

## PART 2: Procure For Medicine Quality Control Laboratory

### LOT 1: Instruments/Equipments/Apparatus

1. LC/MS/MS triple quadrupole System Fully compatible computer and printer and printer .....quantity (2)

Technical Specification for the LC system

Quaternary pump	
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 min in SD whatever is better than the specified, 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
Working solvent pH range	1.0 – 12.5
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 – 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) $\pm 10\%$
Dimensions (height $\times$ width $\times$ depth)	140 x 345 x 435 mm (5.5 x 13.5 x 17 inches) $\pm 10\%$
Line voltage	100 – 240 VAC, $\pm 10\%$
Line frequency	50 or 60 Hz, $\pm 5\%$
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	Above 2300m
Non-operating altitude	Up to 4600 m (15091 ft)
Safety standards: IEC, CSA, UL	Installation category II, Pollution degree 2
Thermo stated column compartment	
Temperature range	4°c to 80 °C up to 80 °C: flow rates up to 5 mL/min
Temperature stability	$\pm 0.15\text{ °C}$

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Temperature accuracy	$\pm 0.5\text{ }^{\circ}\text{C}$
Column capacity	A capacity to hold 3 columns with 30 cm length
Warm-up/cool-down time	Warm up: 5 minutes from ambient to $40\text{ }^{\circ}\text{C}$ Cool down: 10 minutes from $40 - 20\text{ }^{\circ}\text{C}$
Dead volume	3 $\mu\text{L}$ left heat exchanger 6 $\mu\text{L}$ 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 $\pm 10\%$
Dimensions (height $\times$ width $\times$ depth)	140 x 345 x 435 mm (5.5 x 13.5 x 17 inches) $\pm 10\%$
Line voltage	100 – 240 VAC, $\pm 10\%$
Line frequency	50 or 60 Hz, $\pm 5\%$
Power consumption	220 VA, 85 W / 290 BTU
Ambient operating temperature	$0 - 55\text{ }^{\circ}\text{C}$ ( $32 - 131\text{ }^{\circ}\text{F}$ )
Ambient non-operating temperature	$-40 - 70\text{ }^{\circ}\text{C}$ ( $-4 - 158\text{ }^{\circ}\text{F}$ )
Humidity	$< 95\%$ , at $25 - 40\text{ }^{\circ}\text{C}$
Operating altitude	2200 - 2500 m
Safety standards: IEC,	Installation category II, Pollution degree 2

CSA, UL	
Autosampler	
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

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Injection cycle time	50 s for draw speed 200 $\mu\text{L}/\text{min}$ , ejection speed 200 $\mu\text{L}/\text{min}$ , injection volume 5 ml
Weight	14.2 kg
Dimensions (height $\times$ width $\times$ depth)	200 x 345 x 435 mm (5.5 x 13.5 x 17 inches)
Line voltage	100 – 240 VAC, $\pm 10\%$
Line frequency	50 or 60 Hz, $\pm 5\%$
Power consumption	220 VA, 85 W / 290 BTU
Ambient operating temperature	0–55 $^{\circ}\text{C}$ (32–131 $^{\circ}\text{F}$ )
Humidity	< 95 %, at 25 – 40 $^{\circ}\text{C}$
Operating altitude	2200 to 2500 m
Safety standards: IEC, CSA, UL	Installation category II, Pollution degree 2
Equipped with PDA Detector with the following requirements	
Detection type	Double-beam photometer
Light source	Deuterium lamp
Wavelength range	190 – 800 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

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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 $\times$ width $\times$ depth)	140 x 345 x 435 mm (5.5 x 13.5 x 17 inches)
Line voltage	100 – 240 VAC, $\pm$ 10 %
Line frequency	50 or 60 Hz, $\pm$ 5 %
Power consumption	220 VA, 85 W / 290 BTU
Ambient operating temperature	0–55 $^{\circ}$ C (32–131 $^{\circ}$ F)
Ambient non-	-40 – 70 $^{\circ}$ C (-4 – 158 $^{\circ}$ F)

operating temperature	
Humidity	< 95 %, at 25 – 40 °C
Operating altitude	2200 to 2500 m (6562 ft)
Safety standards: IEC, CSA, UL	Installation category II, Pollution degree 2

#### Specification for the triple quadrupole

Parameter	Measure	Specification
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) Mass resolution (manual tune)	Full width at half maximum Full width at half maximum	0.7 Da  0.5 Da
Mass accuracy		0.1 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

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Dynamic range		$> 6.0 \times 10^6$
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

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		Delivery
Solvent declustering		Countercurrent gas
Detector		High-energy conversion dynode and high-gain electron multiplier horn
Vacuum system		<ul style="list-style-type: none"> <li>• Two turbo molecular pumps with one mechanical pump</li> <li>• Should allow transfer of ions only and restrict transfer of unnecessary sample and air components</li> </ul>
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	
Computer System and Software for System Control, Data Acquisition and Analysis.	<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> </ul> </li> </ul>	

	<p>✓ Remote control: ready, start and stop shut down signals</p> <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>	
<p>Nitrogen generator with inbuilt compressor, oil free and compatible with LCMSMS instrument</p>	<p>Features</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>	
	<p>Nitrogen (L/min)</p>	<p>Min 300</p>
	<p>Inlet Air Requirement (L/min)</p>	<p>900</p>
	<p>Min/ Max Air Inlet Pressure</p>	<p>125-145 psi</p>
	<p>Min/ Max Operating Temperature</p>	<p>5°C (41°F) - 30°C (86°F)</p>
	<p>Particles</p>	<p>&lt; 0.01 µm</p>
	<p>Suspended Liquids</p>	<p>None</p>
	<p>Phthalates</p>	<p>None</p>
	<p>Pressure Dewpoint</p>	<p>-40°C / 40°F</p>
	<p>Electrical Requirements</p>	<p>110 - 230v 50/60 Hz</p>
	<p>Weight</p>	<p>80-100 kg</p>
<p>Size (HxWxD) mm</p>	<p>90x40x70 - 1150 x 500 x</p>	

		800mm	
Installation and Training	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at medicine and 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>		
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>		

**2. GCMSMS triple quadruple 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	Negative ramps are allowed

	plateaus	
	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 the range 0.000 to 99.999 psi; 0.01 psi for the range 100.00 to 150.00 psi</li> <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>
Inlets		
	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</li> </ul>

		<p>column &lt; 0.200 mm diameter</p> <ul style="list-style-type: none"> <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> <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 β emission of &lt; 15 mCi<sup>63</sup> Ni as electron source</li> <li>• Unique micro-cell design minimizes contamination and</li> </ul>

		optimizes sensitivity <ul style="list-style-type: none"> <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 +/- 10%</li> </ul>
	Width	<ul style="list-style-type: none"> <li>• 58 cm with EPC inlet and detectors +/- 10%</li> </ul>
	Depth	<ul style="list-style-type: none"> <li>• 51 cm +/- 10%</li> </ul>
	Typical weight	<ul style="list-style-type: none"> <li>• 49 Kg +/- 10%</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 value 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>
Auto sampler: both ALS and Headspace Sampler		
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 acceleration adjustable parameters provides faster sample equilibration</li> <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> </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>

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	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 Tray Park <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> </li> <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</li> </ul>

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		actual temperatures and can be set to off (uncontrolled .
	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> <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> </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 <ul style="list-style-type: none"> <li>- Pressure with user settable vial pressure</li> </ul> </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</li> </ul>

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		<ul style="list-style-type: none"> <li>- The following modes are available</li> <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)</li> <li>- Onboard carrier EPC module (optional)</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>

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		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 both flow and time</li> <li>- Between Sequences both vial pressurization gas and optional carrier supply gas flows can be reduced</li> </ul> </li> <li>• Excess vial gasses are safely depressurized via vent fitting on instrument and can be plumbed to traps or hoods as appropriate</li> </ul>

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	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. ALS (Automated liquid sampler)</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 performance	<ul style="list-style-type: none"> <li>• Sample discrimination <math>\leq 10\%</math></li> <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</li> </ul>

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		<p>with advanced sampler capabilities</p> <ul style="list-style-type: none"> <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 injection	<ul style="list-style-type: none"> <li>• 10 nl (with 2ul syringe)</li> </ul>
	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>

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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 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> </ul>

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		<ul style="list-style-type: none"> <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>
	Hydrogen Generator, oil free with inbuilt compressor	<p>Features</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> </ul>

