qualify to IEC 61730 Part I and II for safety qualification testing.
3. The efficiency of the PV modules should be minimum 14% and fill factor should be more than 70%.
4. The terminal box on the module should have a provision for “Opening” for replacing the cable, if required.
5. There should be a Name Plate fixed backside the module which will give:
 - a. Name of the Manufacturer or Distinctive Logo.
 - b. Capacity of SPV water pumping systems.
 - c. Model Number
 - d. Serial Number
 - e. Year of manufacture
 - f. Project Name and Year (GUVNL Solar Pumping Project 2014-15)
6. Each PV module must use a RF identification tag (RFID), which must contain the following information:
 - a. Name of the manufacturer of PV Module
 - b. Model or Type Number
 - c. Serial Number
 - d. Month and year of the manufacture
 - e. I-V curve for the module
 - f. Peak Wattage of the module at 16.4 volts
 - g. I_m , V_m and FF for the module
 - h. Unique Serial No and Model No of the module
 - i. Project Name and Year (GUVNL Solar Pumping Project 2014-15)

IV MOTOR PUMP-SET (2 Star Rating minimum)(230Volt/415Volt)

The SPV water pumping systems may use following types of motor pump set:

1. Submersible Motor pump set

The “Motor Pump Set” should have a capacity of **5 HP (2 Star Rating)** and should have the following features:

1. The A C centrifugal motor pump set has its driving unit and impeller mounted on a common shaft, thereby giving it a perfect alignment. The pump should be provided with specially developed mechanical seals which ensure zero leakage.
2. The suction/ delivery pipe (GI/HDPE), electric cables, floating assembly, civil work and other fittings required to install the system.
3. The following details should be marked indelibly on the motor pump set
 - a) Name of the Manufacturer or Distinctive Logo.
 - b) Capacity of Motor Pump Set.
 - c) Model Number.
 - d) Serial Number
 - e) Year of Manufacture.

V. MOUNTING STRUCTURES.

The PV modules should be mounted on metallic structures of adequate strength and appropriate design, which can withstand load of modules and high wind velocities up to 150 km per hour. The support structure used in the pumping system should be hot dip galvanized iron with minimum 80 micron thickness.

The structure design (along with the civil work) declared by the manufacturer should technically be full proof / sufficiently strong against the prevailing wind load.

TRACKING:

To enhance the performance of SPV water pumping system, manual tracking system must be provided so that the panel can be manually adjusted three times a day (east-south-west) to face the sun optimally. This adjustment could be done in the early morning, noon and afternoon time to increase total solar radiation on the solar panel surface substantially

VI. ELECTRONICS AND PROTECTIONS

1. Maximum Power Point Tracker (MPPT) included in Solar panel and maximize the water discharge.
2. Inverter to be used, to operate an A.C. Pump.
3. Adequate protections incorporated against dry operation of motor pump set, lightning, hails and storms. Full protection against open circuit, accidental short circuit and reverse polarity.

VII. OTHER ACCESSORIES: ON / OFF SWITCH

Interconnect Cables, “On-Off” switch and LCD Display showing following parameters

1. Frequency of VFD,
2. Voltage,
3. current,
4. Output Watt
5. Cumulative in KWH.

A good reliable switch suitable for AC use provided with the motor pump set. Sufficient length of cable provided for inter-connection between the PV array and the motor pump set.

IX. PERFORMANCE SPECIFICATIONS AND WARRANTY

Solar PV Water Pumps with PV module capacity in the range of 200 Watt to 5 KWp may be installed for a suitable bore-well / tube well etc Indicative Performance Specifications for the Shallow and Deep well SPV Water Pumping Systems are given in the Annexure-A.

The PV Modules warranted for output wattage, which not be less than 90% at the end of 10 years and 80% at the end of 25 years. The whole system including submersible pumps and Home light system with mobile charger point warranted for 5 years. Required Spares for trouble free operation during the Guarantee period provided along with the system.

