

## PART 1: Procure For Food Quality Control Laboratory

### LOT 1: Instruments/Equipments/Apparatus

1. **LC/MS/MS triple quadra pole System Fully compatible computer and printer and printer .....quantity (1)**

#### Technical Specification for the LC system

<b>Quaternary pump</b>	
Hydraulic system	Dual piston in series pump with proprietary servo-controlled variable stroke drive, floating piston
Setable flow range	0.001 – 10 mL/min, in 0.001 mL/min increments
Flow range	0.2 – 10.0 mL/min
Flow precision	< 0.07 % RSD, or < 0.02 mL in SD whatever is greater, based on retention time at constant room temperature
Flow accuracy	± 1 % or 10 µL/min whatever is greater, pumping degassed H <sub>2</sub> O at 10 MPa
Pressure	Operating range 0 – 60 MPa (0 – 600 bar, 0 – 8700 psi) up to 10 mL/min  Operating range 0 – 20 MPa (0 – 200 bar, 0 – 2950 psi) up to 5 mL/min
Pressure pulsation	< 2 % amplitude (typically < 1.3 %), or < 3 bar at 1 mL/min with fundamental solvent, at all pressures > 10 bar (147 psi)
Compressibility compensation	User-selectable, based on mobile phase compressibility
Recommended pH range	1.0 – 12.5, solvents with pH < 2.3 should not contain acids which attack stainless steel
Gradient formation	Low pressure quaternary mixing/gradient capability using proprietary high-speed proportioning valve
Delay volume	600 – 800 µL, dependent on back pressure
Composition range	0 – 95 % or 5 – 100 %, user selectable

Composition precision	< 0.2 % RSD, or < 0.04 min SD
Control and data evaluation	control software
Analog output	For pressure monitoring, 1.33 mV/bar, one output
Communications	Controller-area network (CAN), RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN optional
Weight	11 kg (25 lbs)
Dimensions (height × width × depth)	140 x 345 x 435 mm (5.5 x 13.5 x 17 inches)
Line voltage	100 – 240 VAC, ± 10 %
Line frequency	50 or 60 Hz, ± 5 %
Power consumption	220 VA, 85 W / 290 BTU
Ambient operating temperature	0–55 °C (32–131 °F)
Ambient non-operating Temperature	-40 – 70 °C (-4 – 158 °F)
Humidity	< 95 %, at 25 – 40 °C
Operating altitude	Up to 2000 m (6562 ft)
Non-operating altitude	Up to 4600 m (15091 ft)
Safety standards: IEC, CSA, UL	Installation category II, Pollution degree 2
<b>Thermostated column compartment</b>	
Temperature range	10 degrees below ambient to 80 °C up to 80 °C: flow rates up to 5 mL/min
Temperature stability	± 0.15 °C
Temperature accuracy	± 0.8 °C ± 0.5 °C with calibration
Column capacity	A capacity to hold 3 columns with 30 cm length

Warm-up/cool-down time	Warm up: 5 minutes from ambient to 40 °C Cool down: 10 minutes from 40 – 20 °C
Dead volume	3 µL left heat exchanger 6 µL right heat exchanger
Communications	Controller-area network (CAN), RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN via other modules
Safety and maintenance	Extensive diagnostics, error detection and display, leak detection, safe leak handling, leak output signal for shutdown of pumping system. Low voltages in major maintenance areas.
GLP features	Column-identification module for GLP documentation of column type.
Housing	All materials recyclable
Weight	11.2kg
Dimensions (height × width × depth)	140 x 345 x 435 mm (5.5 x 13.5 x 17 inches)
Line voltage	100 – 240 VAC, ± 10 %
Line frequency	50 or 60 Hz, ± 5 %
Power consumption	220 VA, 85 W / 290 BTU
Ambient operating temperature	0–55 °C (32–131 °F)
Ambient non-operating Temperature	-40 – 70 °C (-4 – 158 °F)
Humidity	< 95 %, at 25 – 40 °C
Operating altitude	2200 - 2500 m
Safety standards: IEC, CSA, UL	Installation category II, Pollution degree 2
<b>Autosampler</b>	
Pressure	Operating range 0 - 60 MPa (0 - 600 bar, 0 - 8850 psi)

GLP features	Early maintenance feedback (EMF), electronic records of maintenance and errors
Communications	Controller-area network (CAN). GPIB (IEEE-448), RS232C, APG-remote standard, optional four external contact closures and BCD vial number output
Safety features	Leak detection and safe leak handling, low voltages in maintenance areas, error detection and display
Injection range	0.1 - 100 $\mu$ L in 0.1 $\mu$ L increments (recommended 1 $\mu$ L increments)Up to 1500 $\mu$ L with multiple draw (hardware modification required)
Replicate injections	1 – 99 from one vial
Precision	Typically < 0.25 % RSD of peak areas from 5 - 100 $\mu$ L, Typically < 1 % RSD of peak areas from 1 - 5 $\mu$ L,
Minimum sample volume	1 $\mu$ L from 5 $\mu$ L sample in 100 $\mu$ L micr vial, or 1 $\mu$ L from 10 $\mu$ L sample in 300 $\mu$ L microvial
Carryover	< 0.05 %
Sample viscosity range	0.2 – 50 cp
Sample capacity	75-100 $\times$ 2 mL vials in 1 tray 100 - 175 $\times$ 1 mL vials in 1 tray 75-100 $\times$ 1.5 mL vials in 1 tray
Injection cycle time	50 s for draw speed 200 $\mu$ L/min, ejection speed 200 $\mu$ L/min, injection volume 5 $\mu$ L
Weight	14.2 kg
Dimensions (height $\times$ width $\times$ depth)	200 x 345 x 435 mm (5.5 x 13.5 x 17 inches)

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Line voltage	100 – 240 VAC, $\pm 10 \%$
Line frequency	50 or 60 Hz, $\pm 5 \%$
Power consumption	220 VA, 85 W / 290 BTU
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Humidity	< 95 %, at 25 – 40 °C
Operating altitude	2200 to 2500 m
Safety standards: IEC, CSA, UL	Installation category II, Pollution degree 2
<b>PDA Detector</b>	
Detection type	Double-beam photometer
Light source	Deuterium lamp
Wavelength range	190 – 700 nm
Short term noise (ASTM)	$< \pm 0.5 \cdot 10^{-5}$ AU at 254 nm
Drift	$3 \cdot 10^{-4}$ AU/h at 254 nm
Linearity	> 2 AU (5 %) upper limit
Wavelength accuracy	$\pm 1$ nm
Maximum data rate	13 Hz
Band width	6.5 nm typical
Flow cells	High pressure: 14 $\mu$ L volume, 10 mm cell path length and 400 bar (5800 psi) pressure maximum
Control and data evaluation	Compatible software for LC

Analog outputs	Recorder/integrator: 100 mV or 1 V, output range 0.001 to 2 AU, one output
Communications	Controller-area network (CAN), RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN
Safety and maintenance	Extensive diagnostics, error detection and display, leak detection, safe leak handling, leak output signal for shutdown of pumping system. Low voltages in major maintenance areas.
GLP features	Early maintenance feedback (EMF) for continuous tracking of instrument usage in terms of lamp burn time with user- settable limits and feedback messages. Electronic records of maintenance and errors. Verification of wavelength accuracy with built-in holmium oxide filter.
Weight	11 kg (25 lbs)
Dimensions (height × width × depth)	140 x 345 x 435 mm (5.5 x 13.5 x 17 inches)
Line voltage	100 – 240 VAC, ± 10 %
Line frequency	50 or 60 Hz, ± 5 %
Power consumption	220 VA, 85 W / 290 BTU
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### Specification for the triple quadrupole

Parameter	Measure	Specification
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MRM sensitivity Signal-to-Noise ratio (S/N) ESI positive	1 pg of chloramphenicol injected on column, quantifying on the transition m/z 609 to 195	S/N > 150,000:1 Noise 1 × RMS
MRM sensitivity Signal-to-Noise ratio (S/N) ESI positive	1 pg of chloramphenicol injected on column, quantifying on the transition m/z 321 to 152	S/N > 150,000:1 Noise 1 × RMS
Mass range	m/z	5 – 3,000
Polarity switching		30 ms
Mass resolution (auto tune)	Full width at half maximum	0.7 Da
Mass resolution (manual tune)	Full width at half maximum	0.5 Da
Mass accuracy		1.1 Da from 5 – 1,000 m/z 0.01% from 1,000 – 2,000 m/z 0.02% from 2,000 – 3,000 m/z
Mass stability		< 0.1 Da in 24 h
Dynamic range		> 6.0 × 10 <sup>6</sup>
Scan modes		MS scan, MS/MS product ion scan, MRM, MS/MS neutral loss/gain scan and precursor ion scan, SIM
Maximum scan rate		17,000 Da/s
Minimum MRM dwell time		0.5 – 0.8 ms

MRM transitions		450 per time segment > 40,000 ion transactions per method
Dynamic MRM transitions		4,000 ion transitions per method
Triggered MRM transitions		Up to 10 MRM transitions (primary and secondary) for library search and
Collision cell ion clearance		< 1 ms
Single point of control		Single-point data system method capability with full control of HPLC systems and Triple Quadrupole LC/MS System
Time programming		<ul style="list-style-type: none"> <li>• Polarity change in time segment</li> <li>• Scan and SIM or MRM (plus other modes of data collection)</li> <li>• Dynamic and triggered MRM aligns MRMs with compound retention time</li> <li>• Solvent divert through calibrant delivery system valve</li> </ul>
Ionization sources		Electrospray (ESI) , atmospheric pressure photo ionization (APPI) and Atmospheric pressure chemical ionization (APCI)
Autotune		Automated optimization of ion optics and mass axis calibration in positive and negative ion modes using a proprietary tune solution of 2 bottle of 100 ml two years of expiry date at the time of delivery
Solvent declustering		Countercurrent gas
Detector		High-energy conversion dynode and high-gain electron multiplier horn
Vacuum system		Two turbo molecular pumps with one mechanical pump

Library	<ul style="list-style-type: none"> <li>• NIST mass spectral library–latest version with license to be supplied with the system.</li> <li>• With LC/MS/MS library with effective search software(NIST 17)</li> </ul>
Electricity Supply	Single Phase, 200-240V, 50/60Hz
System software	Workstation Software with both compliance and method optimization software, a PC, a monitor and printer, service installation of the system
<b>Computer System and Software for System Control, Data Acquisition and Analysis.</b>	<ul style="list-style-type: none"> <li>• Intel at least Core i5 Processor with a minimum of 3.2 GHz Processor speed, 8 GB RAM, 1TB hard disk, CD/DVD RW with a separate graphics card that can support multiple displays with preloaded Windows 7 OS. 21"high resolution LCD</li> <li>• Software package should work on a Microsoft Windows 7 Professional Platform.</li> <li>• Software package should be comprehensive to handle the following basic options: <ul style="list-style-type: none"> <li>} Acquisition in full spectrum, peak hopping and time resolved modes.</li> <li>} Data analysis that is supported using isotope ratios, isotope dilution, external and standard calibrations with or without internal standards</li> <li>} Should support semi-quantitative analysis with rapid screening of unknowns.</li> <li>} Data archival and retrieval functions.</li> <li>} Auto-tuning of the instrument from a cold start.</li> <li>} Data Reporting and Macro Programming of customized analysis routines.</li> <li>} System diagnostics software. (Two identical computer systems one with a second license of the software should be supplied – for On-line analytical work and Off-line Data Processing).</li> <li>} Remote control: ready, start and stop shut down signals</li> </ul> </li> </ul> <p>Operating system: Microsoft Windows 2000 or XP  Autotuning: Included  Custom reporting: Included  Macro Programming language: Included  Intelligent sequencing: Optional  Data security pack: Optional</p>
Nitrogen generator with	Features

<p>inbuilt compressor, oil free and compatible with LCMSMS instrument</p>	<ul style="list-style-type: none"> <li>• Delivers 99.9 % nitrogen min 300 l/min</li> <li>• 24/7 operation at optimum performance</li> <li>• Generator outlets with flow adjusted gages</li> <li>• Gas is supplied on demand so generator works to your schedule</li> <li>• Few moving parts means little maintenance required and ensures long life of the generator</li> <li>• Minimal set-up required</li> <li>• Completely silent in operation</li> <li>• With LCMSMS work station</li> <li>• 12 month comprehensive on-site warranty</li> </ul> <p>Technical specification</p> <table border="1" data-bbox="613 810 1458 1514"> <tr> <td>Nitrogen (L/min)</td> <td>Min 300</td> </tr> <tr> <td>Inlet Air Requirement (L/min)</td> <td>900</td> </tr> <tr> <td>Min/ Max Air Inlet Pressure</td> <td>125-145 psi</td> </tr> <tr> <td>Min/ Max Operating Temperature</td> <td>5°C (41°F) - 30°C (86°F)</td> </tr> <tr> <td>Particles</td> <td>&lt; 0.01 µm</td> </tr> <tr> <td>Suspended Liquids</td> <td>None</td> </tr> <tr> <td>Phthalates</td> <td>None</td> </tr> <tr> <td>Pressure Dewpoint</td> <td>-40°C / 40°F</td> </tr> <tr> <td>Electrical Requirements</td> <td>110 - 230v 50/60 Hz</td> </tr> <tr> <td>Weight</td> <td>80-100 kg</td> </tr> <tr> <td>Size (HxWxD) mm</td> <td>90x40x70 - 1150 x 500 x 800mm</td> </tr> </table>	Nitrogen (L/min)	Min 300	Inlet Air Requirement (L/min)	900	Min/ Max Air Inlet Pressure	125-145 psi	Min/ Max Operating Temperature	5°C (41°F) - 30°C (86°F)	Particles	< 0.01 µm	Suspended Liquids	None	Phthalates	None	Pressure Dewpoint	-40°C / 40°F	Electrical Requirements	110 - 230v 50/60 Hz	Weight	80-100 kg	Size (HxWxD) mm	90x40x70 - 1150 x 500 x 800mm
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<p>Installation and Training</p>	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at Food lab EFMHACA, Addis Ababa, Ethiopia.</li> <li>• Five days Hands on training especially operational training to be provided at same site by company engineer on complete LC/MS/MS system</li> </ul>																						
<p>Warranty</p>	<ul style="list-style-type: none"> <li>• Instrument should be covered under comprehensive warranty for 5 years from the date of installation</li> <li>• Assuring availability of spares and Certified company service engineer</li> </ul>																						

Others	<ul style="list-style-type: none"> <li>Application notes, all relevant SOPs (if any), working Instructions manuals, training materials in English should be provided with soft and hard copy</li> </ul>
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**2. GCMSMS triple quadrupole with fully compatible computer and printer control.....Quantity (1)**