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		<ul style="list-style-type: none"> <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> <li>•</li> </ul>												
	<p>Nitrogen generator compatible with GCMSMS</p>	<ul style="list-style-type: none"> <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="643 1604 1490 1864"> <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> </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 /
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
Computer System and Software for System Control, Data Acquisition and Analysis.			<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>	
Installation and Training			<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA Food and medicine lab. office, Addis Ababa Ethiopia</li> </ul> <p>Five days on training especially operational training to be provided at same site by company engineer on complete GC/MS/MS system</p>	

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
Sample introduction	
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
Auto sampler	
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</li> </ul>

	<p>maintenance.</p> <ul style="list-style-type: none"> <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>
Integrated environmental enclosure option protects your samples and your laboratory environment	<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>
Dual-wash reservoir option eliminates potential carryover	Optional dual-port wash reservoir for ultra-trace applications or applications requiring two different rinse chemistries
Three-channel peristaltic pump for ultimate flow-through rinse	<ul style="list-style-type: none"> <li>• Simultaneously pump two different rinse solutions (in conjunction with the optional dual wash reservoir)</li> </ul>

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flexibility	<ul style="list-style-type: none"> <li>• Third channel still allows for a pumped drain when a gravity drain is not an option.</li> </ul>		
Multiple probe size options for a diverse range of applications	<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>		
Dimensions (WXDXH)	<ul style="list-style-type: none"> <li>• 600 mm*320 mm* 510 mm (+/- 10%)</li> </ul>		
Probe arm speed:	User programmable in X, Z, and Theta (rotational) dimensions. 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.		
Plasma Ion source			
RF generator	<p>High power-transfer efficiency and maintenance-free solid state digital drive 27 MHz RF generator with variable-frequency impedance matching.</p> <p>RF power range: 500 W to 1600 W</p>		
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	<p>Stepper-motor controlled in three axes (horizontal, vertical and sampling depth) in 0.1 mm steps.</p> <ul style="list-style-type: none"> <li>• Horizontal and vertical position range: <math>\pm 2</math> mm</li> <li>• Sampling depth: 3 to 28 mm</li> </ul>
Torch plasma system	Argon gas consumption 3 liter/minute or lower
Computer control of torch	<p>Torch movement should allow for complete computer and auto tunable X-Y-Z directions. With independent movements in three directions</p> <p>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</p>
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
Interface	
Sampling cone	1 mm diameter orifice, Ni-tipped or Pt-tipped (option) 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, Ni or Pt-tipped (option). 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 ( $> 1$ GHz/ ppm sensitivity at $< 2.5\%$ CeO/Ce and low back grounds to deliver superior detection limits
Extraction lens	<p>Should minimize space charge effects and reducing mass bias/minimizing interference back ground</p> <p>Should provide a flat mass response with the best low mass transmission</p> <p>Should be dual mode extraction system (conventional and soft extraction)</p>
Off-axis lens system	<p>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.</p> <p>Should be outside the high vacuum region for easy maintenance</p>
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).
Plasma gas control	Should have a minimum of four active mass flow control plasma auxiliary make up and carrier gas.
Mass analyzer	
Quadrupole mass spectrometer	<p>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 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: 5 x 10<sup>-7</sup> or lower</li> <li>➤ High Mass side: 1 x 10<sup>-7</sup> 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 µsec) 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)	Li (7) Y (89) Tl (205)
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	Ce <sup>2+</sup> /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)
Others	
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>		
Computer System and Software for System Control, Data Acquisition and Analysis.	<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>		
Installation and Training	Installation and commissioning of the system including IQ, OQ at EFMHACA Food and medicine 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. HPLC Specification fully equipped with computer and printer.....quantity (4)

<p>LC 1. Solvent Delivery System</p>	<ol style="list-style-type: none"> <li>1) A quaternary Pump system for using four solvents with integrated Degasser where a user can choose up to four solvents + one solvent degasser in combination.</li> <li>2) Hydraulic system: dual piston in series pumps with preprogrammed servo-controlled variable stroke drive, floating pistons and active inlet valve</li> <li>3) Flow Rate Range: - 0.2 to 10 ml/min</li> <li>4) Settable flow range: 0.001 to 10 ml/min, with 0.001 ml/min increments.</li> <li>5) Flow Rate precision: - 0.07% RSD</li> <li>6) Compressibility compensation: Automatic and continuous</li> <li>7) System delay volume: &lt;650 µl independent of backpressure at 1 mL/min</li> <li>8) Plunger seal wash: Integral, active, programmable</li> <li>9) Gradient profiles: 11 gradient curves (Including linear, step[2], concave [4], and convex [4])</li> <li>10) Operating Pressure: - 0- 40 MPa</li> <li>11) Flow rate accuracy: - ± 1%</li> <li>12) Composition range: 0.0 – 100.0 in 0.1% increments</li> <li>13) Composition accuracy: + 0.5% absolute, independent of backpressure (proportioning valve pair test, [degassed ethanol: methanol/ propyl-paraben 2.0 mL/min. 254 nm])</li> <li>14) Composition precision: 0.15% RSD or 0.02 min SD, whichever is greater, based on retention time (degassed methanol water 60:40 dial-a-mix, 1.00 mL/min, six replicates, phenone mix, 254 nm)</li> <li>15) Solvent selection valve should be quoted</li> <li>16) Delay Volume :- 400 µL</li> <li>17) Temperature controlled range 4 to 45 °C</li> </ol>
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	18) An auto injection system for sample injection with variable volume capability, volume range of at least 0.1 – 40 mL;
<b>1. Auto Sampler</b>	<ol style="list-style-type: none"> <li>1) Should have overlapped injections.</li> <li>2) Number of sample injections: 1 to 99 injections per sample vial</li> <li>3) Sample delivery precision: Typically &lt; 0.59 RSD, 5 to 80 µl (degassed methanol water 60:40 dlal-a-mix. 1 mL/min, six reallocates. phenone mix. 254 nm)</li> <li>4) Should have facility to hold multiple vials.</li> <li>5) Injection needle wash: Integral, active, programmable</li> <li>6) Injection accuracy: + 1 µl (± 2%) (50uL. N-6X sample: 100% degassed water, analytical solvent: 100% degassed methanol)</li> <li>7) Injector linearity : &gt;0.999 coefficient of deviation (1 to 100 µl)</li> <li>8) Capacity to hold more than 100 vials of 1, 1.5 and or 2 ml in the same autosampler.</li> <li>9) Carryover should be &lt; 0.004 %</li> <li>10) 0.1–20 µl standard injection range up to 1300 bar pressure.</li> <li>11) Precision typically &lt; 0.30%</li> <li>12) Design must ensure isolation of electrical components from liquid flow path.</li> <li>13) Needle should be stainless steel or peak needle; Quote for minimum 4 needles.</li> <li>14) Sample Temperature control: 4 to 40 °C, programmable in 1 *c increments</li> </ol>
<b>2. Column Compartment</b>	<ol style="list-style-type: none"> <li>1) Thermostatted Column Compartment</li> <li>2) Preferably have capacity to hold 3-4 columns simultaneously or other possible combination</li> <li>3) Temperature stability ±0.1 °C</li> <li>4) Temperature range from room temperature to 60°C</li> <li>5) A-Line Quick Connect UHPLC column fittings for dead-volume-free fluidic connections</li> </ol>
<b>3. Column &amp; Vials</b>	<p>C18 3.0 x 100 mm, STM</p> <p>C8 4.6 x 75 mm, 3.5 µm</p> <p>C18 4.6 x 150 mm, 5 µm</p>



	Minimum 3 of each above should be quoted
4. PDA detector	<ol style="list-style-type: none"> <li>1) Wavelength range: 190-700 nm, settable in 1nm increments.</li> <li>2) Linearity of 5% at 2.0AU</li> <li>3) Noise specifications: <math>0.2 \times 10^{-5}</math> AU</li> <li>4) High brightness lamp with a guaranteed life of 2000 Hours</li> <li>5) Only one lamp source and Lamp Optimization software</li> <li>6) Acquire data up to 80Hz</li> <li>7) The detector must provide comprehensive and interactive diagnostic information on the unit</li> <li>8) Low volume long path length flow cells for optimum performance as well as the highest sensitivity &amp; should be optimized for use with latest sub 2 micron particle size technology. Flow cell should have 10mm path length with no more than 500nL volume.</li> </ol>
Computer System and Software for System Control, Data Acquisition and Analysis.	<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>✓ 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>
Installation and Training	Installation and commissioning of the system including IQ, OQ at EFMHACA medicine lab. office, Addis Ababa Ethiopia
	Five day Hands on training especially operational training to be provided at same site by company engineer on complete ICP/MS/MS system
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	Application notes, all relevant SOPs (if any), working Instructions manuals, training materials in English should be provided with soft and hard copy
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5. UV-Vis Spectrophotometer fully PC Controlled.....Quantity(2)