Indicative Technical Specifications of Solar Deep well (Submersible) Pumping Systems with suitable Induction Motor Pump Set and a Suitable Inverter.

Description	<i>Solar Deep well (submersible) Pumping Systems</i>
PV array	5000 Wp
Motor Pump set Capacity 3HP/5HP	Submersible with electronic controller
Maximum Total Dynamic Head	70 Meters
Module mounting structure	MS hot dipped galvanized, Three times Manual Tracking Facilities
Water Output*	95,000 liters per day from a total head of 50 mtrs.

22. DG set (25 kva)

Power Rating(KVA)	25
Power Rating(Kw)	20
Current (Amperes)	108.7/34.8
Power Factor	0.8
Engine Model	2A2D1C18.8CW
Rated Power KW(HP)	31.4(42.7)
Aspiration	TCIC
Cooling System	Liquid cooled
Starting System	12 Volt(Electrical)
Governor	Electrical(CRDI)
No of Cylinder	2
Engine Speed(rpm)	3000
Compression Ratio	17.5:1
Fuel Tank Capacity(lit)	75
Lube Oil Specification	15W40CH4
Lube Oil capacity(lit)	4.5
Total Coolant Capacity	6.5
Type	Brushless
Speed /Frequency	3000RPM/50HZ
Voltage Regulation	+/- 1%
Endosure	IP 23
Class of Insulation	class H

23. AUTOMATIC WASHER & DRIER (GLASSWARE)

1. Tank and interior door of SS 304 with brushed finish and 4 leveling feet.
2. Upper rack operable on 304 SS slides.
3. Fiberglass blanket surrounds the tank. Aluminum-backed acoustic material at strategic locations.
4. Injection molded Control panel with microprocessor storing 10 programs

Wash programs:

- a) Rinse only: 1 tap water rinse, no drying
- b) Plastic: 2 washes, 2 rinses (tap/pure water), water temperature set point 122⁰F /50⁰C,15 min dry time
- c) Glass: 2 washes, 3 rinses (tap/pure water), water temperature set point 140⁰F/60⁰C, 30 min dry time
- d) Glass plus: 2 washes, 10 min. steam cycle, 4 rinses (tap/pure water), water temperature set point 140⁰F/60⁰C, 30 min dry time
- e) Scientific:2 washes, 4 rinses (tap/pure water), water temperature set point 158⁰F/70⁰C, 40 min dry time.
- f) Scientific plus: 2 washes, 10 min. steam cycle, 4 rinses (tap/pure water), water temperature set point 158⁰F/70⁰C, 40 min dry time
- g) Intense:3 washes, 5 rinses (tap/pure water), water temperature set point 180⁰F/82⁰C,50 min dry time
- h) Intense plus: 3 washes, 10 min. steam cycle, 5 rinses (tap/pure water), water temperature set point 180⁰F/82⁰C, 50 min dry time.
- i) Extreme: 3 washes, 10 min. steam cycle, 6 rinses (tap/pure water), water temperature set point 199⁰F/ 93⁰C, 60 min dry time.

j) Dry only: Dry time set for 60 minutes

Two user set programs (USER 1 and USER 2)

Program parameters WASH 2 TEMPERATURES, WASH 2 TIMES, TOTAL NUMBER OF RINSES, NUMBER OF PURIFIED WATER RINSES (UP TO 6), FINAL RINSE TEMPERATURE, ENABLE OR DISABLE THE STEAM FUNCTION, DRY TEMPERATURE AND DRY TIME capable of alteration by the user. LCD display of programs.