Technical specification

Triple QQQ Mass Spectrometer

Parameter	Value
Mode of operation	EI standard
Ion source material	Noncoated, proprietary inert source
Ion source temperature	150 to 350 °C
Filaments	Dual filaments for EI
Source cleaning	Automated and vent-free with patented (or proprietary) Jetclean Option
Electron energy	10 to 300 eV
Mass filters (2)	Proprietary monolithic hyperbolic gold-coated quadrupole
Mass axis stability	< ± 0.10 u over 24 hours (10 to 40 °C)
Quadrupole temperature	106 to 200 °C
Mass range	m/z 10 to 1,050
Resolution	Selectable, 0.7 to 2.5 Daltons, default tune settable, 0.4 to 4.0 Daltons, custom tune
Scan rate	Up to 20,000 u/s
Tuning	Auto tune or manual
Detector	Triple-Axis HED-EM with extended-life EM and dynamically ramped iris
MRM speed	800 transitions/sec
Minimum MRM dwell	0.5 msec
Collision cell	Linear hexapole Collision cell gas

Collision energy	Selectable up to 60 eV
Vacuum system	Dual stage turbomolecular pump Total gas flow up to 8 mL/min
Software	Software acquisition, data handling (quant/qual) and reporting Pesticides and Environmental Pollutants MRM database with over 8,000 optimized transitions (optional)

### Gas Chromatography

Column Oven		
	Dimensions	28x31x16 cm. accommodates up to two 105 cm x 0.530 mm id capillary columns or two 10-ft glass packed columns (9 in. coil diameter, ¼ in.od), or two 20-ft stainless steel packed columns (1/8 in. od).
	Operating temperature	+4°C to 450°C.  With LN <sub>2</sub> cryogenic cooling -80 to 450°C.  With CO <sub>2</sub> cryogenic cooling -40 to 450°C.
	Temperature set point Resolution	0.1 °C.
	Supports 20 oven ramps with 21 plateaus	Negative ramps are allowed
	Maximum achievable temperature ramp rate	120 °C./min (120 V units are limited to 75 °C./min)
	Maximum run time	999.99 (16.7 h)
	Oven cool down at Ambient	450 to 50 °C in 4.0 min (3.5 min with oven insert accessory).
	Ambient rejection	< 0.01 °C per 1 °C
	Electronic Pneumatics control (EPC)	<ul style="list-style-type: none"> <li>• Compensation for barometric pressure and ambient temperature changes is standard</li> <li>• Pressure has typical control of +/- 0.001 psi for the range of 0 to 150 psi. pressure set points adjusted in increments of 0.001 for</li> </ul>

		<p>the range 0.000 to 99.999 psi; 0.01 psi for the range 100.00 to 150.00 psi</p> <ul style="list-style-type: none"> <li>• Pressure units can be selected as psi, kpa or bar</li> <li>• Pressure /flow ramps: three maximum</li> <li>• Carrier and makeup gas settings selectable for He, H2, N2 and argon/methane.</li> <li>• Flow or pressure set points for each inlet or detector parameter</li> <li>• Constant flow mode is available when capillary column dimensions are entered</li> <li>• Split/split less, multimode, and PTV inlets have flow sensors for the control of split ratio</li> <li>• Inlet modules: pressure sensors: accuracy: &lt;+/- 2% full scale, repeatability:&lt;+/- 0.05 psi, Temperature coefficient: &lt; +/- 0.01 psi/oC, Drift: &lt; +/- 0.1 psi/6 months</li> <li>• Flow sensors: accuracy: &lt;+/- 5 % depending on the carrier gas, repeatability: &lt;+/- 0.35 % of setpoint, temperature coefficient&lt;+/- 0.20 ml/min (NTP)* per oC for He and H2</li> <li>• Detector modules: accuracy: &lt;+/- 3 ml/min NTP or 7 % of setpoint, Repeatability; &lt;+/- 0.35 % of setpoint</li> <li>• NTP= 25 oC and 1 atmosphere</li> </ul>
<b>Inlets</b>		
	S/SL	<ul style="list-style-type: none"> <li>• Suitable for all capillary columns (50 um to 530 um id)</li> <li>• Split ratios up to 7,500:1 to avoid column overload.</li> <li>• Splitless mode for trace analysis.</li> <li>• Maximum temperature range: 400 oC</li> <li>• EPC available in two pressure ranges: 0-100 psig (0 to 680 Kpa) for best control for columns <math>\geq 0.200</math> mm diameter; 0-150 psig for column &lt; 0.200 mm diameter</li> <li>• Gas saver mode to reduce gas consumption with out compromising performance</li> <li>• Electronic septum purge flow control to eliminate 'ghost' peaks</li> <li>• Total flow setting range 0 to 200 ml/min N2 and 0 to 1,250 ml/min H2 or He</li> <li>• Turn top inlet sealing system in built in standard with each S/SL inlet for quick, easy, injector liner changes.</li> </ul>
<b>Detectors</b>		
	FID	<ul style="list-style-type: none"> <li>• Flame ionization detector that responds to most organic compounds</li> <li>• Minimum detectable level (for tridecane): &lt; 1.4 pg C/s</li> <li>• Linear dynamic range: &gt;10<sup>7</sup> (+/-), full range digital data path enables peaks to be quantified over entire 10<sup>7</sup> range in a single run</li> </ul>

		<ul style="list-style-type: none"> <li>• Data rates up to 500 Hz accommodate peaks as narrow as 10 msec at half height</li> <li>• Standard electronic pneumatic control for three gases <ul style="list-style-type: none"> <li>} Air : 0- 800 ml /min</li> <li>} H2: 0- 100 ml /min</li> <li>} Make up gas (N2 or He) : 0- to 100 ml /min</li> </ul> </li> <li>• Adaptable for either packed or capillary columns</li> <li>• Flameout detection and automatic reignition</li> </ul> <p>450 oC maximum operating temperature</p>
	TCD	<ul style="list-style-type: none"> <li>• Thermal conductivity detector(TCD), universal detector that responds to all compounds, excluding the carrier gas</li> <li>• Minimum detectable level: 400 pg tridecane/ml with He carrier.</li> <li>• Linear dynamic range: &gt; 10<sup>5</sup> +/- 5 %</li> <li>• Unique fluidic switching design provides rapid stabilization from turn-on, low-drift performance</li> <li>• Maximum temperature: 400 oC</li> <li>• Standard EPC for 2 gases (He, H2 or N2 matched to carrier gas type)</li> <li>• Make up gas : 0-12 ml/min</li> <li>• Reference gas: 0-100 ml/min</li> <li>•</li> </ul>
	Micro-ECD	<ul style="list-style-type: none"> <li>• Micro –electro capture detector (micro-ECD), a very sensitive detector for electrophilic compounds such as halogenated organic compounds</li> <li>• Minimum detectable level: &lt; 4.4 fg/ml lindane</li> <li>• Proprietary signal linearization. Linear dynamic range: &gt; 5*10<sup>4</sup></li> <li>• Data acquisition rate: up to 50 Hz</li> <li>• Uses of <math>\beta</math> emission of &lt; 15 mCi<sup>63</sup>Ni as electron source</li> <li>• Unique micro-cell design minimizes contamination and optimizes sensitivity</li> <li>• 400 oC maximum operatin temperature</li> <li>• Standard EPC makeup gas types; argon/5% methane or nitrogen 0-150 ml/min</li> </ul>
Environmental conditions		
	Ambient operating Temperature	<ul style="list-style-type: none"> <li>• 15°C to 35 °C</li> </ul>
	Ambient operating Humidity	<ul style="list-style-type: none"> <li>• : 5% to 95 %</li> </ul>
	Storage extremes	<ul style="list-style-type: none"> <li>• -40 °C to 70 °C</li> </ul>
	Power requirments	<ul style="list-style-type: none"> <li>• Line voltage 220 -250 Volts +/- 10% of nominal</li> </ul>

	Frequency	<ul style="list-style-type: none"> <li>• 50/60 Hz</li> </ul>
Other specification		
	Height	<ul style="list-style-type: none"> <li>• 49 cm</li> </ul>
	Width	<ul style="list-style-type: none"> <li>• 58 cm with EPC inlet and detectors</li> </ul>
	Depth	<ul style="list-style-type: none"> <li>• 51 cm</li> </ul>
	Typical weight	<ul style="list-style-type: none"> <li>• 49 Kg</li> </ul>
		<ul style="list-style-type: none"> <li>• Four internal 24 volt connection (up to 150 mA)</li> </ul>
		<ul style="list-style-type: none"> <li>• Two on/off contact closures (48 V, 250 mA max)</li> </ul>
		<ul style="list-style-type: none"> <li>• 550 timed events via data system. 50 timed events via GC keyboard</li> </ul>
	Support up to 8 valves	<ul style="list-style-type: none"> <li>• Valves 1 to 4, 12 V DC 100 mA unheated, for low power valve applications</li> <li>• Valves 5 to 6, 24 V DC 100 mA unheated, for low power valve applications</li> <li>• Valves 7 to 8, externally powered as a remote event from separate contact closure</li> </ul>
<b>Auto sampler: both ALS and Headspace Sampler</b>		
1. Headspace sampler		
	Head space sampler with tray	111 vials with 12 position oven for optimized sample overlapping
	Chromatographic Performance	Typical area repeatability with tray < 1 % RSD
	Sample handling with Tray	<ul style="list-style-type: none"> <li>• 111 vial total capacity <ul style="list-style-type: none"> <li>↳ 108 vials in three removable 36 vial racks suitable for in-rack vial capping (racks are resistant to common solvents used in gas chromatography)</li> <li>↳ Three vials in priority sample positions</li> <li>↳ Racks exchangeable during sequence for continuous operation</li> <li>↳ Available 108 vial cooling plate</li> <li>↳ Twelve position air-bath vial oven for precise temperature control of every sample throughout its equilibration time</li> <li>↳ Adaptive algorithmic sample overlapping to maximize throughput</li> <li>↳ Vial shaker with frequency and accel-eration adjustable parameters provides faster sample equilibration</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>} Integrated bar code reader available</li> <li>} Available vial cooling plate (5 °C to ambient range, depending on environmental conditions, as described in Table 4) with temperature sensor allows critical samples to remain cold until the time of analysis (requires recirculating chiller)</li> </ul>
	Sampling Method	<ul style="list-style-type: none"> <li>• Robust valve and loop headspace sampling system with standard full electronic pneumatics provides complete control of the sampling process (allows independent vial pressurization and GC column head pressures)</li> <li>• Unrestricted GC column selection from 50 to 530 µm regardless of sampling conditions</li> <li>• Chemically inert sample flow path</li> <li>• Fully automated purging of sample and vent paths between each analysis</li> </ul>
	Sample vials	<ul style="list-style-type: none"> <li>• Adaptor-free compatibility with headspace vials of 10 mL, 20 mL, and 22 mL sizes that meet the following specifications: <ul style="list-style-type: none"> <li>} Screw or crimp top closure</li> <li>} Flat or rounded bottom style</li> <li>} Dimensions: - 10 mL size (47.0 mm minimum height with closure)</li> <li>} 20 mL and 22 mL sizes (79.0 mm maximum height with closure)</li> <li>} All sizes (22.40 to 23.10 mm width)</li> </ul> </li> <li>• Unrestricted use of different vial sizes within a single sequence</li> </ul>
	Modes of Operation	<ul style="list-style-type: none"> <li>• Single Extraction mode with overlapping of up to 12 vials for maximized sample throughput while maintaining constant heating time for each vial.</li> <li>• Multiple Headspace Extraction (MHE) mode with up to 100 extractions per vial.</li> <li>• Multiple Headspace Concentration (MHC) mode with up to 100 extractions from a single vial followed by one GC start to maximize sensitivity.</li> <li>• Method Development mode used to optimize headspace extraction by incrementing one of the following parameters: equilibration time, oven temperature, or vial shaking.</li> </ul>
	System control	<ul style="list-style-type: none"> <li>• Standalone Operation <ul style="list-style-type: none"> <li>– Control and monitoring by full function chemical resistant key pad</li> <li>– Multiline display with English language settings</li> </ul> </li> <li>• LED indicators for Not Ready, Run, Sleep, Service Due, and</li> </ul>

		<p>Tray Park</p> <ul style="list-style-type: none"> <li>– Setpoints and actual monitoring for all parameters</li> <li>– Store up to 32 user-defined headspace methods (plus five preset methods)</li> <li>– Store up to 9 user-defined sequences</li> </ul> <ul style="list-style-type: none"> <li>• Control software interfaced via LAN connection and available for integrated control via GC and MSD data systems. <ul style="list-style-type: none"> <li>– Headspace parameters are controlled via configuration and method dialogs</li> <li>– System actuals are displayed in conjunction with GC and GC/MS status</li> <li>– Headspace sequence status window displays individual sample information in graphical and detailed layouts</li> <li>– Event logging captures each headspace action and makes data available for reporting</li> </ul> </li> <li>• Enhanced control of instrument scheduling parameters – Tray diagrams for graphical display of sample status (available in select data systems) <ul style="list-style-type: none"> <li>– “Wizards” for headspace method generation from: <ul style="list-style-type: none"> <li>-Existing methods of either valve and loop or pressure transfer headspace sampling techniques</li> <li>- Sample specific information (solvent, boiling point)</li> </ul> </li> </ul> </li> </ul>
	Thermal control	<ul style="list-style-type: none"> <li>• All temperature zones (oven, valve and loop, transfer line) have setpoint increments in 1 °C with 0.1 °C resolution for actual temperatures and can be set to off (uncontrolled).</li> </ul>
	Pneumatic control	<ul style="list-style-type: none"> <li>• Electronic Pneumatic Control (EPC) with the following specifications: <ul style="list-style-type: none"> <li>– Compensation for barometric pressure and ambient temperature changes is standard.</li> <li>– Pressure setpoints may be adjusted by increments of 0.001 psi, with typical control <math>\pm 0.001</math> for the range 0.000 to 75.000 psi.</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>- Flow setpoints may be adjusted by increments of 0.01 mL/min, with typical control <math>\pm 0.01</math> for the range 0.0 to 200 mL/min.</li> <li>- User may select pressure units as psi, kPa, or bar.</li> <li>- Pressure sensors: <ul style="list-style-type: none"> <li>- Accuracy: <math>&lt; \pm 2\%</math> full scale</li> <li>- Repeatability: <math>&lt; \pm 0.05</math> psi</li> <li>- Temperature coefficient: <math>&lt; \pm 0.01</math> psi/<math>^{\circ}\text{C}</math></li> <li>- Drift: <math>&lt; \pm 0.1</math> psi/6 months</li> </ul> </li> <li>- Flow sensors: <ul style="list-style-type: none"> <li>- Accuracy: <math>&lt; \pm 5\%</math> depending on gas</li> <li>- Repeatability: <math>&lt; \pm 0.35\%</math> of setpoint</li> <li>- Temperature Coefficient: <math>&lt; \pm 0.20</math> mL/min (NTP*) per <math>^{\circ}\text{C}</math> for He; <math>&lt; \pm 0.05</math> mL/min (NTP*) per <math>^{\circ}\text{C}</math> for N2</li> </ul> </li> <li>• Vial pressurization is fully controlled by the included onboard EPC module <ul style="list-style-type: none"> <li>- Gas settings selectable for helium and nitrogen.</li> <li>- The following modes are available: <ul style="list-style-type: none"> <li>- Default with user settable vial pressure and the vial fill is algorithmically computed</li> <li>- Flow to Pressure with user settable vial fill flow and pressure allows gentle vial pressurization to minimize sample disturbance</li> <li>- Pressure with user settable vial pressure</li> <li>- Constant Volume with user settable volume of pressurization gas to add to the vial</li> </ul> </li> </ul> </li> <li>• Loop Fill is fully controlled by the included EPC module <ul style="list-style-type: none"> <li>- The following modes are available</li> </ul> </li> </ul>
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		<ul style="list-style-type: none"> <li>- Default where the loop fill is automatically computed</li> <li>- Custom where the fill rate (0 to 200.00 psi/min in 0.01 psi/min increments), final pressure (75.00 psi max), and equilibration time (0 to 999.99 min in 0.01 min increments) are user settable</li> <li>• Carrier Control Options <ul style="list-style-type: none"> <li>– External source such as a gas chromatograph</li> </ul> </li> <li>- Compatible gas types: nitrogen, helium, hydrogen, and argon/methane (95%/ 5% mix) <ul style="list-style-type: none"> <li>– Onboard carrier EPC module (optional)</li> </ul> </li> <li>- Compatible gas types: nitrogen, helium, hydrogen, and argon/methane (95%/5% mix)</li> <li>- Operation Modes: Constant Pressure, Constant Flow, Ramp Pressure, and Ramp Flow</li> <li>- Configuration Modes: Direct Control and Additive Flow</li> <li>- Supports a maximum of 10 GC oven ramps and 5 pneumatic ramps</li> </ul>
	Timing control	<ul style="list-style-type: none"> <li>• Vial equilibration time from 0 to 999.99 min in 0.01 min increments</li> <li>• Injection duration from 0 to 999.99 min in 0.01 min increments</li> <li>• GC cycle time from 0 to 999.99 min in 0.01 min increments</li> <li>• Sample probe purge time from 0 to 999.99 min in 0.01 min increments</li> </ul>
	Sample pathway	<ul style="list-style-type: none"> <li>• The sampling probe is UltiMetal Plus deactivated stainless steel.</li> <li>• The standard 1 mL sample loop is UltiMetal Plus deactivated stainless steel. Optional sample loops are available in 0.025 mL, 0.050 mL, 0.100 mL, 0.500 mL, 2 mL, 3 mL, and 5 mL sizes with UltiMetal Plus deactivation.</li> <li>• The transfer line heater assembly is 1 m in length and accommodates the following tubing types: <ul style="list-style-type: none"> <li>– Fused Silica Capillary of 0.25 mm, 0.32 mm, and 0.53 mm ID (maximum OD of 0.67 mm)</li> <li>– Metal Capillary of 0.53 mm ID (such as Agilent UltiMetal</li> </ul> </li> </ul>