Technical specification

Source	Unique full-spectrum Xenon, Halogen lamp, Deuterium lamp flash 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,

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	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	USB memory plus  Save as text and UV PC file
Computer System and Software for System Control, Data Acquisition and Analysis.	<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	Installation and commissioning of the system including IQ, OQ and PQ at EFMHACA Medicine and Food lab. office, Addis Ababa, Ethiopia
	Two days Hands on training especially operational to be provided at

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	same site by company engineer on complete UV-Vis-Spectrophotometer 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	Application notes, all relevant SOPs (if any), working Instructions manuals, training materials in English should be provided with soft and hard copy

6. Dietary fiber analyzer.....Quantity (1)

General specification

- Automated system that uses internally preheated reagents added to a closed system, reduce contact with hot reagents.
- It determines fibre content according to recognised methods.
- Single or sequential extractions including boiling, rinsing and filtration are performed under reproducible and controlled conditions.
- At least 12 samples processed simultaneously.
- Accessories for batch handling.
- Integral extraction and filtration.
- No sample transfer and no loss of sample.
- Separate unit for solvent dehydration, lignin determination and defatting.
- Extensive application service.
- High reproducibility of conditions and results.
- Saves time, energy and laboratory space.
- Hot Extraction Unit, for hot hydrolysis and extraction with built-in systems for heating and filtration
- Cold Extraction Unit, for defatting samples, extraction at ambient temperature e.g. lignin determination, and for solvent dehydration of fibre residues



Parts	Specification
Hot extraction unit	Hot Extractor, Reflector, Reagent Bottles, Hot Water Sprayer, Beaker, Funnel, Water Suction Pump, Antifoaming Agent, Tubing, Holder for 6 crucibles, Stand for 6 crucibles, Crucibles (P2 standard, 2 sets of 6), Manual.
Cold extraction unit	Cold Extractor, Spray Bottle, Tubing, T-tube, Spare Part Kit, Stand for 6 crucibles, Crucibles (P2 standard 40 - 100 $\mu\text{m}$ , set of 6), Antifoaming Agent (octanol), Celite, 1 l.
C. Accessories:	Crucible stands for 6 crucibles. At least two stands recommended. Crucible holder for 6 crucibles Water Aspirator Pump Anti-foaming agent (octanol) Filtering agent (celite 545), 1 l
Required accessories:	Crucibles, P0 (porosity 160-250 $\mu\text{m}$ ), set of 6 Crucibles, P1 (porosity 100-160 $\mu\text{m}$ ), set of 6 Crucibles, P2 standard (porosity 40-100 $\mu\text{m}$ ), set of 6 Crucibles, P3 (porosity 16-40 $\mu\text{m}$ ), set of 6
Application	<ul style="list-style-type: none"> <li>• Crude Fibre .</li> <li>• Neutral Detergent Fibre.</li> <li>• Acid Detergent Fibre.</li> <li>• Acid Detergent Lignin</li> </ul>
	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at</li> </ul>

Installation and Training	<p>EFMHACA Food lab. office, Addis Ababa Ethiopia</p> <ul style="list-style-type: none"> <li>• Three days Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</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>

Installation requirements:

Equipment	Power supply	Power consumption	Dimensions W*d*h	Weight	Water supply
Hot Extraction unit	200-240 V +- 10% 50HZ or 200- 240V+- 10% 60HZ	2.3 K.W	75*40*68	65 kg	Tap water* appr.21/min
Cold Extraction unit with water aspirator	-	-	58*38*28	14 kg	Tap water



7. **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>
Warranty	<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

**8. 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	PHR-MEAN statistical, Specific Rotation, Concentration, Inversion (A-B), Invert Sugar and User Defined

Library	
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
Installation and Training	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA Food lab and Medicine 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>
Warranty	<ul style="list-style-type: none"> <li>• A minimum of 2 year warranty period should be provided</li> </ul>

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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>
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9. 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	±0.00002 RI, ±0.015 Brix, ±0.0001 Urine S
Accuracy	±0.00002 RI, ±0.02Brix, 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
Installation and Training	<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>
Warranty	<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

#### 10. Density Meters.....quantity (2)

Accuracy	Density: 0.00001 g/cm <sup>3</sup> Temperature: 0.01 °C
Repeatability	Density: 0.000005 g/cm <sup>3</sup> Temperature Selectable: 0.001 °C
Resolution	Density: 0.000001 g/cm <sup>3</sup> Temperature: 0.001°C
Density range	0 to 3 g/cm <sup>3</sup>
Temperature range(controlled via peltier)	0°C to 95°C



Pressure	0 to 10 bars
Video scanning and magnification	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.
Automatic Bubble Detection	Automatically warns operator of bubbles
Measurement modes	Continuous, single, multiple
Measurement technique	Mechanical oscillating U-tube method
Maximum sample volume	Less than 1 ml
Wetted material	Borosilicate glass, Teflon PTFE, ECTFE
Operating system	Windows Embedded; write protected software safe from malware and viruses
Measurement time	30 - 60 seconds after thermal equilibration
Display	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
Communication Interface	Touch Screen User Interface, 5 – USB Ports, 2 – RS232 Ports, 2 – Ethernet Ports for Network Connection, Keyboard Bar Code canner, Mouse, Network Capabilities
Remote Support	Troubleshooting, Diagnostics, Software Updates available via the Internet

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Internal Memory	32 GB Non-removable Compact Flash
Operating Dimensions	18.36'' (L) x 11.80'' (W) x 13.90'' (H) 46.61 cm (L) x 29.97 cm (W) x 35.30 cm (H)
Power Supply	250 V, 50 Hz
Installation and Training	<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>
Warranty	<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>

11. Hot-plate stirrer Digital.....Quantity (5)

- Digital setting and control of both temperature and speed
  - Supplied complete with temperature probe for accurate control of liquid temperature
  - Advanced safety features:
    - Flashing "Hot" warning light
    - Independent safety circuit to protect against overheating
- Choice of robust aluminium or chemically resistant ceramic tops Technical specification

Plate material	Al/Si alloy
Plate dimensions, mm	160 x 160

Heater power, W	700
Max. plate temperature, °C with probe oC	300
Display resolution, °C	1
Stirrer speed	200
Control accuracy with probe oC	+/-0.5oC
Stirrer speed, rpm	200 -1300
Ma x. stirring capacity, liters	15
Temperature variation across plate, °C	±0.2 @ 37°C, ±1.0 @ 150°C
Temperature stability, °C	±0.25
Overall dimensions, (w x d x h), mm	190 x 300 x 110
Net weight, kg	3.4
Electricity supply	230V, 50-60Hz , 700W
Warranty	<ul style="list-style-type: none"> <li>• A minimum of 2 year warranty period should be provided</li> </ul>

## 12. Water purification

### ❖ General features:

Bench type or any suitable location water purifier

- Position the dispenser independent from the water purification system
- Weight: 15-22kg
- Dimension: Height 400-450mm, Width 300-380mm, Depth 300-350mm

S.No	Item	Specifications	Unit	Required quantity	Remark
	Water purifier	<p>❖ Specifications:</p> <ul style="list-style-type: none"> <li>• Auto rinsing</li> <li>• Flow rate 2liters/min</li> <li>• Resistivity: &lt;18.2 MΩ-cm</li> <li>• Real-time TOC monitoring</li> <li>• reports on TOC every 2 seconds</li> <li>• Bacteria: &lt;0.1 cfu/ml</li> <li>• Endotoxin:&lt;0.001EU/ml</li> <li>• TOC: 1-3 ppb</li> <li>• PH: Effectively neutral</li> <li>• Temperature: 10-35oC</li> <li>• water source-Potable water</li> <li>• Data capture via USB for system performancevalidation and software updates</li> <li>• For type I+ water production</li> <li>• Production capacity: &gt;120Liters per day</li> <li>• Flexible dispenser (variable flow, auto volume dispense, hand held dispensing, locked dispense</li> <li>• alerting alarm to changes in system performance</li> <li>• In built Storage capacity: &gt;120 Liters</li> <li>• Real-time TOC monitoring</li> <li>• Fully re-circulating</li> <li>• Integrated filtration</li> <li>• Multiple dispensing</li> </ul> <p>❖ Ideally suited for:</p> <ul style="list-style-type: none"> <li>• Mass Spectrometry</li> <li>• Molecular biology</li> <li>• Ultra trace analyses</li> </ul>	Each	2	