5. Steam generator produces steam before the second wash cycle of any program except RINSE ONLY and PLASTIC. Selection/cancellation of steam from the control panel.
6. Purified water pump for pressurized/non-pressurized purified water from external source into tank for up to 6 rinses. Selection/cancellation of purified water from the control panel.
7. Overflow detector
8. Dual pump system: Separate pumps for drain and fill water.
9. Automatic liquid detergent dispenser with peristaltic pump accommodatable to 3.8 litre bottle.
10. Automatic rinse aid dispenser with peristaltic pump and accommodates a 1-liter bottle of rinse aid.
11. Manual detergent dispenser holds powder or liquid detergent. An indentation on the door's interior accommodates additional detergent.
12. Circulation pump is capable of re-circulating up to 112 gallons (424 lit) of water/minute (at 60 Hz) throughout the tank during the wash cycle.
13. Purified water inlet valve equipped with plastic serrated hose connection to accommodate 3/4" ID flexible plastic/rubber hose.
14. Particle filter is constructed of removable one-piece fine mesh.
15. Freestanding model with SS 304 sides, top and epoxy-coated steel back.
16. 2000W sump heater, with inlet temperature of 50⁰F/10⁰C to 200⁰F/93⁰C during final wash and rinse.
17. Standard viewing window-clear tempered safety glass, 7.0"x14.27" (17.8x36.2cm). Interior light:25W.
18. RS232 port transmits data including time, temperature, cycle phase, alarms, and water conductivity to a user-supplied computer or chart recorder.
19. Drying system should be forced air and HEPA Filtered.
20. Model with feature a wash arm and spindle rack with 36 detachable spindles constructed of SS 304. Optional upper rack or upper spindle rack positioned in either of two different height locations.

Fabrication:

1. Nominal Exterior Dimensions of Freestanding models: 32.2" W x 27.5" D x 34.2"-36.2"H (81.7 x 69.9 x 86.9-91.9cm).
2. Overall interior dimensional : Nominal Interior Dimensions: 22.6" W x 21.0" D (57.5 x 54.1 cm) 18.7" H (47.4 cm) - distance from top of spindle rack to top of tank
3. Sound level:<62 dbA

24. PREPARATIVE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY with accessories

SPECIFICATIONS

Latest model of Preparative cum Analytical HPLC System with Photo Diode Array Detector and the accessories to be quoted. It should have facility for independent injecting systems for both analytical as well as preparative models.

Solvent Delivery Unit: Pumping system suitable to deliver micro, semi micro, semi prep and prep flow rates. It should be capable of standalone operations with micro processor controller device.

No. of Pumps : Two Pumps for High Pressure Binary Gradient
with Dual Plunger
And Dual Piston Design.

Plunger capacity : 250 μ L
Maximum discharge pressure : 42 MPa
Flow Rate Range : 0.01 mL/min to 150 mL/min (without change of
pump head)

Flow-rate accuracy : Not more than 1%
Flow-rate precision : Less than 0.1 %RSD or 0.02 min SD, whichever is
greater

Modes : Constant Flow & Constant Pressure solvent
delivery

- Automatic rinsing facility for longer life of plunger seals.
- High Pressure gradient mixers to be provided both for analytical & preparative application.
- Flow diverter valve is must for handling of both analytical and Preparative injecting systems.
- Recycle Valve for Recycling the Eluent to improve separation efficiency.
- Column Holder to keep injectors, columns & valves.
- All module of the HPLC system should be micro processor controlled and capable of standalone operations and able to operate independently without help of software.

Analytical Auto Injector: Auto Sampler with Sample cooler for analytical workflow needs to be offered with the following specification:

- Injection Method: Total Volume sample Injection , Variable Volume Injection
- Injection Volume Range: 0.1 -2,000 micro litre
- Injection Volume accuracy: 0.1 % or better
- Injection Volume precision: 0.3% RSD or better
- Carry over: 0.005% or better

Sample Rack for Auto Sampler: Suitable rack for 1.5 ml and 4 ml to be offered with 1 Set Vials with cap and Septum.

Sampler Cooler: Direct cooling type cooler for Auto Sampler offered with temperature control from 4 to 40⁰C.