		or ProSteel) with maximum OD of 0.67 mm
	Sample integrity	<ul style="list-style-type: none"> <li>• Automatic vial leak checking ensures vials have been sealed correctly before sampling and requires no calibration or setup.</li> <li>• Post-injection sample probe purge with user settable flow (0-200 mL/ min) and time (0-999.99 min).</li> <li>• Logging of movements, events, and errors for each vial. • Sequence Actions gives the user complete system control via logical operators (continue, skip, pause, abort) when any of the following occur: missing vials, wrong vial size, vial leak detected, and system not ready.</li> <li>• Optional bar code reader with support for checksums and the following fonts: <ul style="list-style-type: none"> <li>– 128</li> <li>– 3 of 9</li> <li>– matrix 2 of 5</li> <li>– standard 2 of 5</li> <li>– interleaved 2 of 5</li> <li>– UPC-A</li> <li>– EAN/JAN 13</li> <li>– EAN/JAN 8</li> <li>– UPC-E</li> </ul> </li> </ul>
	System integrity	<ul style="list-style-type: none"> <li>• System leak check diagnostics for the complete flow-path</li> <li>• Counters, alarms, and log for tracking of routine maintenance items</li> <li>• Instrument utilities software included, which enables firmware updates and diagnostics as well as providing all instrument manuals via LAN connection</li> <li>• Detailed power-on self test with error reporting</li> </ul>
	Environmental, Health, and Safety	<ul style="list-style-type: none"> <li>• Resource conservation settings allow the user to reduce environmental impact. <ul style="list-style-type: none"> <li>– Instrument Scheduling allows sleep and wake settings of time and instrument parameters</li> <li>– Gas Saver settings</li> <li>- Between Samples the sample probe purge is adjustable for</li> </ul> </li> </ul>

		<p>both flow and time</p> <p>- Between Sequences both vial pressurization gas and optional carrier supply gas flows can be reduced</p> <ul style="list-style-type: none"> <li>Excess vial gasses are safely depressurized via vent fitting on instrument and can be plumbed to traps or hoods as appropriate</li> </ul>
	Communication	<ul style="list-style-type: none"> <li>LAN</li> <li>Remote start/stop</li> </ul>
	Environmental Conditions	<ul style="list-style-type: none"> <li>Operation: 10 °C to 40 °C</li> <li>Storage: -40 °C to 70 °C</li> <li>Humidity: 5% to 95% (noncondensing)</li> <li>Power requirements <ul style="list-style-type: none"> <li>Line voltage: 120/200/220/230/240 ±10% supported by configurable transformer</li> <li>Frequency: 50/60 Hz</li> <li>Power: 850 VA maximum</li> </ul> </li> </ul>
	Safety and regulatory Certification	<ul style="list-style-type: none"> <li>Canadian Standards Association (CSA) C22.2 No. 61010-1</li> <li>CSA/Nationally Recognized Test Laboratory (NRTL): UL 61010-1</li> <li>International Electrotechnical Commission (IEC): 61010-1, 61010-2-010, 61010-2-081</li> <li>EuroNorm (EN): 61010-1</li> <li>CISPR 11/EN 55011: Group 1 Class A</li> <li>IEC/EN 61326</li> <li>Designed and manufactured under a quality system registered to ISO 9001</li> <li>Declaration of Conformity available</li> </ul>
<p>2. <b>ALS (Automated liquid sampler)</b></p> <p>System consists of</p> <ul style="list-style-type: none"> <li>Injection tower</li> <li>Sample tray</li> <li>Heater/mixer/bar code reader</li> <li>Enhanced sample handling syringe carriage</li> <li>Heater/chiller module</li> <li>Controller board</li> </ul>		
	Chromatographic	<ul style="list-style-type: none"> <li>Sample discrimination ≤10%</li> </ul>

	Performance	<ul style="list-style-type: none"> <li>• Better than 0.3 % RSD area reproducibility</li> <li>• Less than 5 % RSD in response factor variation</li> <li>• Less than 1 part in 100, 000 carry over</li> </ul>
	Injection features	<ul style="list-style-type: none"> <li>• Fast and on column default injection types</li> <li>• Fully programmable dispense rate, draw rate, and injection rate</li> <li>• Fast injections are performed less than 100 ms</li> <li>• Support of 250 and 500 ul syringes with optional Enhanced sample handling syringe carriage</li> <li>• User-definable sandwich injection mode</li> <li>• Transfer turret can hold up to three 2 ml vials at once for use with advanced sampler capabilities</li> <li>• Active vial gripping mechanism</li> <li>• Sensors in the vial gripper mechanism detect that a sample vial has been grasped</li> <li>• Sensors in the injector turret detect that the sample vial has been transferred to the injector</li> <li>• Sensors to detect the presence of enhanced sample handling syringe carriage</li> <li>• Sensors to detect the injection port location for easy movement between front and rear inlet ports</li> <li>• Illuminating syringe for easy viewing</li> <li>• User-changeable syringe carriage</li> <li>• Self-aligning injector and tray</li> <li>• Available solvent-saving mode extends solvent capacity by up to eightfold</li> </ul>
Sample injection		
	Injection parameter Control	<ul style="list-style-type: none"> <li>• Parameter range</li> </ul>
	Variable sampling Depth	<ul style="list-style-type: none"> <li>• -2 to +30 mm above default</li> </ul>
	Pre- and post injection Syringe	<ul style="list-style-type: none"> <li>• 0-15 rinses for each of solvent A and B rinsing</li> </ul>
	Sample pre washes	<ul style="list-style-type: none"> <li>• 0-15 prewashes</li> </ul>
	Viscosity delay	0-7 seconds
	Pre-injection sample Pumps	<ul style="list-style-type: none"> <li>• 0-15 pumps</li> </ul>
	Minimum sample	<ul style="list-style-type: none"> <li>• 10 nl (with 2ul syringe)</li> </ul>

	Injection	
	Maximum sample Injection	<ul style="list-style-type: none"> <li>• 50 ul (with 100 ul syringe in standard tower) 250 ul (with 500 ul syringe and enhanced sample handling syringe carriage)</li> </ul>
	Injection plunger Speed	<ul style="list-style-type: none"> <li>• Fast/slow/variable</li> </ul>
	On-column injection Mode	<ul style="list-style-type: none"> <li>• Automatic</li> </ul>
	Multiple injection Mode	<ul style="list-style-type: none"> <li>• 1-99 injections of specified volume</li> </ul>
	Injection delay time	<ul style="list-style-type: none"> <li>• 0-1 min (with multiple injection mode)</li> </ul>
	Pre injection dwell Time	<ul style="list-style-type: none"> <li>• 0-1 min</li> </ul>
	Post injection dwell Time	<ul style="list-style-type: none"> <li>• 0-1 min</li> </ul>
	Solvent saver	<ul style="list-style-type: none"> <li>• Set at 10, 20, 30, 40, and 80 % of syringe volume</li> </ul>
	Injection range	<ul style="list-style-type: none"> <li>• 1 to 50 % of syringe volume in increments of 1 %</li> </ul>
	Syringe size	<ul style="list-style-type: none"> <li>• 1,2,5,10,25,50 and 100 ul maximum volume with standard syringe carriage</li> <li>• 250 and 500 ul maximum volume with optional enhanced sample handling syringe carriage</li> </ul>
Sample management		
	Vial handling	<ul style="list-style-type: none"> <li>• System supports neckless (shell) vials, standard 2 ml vials, and micro vial inserts</li> <li>• 16 samples with injection tower and standalone turret</li> <li>• 150 samples with injection tower and tray</li> <li>• Sampler tray positioned away from GC to minimize exposure to heat</li> <li>• Tray samples stored in 3 removable 5*10 racks</li> <li>• Racks are compatible with multi-tip pipettes</li> </ul>
	Solvent	<ul style="list-style-type: none"> <li>• 4 ml solvent vials</li> <li>• 2*4 ml for injector tower with standalone turret(usable solvent capacity fo 4 ml)</li> <li>• 10*4 ml for injector tower with transfer turret (usable solvent capacity fo 20 ml)</li> </ul>
	Syringe support	<ul style="list-style-type: none"> <li>• Up to 100ul with standard syringe carriage</li> <li>• 250/500 ul with optional enhanced sample handling syringe</li> </ul>

		<ul style="list-style-type: none"> <li>carriage</li> <li>Supports compatible liquid and gastight syringes</li> </ul>
	Sample sequencing	<ul style="list-style-type: none"> <li>Advanced sequencing with random access</li> <li>Sample sequencing using GC keyboard</li> <li>Next sample overlap</li> <li>Capability to run priority samples</li> </ul>
	Heater/chiller module	<ul style="list-style-type: none"> <li>User installable</li> <li>Heat or cools all the 150 vials in the tray (temperature range 5-60 oC)</li> <li>Built in sensor monitors average coolant temperature in plate</li> <li>Uses aluminum vial racks to hold samples</li> <li>Thermal bath recirculator</li> </ul>
	Heater/mixer/bar code Reader	<ul style="list-style-type: none"> <li>Single vial heating prior to injection (temperature range 35 -80oC)</li> <li>Single vial mixing prior to injection</li> <li>Heating time and mixing time are fully programmable</li> <li>Bidirectional mixing up to 4,000 RPM</li> <li>Entire module is integrated into 150 position sample tray</li> </ul>
	Method programming	<ul style="list-style-type: none"> <li>Equipped with two towers, a tray, a heater/mixer/bar code reader. And enhanced sample handling syringe carriage can perform liquid manipulation including <ul style="list-style-type: none"> <li>Solvent addition</li> <li>Standard addition</li> <li>Internal standard addition</li> <li>Dilution</li> <li>Derivatization</li> <li>Quenching</li> </ul> </li> </ul>
	Physical specification	<ul style="list-style-type: none"> <li>weight <ul style="list-style-type: none"> <li>injector 3.9 Kg</li> <li>tray with heater /mixer/bar code and heater/chiller 9.3 Kg</li> <li>controller box 5 Kg</li> </ul> </li> <li>height <ul style="list-style-type: none"> <li>above bench surface of top injector 94 cm</li> <li>above bench surface of bottom tray 43 cm</li> <li>above bench surface of top of tray 73 cm</li> <li>controller box 11 cm</li> </ul> </li> <li>width <ul style="list-style-type: none"> <li>extension of tray past left side 45 cm</li> <li>width of controller box 25 cm</li> </ul> </li> <li>depth <ul style="list-style-type: none"> <li>tray with options , front to back 42 cm</li> <li>controller 31 cm</li> </ul> </li> </ul>

	<p><b>Hydrogen Generator, oil free with inbuilt compressor</b></p>	<p><b>Features</b></p> <ul style="list-style-type: none"> <li>• Suitable for flame gas and carrier gas at trace detection limits</li> <li>• 99.9999% purity</li> <li>• Internal leak detection with automatic shutdown features</li> <li>• Proven PEM technology to generate hydrogen safely and reliably</li> <li>• Regenerative PSA dryers to ensure highest level of purity</li> <li>• Automatic loading pump as standard</li> <li>• Maintenance limited to replacing de-ionizer cartridge</li> <li>• Compact, space-saving modular design</li> <li>• Creates hydrogen on demand, minimal storage of hydrogen in the system</li> <li>• Short and easy start-up and shutdown procedures</li> <li>• Combine multiple units for higher flow requirements</li> <li>• GC in-oven hydrogen leak detector available as an optional extra</li> <li>• 12 month comprehensive on-site warranty</li> <li>• Peak also offers a 3 year cell warranty with this generator as standard</li> </ul> <p>Generator outlets</p> <p>Gas type: hydrogen</p> <ul style="list-style-type: none"> <li>• Gas flow: 5000 cc/min</li> <li>• Purity: 99.9999 %</li> <li>• Dew point: -94 o/-70oC</li> <li>• Input requirements <ul style="list-style-type: none"> <li>} Outlet pressure range: 0 – 100 psi</li> <li>} Power consumption: 660 W – 1380 W</li> </ul> </li> <li>• Electrical requirements <ul style="list-style-type: none"> <li>} Voltage: 230 VAC</li> <li>} Frequency: 50/60 Hz</li> <li>} Current: max 6 amps</li> </ul> </li> <li>• General <ul style="list-style-type: none"> <li>} Size (HXWXD) mm : 460*380*540 mm</li> </ul> </li> <li>• Generator weights: 29 Kg</li> </ul>
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	<p><b>Nitrogen generator compatible with GCMSMS</b></p>	<ul style="list-style-type: none"> <li>•</li> <li>• Suitable for applications such as GCMSMS</li> <li>• Suitable for applications requiring ultra high purity</li> <li>• With an external compressor</li> <li>• Contains self-regenerating Carbon Molecular Sieve column</li> <li>• Gas is supplied on demand so generator works to your schedule</li> <li>• 12 month comprehensive on-site warranty</li> </ul> <p>Technical specification</p> <table border="1" data-bbox="641 632 1474 1333"> <tr> <td>Gas flow</td> <td>5L/min</td> </tr> <tr> <td>Nitrogen Purity</td> <td>99.9995%</td> </tr> <tr> <td>Outlet pressure</td> <td>80 psi</td> </tr> <tr> <td>Maximum relative humidity</td> <td>None</td> </tr> <tr> <td>Maximum altitude</td> <td>None</td> </tr> <tr> <td>Electrical requirements</td> <td>With air compressor 230v 50Hz 3.6A /</td> </tr> <tr> <td>Size (HxWxD) mm</td> <td>1222 x 432 x 406mm</td> </tr> <tr> <td>Power consumption</td> <td>With are compressor 230v - 828 watts</td> </tr> <tr> <td>Weight</td> <td>60 - 80 Kg</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Gas flow	5L/min	Nitrogen Purity	99.9995%	Outlet pressure	80 psi	Maximum relative humidity	None	Maximum altitude	None	Electrical requirements	With air compressor 230v 50Hz 3.6A /	Size (HxWxD) mm	1222 x 432 x 406mm	Power consumption	With are compressor 230v - 828 watts	Weight	60 - 80 Kg		
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<p><b>Computer System and Software for System Control, Data Acquisition and Analysis.</b></p>	<ul style="list-style-type: none"> <li>• Intel at least Core i5 Processor with a minimum of 3.2 GHz Processor speed, 8 GB RAM, 1TB hard disk, CD/DVD RW with a separate graphics card that can support multiple displays with preloaded Windows 7 OS. 21"high resolution LCD</li> <li>• Software package should work on a Microsoft Windows 7 Professional Platform.</li> <li>• Software package should be comprehensive to handle the following basic options: <ul style="list-style-type: none"> <li>} Acquisition in full spectrum, peak hopping and time resolved modes.</li> <li>} Data analysis that is supported using isotope ratios, isotope</li> </ul> </li> </ul>																					