		<ul style="list-style-type: none"> <li>• Electrochemistry</li> <li>• Atomic Spectroscopy</li> <li>• Liquid Chromatography</li> <li>• Ion Chromatography</li> <li>• Cell cultures</li> <li>• Qualitative Analyses</li> <li>• Gas Chromatography</li> <li>• Immunochemistry <ul style="list-style-type: none"> <li>❖ All necessary accessories and cartridges: need to be made available along with the main equipment</li> <li>❖ Installation and training <ul style="list-style-type: none"> <li>The supplier or its agent should provide IQ, OQ, PQ and operation training at EFMHACA, Addis Ababa</li> <li>One day Hands on training to be provided at same site by company engineer on complete water purifier system.</li> </ul> </li> <li>❖ Others: <ul style="list-style-type: none"> <li>• All relevant SOPs ( if any), instruction manual should be provided</li> <li>• The system must be factory tested and certificate should be provided</li> <li>• A minimum of 1 year warranty period should be provided</li> <li>• The system should be installed by the company engineers</li> </ul> </li> <li>❖ h</li> </ul> </li> </ul>			
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13. 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 µm 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 µl, useful for quantitative analysis & preparative work; accepts 100 or 500 µl 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 :	Post column derivetization UV cabinet, dual wavelength 254 nm & 366 nm, with guaranteed minimum intensity, as follows : UV lamp uw/cm <sup>2</sup> at distance 15 cm/100 cm Short wave UV (254 nm): :590 :13.4 Long wave (366 nm) :420 : 9 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.
Scanning and Data	Measurements by build-in fluorescence / absorbance in UV / VIS, high speed scanning up to 100 mm sec., wavelength range 190-800 nm,

Handling :	suitable for scanning both. TLC & 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 & 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.
Data Evaluation	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 & identification, base line correction / subtraction. Interface for scanner, video spot check. Spectra recorded after correction for background and lamp emission. Up to 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.  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-relates etc. functions.
	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.
	The computer should be of state of art technology and the configuration should meet the requirements of the system
	Inkjet printer compatible with system should be provided.
Packing material	20 x 20cm of 25 plates glass <ul style="list-style-type: none"> <li>• Silica gel 60 F254s <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>

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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 front monitor ( only suitable for glass plates )</p> <p>Viewing Box 4 dual wavelength 254/366 nm, 2x8W</p> <p>Glass reagent sprayer , 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 magazine for 2 µl capillaries</p> <p>Dispenser magazine for 5 µl capillaries</p> <p>Disposable capillaries pipets 2 µl packs of 5 x 100</p> <p>Disposable capillaries pipets 5 µl packs of 5 x 100</p>
System Configuration Accessories, spares and consumables	<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>
Environmental factors	<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>The unit shall be capable of operating in ambient temperature of 20-30 deg C and relative humidity of 80%.</p>
Power Supply	<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</p>



	<p>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>
Installation and Training	<p>Installation and commissioning of the system including IQ &amp; OQ at EFMHACA Medicine and Food lab. office, Addis Ababa Ethiopia</p>
	<p>Three days hands on training to be provided at same site by company engineer on complete system and accessories</p>
Computer System and Software for System Control, Data Acquisition and Analysis.	<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>
Others	<p>All relevant SOPs (if any), working Instructions manuals, training materials in English should be provided</p>
Warranty	<p>Comprehensive warranty for 2 years and 5 years AMC after warranty</p>

14. Laboratory centrifuge.....Quantity (1)

S.No.	Item Name	Specifications
1	Future	-Refrigerated floor model
	-Maximum capacity:	6x1000ml
		6 x 250mL (fixed angle) 4 x 1000mL (swinging bucket)
	-Maximum speed:	29,000rpm
	-Maximum RCF:	100,605xg
	Dimensions (WXHxD mm):	700x929.64x805.18 ± 10
	Weight	293kg ± 10
		Drive system:
	Display type	LCD
	Voltage	200-240oltage
	Phase type	single phase <ul style="list-style-type: none"> <li>▪ -Rotors:-Light weight carbon fiber, Lightweight carbon fiber and Corrosion- and fatigue-resistance secures the rotor's structural integrity for unequalled durability</li> <li>▪ Full range of fibrolite carbon fiber rotators.</li> </ul>
		▪ Continuous flow/zonal rotors providing scale-up flexibility from
		▪ Supers peed applications to harvesting and clarification
	Temperature Range:	-20° to +40°C
		- Type : Super speed centrifuge - Noise level : < 59dBA - Run time : 99 Hours, hold - Hertz: 50/60Hz - Program storage: 120 programs with alpha-numeric naming.
	Controller Type	-: Touch screen interface
		- Accel /Decel Profile

	Drive System	High torque brushless motor
	Voltage	200-240V
	Power	2000-240V,50/60Hz,30A,Single phase
	Other function	Rotor Calculator, On-Board Training Videos, User Logging, User Lock-Out, Automatic Door Opening, Rotor Speed Handle
		Warranty: Unit: 1 yr., Drive: 3 yrs., Refrigeration: 5 yrs
	Installation	<ul style="list-style-type: none"> <li>Installation and commissioning of the system including IQ, OQ at EFMHACA medicine, office, Addis Ababa Ethiopia</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>

15. LCD Microscope .....Quantity(1)

2	Illuminator	-Ultra bright Light Emitting Diode (LED) 000000
		-Produce narrow spectrum light
		- Able excite the stains without producing Uv light
		-Produce minimal heat
		-Contain no hazardous material
		-Have minimal lifetime of 50,000 hours
		-Able to generate good image quality without the use of dark room
		<ul style="list-style-type: none"> <li>➤ <a href="#">Eyepiece Lens</a></li> <li>- 10x power.</li> </ul>
		<ul style="list-style-type: none"> <li>➤ <a href="#">Objective Lenses</a></li> <li>-3 or 4 objective lenses each with powers of 4x, 10x, 40x and 400x powers</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Condenser lens</li> <li>-rated at 0.65 NA and greater</li> </ul>	

		- Abbe condenser should also be available equipped on the microscope
		-Movable up and down
		<ul style="list-style-type: none"> <li>➤ Parts</li> </ul> -parts like objectives, filter sets, fluorescent dyes and lamps should be presented with the microscope

**16. Microscopic slide.....(10)**

3		-Pre-cleaned to remove debris and improve wettability and unscratched
		-Dimension 25.0mmx75.0mm
		-Beveled edges to provide utmost safety during manual operation
		-Super white glass to meet higher transparency
		-Supplied with tissue paper
		- frosted one

**17. Fully Automated ELISA Analyzer With Washer.....( 2 )**

4		- plate fully automated ELISA analyzer
	Number of plates	up to 3 plates
	Number of samples	max. of 144
	Number of reagents	depending on rack configuration
	Controls & standard	depending on rack configuration
	Dilution area	for up to 192 dilution positions (2 x 96 Deep well plate)
	Number of tips	up to 3 tip racks for 300µl or 1100µl disposable tips

Loading	continuous loading of plates, samples and reagents
Photometer Spectral range	400– 700nm
Dynamic range	–0.100 to +3.000OD (measurement range 1 wavelength) –3.000 to +3.000OD (measurement range 2 wavelengths)
Accuracy	±0.005OD or 2.5% (whichever is greater)
Linearity	0–2.000OD ±1%
Detection	Photodiode
Read modes	OD
Filters	up to 8 positions
Pipetting system Pipettor	Liquid pipettor for disposable tips
Liquid level detection	standard (capacitive)
Min/Max volumes	10µl to 300µl (with 300µl tip) or 301µl to 1000µl (with 1100µl tip)
Processing time	patient samples ( 100µl/well) appr. 16 min. for 96 positions reagent (100µl/well) appr. 4 min. for 96 positions
Accuracy	< 10% at 20µl, < 5% at 100µl
Precision	6% at 20µl, 3% at 100µl
Features	tip detection, mixing, multi-dispensing

Incubation Capacity	2 independently controlled chambers, 1 ambient
Temperature range	ambient +5 to 45°C
Accuracy	-2°C; +0°C (measured in plate, 200µl)
Uniformity	±1.5°C (measured in plate, 200µl aqua)
Washing Capacity	up to 3 buffers. 2 x 2l bottles, 1 x 1l bottle
Wash head	1 x 8
Dispense volume	200– 999µl/well
Precision	10% CV at 300µl
Residual volume	< 3µl in U Bottom < 6µl in F Bottom
Fluid alarms	low reagent, waste full
Features	Sweep, soak, purge, top & bottom, wash, variable pump speeds, Plate & Strip mode
Others Barcode	Samples and in rack system
Plate barcode reader	(optional)
Operating system	Windows XP
Interfaces	ASTM interface
	ASCII import of work list sample ID's
Time Scheduling	schedules 3 plates