Preparative Manual Injector: Manual Injector to be provided for preparative workflow. It should contains 1ml, 2 ml and 5 ml Sample loops and suitable syringes

Photo Diode Array Detector: A Programmable PDA Detector should be offered with the following Specifications:

- Wavelength Range: 190 nm to 800nm with 512 diode array elements
- Bandwidth: Selectable (1.2 for high resolution and 8 nm for high sensitivity)
- Wavelength accuracy: \pm 1 nm
- Wavelength Precision: \pm 0.1 nm

- Noise Level: 0.6×10^{-5} AU
- Drift: 5×10^{-4} AU/h
- Temperature Controlled flow cell to reduce the base line noise
- Preparative Flow cell to be provided
- Linearity: 2.0 AU (ASTM Standard)

3 D Plot, Control Plot, Snap Shot functions, multi wavelength monitoring, peak purity curves, spectral library and spectral matching etc should be offered through the workstation software.

Fraction Collector:

- Head with valve for no loss of sample
- Drive System : Arm – movement X-Y system
- Fraction collection modes: Basic programmable mode, Time Program mode, Overlapping Peak Collection mode, Off-Scale Detector Signals mode, Ratio Chromatogram mode, etc.
- Provide collection Rack, mount, collection tubes & Vials/test tubes for large volume fraction collection i.e 500ml/250 ml for 5-12 fractions.
- Collection Rack & Vials of 50 ml for 16 fractions.
- Collection Rack & Vials of 3.5ml for 120 fractions
- Able to use over a wide range of flow rates, covering small and large scale preparative work. The maximum flow rate settable is 150ml/min.

Chromatography Software:

- Software should compliant with GLP standards.
- Capable of controlling all the HPLC Modules through PC with data acquisition, data control, chromatogram and special analysis facilities. Support PDA and RI detectors
- Easy operation with Windows 7 based operating system.
- Qualitative and quantitative processing, report creation and self-diagnosis
- Online 3D Image window for contour and snapshot functions
- Flexible Reporting format and easy to use in any desired format
- Facility for the data to be converted into other formats like Spread Sheet, word-Processing
- Allow automatic execution of system checks, auto-purge and baseline checks

HPLC column: Column with 20mm ID X 250mm Length with Guard Column needs to be offered (1no.)

Computer Printer: Branded Computer/Printer to be supplied.

Warranty: Two Years Warranty of complete HPLC system has to be provided.

25. TREE (PLANT) CANOPY ANALYZER

Specifications

General requirement: Tree (Plant) Canopy Analyzer for measurement of Leaf Area Index at above and below the forest/ tall canopy and it is measured with built-in GPS and possible for corrections due scattering. Instrument providing Leaf Area Index and other parameters of tall trees in Forest Canopy, Isolated tree condition, plantation trees/ seedling (Row trees).

Desirable output: Leaf Area Index, Foliage Density, Standard Error of LAI, Mean Tip Angle, PAR, Gap Fraction, Canopy Volume, Total Foliage Area, Standard error of the Mean Tip Angle

Control Unit: Instrument with built-in GPS and software for corrections due to scattering:

- Sensor Inputs: 2 no. for both beneath the canopy and outside (open condition)
- Connectors for Optical Sensors
- Connectors for Light Sensors
- Inbuilt Memory: minimum of 128 MB for Data Storage with extendable up to 2GB or more
- Display: atleast 128x64 graphics display
- Communications: USB port for connecting external hard disc or memory card

Optical Sensor:

- Two optical sensor –one for beneath the canopy and other for outside the canopy (open condition)
- Sensor output: connector for control unit interface
- Memory: minimum of 1 MB flash memory for record storage for individual Optical Sensor in dual mode and 1 KB EEPROM for calibration and configuration storage.
- Battery Life: minimum of 180 hours of typical operation
- Optics: 1.00° maximum decentering error as measured from center of mass of ring 4. 0.50° maximum magnification error as measured from the center of mass of ring 4
- Radiation Rejection: > 99% from 490-650 nm; > 99.9% above 650 nm
- Wavelength Range: 320-490 nm
- Nominal Angular Coverage: five rings-Ring 1: 0.0-12.3° ; Ring 2: 16.7-28.6° ; Ring 3: 32.4-43.4° ; Ring 4: 47.3-58.1° ; Ring 5: 62.3-74.1°
- Lens Coating: MgF2 for improved transmission at oblique angles (external and internal lenses).
- View condition: Provide view of 10°, 45°, 90°, 180°, and 270° quadrants