	<p>dilution, external and standard calibrations with or without internal standards</p> <ul style="list-style-type: none"> <li>⌋ Should support semi-quantitative analysis with rapid screening of unknowns.</li> <li>⌋ Data archival and retrieval functions.</li> <li>⌋ Auto-tuning of the instrument from a cold start.</li> <li>⌋ Data Reporting and Macro Programming of customized analysis routines.</li> <li>⌋ System diagnostics software. (Two identical computer systems one with a second license of the software should be supplied – for On-line analytical work and Off-line Data Processing).</li> <li>⌋ Remote control: ready, start and stop shut down signals</li> </ul> <p>Operating system: Microsoft Windows 2000 or XP  Autotuning: Included  Custom reporting: Included  Macro Programming language: Included  Intelligent sequencing: Optional  Data security pack: Optional</p>
Installation and Training	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA Food lab. Office, Addis Ababa Ethiopia.</li> <li>• Five days on training especially operational training to be provided at same site by company engineer on complete GC/MS/MS system</li> </ul>
Warranty	<ul style="list-style-type: none"> <li>• Instrument should be covered under comprehensive warranty for 5 years from the date of installation</li> <li>• Assuring availability of spares and Certified company service engineer</li> </ul>
Others	<ul style="list-style-type: none"> <li>• Application notes, all relevant SOPs (if any), working Instructions manuals, training materials in English should be provided with soft and hard copy</li> </ul>

3. ICP/MS Fully equipped with compatible computer and printer.....Quantity (1)

Technical specification

Items	Parameters
<b>Sample introduction</b>	
Nebulizer:	Concentric nebulizer with low sample flow rate as standard (~0.2 mL/min) borosilicate glass
Spray chamber	Quartz, low-volume, Scott-type double pass spray chamber, Should provides improved removal of larger aerosol droplets, Should eliminates the need for separate external cooling water supply.
Controlled temperature range:	5 °C to +20 °C (with instrument cooling water at 15–30 °C)
Peristaltic pump	Low-pulsation, high-precision, 10-roller peristaltic pump, with three separate channels for precise delivery of sample and internal standard (ISTD), plus spray chamber drain.
Matrix Introduction	Ultra High Matrix Introduction aerosol dilution technology.
Injectors	Alumina/quartz/ PFA injector for HF medium and other samples
<b>Auto sampler</b>	
Design and compatibility	<ul style="list-style-type: none"> <li>• Heavy-duty, powder-coated aluminum frame for light weight, maximum rigidity and corrosion resistance.</li> <li>• User programmable high-speed probe arm assembly and optimized movement for fastest sample-to-sample speed.</li> <li>• USB plug-and-play connectivity should allows fast and easy setup.</li> <li>• Integrated spill tray contains accidental spills, protecting the laboratory bench and simplifying cleanup.</li> <li>• Standards rack and rinse port are centrally located for the fastest access and maximum throughput.</li> <li>• All electronic and mechanical components are located in top gantry, away from liquid spills, for long life and easy maintenance.</li> <li>• Compatible with full range of atomic spectroscopy instruments.</li> <li>• Modern industrial design combines well thought out robustness and performance characteristics with a sleek, eye-catching profile that coordinates with ICP-MS designs.</li> </ul>
Flexible rack configuration enables wide range of sample capacities	<ul style="list-style-type: none"> <li>• Compatible with a wide range of (Bel-Art) metal-free sample racks, including 90-, 60-, 40-, 24-, and 21-position racks. A 96-well microtiter plate rack for ICP-MS.</li> <li>• Central standards rack is configurable to support either a 34 position (twelve 29 mm OD tubes plus twenty two 17 mm OD tubes) or 5 position (five 61 mm OD bottles) rack (depending on instrument configuration).</li> <li>• Four sample rack capacity supports up to 360 samples, permitting long unattended runs in high-through put labs.</li> <li>• Eight 96-well microtiter plate capacity, with optional well plate kit, supports up to 768 samples for ICP-MS.</li> </ul>

<p><b>Integrated environmental enclosure option protects your samples and your laboratory environment</b></p>	<ul style="list-style-type: none"> <li>• Heavy-duty, powder-coated aluminum frame for light weight, maximum rigidity and corrosion resistance.</li> <li>• Maintain maximum sample integrity by protecting samples from the lab environment.</li> <li>• Protect operators and laboratory instrumentation from corrosive sample vapors.</li> <li>• Fully integrated environmental enclosure takes up no extra valuable bench space.</li> <li>• When the environmental enclosure is fitted, sample visibility remains unrestricted, as well as sample access from the front when the door is in the raised position.</li> <li>• Vertically sliding front access door can be fixed open for easy access to samples.</li> <li>• Electrical and plumbing connections remain outside the environmental enclosure for easy access with the cover in place.</li> <li>• Environmental Enclosure Kit includes a 50 mm (2 in) extraction air duct fitting that can be fitted to either side of the autosampler as needed.</li> </ul>
<p>Dual-wash reservoir option eliminates potential carryover</p>	<p>Optional dual-port wash reservoir for ultra-trace applications or applications requiring two different rinse chemistries</p>
<p>Three-channel peristaltic pump for ultimate flow-through rinse flexibility</p>	<ul style="list-style-type: none"> <li>• Simultaneously pump two different rinse solutions (in conjunction with the optional dual wash reservoir)</li> <li>• Third channel still allows for a pumped drain when a gravity drain is not an option.</li> </ul>
<p>Multiple probe size options for a diverse range of applications</p>	<ul style="list-style-type: none"> <li>• A range of carbon fiber–reinforced fluoropolymer probes suit all applications from microvolume sampling to high-speed discrete sampling.</li> <li>• Integrated nebulizer/probe assembly option for ultra-clean applications.</li> <li>• Programmable probe speed in 3 axes for the ultimate performance with all sample types.</li> <li>• Intelligent probe acceleration and deceleration permits high speed while minimizing spattering.</li> <li>• Programmable probe depth for sedimentary or separated layer samples.</li> </ul>
<p>Dimensions (WDXH)</p>	<ul style="list-style-type: none"> <li>• 600 mm*320 mm* 510 mm</li> </ul>
<p>Probe arm speed:</p>	<p>User programmable in X, Z, and Theta (rotational) dimensions.</p>

	Optimized sample-to-sample probe movement time for corner-to-corner travel in less than 3 seconds.		
	Axis	Minimum speed	Maximum speed
	X (mm/sec)	14.5	1016
	Z (mm/sec)	8.6	518
	Theta (degrees/sec)	9	540
Rinse port flow rate:	Programmable, up to 50 mL/min depending on pump tube Diameter		
Communication:	USB 2.0 (full speed) virtual com port with plug-and-play capability		
AUX interface:	RS485 for future upgradability to external device control		
Power requirements:	220 VAC, 50 Hz,		
Built-in diagnostics:	Includes a row of four LEDs on the front panel that indicate the operational or error status of the instrument.		
<b>Plasma Ion source</b>			
RF generator	High power-transfer efficiency and maintenance-free solid state digital drive 27 MHz RF generator with variable-frequency impedance matching.  RF power range: 500 W to 1600 W		
Torch	Easy-mount, one-piece quartz torch with 2.5 mm internal diameter injector. The system should be capable of using demountable torch with Platinum/sapphire injector		
Torch position	Stepper-motor controlled in three axes (horizontal, vertical and sampling depth) in 0.1 mm steps.  • Horizontal and vertical position range: $\pm 2$ mm  • Sampling depth: 3 to 28 mm		
Torch plasma system	Argon gas consumption 3 liter/minute or lower		
Computer control of torch	Torch movement should allow for complete computer and auto tunable X-Y-Z directions. With <b>independent</b> movements in three directions  Should provide for auto alignment of the torch after routine maintenance with reproducibility better than 0.1mm in X-Y-Z directions. Option of manual over ride for the above mentioned movements should also be available		
Preset plasma conditions:	Robust preset plasma condition, and easily reproduced using the pre-set		

	plasma function within the software — no manual tuning is required.
Shield torch mechanism	Capable of reducing the plasma ion spread provide for efficient cool plasma operation
<b>Interface</b>	
Sampling cone	1 mm diameter orifice, <b>Ni-tipped or Pt-tipped (option)</b> with Cu base. Easy access to the interface region for routine maintenance; no tools are required for removal/refitting of sampling cone.
Skimmer cone	0.45 mm diameter orifice, <b>Ni or Pt-tipped (option)</b> . Precisely controlled skimmer tip temperature ensures minimal matrix condensation, providing good tolerance to high matrix samples.
Ion optics and focusing system	
Ion Lens	The ion lens provides high ion transmission (> 1GHz/ ppm sensitivity at < 2.5% CeO/Ce and low back grounds to deliver superior detection limits
Extraction lens	Should ,minimize space charge effects and reducing mass bias/minimizing interference back ground  Should provide a flat mass response with the best low mass transmission  Should be dual mode extraction system (conventional and soft extraction)
Off-axis lens system	This double deflection lens protects the ORS4 cell and high vacuum region from contamination, by rejecting neutral species from the ion beam. This contributes to the minimal mass bias and low background noise. Should be outside the high vacuum region for easy maintenance
Reaction System/cell	
Ion guide	Should be octopole which provides superior ion focusing, minimizing ion scattering and ensuring that high sensitivity is maintained at the high cell pressures required for effective Kinetic energy discrimination/KED./
He cell mode as standard	unique octopole-based cell which enables efficient removal of interferences using an inert cell gas (He) and KED. The use of He cell gas also eliminates safety issues related to reactive gases such as H <sub>2</sub> , H <sub>2</sub> mixes or NH <sub>3</sub> .
Cell gas control	A single He cell gas controller as standard. A second or third cell gas line is to be added to permit the use of reactive cell gases such as H <sub>2</sub> , xenon or ammonia. If multiple cell gases are used in a method, the cell gas is automatically changed with minimal switching time (~5 sec).  Should have a minimum of four active mass flow control plasma auxiliary make up and carrier gas.
Plasma gas control	
<b>Mass analyzer</b>	
Quadrupole mass spectrometer	It should operate at high (3 MHz) frequency. It should provide A hyperbolic profile quadrupole for superior ion transmission, resolution and abundance sensitivity at standard settings It should eliminate the need for multiple resolution settings to separate

	<p>adjacent peaks.</p> <ul style="list-style-type: none"> <li>• Mass range: 2–260 amu</li> <li>• Mass scan speed <ul style="list-style-type: none"> <li>– Slew rate (Li to U, no intervening peaks): not less than 56.6 million amu/s</li> <li>– Scan speed (Li to U, plus data collection at 40 intervening masses): not less than 3,000 amu/s</li> </ul> </li> <li>• Abundance Sensitivity (at Cs): <ul style="list-style-type: none"> <li>– Low Mass side: <math>5 \times 10^{-7}</math> or lower</li> <li>– High Mass side: <math>1 \times 10^{-7}</math> or lower</li> </ul> </li> </ul>
Orthogonal detector system (ODS)	The ODS delivers higher sensitivity, lower background, and a wider linear dynamic range — up to 11 orders of magnitude from 0.1 cps to 10 Gcps. Provides fast measurement of transient signals, which uses a proprietary analog amplifier, which operates at the same short integration time (100 $\mu$ sec) in both pulse and analog mode.
Vacuum system	<p>Three-stage differential vacuum system using a single, split-flow turbo molecular pump and single external rotary pump for fast pump-down and simple maintenance.</p> <p>Should have Auto recover mode which returns the standby (pumping) state when electrical power is resumed after a power failure, saving valuable time. Shall not need to manually start the vacuum system following an overnight power failure</p>
Performance specification	
Sensitivity (Mcps/ppm)	<p>Li (7)</p> <p>Y (89)</p> <p>Tl (205)</p>
Inter element correction	Shall provide online inter element correction for precise correction of spectral interference
Background (cps)	No gas (9 u)
Oxide ratio (	CeO/Ce
	CeO/Ce (HMI-25)

Doubly charged ratio	Ce2+/Ce
No gas mode detection limits (Ppt)	Be(9)
	In(115)
	Bi(209)
He mode detection limit(ppt)	As (75)
	Se (78)
H2 mode detection limit	Se(78)
Short term stability (%RSD)	Li, Y, Ti
Long term stability (%RSD)	Li, Y, Ti
Isotope ratio precision (%RSD)	Ag (107)/Ag (109)
<b>Others</b>	
W X D X H	730 X 600 X 595mm
Operating temperature range	15 - 30 °C
Temperature rate of change	< 2°C/hr (max. change 5°C)
Operating Humidity range	20% to 80%
Electric voltage	Single phase, 200 - 240V, 50/60Hz
Current	30 A
Cooling water inlet temperature	15 – 40°C
Cooling water max flow rate	5L/minute
Cooling water inlet pressure	230 - 400kpa (33 – 58psi)
Argon gas minimum purity	99.99%
Argon gas maximum flow rate	20L/minute
Argon gas supply pressure	500 – 700 Kpa (71 – 1000Psi)
Cell gas minimum purity	99. 999%
Cell gas maximum flow rate	12ml/minute for He and 10ml/minute for H <sub>2</sub>
Cell gas supply pressure	90 – 130kpa (13 – 18.8psi) for He and 20 -60kpa (2.9 – 8.7psi) for H <sub>2</sub>
Exhaust duct vent type	Single vent 150mm diameter
Exhaust duct flow rate	5 - 7 m <sup>3</sup> /min