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	Multiple assays per plate	up to 8 assays per plate
	Export options	ASCII export/report
	Qualitative	user definable result classes
	Quantitative	linear to quadratic regression, sigma, and many more
	QA analysis	Mean, SD, CV, Standard Error and Levey-Jennings (basic version)
	Power supply	Universal AC input wide range AC 50/60Hz, ~100–240V ±10% typically Max 240VA
	Dimensions	Packaging 97cm (W) x 82cm (D) x 75cm (H) Installed 120cm (W) x 66cm (D) x 110cm (H) (with bottle tray and open cover) ±10%
	Weight	90kg
		Environmental conditions
	Temperature	operating: 15–30°C transport: 5–50°C
	Humidity	operating: 30–80% non-condensing transport: 10–85% non-condensing
Control		Positive control  Negative control  Endogenous positive control



Standard	<p>Ms IL-6 Standard, lyophilized; contains 0.1% sodium azide. 2 vials  Standard Diluent Buffer; contains 0.1% sodium azide 25 mL  Antibody Coated Plate, 96-well plate 1 plate  Ms IL-6 Biotin Conjugate; contains 0.1% sodium azide 11 mL  Streptavidin-HRP (100X); contains 3.3 mM thymol 0.125 mL  Streptavidin HRP Diluent; contains 3.3 mM thymol 25 mL  Wash Buffer Concentrate (25X) 100 mL  Stabilized Chromogen, Tetramethylbenzidine (TMB) 25 mL  Stop Solution 25 mL</p>
Installation and Training	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA medicine lab. office, Addis Ababa Ethiopia</li> <li>• Five days Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</li> </ul>
Computer and printer	<ul style="list-style-type: none"> <li>• Compatible computer and printer 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>

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18. Class II Bio safety cabinet..... ( 1)

Standard Features

- Motorized front Window
- Large LCD display
- Automatic Airspeed adjustable with filter block
- Side & back wall is made up of single piece stainless steel
- Interlock function: UV lamp and front window; UV lamp and blower, fluorescent lamp; Blower and front window
- Front 10°slanted to offer operator comfort while working for long time, reduce glare and maximize reach into the work area.
  
- Accessory Included: Fluorescent lamp, UV lamp \*2, base stand, remote control, foot switch, exhaust blower, exhaust duct, drain valve water proof sockets\*2, pipe strap\*2  
 Optional Accessory: Water and gas tap

External Size(W*D*H)	44" x 30" x 89" ±10%
Internal Size(W*D*H)	38" x 24" x 26"
Work Surface Height	29.5" ±10%
Max Opening	17"
Airflow Volume-Inflow	382 CFM
Airflow Volume-downflow	700 CFM
Airflow Volume-Exhaust	394 CFM
HEPA Filter	Two, 99.999% efficiency at 0.3um, filter life indicator
Noise Level	NSF 49≤61 dB / EN 12469≤58 dB

Illumination	≥1000Lux
Waterproof Socket	2, Total consumption:≤500W
Tap	Water tap x1, Gas tap x1
Power Supply	AC220/110V±10%, 50/60Hz ±1Hz, Full load Amps: 9A, BTU/Hr: 1689
Consumption	700W
Alarm	Abnormal airflow velocity; Filter Replacement; Front Window over height
Motor	110V& 220V acceptable, Speed adjustable
Material	Working area: 304 stainless steel/ Frame and Decorative Plate: cold-rolled steel Main Body: Cold-Rolled steel with anti-bacteria powder coating
UV Lamp	30W*1
Package Size (W*D*H) Exhaust Blower (W*D*H)	49" x 40" x 73" ±10% 39" x 32" x 25" ±10%
Gross Weight	543 Lbs
Installation and Training	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA medicine lab. office, Addis Ababa Ethiopia</li> <li>• Five days Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</li> </ul>
Computer and printer	Compatible computer and printer should be provided

	<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>
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19. PCR System Tester ..... (1)

	Futures	Generates droplets for 96 ddPCR reaction 45 minutes. A single instrument supply 4-5 Droplet readers continually Guides setup and loading with large , color touch- screening interference and LED lighting Enclosure HEPA system
	Starting sample size, $\mu$ l	20
	Automated Droplet Generator capacity	1–96 samples/run
	Droplets per 20 $\mu$ l sample	20,000
	QX200™ Droplet Reader capacity	1–96 samples
	Sample illumination	Light-emitting diodes
	Sample detection	Multi-pixel photon counter
	Detection channels	FAM (EvaGreen), HEX (VIC)
	Linear dynamic range	5 orders of magnitude
	Precision	$\pm$ 10%
	Droplets per 96-well plate, million	$\sim$ 1.5
	Automated Droplet Generator dimensions (W x D x H)	Open: 66 x 56 x 89 cm (26 x 22 x 35 in) Closed: 66 x 56 x 66 cm (26 x 22 x 26 in)
	QX200 Droplet Reader dimensions (W x D x H)	66 x 52 x 29 cm (26 x 20 x 11 in)

	Precision	±10%
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### 19.1 PCR Accessories

#### 19.1.1 PCR Plate Sealer

	Futures	Ready to seal in less than 3 min Support block holds both 96-and 384 well plates Motorized drawer for insertion of plate and seal Touch-screen interface allowing single button modification of and time  Easy access to previously stored sealing protocols
	Heat up time, min	<3
	Display, cm (in)	10.9 (4.3) color touch screen
	Temperature range, °C	100–190, off
	Time range, sec	0.5–10.0
	Dimensions (W x D x H), cm (in)	19.2 x 24.8 x 21.9 (7.6 x 9.8 x 8.6)

#### 19.1.2 Thermal cylinder

Input Power	850W, maximum Frequency	
	50 – 60 Hz , Single phase	
Display	8.5 in. LCD display and touch screen	
Port	5 USBA, 1USB B	
Fuses	Two 6.3 A, 250 V, 5x20mm	
Memory	>1,000 typical	
Damnations ( W x D x H )	33X46X20cm	
Wight	10Kg	
Temperature Control Modes	Calculated	
PCR License	Yes	
Reaction Module	96-well Fast	
Sample capacity	96X0.2 ml tubes	
Max rmp rate	5°C	
Average rmp	3.3°C/sec	
Temp. Range	0-100°C	
Temp. accuracy	±0.4 °C	
Temp uniformity	±0.4 °C well to well with in	

10sec.

19.1.3 Plate Support Block

Pkg of 50, white shell/clear well PCRplate , rigid 2-component design

Plate support block, holds 96- and 384-well PCR plates in position Hard-Shell <sup>®</sup> Low-Profile 96-Well Skirted PCR Plates (HSP-9xxx)	
Futures	
Microplate Dimensions	Well Skirted PCR Plates (HSP-9xxx)
Length at base plane	127.76 mm
Width at base plane	85.48 mm
Height overall	16.06 mm
Well depth	14.81 mm
Well diameter at opening	5.46 mm
Well diameter at bottom of conical section	2.64 mm
Well volume	200 µl
Well spacing	9.00 mm
Well angle	17.5°
Well offset	
Left edge to well A1	14.38 mm
Top edge to well A1	11.24 mm

Pkg of 25, white shell/clear well PCRplate , rigid 2-component design

Hard-Shell <sup>®</sup> High-Profile 96-Well Semi-Skirted PCR Plates (HSS-9xxx)	
Microplate Dimensions	Hard-Shell <sup>®</sup> High-Profile 96-Well Semi-Skirted PCR Plates (HSS-9xxx)
Length at top plane	127.76 mm
Width at top plane	85.47 mm
Height overall	20.75 mm
Well depth	19.85 mm
Well diameter at opening	5.50 mm
Well diameter at bottom of conical section	2.69 mm
Well volume	350 µl
Well spacing	9.00 mm
Well angle	17.5°
Well offset	