Battery: Rechargeable: NiMH/ Lithium ion

Other accessories: Data cable, USB cable, Carrying case, Charger, operating manual, associated software with laptop for data processing and storage, view-restrictors, diffuse cap, belt clip.

26. LEAF AREA METER

Preferably Imported instrument with non destructive method of measurement (portable-hand held) with Scanning Head and Readout-control Unit

Measuring range-leaf area, length-width-thickness of leaf. Test unit- mm, mm², Battery along with computer and software accessories

Resolution: 0.1 mm x 0.1 mm

Area unit: cm²

Accuracy: ±1% for sample >10 cm²

Sample Dimensions-maximum capacity

Width: 150 mm

Thickness: 25 mm

Length: 3 m

Area: 1m²

Scanning Technology: laser

Display Capacity : TFT LCD 320x240

Maximum capacity: area 1m²

RAM memory size: 64 k bytes

Real Time clock: Year, month, day, hour, minute, second.

Storage Capacity: HD SD card 4 GB

Scanning Speed: Up to 500 mm/s.

Battery: 7.2 V rechargeable NiMH

Battery Capacity: > 5 hours for continuous operation.

Operating Temperature: 0-50⁰C

Operating Time: to a minimum of 500 leaves

Warranty: 3 years

27. ATOMIC EMISSION SPECTROMETER for Elemental Analysis

Technical	<p>SPECTROMETER:</p> <ol style="list-style-type: none">1. The instrument must use a fast scanning, high resolution optical system with a min. focal length of 600 mm incorporating a single solid state detector with holographic diffraction grating.2. The entire spectrometer system must be enclosed in a purgeable optical enclosure.3. The spectrometer must not require any source lamps – either for the sample measurement or for the background measurement. The vendor should specify how this is achieved in their response to this tender.4. The spectrometer must view the atomization source end on (axially) with radial torch.5. The instrument must be capable of continuously measuring wavelengths over the range from 180 to 780 nm or more to enable determinations across the entire spectrum, both UV and visible.6. The instrument must include a user replaceable pre-optics window for easy and simple maintenance when running difficult samples and should provide capability to purge the optics with either nitrogen or air to exclude dust, dirt and acid fumes and maximize instrument performance throughout the life of the instrument. <p>SYSTEM DETECTOR:</p> <ol style="list-style-type: none">1. The instrument must utilize a single focal plane with one solid-state detector must be a UV sensitive solid state CCD or better that is optimized for performance across the entire emission spectrum.2. The detector should be hermetically sealed, eliminating any need for purging of the detector.3. The detector must feature high speed binning for anti-blooming protection to enable the measurement of trace levels in the presence of major matrix constituents and must be Peltier cooled to at least 0 Deg C. <p>ATOMIZATION SOURCE:</p> <ol style="list-style-type: none">1. The atomization source must run at an operating frequency of 2450 MHz. The atomization source must be computer controlled and provide optimum performance with a power output of 1,000 watts.2. The universal atomization source must be an air cooled design with a solid-state, high voltage power supply, eliminating the need for an external water re-circulator.3. Ignition and shut down of the atomization source must be computer controlled and totally automated.4. The instrument must include a gas flow across the atomization source to protect the pre-optics from the heat of the atomization source. The vendor should specify how this is achieved in their response to this tender. <p>GAS FLOW CONTROL:</p>
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1. Gas flows for the atomization source must be computer enabled with fixed flow settings for optimum ease of use. Optimum performance must be achieved using a fixed outer flow of 20 L/min. and a fixed intermediate flow of 1.5 L/min. The nebulizer gas flow must be controlled using a mass flow controller.