Nitrogen generator with inbuilt compressor, oil free and compatible with ICP MS instrument

#### Features

- Delivers 99.95 % nitrogen min 300 l/min
- 24/7 operation at optimum performance
- Generator outlets with flow adjusted gages
- Gas is supplied on demand so generator works to your schedule
- Few moving parts means little maintenance required and ensures long life of the generator
- Minimal set-up required
- Completely silent in operation
- With ICPMS work station

- 12 month comprehensive on-site warranty

Technical specification

Nitrogen (L/min)	Min 300	
Inlet Air Requirement (L/min)	900	
Min/ Max Air Inlet Pressure	125-145 psi	
Min/ Max Operating Temperature	5°C (41°F) - 30°C (86°F)	
Particles	< 0.01 µm	
Suspended Liquids	None	
Phthalates	None	
Pressure Dewpoint	-40°C / 40°F	
Electrical Requirements	110 - 230v 50/60 Hz	
Weight	80-100 kg	
Size (HxWxD) mm	90x40x70 - 1150 x 500 x 800mm	

Library	<ul style="list-style-type: none"> <li>• NIST library–latest version with license to be supplied with the system.</li> <li>• With ICP mass spectrum library with effective search soft ware</li> </ul>
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<b>Computer System and Software for System Control, Data Acquisition and Analysis.</b>	<ul style="list-style-type: none"> <li>• Intel at least Core i5 Processor with a minimum of 3.2 GHz Processor speed, 8 GB RAM, 1TB hard disk, CD/DVD RW with a separate graphics card that can support multiple displays with preloaded Windows 7 OS. 21"high resolution LCD</li> <li>• Software package should work on a Microsoft Windows 7 Professional Platform.</li> <li>• Software package should be comprehensive to handle the following basic options: <ul style="list-style-type: none"> <li>} Acquisition in full spectrum, peak hopping and time resolved modes.</li> <li>} Data analysis that is supported using isotope ratios, isotope dilution,</li> </ul> </li> </ul>
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	<p>external and standard calibrations with or without internal standards</p> <ul style="list-style-type: none"> <li>} Should support semi-quantitative analysis with rapid screening of unknowns.</li> <li>} Data archival and retrieval functions.</li> <li>} Auto-tuning of the instrument from a cold start.</li> <li>} Data Reporting and Macro Programming of customized analysis routines.</li> <li>} System diagnostics software. (Two identical computer systems one with a second license of the software should be supplied – for On-line analytical work and Off-line Data Processing).</li> <li>} Remote control: ready, start and stop shut down signals</li> </ul> <p>Operating system: Microsoft Windows 2000 or XP  Autotuning: Included  Custom reporting: Included  Macro Programming language: Included  Intelligent sequencing: Optional  Data security pack: Optional</p>
Installation and Training	Installation and commissioning of the system including IQ, OQ at EFMHACA Food lab. office, Addis Ababa Ethiopia
	<ul style="list-style-type: none"> <li>• Five day Hands on training especially operational training to be provided at same site by company engineer on complete ICP/MS/MS system</li> </ul>
Warranty	<ul style="list-style-type: none"> <li>• Instrument should be covered under comprehensive warranty for 5 years from the date of installation</li> <li>• Assuring availability of spares and Certified company service engineer</li> </ul>
Others	<ul style="list-style-type: none"> <li>• Application notes, all relevant SOPs (if any), working Instructions manuals, training materials in English should be provided with soft and hard copy</li> <li>• Instrument should be covered under comprehensive warranty for 5 years from the date of installation</li> </ul>

4. **UV-Vis Spectrophotometer fully PC Controlled.....**

**Quantity(2)**

**Technical specification**

Source	Unique full-spectrum Xenon, Halogen lamp, Deuterium lamp flash
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	lamp (80 Hz) with typical lifetime of 10 years
Monochromator:	Czerny-Turner
Grating:	Holographic, 27.5 x 35 mm, 1200 lines/mm, blaze angle 8.6° at 240 nm
Beam splitting system	Beam splitter
Detector	2 silicon diode detectors for simultaneous sample beam and reference beam measurements
Optical Design	Double beam Czerny-Turner monochromator
UV-Vis limiting resolution (nm)	≤ 1.5 nm
Wavelength range	190–1100 nm
Wavelength accuracy	± 0.5 at 541.94 nm
Wavelength reproducibility	± 0.1 nm
Photometric accuracy	± 0.002 Abs (at 0.5 abs) ± 0.0004 abs (at 1.0 abs) ± 0.006 Abs (at 2.0 abs)
Stray light (% T)	At 198 nm (12 g/L KCl, TGA & BP/EP method) ≤ 1 %
	At 220 nm (10 g/L NaI ASTM method) ≤ 0.05 %
	At 370 nm (50 mg/L NaNO <sub>2</sub> ) ≤ 0.05 %
Photometric range	± 4.0 Abs Transmittance: 0 % - 400 %
Photometric display	± 9.9999 Abs, ± 200.00 %T
Photometric reproducibility	Using NIST 930E at 465nm & 2s SAT: Max. deviation <0.004Abs and SD of 10 measurements <0.00050Abs; Using NIST 930E at 546.1nm & 2s SAT: Max deviation <0.003Abs and SD of 10 measurements <0.0030Abs.
Photometric stability	at 500nm, 10s SAT is <0.0004 Abs/h

Photometric noise	500 nm, 10 s SAT, after 30 min warmup 500 nm, 1 s SAT At 0 Abs < 0.00002 Abs
	At 1 Abs < 0.00012 Abs
	At 2 Abs < 0.0011 Abs
	260 nm, 1s SAT at 0 Abs < 0.00002 Abs
	0.0004 Abs
Baseline Flatness:	200 to 850 nm, baseline corrected +/- 0.001 Abs
Spectral bandwidth (nm)	Fixed at 1.5 nm (approximately)
Signal averaging (seconds)	0.0125-999 s
Maximum scan rate (nm/min)	24,000 nm/min
Slew rate (nm/min)	24,000 nm/min
Data interval (nm)	0.15 – 5.0 nm
Repetitive scanning	4800 data points per minute, maximum number of cycles: 999, Maximum cycle time (min): 999
Data collection rate	80 data points/second
Minimum sample volume	0.5 µL
Compartment size (WXDXH)	130 mm x 523 mm x 123 mm
Sample compartment access	Top and front
Temperature monitor	Temperature probe inside cuvette (using Temperature probe accessories)
Instrument dimensions (WXDXH)	Unpacked 450-477 x 490-567 x 196-270 mm
Instrument weight	Unpacked 15 - 18 kg
Instrument electrical requirements (Required supply voltage )	220- 240 V AC, Frequency 50 Hz Nominal rating Scanning: 18 W, Idle: 9 W

Memory	<p>USB memory plus</p> <p>Save as text and UV PC file</p>
<b>Computer System and Software for System Control, Data Acquisition and Analysis.</b>	<ul style="list-style-type: none"> <li>• Intel at least Core i5 Processor with a minimum of 3.2 GHz Processor speed, 8 GB RAM, 1TB hard disk, CD/DVD RW with a separate graphics card that can support multiple displays with preloaded Windows 7 OS. 21"high resolution LCD</li> <li>• Software package should work on a Microsoft Windows 7 Professional Platform.</li> </ul>
Installation and Training	<p>Installation and commissioning of the system including IQ, OQ and PQ at EFMHACA Food lab. office, Addis Ababa, Ethiopia</p>
	<p>Two days Hands on training especially operational to be provided at same site by company engineer on complete <b>UV-Vis-Spectrophotometer</b> system and accessories</p>
Warranty	<ul style="list-style-type: none"> <li>• Instrument should be covered under comprehensive warranty for 2 years from the date of installation</li> <li>• Assuring availability of spares and Certified company service engineer</li> </ul>
Others	<p>Application notes, all relevant SOPs (if any), working Instructions manuals, training materials in English should be provided with soft and hard copy</p>

5. Freeze drier with Pro control together with external vacuum pump..... Quantity (1)

Technical specification

Dimensiones without drying attachments (WxDxH)	450 x 585 x 510 mm
Weight	75 kg
Minimum clearance on all sides	300 mm
Connection voltage	208-230 VAC
Power consumption(rated)	1200 W
Power consumption (máximum)	1800 W
Lug	10A/250V
Frequency	50 HZ
Overvoltage category	II
Protection rating	IP20
Pollution degree	2
Condensing capacity	6 Kg/24 hr
Lowest condenser temperature	-55 oC
Temperature divergence	+/- 1.0 oC
Condenser capacity	<6Kg
Number of compressors	1
Condenser surface area	1410 cm <sup>2</sup>
Refrigerant	CFC-free
Refrigerant quantity	467 g
Drying shelf temperature	Up to 60 oC
Drying shelf temperature tolerance	+/- 1.0 oC
Vacuum generation time to 0.1 mbar	Typically <10 min
Volumen-based leakage rate	Typically < 0.001 mbar*L/sec
Máximum system vacuum	Typically <30m Torr
Vacuum control range	50 to 500 m Torr

User interface	Pro
Vacuum sensor	1 pc
Main valve	1pc
Aeration valve	1pc
Regulation valve	1pc
Vacuum pump Duo 6	1pc
Drying chamber heatable shelf	1pc
Drying chamber rack manifold	1pc
Additional external vacuum sensor	1pc
Power cord	1
Vacuum clap, ISO-KF 16	1
Vacuum clap, ISO-KF 25	2
Vacuum seal, ISO-KF 16	1
Vacuum seal, ISO-KF 25	2
O-ring 300 mm	2
Vacuum tubing adaptor, ISO-KF 16 to ISO-KF 25	1
Cross-pipe (inc. Seals and clamps)	1
90° elbow, ISO-KF 16	2
Main valve (inc. Seals and clamps)	1
Monitor	1pc
<b><u>Vacuum pump</u></b>	
Suction capacity (DIN 28432)	1.5 m <sup>3</sup> /h*
Number of steps (heads)	2 (2)
Final vacuum (absolute)	10 mbar (± 2 mbar)
Connections	G L14
Power consumption	150 W

Power consumption in ECO <sub>2</sub> -mode* (70 %)	70 W
Electrical requirements	100 – 240 V, 50/60 Hz
Pump motor	DC, brushless
Nominal speed	max. 1280 rpm
Power consumption in ECO <sub>2</sub> -mode* (70 %)	70 % of nominal speed
Sound level	32 – 57 dB(A) 57 dB(A) with 100 % loa
Material in contact	PTFE, FEP, FFKM, PPS
Installation and Training	Installation and commissioning of the system including IQ & OQ at EFMHACA Food lab. office, Addis Ababa Ethiopia
	Hands on training to be provided at same site by company engineer on complete <b>Freeze drier</b> system and accessories
Warranty	<ul style="list-style-type: none"> <li>• Instrument should be covered under comprehensive warranty for 2 years from the date of installation</li> <li>• Assuring availability of spares and Certified company service engineer</li> </ul>
Others	All relevant SOPs (if any), working Instructions manuals, training materials in English should be provided

6. **Orbital and Linear shaker.....quantity (2)**

**Technical specification**

**Shaker - orbital and Linear shaking action**

Electronic time switching clock controls or continuous operation mode

Built-in digital timer

Reliable quiet drive mechanism

Fully adjustable cradle system

Simultaneously display of speed, timer and operating mode

Shaking action	Reciprocating or orbital
Accommodate the following Erlenmeyer flasks or bottles	12 x 250ml or 9 x 500ml or 4 x 1000ml or 2 x 2000ml.
Platform dimensions (w x l)	335 x 335mm
Speed range 2	100 to 500 rpm orbital 100 – 350 linear
A digital built-in timer	Allows shaking times from 1 to 999 minutes to be set (After the timer has counted down, the shaker stops and sounds an alert) Alternatively the unit can be set for continuous operation.
Orbit amplitude	20 mm
Maximum load	10kg
Operational temperature range	+4 to +40°C
Maximum permissible humidity	80 percent
Overall dimensions (w x d x h)	360 x 420 x 270mm
Net weight	11kg
Electrical supply	230V, 50Hz, 50W

Required accessories	<ul style="list-style-type: none"> <li>Fixing clip attachment</li> </ul>
<b>Warranty</b>	<ul style="list-style-type: none"> <li>A minimum of 2 year warranty period should be provided</li> </ul>
Others	All relevant SOPs (if any), working Instructions manuals, training materials in English should be provided

7. **Digital Polari meters.....quantity (1)**

Rotation	<ul style="list-style-type: none"> <li>Optical rotation</li> <li>Specific rotation</li> </ul>
Scales	Angular Degrees (°A): -355 to +355 International Sugar Scale (°Z): -225 to +225 User Scales/Methods: 100
Rotation	Dextro rotator – 200 Levorotatory + 200
Resolution	Angular Degrees (°A) 0.01/0.001 (selectable) International Sugar Scale (°Z)
Accuracy	Angular Degrees (°A): ± 0.010  International Sugar Scale (°Z): ± 0.030
Precision (Reproducibility)*	Angular Degrees (°A): ± 0.002  International Sugar Scale (°Z): ± 0.005
User Scales & Methods Library	PHR-MEAN statistical, Specific Rotation, Concentration, Inversion (A-B), Invert Sugar and User Defined
Reading Time	Continuous measurement and display or single shot (selectable)
Tube Length , Sample cell	Automatic identification of sample cell, 10 to 200 mm
Wave length	Sodium (589nm)
Standard light source	Light Emitting Diode (LED) (100,000+ hours)
Beam Diameter	4mm
Optical Density	0.0 to 3.0 OD

Instrument Housing	Polyurethane foam with aluminum base
Interfaces	1 x USB (A), 1 x USB (B), 1 x Ethernet
Power	Instrument: 24 V DC, $\pm 5\%$ , $<2A$ External PSU: 100-240V, 50-60Hz (supplied)
Humidity Range	$<90\%$ RH (non condensing)
Measuring Range	10 - 45°C
Sensor Accuracy	$\pm 0.1$ °C
Stability	$\pm 0.2$ °C
Stability checks	SMART
<b>Installation and Training</b>	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA Food lab lab. office, Addis Ababa Ethiopia</li> <li>• One day Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</li> </ul>
<b>Warranty</b>	<ul style="list-style-type: none"> <li>• A minimum of 2 year warranty period should be provided</li> </ul>
<b>Others</b>	<ul style="list-style-type: none"> <li>• All relevant SOPs (if any), working Instructions manuals, training materials should be provided soft and hard copy</li> </ul>

8. Digital Refractometer .....quantity (1)

Technical specification

Range	1.33 - 1.53 RI, 0 - 95% Brix, 1.0000 - 1.0400 Urine S
Resolution	0.00001 RI, 0.01 Brix, 0.0001 Urine S
Reproducibility	$\pm 0.00002$ RI, $\pm 0.015$ Brix, $\pm 0.0001$ Urine S
Accuracy	$\pm 0.00002$ RI, $\pm 0.02$ Brix, 0.0001 Urine S