Left edge to well A1	14.37 mm
Top edge to well A1	11.23 mm
Left edge to H12	113.37 mm
Top edge to H12	74.23 mm
<p><u>19.1.4 PCR Kits and Reagents</u></p> <ol style="list-style-type: none"> <li>2 ml (2 x 1 ml), 2 x supermixes, for use in sample preparation for droplet generation</li> <li>200 x 20 µl reactions, 2 ml (2 x 1 ml), 2x supermix, for use in sample preparation with the droplet generator</li> <li>9 ml (2 x 4.5 ml), 2x buffer, for use as a blank control with Droplet Generation Oil for EvaGreen</li> <li>9 ml (2 x 4.5 ml), 2x buffer, for use as blank control with Droplet Generation Oil for Prob</li> </ol>	
<p>19.1.5. Control sample for RDT kits</p>	
<p>21.1 .5.1 Control sample for Malaria RDT</p>	
<p>Negative control: 0 parasites/ul of Plasmodium spp.  Low Positive Control: 200 parasites/ul of Plasmodium falciparum.  High Positive Control: 2000 parasites/ul of Plasmodium falciparum.</p> <p>Low Positive Control: 200 parasites/ul of Plasmodium vivax.</p>	
<p>Medium Positive Control: 500 parasites/ul of Plasmodium vivax.</p>	
<p>19.1.5.2 Reagent and supply for Malaria RDT</p>	
Pipette 2	1-20 L
Pipette tips	1-20 L capacity)
Timer	4
Vortex mixer	1
freezer 2	-70°C
refrigerator 1	+4°C
Incubator	(range: +20°C to +80°C) 2
Refrigerator thermometer	(range: -20°C to +50°C) 1
Incubator thermometer	(range: 0°C to +100°C) 2
RDTs for lot testing, including spares	
QC aliquots of Pf, Pv and malaria parasite negative cases	
QC aliquots	Rack for
<p>Installation, assembling and commissioning of the system including IQ, OQ and PQ at EFMHACA Food lab. office, Addis Ababa Ethiopia</p>	
<p>Hands on training to be provided at same site by company engineer on complete PCR system and accessories</p>	

20. Incubator .....quantity (2)

Temperature	
Set temperature range in °C	min. 5°C above ambient up to +80°C
Setting accuracy temperature	0.1 °C
Temperature	1 Pt100 sensor DIN class A in 4-wire-circuit
Control technology	
Language setting	English, Spanish, French, Polish, Czech, Hungarian German
ControlCOCKPIT	SingleDISPLAY. Adaptive multifunctional digital PID- microprocessor controller with high-definition TFT- colour display
Timer	Digital backwards counter with target time setting, adjustable from 1 minute to 99 days
Function Set point WAIT	the process time does not start until the set temperature is reached
Calibration	three freely selectable temperature values
adjustable parameters	temperature (Celsius or Fahrenheit), air flap position, programme time, time zones, summertime/wintertime
Ventilation	
Convection	natural convection
Fresh air admixture	adjustment of pre-heated fresh air admixture by air flap control in 10 % steps

Vent	vent connection with restrictor flap
Communication	AtmoCONTROL software for reading out, managing and organising the data logger via Ethernet interface (temporary trial version can be downloaded). USB stick with AtmoCONTROL software available as accessory (on demand).
Temperature control	adjustable electronic overtemperature monitor and mechanical temperature limiter TB, protection class 1 according to DIN 12880 to switch off the heating approx. 20°C above nominal temperature
Auto diagnostic system	for fault analysis
Door	fully insulated stainless steel door with 2-point locking (compression door lock)
Internals	1 stainless steel grid(s), electropolished
Works calibration certificate	incl. works calibration certificate for +37°C
Door	inner glass door
Interior	easy-to-clean interior, made of stainless steel, reinforced by deep drawn ribbing with integrated and protected large-area heating on four sides
Volume	32 l
Dimensions	$w_{(A)} \times h_{(B)} \times d_{(C)}$ : 400 x 320 x 250 mm $\pm 10\%$
Max. number of internals	3



Max. loading of chamber	60 kg
Max. loading per internal	20 kg
Housing	rear zinc-plated steel
230 V, 50/60 Hz approx. 1600 W	Voltage Electrical load
115 V, 50/60 Hz approx. 800 W	Voltage Electrical load
Ambient Conditions	
Set Up	The distance between the wall and the rear of the appliance must be at least 15 cm. The clearance from the ceiling must not be less than 20 cm and the side clearance from walls or nearby appliances must not be less than 5 cm.
Altitude of installation	2,200 – 2500 m above sea level
Ambient temperature	+5 °C to +40 °C
Humidity rh	max. 80 %, non-condensing
Overvoltage category	II
Pollution degree	2

Installation and Training	<ul style="list-style-type: none"> <li>• Installation and commissioning of the system including IQ, OQ at EFMHACA medicine lab. office, Addis Ababa Ethiopia</li> <li>• Five days Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</li> </ul>
Computer and printer	Compatible computer and printer should be provided

21. Multi tube Vortex Mixer..... Quantity (3)

- 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>

21. **Horizontal Bench top Autoclaves .....Quantity (2)**

- 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>

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22. Vertical Floor-Standing Autoclaves..... Quantity (2)

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
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>

27.

23. Microplate Reader and washer ..... (1)

23.1 Microplate Reader	
Overall dimensions	526 mm (W) x 579 mm (D) x 509 mm (H)
Weight	53– 60 kg, depending on the configuration
Operating Conditions	+10°C to +40°C; maximum relative humidity 80% for temperatures up to 31°C. Decreasing linearly to 50% relative humidity at 40°C. Indoor use only!
Performance specification conditions	All performance specifications shall be fulfilled within an ambient temperature range of 20 – 25°C in humidity range of 10 – 80%.
Transportation conditions	-40°C to +70°C, packed in transport packaging

Storage conditions	25°C to +50°C, packed in transport packaging
Mains power supply	100–240 Vac, 50/60 Hz, nominal
Power consumption	200 VA max.
User interface	The instrument is under PC software control.
Computer interface	USB 2.0
Measurement types	Fluorescence intensity, time-resolved fluorescence, photometry, luminometry, and AlphaScreen
Incubator	Incubator included (heating)
Shaker	Orbital shaking
Dispensers	Up to two optional dispensers with automatic dispensing position control
Plate size	Plate maximum dimensions: Universal tray: 127.8 mm (W) x 85.8 mm (D) x 23.5 mm (H) Robotic tray: 128.6 mm (W) x 86.0 mm (D) x 18.0 mm (H)
Light source	Xenon flash lamp
Wavelength selection	Double excitation and double emission monochromators
Detector	Photodiode
Wavelength range	200 – 1000 nm
Bandwidth	5 nm
Wavelength setting resolution	1 nm
Wavelength accuracy	± 2 nm
Linear measurement range	0 – 4 Abs (96-well plate) at 450 nm, ± 2% 0 – 3 Abs (384-well plate) at 450 nm, ± 2%
Absorbance resolution	0.001 Abs
Accuracy	0.003 Abs or ± 2%, at 200 – 399 nm (0 – 2 Abs) 0.003 Abs or ± 1%, at 400 – 1000 nm (0 – 3 Abs)
Precision	SD < 0.001 Abs or CV < 0.5%, at 450 nm (0 – 3 Abs)
Stray light	< 0.005% at 230 nm
Measurement time	10 – 1000 ms
Measurement speed	Reads a 96-well plate in 15 s and a 384-well plate in 45 s (minimum kinetic interval time from A1 back to A1)
Spectral scanning speed	< 2.2 s/well 400 – 500 nm, 1 flash, 2 nm steps

Plate types	6 – 384-well plates
Alpha	
Light source	LED
Alpha measurement excitation Wavelength	680 nm
Emission wavelength selection	Filter wheel with up to 8 optional filter positions
Alpha measurement emission wavelength range	400 – 660 nm
Alpha measurement limit of Detection	< 100 amol phosphotyrosine/well (white 384-well plate)
Other	Installation, assembling and commissioning of the system including IQ, OQ and PQ at EFMHACA Food lab. office, Addis Ababa Ethiopia
	Hands on training to be provided at same site by company engineer on complete PCR system and accessories

23.2 Micro plate washer ..... ( 1 )

Microplate Types	96- and 384-well, standard height and low profile.
Wash Manifold	96-channel.
Dispense Accuracy	± 2 % typical @ 50–300 µl range.
Dispense Precision	≤ 2 % CV @ 200 µl, ≤ 3 % CV @ 100 µl, ≤ 4.5 % CV @ 50 µl.
Wash Volume	1–2000 µl selectable in 1 µl increments.