SAMPLE INTRODUCTION SYSTEM:

1. The system must use a three channel, variable speed, computer controlled peristaltic pump for sample introduction. It should be future upgradable to 5 channel system. There should be Option for online hydride vapor generation system and the system should have provision to measure non hydride and hydride forming elements in a single run.
2. The instrument must use sample introduction components that includes glass double pass spray chamber, inert nebulizer and multi-purpose peristaltic pump tubes.
3. The atomization source must be a single piece design and be incorporated into a cassette design enabling easy removal and replacement without requiring the use of special tools. Must be mounted vertically for improved matrix tolerance.

SOFTWARE:

1. The software must provide capability for a novice user to automatically load a preset method by simply clicking an icon on the desktop. The method should have all required parameters already set to the optimum parameters, enabling the user to simply ignite the plasma and start analysis.
2. The software must have a library of preferred analytical wavelengths providing relative intensities of each wavelength and graphically highlight potential interferences based on other selected analytes, for easy method development.
3. To improve analytical precision, the instrument must be able to read both background and analyte emission data simultaneously and allow for manual or automatic background correction. Must provide at least three different forms of background correction.
4. The software must also provide the capability to apply correction for spectral interferences using spectral modeling techniques in real time. The correction technique used must be able to correct for up to 10 interfering elements simultaneously. The system must be able to apply spectral interference correction in addition to background correction post sample analysis, eliminating the need to reanalyze the sample.
5. The software must provide capability to measure the same analyte using different wavelengths in the same determination so that the most sensitive line can be used to achieve the best detection limits and less sensitive lines can be used to measure higher concentrations. This enables extended dynamic range during the measurement, without re-measuring samples.
6. The software must continuously monitor gas pressures, safety interlocks, temperatures inside the atomization source and operation of the atomization source. If any interlock is tripped, the atomization source

	should be shut down immediately and automatically.
Application:	<ol style="list-style-type: none"> 1. The machine should be able to analyze plant available elements like P, K, Fe, Mn, Zn, Cu, S, Ca, Mg, Mn, Co, Hg, Ni, As, Pb, Cr, Cd, Si, Se, Mo, Al & B etc. from soil up to ppb level. As well as the machine should be able to analyze above mentioned elements from diverse kind of samples like water, effluent, fertilizer, plant, food, animal etc. in ppb level. 2. The atomic emission spectrometer should be capable of simultaneous measurement of sample and background using a solid-state CCD detector to measure waste water samples and future upgradable to acid and organic samples including oils. 3. The instrument must be able to determine all desired elements as above in one analytical method/run. 4. For cost effective operations the System should run with N₂ gas and does not require expensive gases.
Additional accessories:	<p>The supplier should quote all the accessories required for operating the instrument and other accessories required for running the instrument</p> <ol style="list-style-type: none"> 1.N₂ generator. 2.Wavelength calibration solution 500mL with concentration 50 ppm/ multi-element standards 3.Plasma Torch-2nos. 4.Compatible Air compressor with desired flow to N₂ generator / Gas Cylinders/Gas Generators/regulators 5.Appropriate UPS with one hour back up. 6.Fume hood with exhaust. 7.PC (64-bit running under the Microsoft Windows 7 operating system)-printer.
Warranty:	Five years extended warranty.
Training:	One pre and post installation at company's training facility and one onsite training each year up to warranty period for the three persons for three days
Other:	<p>Any accessories and necessary requirement for the installation and to perform our application tenderer have to provide all such facilities such as housing and temperature control requirement (AC, dehumidifier, non-vibrating table <i>etc.</i>), special electrification and specific power supply requirement, sample preparation tools and any other requirement for IQ/OQ/PQ of the instrument <i>etc.</i></p> <p>Any glassware, plastic ware chemicals, standards or any other consumables required at the time of installation and checking of the OQ/PQ must be provide by the tenderer.</p>