Automatic temperature compensation	between 10 and 40°C (50 – 104°C)
Sample temperature limite	-20oC to +250oC
Temperature correction range	10 to 95 oC
Wavelength	589.3 nm
Measurement time	Approximately 1.5 seconds
Minimum Sample Volume	2 metric drops
Light source	Yellow LED(exp life>1,000,000 measurements)
Simple cell	Stainless Steel ring and Flint glass prism
Case material	ABS
Enclosure rating	IP6S
Battery type/life	(1) 9V / 5000 readings
Auto-off	After 3 minutes of non-use
Dimensions (WXDXH)	19.2(W) x 10.2(D) x 6.7 (H)cm
Weight	420g
<b>Installation and Training</b>	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA Food lab. office, Addis Ababa Ethiopia</li> <li>• One days Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</li> </ul>
<b>Warranty</b>	<ul style="list-style-type: none"> <li>• A minimum of 2 year warranty period should be provided</li> </ul>
Others	All relevant SOPs (if any), working Instructions manuals, training materials in english should be provided

9. **Density Meters**.....quantity (1)

<b>Accuracy</b>	<b>Density: 0.00001 g/cm<sup>3</sup></b> <b>Temperature: 0.01 °C</b>
<b>Repeatability</b>	<b>Density: 0.000005 g/cm<sup>3</sup></b> <b>Temperature Selectable: 0.001 °C</b>
<b>Resolution</b>	<b>Density: 0.000001 g/cm<sup>3</sup></b> <b>Temperature: 0.001°C</b>
<b>Density range</b>	<b>0 to 3 g/cm<sup>3</sup></b>
<b>Temperature range(controlled via peltier)</b>	<b>0°C to 95°C</b>
<b>Pressure</b>	<b>0 to 10 bars</b>
<b>Video scanning and magnification</b>	<b>Three magnified video assisted views of the entire cell are available, in 2x, 6x and a 10x magnifications with video scanning. Images may be saved with results for subsequent review.</b>
<b>Automatic Bubble Detection</b>	<b>Automatically warns operator of bubbles</b>
<b>Measurement modes</b>	<b>Continuous, single, multiple</b>
<b>Measurement technique</b>	<b>Mechanical oscillating U-tube method</b>
<b>Maximum sample volume</b>	<b>Less than 1 ml</b>
<b>Wetted material</b>	<b>Borosilicate glass, Teflon PTFE, ECTFE</b>
<b>Operating system</b>	<b>Windows Embedded; write protected software safe from malware and viruses</b>
<b>Measurement time</b>	<b>30 - 60 seconds after thermal equilibration</b>

<b>Display</b>	<b>10.4 inch diagonal TFT type LCD with wide viewing angle, anti-glare flat panel touch screen, 300 nits brightness, 800 x 600 pixels, chemical, scratch and spill resistant monitor, the industry's largest and most flexible interface</b>
<b>Communication Interface</b>	<b>Touch Screen User Interface, 5 – USB Ports, 2 – RS232 Ports, 2 – Ethernet Ports for Network Connection, Keyboard Bar Code canner, Mouse, Network Capabilities</b>
<b>Remote Support</b>	<b>Troubleshooting, Diagnostics, Software Updates available via the Internet</b>
Internal Memory	32 GB Non-removable Compact Flash
Operating Dimensions	<b>18.36” (L) x 11.80” (W) x 13.90” (H)</b> <b>46.61 cm (L) x 29.97 cm (W) x 35.30 cm (H)</b>
Power Supply	<b>250 V, 50 Hz</b>
<b>Installation and Training</b>	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA Food lab. office, Addis Ababa Ethiopia</li> <li>• One days Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</li> </ul>
<b>Warranty</b>	<ul style="list-style-type: none"> <li>• A minimum of 2 year warranty period should be provided</li> </ul>
	<ul style="list-style-type: none"> <li>• All relevant SOPs (if any), working Instructions manuals, training materials should be provided soft and hard copy</li> </ul>

10. . **Mortar Grinder.....quantity (1)**

**Technical specification**

Applications	Grinding, mixing and triturating, dry and wet
Field of application	agriculture, biology, chemistry /plastics, construction materials, food, geology / metallurgy, glass / ceramics, medicine / pharmaceuticals
Feed material	Soft, hard, brittle, pasty
Size reduction principle	Pressure, friction
Material feed size	< 8 mm
Final fineness	< 10 $\mu\text{m}$
Batch size/feed quantity	10 – 190 ml
Grinding chamber volume	700 ml
Speed at 50 HZ (60 HZ)	100 $\text{min}^{-1}$
Setting of pestele pressure	vertical by adjusting knob + scale, horizontal by adjusting knob + visual/acoustic control
Setting of scraper pressure	by adjusting knob + visual control
Material of grinding tools	hardened steel, stainless steel, tungsten carbide, agate, sintered aluminium oxide, zirconium oxide, hard porcelain
Setting of grinding time	digital, 1 - 99 min / continuous operation
Drive	1-phase motor with auxiliary capacitor
Electrical supply data	Different voltage
Power connection	1-phase
Protection code	IP 53
Power consumption	250 W (230 V, 50 Hz) / 290 W (120 V, 60 Hz)
Dimensions (WXHxD)	400 x 480 x 370 mm (opened 400 x550 x 510 mm )
Weight	24.2 Kg
<b>Warranty</b>	<ul style="list-style-type: none"> <li>A minimum of 2 year warranty period should be provided</li> </ul>
Others	All relevant SOPs (if any), working Instructions manuals, training

	materials in English should be provided
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**11. Hotplates, 30x50cm .....Quantity (2)**

- Large plate area ideal for heating multiple vessels Accommodates up to 30 x 100ml beakers
- These large rectangular shaped hotplates are ideal for heating many smaller vessels simultaneously.
- An easy to use knob located on the front of the hotplate controls the top plate temperature. The robust side arms make the unit very easy to carry.
- The large surface area may stay hot for a long time after use, so for maximum safety, a bright red hot warning light will continue to flash until the hotplate is cool. There are two models to choose from:
- Has a glass ceramic top plate. It is easy to clean in the event of spillage and, due to unique thermal properties, can be heated to very high temperatures giving very fast heat up times.

<b>Plate material</b>	Glass ceramic
<b>Plate dimensions, mm</b>	300 x 500
Heated area, mm	250 x 450
<b>Heater power, W</b>	2250
<b>Max. plate temp. °C</b>	375
Overall dimensions, (w x d x h) , mm	520 x 360 x 130
Net weight, kg	12
Electricity supply	230V, 50-60Hz
<b>Warranty</b>	<ul style="list-style-type: none"> <li>• A minimum of 2 year warranty period should be provided</li> </ul>

**12. Muffle Furnance vertical lift door.....Qty (1)**

- Feature exclusive LGO heating elements and Moldatherm insulation for efficient and economical transfer of heat to chamber, with low exterior temperatures

- Variable heat-up rate eliminates thermal shock to materials with quick heat-up and cool-down rates
- Air vent (1 in. dia., top) and air inlet (0.375 in. dia., rear) for inert atmosphere exchange; (Note: door is not gas-tight)
- Self-tuning, digital instrumentation for precise temperature setpoint and display
- Platinel II thermocouple for longterm stability
- 0.6 cu.ft. models feature vertical lift door; 2 cu.ft. models feature horizontal side swing door, hot side facing away from operator for protection Microprocessor control
- Microprocessor-based self-tuning PID control provides optimum thermal process, prevents overshoot
- Control panel designed for easy access and maintenance
- Main power ON/OFF switch on control panel
- •Adjustable high-limit overtemperature protection Simultaneous LED display of actual
- temperature vs. set point in °C or °F
- Safety door switch interrupts power to heating element when door is opened; protects heating elements and minimizes exposure to end-user
- Removable shelves for versatility
- Moldatherm hearthplate supports load and prevents damage due to spillage
- Flowmeter option (FM)
- Available on selected models with “FM” designation (see chart)
- Gas flowmeter, adjustable, located on front control panel
- Adjustable flow rate, range 1.0 to 10.0 cu.ft./hr standard
- Suitable for inert gas or air flow to chamber
- Allows fresh air exchange for ashing applications
- Not suitable for combustible or volatile gases
- Note: Use with inert atmosphere will exhibit some leakage.

<b>Capacity</b>	16.4 L
<b>Temperature Range (Metric)</b>	100°C to 1200 °C
<b>Temperature Stability</b>	±1.2 at 1000°C
<b>Temperature Uniformity</b>	±3.45°C
<b>Type</b>	Single setpoint
<b>Interior(D*W*H)</b>	27.9 x 33.0 x 17.8 cm (11 x 12 x 11 in)
<b>Exterior(D*W*H)</b>	58.4 x 61 x 68.6 cm (23 x 24 x 27 in)
<b>Control</b>	C/OTC/FM
<b>Electrical Requirements</b>	208/240 V, 50/60 Hz 4500 W, 16-19
<b>Installation and Training</b>	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA medicine and Food lab. office, Addis Ababa Ethiopia</li> <li>• One days Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</li> </ul>
<b>Warranty</b>	<ul style="list-style-type: none"> <li>• A minimum of 3 year warranty period should be provided</li> </ul>
<b>Others</b>	<ul style="list-style-type: none"> <li>• All relevant SOPs (if any), working Instructions manuals, training materials should be provided soft and hard copy</li> </ul>

**13. Multi tube Vortex Mixer..... Quantity (1)**

- Hands-free, high capacity vortexing
- Up to 2500rpm, a true vortex in every tube
- Assortment of accessories for a variety of tubes, flasks & plates
- Pulsing program for interval mixing

- Fits almost any tube rack

Speed Range:	500 to 2500rpm
Capacity:	6 x 250ml
Orbit:	3.6mm
Timer:	1min. to 99 hr 59min.
Platform Dimensions:	12 x 7 in. / 30 x 17.8 cm
Dimensions:	15 x 9.2 x 16.5 in. 38.5 x 23.5 x 42cm
Weight:	13kg / 29lb
Warranty:	Two Years
Electrical:	100 to 240V, 50-60 Hz
Dimensions:	15 x 9.2 x 16.5 in. 38.5 x 23.5 x 42cm
Required accessories	
Tube Rack, 96 x 0.5ml, (Ø: 8mm)	
Tube Rack, 96 x 1.5ml/2.0, (Ø: 10mm)	
Tube Rack, 50 x 12mm (included)	
Tube Rack, 50 x 13mm	
Tube Rack, 50 x 15ml, (Ø:16.58mm)	
Tube Rack, 15 x 50ml, (Ø: 29mm)	
Tube Rack, 15 x 25mm	

Tube Rack, 9 x 50ml horizontal, (QuEChERS method)	
Rack for up to 3 microplates or 96 well microtuberacks	
Carrier for above, 96 x 0.2ml tubes or strips (3pk.)	
Additional	<ul style="list-style-type: none"> <li>All relevant SOPs (if any), working Instructions manuals, training materials should be provided soft and hard copy</li> </ul>

**14. Horizontal Bench top Autoclaves .....Quantity (1)**

- Integrated, separate steam generator
- Housing, support frame and pressure vessel made of corrosion-resistant stainless steel
- Temperature and pressure range 140°C, 4 bar
- LCD display and fully automatic microprocessor control
- Number of sterilization programs: Up to 25
- Code-secured access rights for changing parameters and further safety-relevant intervention
- Internal memory for storing up to 500 sterilization cycles
- Timer for starting programs
- Autofill: automatic demineralized water feed for steam generation
- Flexible PT-100 temperature sensor
- Additional temperature sensor in condense exhaust
- Temperature holding function for liquids after program finish
- Special program for Durham tubes
- Calculation of F0 value
- Special program for waste sterilization with pulsed heat-up for more efficient air exhaust
- Water-cooled steam exhaust, thermostatically controlled
- Programmable automatic door-opening on completion of program
- RS-232 and RS-485 interfaces for external data transmission (network-compatible)

Depth (Metric) Outside	970mm
Depth (Metric) Chamber	700mm

For Use With (Application)	For all laboratory applications even for sophisticated state-of-the-art sterilization processes
Temperature (Metric)	120 - 160°C
Electrical Requirements	380 to 400V, 50/60Hz, 3-phase plus neutral, 16A
Volume	95L (total) 90L (nominal)
Depth (Metric) Outside	970mm
Design	Horizontal benchtop
Diameter (Metric) Chamber	400mm
Height (Metric)	630mm (outer)
Product Type	D-Series Benchtop Autoclave
Display Type	LCD display and fully automatic microprocessor control
Pressure	4 bar
Width (Metric)	750mm (outer)
Required accessories	
<ul style="list-style-type: none"> <li>• BUCKET FOR WASTE STERILIZATION, STAINLESS STEEL, 696 X 318 X 219 MM</li> <li>• WIRE-MESH BASKET STAINLESS STEEL 700 X 300 X 250 M</li> </ul>	
Additional	<ul style="list-style-type: none"> <li>• All relevant SOPs (if any), working Instructions manuals, training materials should be provided soft and hard copy</li> </ul>

**15. Vertical Floor-Standing Autoclaves..... Quantity (1)**

**Standard Features**

- Internal heating elements within the autoclave chamber
- Housing, support frame and pressure vessel made of corrosion-resistant stainless steel
- Temperature and pressure range 140°C, 4 bar
- LCD display and fully automatic microprocessor control
- 12 sterilization programs

- Code-secured access rights for changing parameters and further safety-relevant intervention
- Internal memory for storing up to 500 sterilization cycles
- Timer for starting programs
- Autofill: automatic demineralized water feed for steam generation
- Flexible PT-100 temperature sensor
- Temperature holding function for liquids after program finish
- Special program for Durham tubes
- Calculation of F0 value
- Special program for waste sterilization with pulsed heat-up for more efficient air exhaust
- Water-cooled steam exhaust, thermostatically controlled
- Programmable automatic door-opening on completion of program
- RS-232 and RS-485 interfaces for external data transmission (network-compatible)

Depth (Metric) Outside	740mm
Depth (Metric) Chamber	600mm
For Use With (Application)	Basic laboratory applications and media sterilization
Model	E-55
Temperature Range (Metric)	140°C
Display Type	LCD display and fully automatic microprocessor control
Operating Pressure	4 bar
Width (Metric)	External width: 500mm
Design	Top-loading
Diameter (Metric) Chamber	344mm
Height (Metric)	External height: 920mm
Product Type	Vertical floor-standing autoclave
Type	V-Series Vertical Floor-Standing Autoclave
Electrical Requirements	220 to 240V, 50/60Hz, 16A
Volume	60L (total); 55L (nominal)

Required Accessories	
<ul style="list-style-type: none"> <li>• BUCKET FOR WASTE STERILIZATION, STAINLESS STEEL, 696 X 318 X 219 MM</li> <li>• WIRE-MESH BASKET STAINLESS STEEL 700 X 300 X 250 M</li> </ul>	
Others	<ul style="list-style-type: none"> <li>• All relevant SOPs (if any), working Instructions manuals, training materials should be provided soft and hard copy</li> </ul>

16. **Multi channel micro pipette ..... ( 2 )**

Cat. No.	Volume	Accuracy	Precision
OO-NPM-8V	1	±8.0	≤5.0
OO-NPM-12V	5	±4.0	≤2.0
OO-NPM-8s	10	±2.0	≤1.0
OO-NPM-12s	10	±3.0	≤2.0
OO-NPM-8L	50	±1.0	≤0.8
OO-NPM-12L	100	±0.8	≤0.3
OO-NPM-8L	20	±3.0	≤0.6
OO-NPM-12L	100	±1.0	≤0.4
OO-NPM-8L	200	±0.9	≤0.3
OO-NPM-12L	30	±3.0	≤1.0
OO-NPM-12L	150	±1.0	≤0.5
OO-NPM-8L	300	±0.6	≤0.3
OO-NPM-12L			