Residual Volume	< 2 µl/well.
Wash Fluid Flow Rate	1–7.
Aspirate Tip Descent Speed	Fast/Medium/Slow.
Wash Mode	Regular and Superwash.
Soak Time	0–99 s.
Number of Programs	1–99.
Wash Cycles per Program	1–99.
Wash Fluid Selection (Option)	Automatic switching for up to 4 wash fluids.
Stacker Magazines	30, 45, 60 microplates .
Number of Reagents	up to 2.
Liquid Delivery	8-or 16-tip manifold, each channel.
Dispense Volume	10–300 µl.
Dispense Accuracy	≤ 2.5 % CV @ 20–100 µl range. ≤ 3.0 % CV @ 20–100 µl range.
Dispense Precision	≤ 3.5 % CV @ 5 µl. ≤ 7.5 % CV @ 5 µl.
Dispense Speed	Fast/Medium/Slow.
Liquid Path Materials	Glass, Teflon® and Kel-F.
Plate Processing Speeds	3 cycles, 75 µl each: 38 s (384-well plate).
Wash (3 Cycles) & Dispense	300 µl each, followed by immediate 50 µl dispense: 30 s (96-well plate).
Dimensions (W x D x H)	69 x 56 x 61 cm.*
Weight	29.5 kg, 65 lb.*
Power Consumption	100 VA.
Power Requirements	230 V 50 Hz; 115 V 60 Hz.
Interface	USB, Serial interface (RS-232).
Operating Temperature	10–40° C, 50–104° F.
Installation and Training	<ul style="list-style-type: none"> <li>• Installation and commissioning of</li> </ul>

	<p>the system including</p> <p>IQ, OQ at EFMHACA medicine lab. office,</p> <p>Addis Ababa Ethiopia</p> <ul style="list-style-type: none"> <li>• Five days Hands on training to be provided at the site by company engineer on complete instrument and accessories(optional)</li> </ul>
Computer and printer	Compatible computer and printer should be provided

24. Multi channel micro pipette\_..... (4 )

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
00-NPM-8L	50	±1.0	≤0.8
OO-NPM-12L	100	±0.8	≤0.3
00-NPM-8L	20	±3.0	≤0.6
OO-NPM-12L	100	±1.0	≤0.4
00-NPM-8L	200	±0.9	≤0.3
OO-NPM-12L	30	±3.0	≤1.0
00-NPM-8L	150	±1.0	≤0.5
OO-NPM-12L	300	±0.6	≤0.3

25. Syringe testing Machine.....( 2 )

Item No.	Item Name	Technical Specifications	Unit of measurement	Quantity
1	Syringe testing machine	<p>Range of application (for syringe):</p> <ul style="list-style-type: none"> <li>▪ Penetration testing</li> <li>▪ Needle withdrawal testing</li> <li>▪ Liquid leakage testing</li> <li>▪ Luer-lock connection testing</li> <li>▪ Syringe torque testing</li> <li>▪ Catheter connection testing</li> <li>▪ Pull off and out force testing</li> </ul> <p>Testing Machine</p> <ul style="list-style-type: none"> <li>- Nominal force 1kN</li> <li>- Test area (W x H) 408 x 1289 mm</li> <li>- High test-speed (0.0005 ... 2000 mm/min) right up to nominal force</li> <li>- Very high speed return</li> <li>- ergonomic adjustable Hight for seated and standing operation</li> <li>- High precision guideline</li> <li>- Low noise generation</li> <li>- Innovative testControl electronics</li> <li>- 6 slots, of these two module bus slots and one PCIe slot are activated as default.</li> <li>- High-quality DCSC measurement module included in delivery as</li> </ul>	Pcs	1

	<p>standard (occupies one activated module bus slot)</p> <ul style="list-style-type: none"> <li>- Maintenance-free AC drive motor</li> </ul> <p>Xforce P load cell</p> <ul style="list-style-type: none"> <li>- High-precision load cell with wide measurement range</li> <li>- Axis-symmetric principle, thus minimized sensitivity to parasitic forces(transverse forces, bending moments, torque)</li> <li>- Extremely robust, high operating force up to 150% of their capacity</li> <li>- Unique electronic identification system <ul style="list-style-type: none"> <li>- capacity 1kN</li> <li>- Xforce type HP (High Precision)</li> <li>- Mounting stud diameter 8mm</li> <li>- Accuracy class 1 according to ISO 7500-1</li> <li>- Including calibration certificate on the basis of ISO 7500-1</li> </ul> </li> </ul> <p>Test fixture components:</p> <p>1.1 Luer- Lock connection test</p>		
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		<p>Lower retainer</p> <p>Screw Grips</p> <ul style="list-style-type: none"> <li>- Simple, safe and quick operation, robust gripping system</li> <li>- For use in a wide range of temperatures</li> </ul> <p>Wedge Grips ,Fmax 1kN</p> <ul style="list-style-type: none"> <li>- Temperature range -70...+250°C</li> <li>- Scope of supply: 1 pair</li> </ul> <p>Jaw inserts, steel 8.15mm</p> <ul style="list-style-type: none"> <li>- Temperature range -70...+250°C</li> <li>- Scope of supply: 1 set = 4 pieces</li> </ul> <p>Adapter with mounting stud Fmax 1kN</p> <ul style="list-style-type: none"> <li>- For the connection of test tools</li> </ul> <p>Compression platen</p> <p>Upper retainer</p> <ul style="list-style-type: none"> <li>- unit for torsion tests on luer lock caps, based on ISO 594-2</li> <li>-consisting of an adapter flange and</li> </ul>		
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		<p>commercially available luer lock adapter based</p> <p>-2 Nm torque transducer</p> <p>-Standard-compliant test gages as per ISO 594-2</p> <p>1.2 Needle penetration test</p> <p>Specimen grips:</p> <p>Fmax: 1kN</p> <p>Minimum pressure: 0.5bar</p> <p>Mounting height: 120mm</p> <p>Depth with connection unit: 121mm</p> <p>Adjustability of opposing jaws: Stepless and in steps Maximum standard opening: 20mm</p> <p>Connection: 20mm diameter</p> <p>Temperature range: +10.... +35°C</p> <p>Accessories required:</p> <p>Jaw inserts: 1x</p>		
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		<p>Set of prim jaws non slip coating :Ø5...12mm</p> <p>Set of prim jaws non slip coating :Ø5...35mm</p> <p>Spacer:</p> <p>1 pair, 20mm height</p> <p>Pneumatic control unit: 1x</p> <p>Needle penetration test device (with variable test angle):</p> <p>Fmax: 50N</p> <p>Specimen width:20mm Specimen thickness: 0-1mm Insertion opening: 10mm diameter</p> <p>Test angle lockable: 30,45, 60and 60°</p> <p>Connection: 20mm diameter</p> <p>Temperature range: +10.... +35°C</p> <p>-Standard: ISO 11040-4</p> <p>1.3 Liquid Leakage tester</p> <p>Testing device:</p> <p>Fmax: 1kN</p> <p>Width x depth x height: 220x155x220mm</p> <p>Weight: 3kg</p> <p>Upper connection: adapter</p>		
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		<p>Lower connection: connector pitch circle 75mm</p> <p>Temperature range: +10.... +35°C</p> <p>Syringe holder</p> <p>-Standard: ISO 11040-4</p> <p>1.4 Needle pull out (withdrawal) force tester</p> <p>Set of jaws corrugated steel with plane surface,30x32mm</p> <p>(added for this test purpose with above mentioned components)</p> <p>-Standard: ISO 11040-4</p> <p>1.5 Needle pull off force (separation force) tester</p> <p>Set of jaws corrugated steel with plane surface,30x32mm</p> <p>(added for this test purpose with above mentioned components)</p> <p>-Standard: ISO 11040-4</p> <p>1.6 Catheter connection tester</p>		
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		<p>Self-aligning specimen grips</p> <p>Fmax 500N</p> <p>Height x width x depth: 155x65x65mm</p> <p>Fixture weight: 600g Connection adapter: 8mm Temperature range: +10.... +35oC</p> <p>-Standard: ISO 10555-1</p> <p>System furniture table 1200 x 810 mm</p> <ul style="list-style-type: none"><li>- Laminated melamine faced board</li><li>- 1 cable bushing</li><li>- Integrated cable duct</li><li>- Adjustable in height from 720 to 840mm</li><li>- Max. loading 300 kg</li></ul> <p>Standard PC:</p> <ul style="list-style-type: none"><li>• Intel Core i5</li><li>• 4 GB RAM</li><li>• 500 GB S-ATA hard disk</li><li>• Monitor resolution 1920 x 1080 pixels and 65k colors (high color)</li><li>• DVD drive</li><li>• 2 serial RS-232 ports</li><li>• 2 * 1-Gbit Ethernet ports</li></ul> <p>Testing software</p> <p>Certificate and Documentation</p> <p>Installation, training and commissioning</p>		
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		shall be included		
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26. **GLOVE LENGTH MANDREL..... (1)**

Futures	This mandrel is an acrylic cylinder with a domed top and has a rule inset, facilitating Testing to ISO medical glove standards. The Glove Length Mandrel fits easily Into the glove’s longest finger so that the length of the glove is clearly visible on the rule.
Height	380mm
Materials	Acrylic, stainless steel or plastic rule inset