17. . HPTLC - MS System with fully equipped with

PC.....Quantity (1)

- Reproducible high-quality images acquired under homogenous illumination with the selected light
- Easy and intuitive operation with visionCATS
- High-dynamic-range imaging (HDRI)
- Side by side comparison of tracks originating from the same or different plates and/or different illumination modes
- Various image enhancement tools, e.g. Spot Amplification
- ("Spot Amp"), Clean Plate Correction and Exposure Normalization
- Image-based profile generation from reference and sample tracks, and subsequent peak integration and calibration
- New digital CCD camera with a maximum resolution of 82  $\mu\text{m}$  on the plate
- USB 3.0 for easy PC connection and rapid data transfer
- Meets all requirements to be used in a cGMP/cGLP environment
- The equipment shall be used for identification and quantization of Herbs, drugs and pharmaceuticals, Food, cosmetics using different matrixes

Sample Applicator	Microprocessor controlled spot and band applicator, volume selectable from 1 to 495 $\mu\text{l}$ , useful for quantitative analysis & preparative work; accepts 100 or 500 $\mu\text{l}$ syringe; spray on technique, individually programmable tracks. Foils or glass plates (upto 4 mm thick). Stationary syringe for steady spray on; removable sample syringe for easy cleaning to prevent cross contamination.
Chromatogram Development devices :	All glass, small internal volume chambers, bottom divided into two halves; maximum 5-15 ml mobile phase/ run S.S. lit. Appropriate size tanks for 20 x 20, 20 x 10 and 10 x 10 cm. plates.
Chromatography Visualisation / Derivatisation :	<p>Post column derivetization</p> <p>UV cabinet, dual wavelength 254 nm &amp; 366 nm, with guaranteed minimum intensity, as follows : UV lamp uw/cm<sup>2</sup> at distance 15 cm/100 cm</p> <p>Short wave UV (254 nm): :590 :13.4</p> <p>Long wave (366 nm) :420 : 9</p> <p>Visible light (Post chromatography development devices, battery operated, suitable for 20x20 cm Plates, low vol. of derivatising reagents regd., variable immersion speed and time complete with dip tanks and lids.</p>
Scanning and Data	Measurements by build-in fluorescence / absorbance in UV / VIS, high

Handling :	<p>speed scanning up to 100 mm sec., wavelength range 190-800 nm, suitable for scanning both. TLC &amp; HPTLC plates, laboratory made plates (4 mm thick) can be scanned, nitrogen flushing of Monochromator, fully automatic, special lens assembly for TLC or HPTLC measurements, autorecording or spectra of all spots on the track, D2/Hg/Halogen lamps built in spectrum scanning speed 100 nm/sec. Pilot slit image for accurate alignment of light beam &amp; sample. Multi wave-length scanning Spatial resolution 25 to 200 nm. Any no. of spectra recorder; complete lamp warm-up before spectrum recorded per plate. Complete lamp warm-up before spectrum measurement. Measuring range 0 to 5.0 volts. Scanning slit size – 38 combinations 16 bit 2 channel A/D converter.</p>
Data Evaluation	<p>Data evaluation software for routine and research analysis; suitable for qualification and identification, Graphic User Interface, infinite method and data storage, manual or video integration. Fully automatic optimization of electronic parameters, corrected true spectra recording of all fractions for purity check &amp; identification, base line correction / subtraction. Interface for scanner, video spot check. Spectra recorded after correction for background and lamp emission. Upto 99 peaks per track calculated. Impurity profiling as per USP/BP by individual peak calculation. 9600 data points/sec. Dual level context sensitive help. Options for specialized requirements.</p> <p>The scanner and data station must have a Spectrum library. This library must be upgraded and aid in identification of compounds by search, compare, co-relate etc. functions.</p> <p>Validation of instruments should be routinely possible. System should be upgradable to gradient system. Since a little analytical research will be required to standardize. We expect support from the suppliers in the form of literature survey, method development methods standardization double checking of analysis.</p> <p>The computer should be of state of art technology and the configuration should meet the requirements of the system</p> <p>Inkjet printer compatible with system should be provided.</p>
Packing material	<p>20 x 20cm of 25 plates glass</p> <ul style="list-style-type: none"> <li>● Silica gel 60 F<sub>254s</sub> <ul style="list-style-type: none"> <li>● Faster analysis, only 3 - 20 min for optimal separations</li> <li>● 5 to 10-fold increased sensitivity compared to classical TLC</li> <li>● Highly reproducible, sharp bands for quantitative analysis</li> <li>● Gold standard for automated use</li> </ul> </li> </ul>
TLC basic kits	<p>Basic kits , consisting of</p> <p>SmartCut plate cutter to cut TLC/ HPTLC glass plates up to 20x 20 cm</p>

	<p>Twin Trough Chamber for 10 x 10 cm plates, with stainless steel lid.</p> <p>Twin Trough Chamber For 20x20 cm plates , with stainless steel lid</p> <p>SmartAlert solvent from monitor ( only suitable fro glass plates )</p> <p>Viewing Box 4 dual wavelength 254/366 nm, 2x8W</p> <p>Glass reagent spryer , all glass with with 100ml Erlenmeyer flask</p> <p>Saturation pads, pack off 100 ( 20 x20 )</p> <p>Capillary dispenser consisting of universal capillary one dispenser magnifier and one Package of 5 x 100 disposable capillary pipettes 1 µl</p> <p>Dispenser madazine for 2 µl capillaries</p> <p>Dispenser madazine for 5 µl capillaries</p> <p>Disposable capillaries pipits 2 µl packs of 5 x 100</p> <p>Disposable capillaries pipits 5 µl packs of 5 x 100</p>
<b>System Configuration Accessories, spares and consumables</b>	<p>System as specified-</p> <ul style="list-style-type: none"> <li>● Accessories &amp; Consumables :</li> <li>● One each of Mercury, Deuterium and Halogen lamp.</li> <li>● Should be available with Indian agent.</li> </ul>
<b>Environmental factors</b>	<p>Shall meet IEC-60601-1-2 :2001(Or Equivalent BIS) General Requirements of Safety for Electromagnetic Compatibility.</p> <p>The unit shall be capable of being stored continuously in ambient temperature of 0 -50deg C and relative humidity of 15-90%</p> <p>Thu unit shall be capable of operating in ambient temperature of 20-30 deg C and relative humidity of 80%.</p>
<b>Power Supply</b>	<p>Power input to be 220-240VAC, 50Hz fitted with Indian plug</p> <p>Suitable Automatic Voltage regulator/stabilizer meeting ISI specifications should be supplied. Broad specifications are : Automatic Type Input 150-280V , Output 220 V +/- 7 % , 50 Hz . Single phase , AC with automatic 2-4 sec Cut Off and 6-9 minutes restart delay.. Quick start arrangements for bypassing the start delay. Suitable MCB on input voltmeter and indicators on Front Panel. Input Poer Cable with 15 A Plug and six way output terminal strip for two outlets</p> <p>Suitable UPS with maintenance free batteries for minimum one-hour back-up should be supplied with the system.</p> <p>Resettable overcurrent breaker shall be fitted for protection</p>
<b>Installation and Training</b>	<p>Installation and commissioning of the system including IQ &amp; OQ at EFMHACA Food lab. office, Addis Ababa Ethiopia</p>

	Three days hands on training to be provided at same site by company engineer on complete system and accessories
Others	All relevant SOPs (if any), working Instructions manuals, training materials in English should be provided
<b>Warranty</b>	Comprehensive warranty for 2 years and 5 years AMC after warranty

18. **Gravimetric diluter (DiluFlow).....Quantity( 1)**

Technical specification

Characterstic	Dilu <i>Flow</i> 5 kg Double pump
<b>BagOpen</b> height < 30 cm	
Patented removable DripTray	
<b>BagOpen</b> with GeckoGrip	
Magnetic stand for <b>BagOpen</b> (patented shape)	
LightCode: color status LED	
Compatible with Booster kit	
304 L stainless steel body	
Stainless casting electromechanical core	
Robotic arm	
Compatible with Jumbo kit	
Protection for tubing nozzle	

Up to 6 pumps	
Patented Multi-Dispensing mode	
32 editable programs	
Bidirectional connectivity	
Resolution up to 200 g	0.01 g
Weighing range	5 000 g
Weighing accuracy	0 to 100 g: $\pm 0,05$ g 100 to 5 000 g: $\pm 0,1\%$
Dilution factor	2 to 1000, editable fractions
Dilution accuracy	> 99 %*
Dilution time for a 25 g sample diluted at 1/10	< 8 s** (**with booster kit in fast mode)
Dilution time for a 375 g sample diluted at 1/10	< 75 s** (**with booster kit in fast mode)
Distribution time for 90 mL	< 6 s** (**with booster kit in fast mode)
Distribution time for 225 mL	< 9 s** (**with booster kit in fast mode)
Max number of pumps	2 integrated + 4 external
Dilution/distribution mode	Fast - Standard – Accurate
Traceability	Printer / Export to Excel™ / CSV file export on USB stick / LIMS
Exported data	Sample weight / Total weight / Dilution factor / Dilution accuracy / Diluent /  Sample number / Diluent batch number / Date / Time / Last calibration date /

	Name of operator / Name of program
Connection	2 USB outputs (type A) to connect printer, keyboard, bar-code reader, USB stick /  1 USB port (type B) to connect a computer / Jack output to connect a food pedal /  Handy gun / Ethernet connection for LIMS
Language	English,
Weight	15.5 kg
Dimensions (w x d x h)	37 x 41.5 x 37.5 cm
Patents	GeckoGrip system, Removable DripTray, Multi-Dispensing, Magnetic BagOpen® (patented shape)
In compliance with	ISO 7218 - ISO 6887-1 - FDA BAM (Bacteriological Analytical manual)
Guarantee	1 year
Installation and training	Installation, assembling and commissioning of the system including IQ, OQ and PQ at EFMHACA Food lab. office, Addis Ababa Ethiopia
<b>Required accessories</b>	
autoclavable bottle	5 L
Booster kit accelerate the dispensing speed up to 225ml/8sec	2 pieces
Bar code reader For traceability of the sample  jumbo kit Bag open + 3500ml drip tray	1 piece
Independent stand For broth bags	3 pieces
GeckoGrip Set of 10 adhesive for bag open	5 pk

<p>BagOpener/holder Models (mL): 80/100 - 400 – 3500</p>	05
<p>BagRackn (Storage rack)</p> <p>Models (mL): 80/100 - 400 3500 (2 or 4 compartments)</p>	10
<p>BagClip (Closing clips)</p> <p>Models (mL): 80/100 - 400 – 3500</p>	1 pk
<p>BagPipet &amp; BagTips</p> <p>Fixed volume pipet &amp; sterile tips</p> <p>BagTips Models: Regular (19 cm) Jumbo (24 cm)</p>	50 pk
<p>BagSeal Thermal sealing unit</p> <p>For bags up to 400 mL</p>	01
<p>PetriPile (Petri dish storage rack)</p> <p>Models (ø): 55 - 65 - 90 - 150 mm</p>	03
<p>BagFilter Sterile bag with <b>lateral fi lter</b></p> <p>Models (mL): 400/3500</p>	10 box
<p>BagPage Sterile bag with <b>full-page fi lter</b></p> <p>Models (mL): 100/400/3500</p>	10box

BagLight Sterile plain bag Models (mL): 100/400/3500	10 box
400 ml non filter bags(×25). Ultra- resistant, box of 500	10
Full-page filiter bags 400ml(× 25), X'tra resistant, box of 200	20
full page filiter bags 400 ml (× 25).Micro perforated filiter(280 μ), box of 500	20
Installation and Training	Installation and commissioning of the system including IQ & OQ at EFMHACA Food lab. office, Addis Ababa Ethiopia
	One day hands on training to be provided at same site by company engineer on complete system and accessories
Others	All relevant SOPs (if any), working Instructions manuals, training materials in English should be provided
<b>Warranty</b>	Comprehensive warranty for 2 years

19. Calibration weights Type E1/E2.....quantity (2)

Features

- Guaranteed Positive Tolerances
- Full Lifetime Guarantee
- Vacuum Melted Stainless Steel
- Electrolytic adjustment

- Weight Link
- Robust and durable
- With calibration certificates

Material	
Steel	904 L
Density kg/dm <sup>3</sup>	8± - 0.002
Susceptibility	< 0.005
Polarization μT	< 2.5
Others	
Box material	Plastic
Box set material	Aluminum
Range	
Mass	1mg, 2 mg, 5 mg, 10 mg, 20 mg, 100 mg, 200 mg, 500 mg, 1 g, 2 g, 5 g, 10g, 20 g, 50 g, 100,g 200 g, 500 g

20. Mini incubator.....quantity (1)

Type	Benchmark
Mode	Heat/cold
Dimensions:	13.2 x 14.5 x 18.7in
Capacity:	20L
Range:	Ambient -15°C - 60°C
Readability:	1°C
Accuracy:	0.5°C
Power requirement:	240V

21. Fridge/freezer .....Quantity (2)

Fridge/Freezer

For storing a variety of substances Dual controllers and

	dual compressors for optimum functionality
Heavy-Duty Castor	Safely and easily move units
Capacity	260liters fridge and 105 liters freezer
Temperature range	Digital temperature display +0 to +10°C: fridge and -10 to -30°C : freezer
Temp. Stability Range of 1°C or Less	Storage items stay at temperature while you open and close the unit
Temperature Control	Use the more precise programmable logic controls,
Temperature Recording	Collect temperature data 24/7 for storage and retrieval as needed with traceable certified calibrated thermometer that stores and displays high and low temperatures over a period of time.
Defrost:	Automatic
Alarms	Audible and visible Temperature Monitoring System for local and remote alarming including contacting a list of personnel by email, text, phone or pager.
Drawers or baskets	Fridge- 4 glass: Freezer: 3
	High-end auto defrost units have separate doors and separate digital LED microprocessor temperature controllers, alarming systems and product temperature displays for the refrigerator and freezer compartments.
Combination	Scientific Refrigerator/Freezer Units
Electrical Power	220V 50Hz/ 60H
Interface -	eye-level, color touch screen
Power Switch On/Off	All Circuit breaker - 230V only
Controller Type	Microprocessor with touch screen input and display. Includes USB port for data retrieval.
Security	Lockable door, password protected settings, optional PIN access

Control Sensor	RTD
Communication Ports	(2) USB Ports (1) RJ45 Hub (1) RS232 Port
Event Log	All alarms, door openings, download via USB
Temperature Access	Log 60 days, download via USB Interactive
Temperature Graph	Yes
Min/Max Display and Reset	Yes
Battery Back-up	20 hour display and alarm battery back-up for touch screen (rechargeable 12V, lead acid battery)
Comprehensive Lab. Warranty & Service	5 years after shipment
Technical & Applications Support	All documents including SOP, manual and others written in English have to be provided

## 22. **Hygiene monitoring device based on ATP with its respective test pen**

### Features

- Reliable and robust product
- Easy 5-buttons operation
- Half-automatic lid
- Temperature compensation
- Unique self check of calibration
- Advanced data management
- Runs from mains or from standard batteries
- Built-in memory, PC-port, ROM-key port and Printer
  - Provides real-time results in 15 seconds
  - AA Battery operated, no charging necessary
  - Fraud-proof, test results cannot be changed or deleted

- identifies problem areas for immediate corrective actions

Dimension	11 x 13 x 28 cm
Display of results	Display of the light intensity (from bioluminescence) in relative light units.
Working range	Linear: 0 - 99.000 RLU, Logarithmic: 0 - 5.00 log 10 RLU
Self-checks	Automatic self-check against a built-in standard, automatic correction of the background signal, and automatic temperature compensation during each measurement.
Data handling.	Optimum usage of the memory capacity by intelligent data handling. More than 2000 sets of data stored. Display information of the free memory capacity.
Test modes.	HACCP Plan, Test & Store, Test Only
Display Graphic	LCD display with 14 lines and adjustable contrast.
Control buttons	1 on/off button and 4 function buttons. Printer Built-in thermal printer
Ambient conditions	Measurements at 5-35 °C, 5-95% air humidity. When moved from a cold to a moist, warm environment, the development of condensation must be prevented
Connections.	Two serial RS232 interfaces for data transfer between system and a computer. One low-voltage socket for power supply unit. One ROM key port.
Mains operation	Can be connected to the mains with the power supply unit and 4 mains adapters for worldwide use. Portable operation Recommended batteries: 4 normal, sealed

23. Hygiene Monitoring system.....Quantity (10)

Features

- Should be cost-effective ATP hygiene monitoring system
- Should Provide real-time feedback and facilitates long-term data analysis
- Optimizes and verifies that cleaning procedures are working
- Assists in developing and improving process and risk assessment programs
- Available Calibration Control Kit for in-house confirmation of calibration
- Complimentary Software

Technical specification

Measures	ATP, TVC, Coliform and other test devices
Sensitive	can detect down to 0.1 femtomoles of ATP
Advanced photodiode sensor technology	Internal solid state detector is not affected by drops or shakes
Storage:	<ul style="list-style-type: none"> <li>○ 100 programmable test plans</li> <li>○ 200 programmable user IDs</li> <li>○ 251 programmable locations per test plan</li> <li>○ 5,000 programmable test locations</li> </ul>
Small, lightweight, handheld instrument	0.57 lbs., 7 x 18. x 3 cm
Quick-test mode	enables ad-hoc testing
Screen	Large screen with back-light and optional BOLD text
Powered by	2 x AA batteries for 2 years of uninterrupted use
Connection	Connects to software via USB
Read chamber	Removable read chamber design allows for easy cleaning
Data analysis software	<ul style="list-style-type: none"> <li>✓ Software takes ATP test results and other data from luminometer and easily converts them into comprehensive reports that illustrate trends and show continuous improvement.</li> <li>✓ Software which is easy to use and free with your luminometer.</li> <li>✓ Helps meet audit requirements</li> <li>✓ Identifies problem areas for immediate corrective actions</li> <li>✓ Fraud-proof, test results cannot be changed or deleted</li> <li>✓ Intuitively track and trend test results, and generate actionable reports</li> <li>✓ PC/Windows compatible</li> </ul>

**Required additional components and to be provided together**

<p>A. <b>AquaSnap Total, microbial and non-microbial ATP in water, Qty ( 100)</b></p>	<ul style="list-style-type: none"> <li>✓ AquaSnap is an easy-to-use ATP liquid test compatible with available luminometers.</li> <li>✓ Both available formats: Free and Total should be provided</li> <li>✓ Easy-to-use</li> <li>✓ Results in 15 seconds Patented Snap-Valve™ design enables accurate results with less variation</li> <li>✓ Unique liquid-stable reagent provides accuracy and reproducibility</li> <li>✓ Reagent is tolerant to temperature abuse and sanitizer effects</li> <li>✓ Honey dipper collects consistent 100 µl sample</li> <li>✓ 100% recyclable plastic</li> <li>✓ 15 month shelf life at refrigerated temperature (2- 8°C)</li> <li>✓ 4 week shelf life at room temperature (21-25°C)</li> <li><b>Sensitivity:</b></li> <li>✓ Extremely sensitive- detects down to 0.1 femtomoles ATP with luminometer</li> <li>✓ Detects down to 10<sup>3</sup> CFU</li> </ul>
<p>B. <b>UltraSnap, Surface ATP, Qty (200)</b></p>	<ul style="list-style-type: none"> <li>• Features <ul style="list-style-type: none"> <li>✓ Costs up to 50% less than other ATP swabs</li> <li>✓ Results in 15 seconds</li> <li>✓ Consistent, reliable results</li> <li>✓ Pre-moistened swab bud</li> <li>✓ Self-contained, liquid-stable reagent</li> <li>✓ Write-on swab label for easy sample identification</li> <li>✓ Environmentally conscious design - uses 20 - 80% less plastic than comparable devices</li> <li>✓ Recyclable #7</li> <li>✓ Patented Snap-Valve™ technology - snap &amp; squeeze</li> <li>✓ Unprecedented accuracy and reproducibility</li> <li>✓ Tolerant to temperature abuse</li> <li>✓ Test wet or dry surfaces</li> </ul> </li> <li>• High sensitivity: Detects 0.1-1 femtomoles of ATP <ul style="list-style-type: none"> <li>✓ For detection to 0.1 femtomoles of ATP, use EnSURE™</li> <li>✓ For detection to 1 femtomoles of ATP, use SystemSURE</li> </ul> </li> <li>• Shelf life: <ul style="list-style-type: none"> <li>15 months at refrigerated temperatures (2-8 °C)</li> <li>4 weeks room temperature (21-25 °C)</li> </ul> </li> <li>• Compatible latest available Luminometers</li> </ul>
<p>C. <b>SuperSnap, Qty (200)</b></p>	<p>Features</p> <p>Superior resistance to harsh chemical sanitizers</p> <ul style="list-style-type: none"> <li>✓ More resistant to challenging product residues and production environments at extreme pHs</li> <li>✓ Pre-wetted swab helps break through biofilm</li> <li>✓ Detects very small amounts of ATP and organic residues</li> <li>✓ Low variation; consistently true results at low RLU</li> </ul>

	<p><b>SuperSnap™ Specifications</b></p> <ul style="list-style-type: none"> <li>✓ High sensitivity: four times more sensitive than UltraSnap</li> <li>✓ All in one test devices</li> <li>✓ Write-on swab label for easy sample identification</li> <li>✓ 100% recyclable plastics-low carbon footprint</li> <li>✓ 15 months shelf life at refrigerated temperature of 35-46°F (2-8°C) - 4 weeks at room temperature of 70-77°F (21-25°C)</li> <li>✓ Compatible with latest available luminometers</li> </ul>
<p><b>D. Water shot total universal ATP test, Qty (100)</b></p>	<ul style="list-style-type: none"> <li>• Write-on swab label</li> <li>• Shelf life: <ul style="list-style-type: none"> <li>✓ 15 months at refrigerated temperatures (2-8 °C)</li> <li>✓ 4 weeks room temperature (21-25 °C)</li> </ul> </li> <li>• Compatible with latest available all Luminometers</li> </ul>
<p><b>E. AquaSnap™ Total and Free ATP Water Test, Qty (100)</b></p>	<p><b>Benefits:</b></p> <ul style="list-style-type: none"> <li>• Ready-to-use out of box</li> <li>• Easy-to-use and reduces user variation</li> <li>• Patented design produces repeatable and accurate results</li> <li>• Tolerant to temperature abuse and sanitizers</li> <li>• All-in-one test device with collection dipper tip</li> <li>• Consistent sample collection (100 µl) over swab or sponge tip test</li> <li>• Liquid-stable chemistry eliminates the need to reconstitute a pellet, giving more accurate results with less variation</li> <li>• True and accurate results at low RLU levels</li> <li>• Reliable trending at low ATP and low RLU levels</li> <li>• Low carbon foot print (recyclable)</li> </ul> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>• Shelf life: 15 months at refrigerated temperatures (2-8°C), 4 weeks room temperature (21-25°C)</li> <li>• Compatible with latest available Luminometers</li> </ul>
<p><b>F. Zymo snap ALP pasteurization verification test, Qty (100)</b></p>	<p><b>Features</b></p> <ul style="list-style-type: none"> <li>✓ All-in-one system</li> <li>✓ Easy-to-use, affordable device</li> <li>✓ Gives actionable results in 5 minutes</li> <li>✓ software tracks and trends tests results for data storage and analysis</li> <li>✓ Measured by available monitoring system which also measures ATP, Coliform, E. coli, Enterobacteriaceae, and Total Viable Count tests</li> </ul> <p><b>Technical specification</b></p> <ul style="list-style-type: none"> <li>✓ Patented snap-valve technology and liquid-stable reagent</li> </ul>

	<ul style="list-style-type: none"> <li>✓ 100% recyclable test device - Recyclable #7</li> <li>✓ For use with available monitoring system</li> <li>✓ Detects down to .001% raw milk</li> <li>✓ Detects below regulatory limits (&lt;350 mU/L)</li> <li>✓ Clear, reliable results even at low levels (25-100mU/L)</li> <li>✓ For evaluation or internal quality testing.</li> </ul>
G. <b>Micro snap coli form</b> , Qty (100)	<p><b>Features</b></p> <ul style="list-style-type: none"> <li>• Pass / Fail result at required detection levels are easy to understand</li> <li>• Equivalent results to other culturing methods</li> <li>• No specific sample preparation required</li> <li>• Independently validated</li> </ul> <p><b>Technical specification</b></p> <ul style="list-style-type: none"> <li>• Applications: environmental and product testing</li> <li>• Built-in pipette for easy sample transfer</li> <li>• Snap-Valve™ technology - snap &amp; squeeze</li> <li>• Write-on swab label</li> <li>• MicroSnap Coliform detects: <ul style="list-style-type: none"> <li>✓ E. coli</li> <li>✓ Klebsiella</li> <li>✓ Citrobacter</li> <li>✓ Enterobacter</li> </ul> </li> </ul>
H. <b>Micro snap enterobacteriaceae (EB)</b> , Qty (200)	<p><b>Feature</b></p> <ul style="list-style-type: none"> <li>✓ Pass / Fail result at required detection levels are easy to understand</li> <li>✓ Equivalent results to other culturing methods</li> <li>✓ No specific sample preparation required</li> <li>✓ Independently validated</li> </ul> <p><b>Technical specification</b></p> <ul style="list-style-type: none"> <li>• Applications: environmental and product testing</li> <li>• Built-in pipette for easy sample transfer</li> <li>• Snap-Valve™ technology - snap &amp; squeeze</li> <li>• Write-on swab label</li> <li>• MicroSnap EB detects: <ul style="list-style-type: none"> <li>✓ E. coli</li> <li>✓ Klebsiella</li> <li>✓ Citrobacter</li> <li>✓ Enterobacter</li> <li>✓ Serratia</li> <li>✓ Shigella</li> <li>✓ Salmonella</li> <li>✓ Yersinia</li> </ul> </li> </ul>
I. <b>Microsnap Total</b> , Qty (100)	<ul style="list-style-type: none"> <li>✓ MicroSnap™ Total delivers same-day TVC test results for Gram-positive and negative bacteria, including <i>E. coli</i>, <i>Listeria</i>, <i>Shigella</i>, <i>Vibrio</i>, <i>Bacillus</i>, <i>Staphylococcus</i>, and <i>Pseudomonas</i>.</li> <li>✓ The test uses a novel bioluminogenic test reaction that generates light when enzymes that are characteristic of viable bacteria react with. The light is then quantified with the available luminometer.</li> <li>✓ Faster results than traditional testing methods</li> <li>✓ AOAC-RI Performance Tested Method<sup>SM</sup> #031501</li> </ul>

J. <b>In site listeria</b> , Qty (100)	<ul style="list-style-type: none"> <li>✓ InSite Listeria is an easy-to-use, self-contained, environmental Listeria species test. Each device contains a chromogenic liquid media formulated with antibiotics, growth enhancers, and color-changing compounds specific to Listeria. Simply swab the test area, incubate, and wait.</li> <li>✓ Results in 24-48 hours</li> <li>✓ Easier to use than other testing methods</li> </ul>
K. <b>In site salmonella</b> , Qty (100)	<ul style="list-style-type: none"> <li>✓ InSite Salmonella is an easy-to-use, self-contained, environmental Salmonella species test. Each device contains a chromogenic liquid media with antibiotics, growth enhancers, and color-changing compounds specific to Salmonella.</li> <li>✓ Results in 24-48 hours</li> <li>✓ Easier to use than other testing methods</li> </ul>
<b>Required accessories</b>	
Swab Extenders, Qty 2	<ul style="list-style-type: none"> <li>✓ Swab Extenders easily enable sampling in hard to-reach test sites like tanks, vents, or hoppers.</li> <li>✓ Collapsible, telescoping extension</li> <li>✓ sizes: 48 inches</li> <li>✓ Easy-release swab holder</li> <li>✓ Compatible with all available monitoring system test devices</li> </ul>
Calibration Control Kit, Qty 2	<ul style="list-style-type: none"> <li>✓ The Calibration Control Kit allows for on-site luminometer calibration checks, to prove to auditors that your monitoring system is working properly.</li> <li>✓ Easy record-keeping</li> <li>✓ Measure in all available luminometers</li> <li>✓ 5-year shelf life</li> </ul>
Positive Control Kit, Qty 50	<ul style="list-style-type: none"> <li>✓ The Positive Control Kit validates the efficacy and stability of ATP test devices. The kit includes known amounts of ATP and sugars validating test device performance.</li> <li>✓ Useful for verifying proper temperature storage of test devices</li> <li>✓ Contains 25 sealed glass vials</li> <li>✓ Compatible with UltraSnap, SnapShot, and SpotCheck Plus</li> </ul>
Zymosnap positive control Kit, Qty 5	<ul style="list-style-type: none"> <li>✓ ZymoSnap Positive Control Kit validates the performance of ZymoSnap ALP Pasteurization Verification Tests.</li> <li>✓ Each vial contains: 350mU/L of ALP</li> <li>✓ Includes 5 positive control vials</li> </ul>
Swab Cooler, Qty 2	<ul style="list-style-type: none"> <li>✓ test devices or collect samples in above-ideal temperatures, Swab Cooler will ensure your devices are kept cool.</li> <li>✓ Vertical side pockets hold luminometers</li> <li>✓ Can hold several bags of test devices</li> <li>✓ Insulated to keepswabs cool</li> </ul>
<b>Installation and Training</b>	<ul style="list-style-type: none"> <li>• Commissioning of the system at EFMHACA , at Food inspection directorate, Addis Ababa Ethiopia</li> <li>• One day Hands on training to be provided on complete equipment and accessories.</li> </ul>
<b>Warranty</b>	Original three year warranty includes parts and labor (additional coverage should be available)
<b>Others</b>	All relevant SOPs, working Instructions manuals, training materials in English should be provided in soft and hard copy.