27. **Glove Visual leak tester ..... (1)**

Futures	Should have 20 hangers on the carousel with a specially secure device for attaching the glove meets the requirement ASTM STANDARED AND ISO 10282, AND ISO 11193
Dimensions	Approximately 600 mm deep x 600 mm wide x 1750 mm high ±10%
Materials	Stainless steel frame with integral reservoir. Acrylic dispensing tank
Head	20 hangers on the carousel heads
Plumbing	Comes with suitable water pump and uses flexible PVC/plastic tubing. Water flow and recirculation controlled by a pump and non-return and gate valves.
	<p>Operation</p> <p>Automatic Time adjustable Rotation of carousel triggers the filling max 500 and emptying of the dispensing tank. Control panel displays the number to test and number remaining to test. The number to test and test mode (choice of male condoms, female</p>

	condoms, gloves) can be controlled by the operator.
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28. TENSILE SAMPLE PRESS SPECIFICATIONS.....( 1 )

Futures	Require tensile testing for product which is calming extra strength
Materials	Aluminum and steel
Operating Pressure	400 kPa minimum for gloves 100 kPa minimum for condoms
Size	300mm wide x 400 mm deep x 250 mm high ±10%

Tensile Sample Accessories Specifications.....( 1 )

Futures	ISO 37 YPPE 1, 2, EN 455-2 AND ASTM D-412
Condom and Glove Dumbbell Sample Cutters	160 mm x 190mm x 55 mm, designed to fit into the Tensile Sample Press
Materials	Aluminum, condom cutter has aluminum replaceable blades, glove cutters have a blade that can be sharpened and is also removable/replaceable
Condom Sample Holders	Aluminum and nylon roller grips
Glove Sample Grips	Aluminum, pneumatic grips
Glove Cuff Rupture Needle	Aluminum rod and holder, needle 1mm radius

GLOVE CUFF RUTURE NEEDLE.....( 1 )

The gloves breaking while being put on. around needle tip is pushed by the tensile machine through a firmly glove sample
Dumbbell sample grips
The pneumatic operating dumbbell grips hold dumbbell sample firmly they are 1mm thick

Calibrator .....(1)

Supplied with calibration device, it is easy to calibrate in house.	
Electrical System	
24 volts DC, supplied with suitable power supply that can be adapted to local mains plug on request	
Lighting	
2 x LED lamps on adjustable arms	
Tensile Tester	
Futures	The material can be used for also condom, glove and each models achieve advantage.
Force Capacity	5000N (5 kN)
Maximum Crosshead Travel (mm) (between eye ends)	975 (38.4 in)
Crosshead Speed Range at full load (mm/min)	0.01-1016 (0.0004-40 in/mi)
Maximum Return Speed (mm/min)	1016 (40 in/min)
Speed accuracy (at steady state)	< 0.2
Minimum load resolution	0.0001N (2.2x10 <sup>-5</sup> lbf)
Load Cell Accuracy	<0.5%
Extension resolution	< 0.1 microns
Data sampling rate	8kHz
Distance accuracy	
Load measuring system EN ISO7500:2004, Class 0.5 ASTM E4	
Machine Dimensions	

Width between columns	404 (16 in)
Machine Height (mm)	1565 (61.2)
Machine Width (mm) (excluding optional console)	820 (with console) (32.3 in)
Machine Depth (mm)	
Throat Depth (mm)	
Machine weight (without shipping crate)	
Weight (kg)	
Operating conditions	
Humidity (non-condensing)	5-85% RH
Operating Temperature	5-35° C
Storage Temperature	
Supply Voltage	-17-54°C
	230Vac ± 10%, 50-60Hz (LR5KPlus Fuse T3.15AH250V)
Maximum Power Requirement (VA)	
Technical specification/details	
<p>The intelligent plug and play load cells have 0.5% accuracy and come in a wide range of sizes suitable for the models ENERSOL offers (YLC type for LS models and XLC type for KPlus models). Each tensile tester is supplied with one load cell from the appropriate range below (as selected) and with any order, additional load cells can be purchased:</p>	

29. **FEMALE CONDOM LENGTH MANDREL .....( 1 )**

Futures	48mm diameter mandrel for female condoms. The mandrels have a smooth domed top, standing firmly on a base and stainless steel ruler set accurately into the mandrel for length testing.
Model	MFL (female condoms) Dimensions Mandrel is 48mm for female condoms Device
Height	270mm
Materials	Clear Acrylic or Black Acetyl, stainless steel rule

30. **First Responder Kit, Medium ..... Quantity (9)**

**Technical specification**

**All items shall placed in backpage made for this purpose only.**

- (50) 3/4" x 3" Adhesive plastic bandages;
- (4) 2" x 2" Gauze dressing pads, (2) 2 packs;
- (4) 3" x 3" Gauze dressing pads (2) 2 packs;
- (20) 4" x 4" Gauze dressing pads (10) 2 packs;
- (2) 5" x 9" Trauma pads; (1) 8"x10" Trauma pad;
- Emergency pressure dressing;
- 2" Conforming gauze roll bandages;
- 36" Triangular sling/bandage, with 2 safety pins;
- (6) Alcohol cleansing pads;
- Burn relief packs, 3.5 gm.;
- Povidone-iodine infection control wipes;
- 2" x 5 yd. 3-Cut first aid tape;
- 4" x 5" Instant cold compress;
- Sterile eye pads;
- Eye wash, 4 oz.;
- 24"x24" Biohazard bag, 10 gallon capacity;
- 10" x 12" Ziplock bags;
- CPR one-way valve face shield, latex free;
- 52" x 84" Emergency blanket;
- Exam quality vinyl gloves, 2 pairs;
- (1) 7-1/4" Utility shears;
- (1) 3-1/2" Deluxe tweezers, stainless steel;
- Water purifying tablets.
  
- A mosquito-proof bed net.
  
- Hand sanitiser or wipes.
  
- Digital thermometer.

- Sterile syringes.
- First aid reference.
- Analgesic (pain relief) medicine such as paracetamol or aspirin.
- Antihistamine tablets for bites, stings or allergies.
- Cold and flu tablets.
- Cough medicine.
- Motion sickness tablets.
- Throat lozenges or drops.
- Antiseptic solution for cleaning wounds or bites.
- Antiseptic ointment to apply to a wound.
- Blister and wound patches, such as sticking plasters.
- Medical adhesive tape, e.g. Micropore.
- Wound dressings, e.g. a crepe bandage, gauze swabs and OpSite, and Steristrips, which can often take the place of stitches.
- Safety pins, scissors and tweezers (you may not be allowed to carry these in your cabin luggage).
- Insect repellent containing DEET (diethyl toluamide).
- Sting relief solution, e.g. Stingose (aluminium sulfate).
- Diarrhoea medicine, e.g. Imodium (loperamide).
- Mild laxative, for constipation.
- Antacid for indigestion.
- Antifungal or antibacterial cream.
- Low potency hydrocortisone cream.
- Fluid and electrolyte replacement powder or tablets, e.g. Gastrolyte or HYDRALyte.
- Eye lubricant drops.
- Ear plugs.
- Sunscreen (at least SPF 30+).

Thermometer (a forehead thermometer is best for travel as it doesn't break or run out of batteries).

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**Technical Specifications**

Raman Spectrum Range; 250 to 2875 cm-1

Spectral Resolution; 8 to 10.5 cm-1 (FWHM) across range

Laser (excitation wavelength); 785 nm +/-0.5 nm, 2 cm-1 line width, stability <0.1 cm-1

Laser Output Power; 250 mW +/-25 mW or customizable (low/med/high) with TruTools

Collection Optics; NA=0.33, 18mm working distance; 0.2 to 2.5 mm spot size

Exposure; Automatic modes (12 ms minimum) or customizable up to 10,000 ms with TruTools

Battery; Rechargeable internal lithium ion battery > 3 hours operation

External Power Supply; DC Wall Adapter, 100-240 V AC 50/60 Hz

Weight; 2 lb (0.9 kg)

Size; 8.2 in x 4.2 in x 1.7 in (20.8 cm x 10.7 cm x 4.3 cm)

Operating Temperature; -20°C to +40°C (continuous)

Connectivity; Ethernet

Ports; Up to 10 simultaneous ports

Software Version; Requires RM v.2.6 or later

Chemometrics Package; Works with Eigenvector Solo + Model Exporter v8.1

Operating Systems and Browsers; Microsoft® Windows® 7,8,10, Internet Explorer® 11,

Microsoft Edge™ 25; Google Chrome™ 51

Barcode Supported Symbologies; Most linear and 2D standards

Biometrics; Fingerprint reader for easy login

Measurement Accessories; Vial holder, universal tablet holder, cuvette holder

Compliance; FDA 1040, 21 CFR Part 11, CE certification, Ph. Eur. 8.7

**Training and Support**

The suppliers shall provide experts in subject matter training and technical consultation for **one day** from method development and validation to general operator usage.

**Templates and documentation shall include:**

- IQ/OQ/PQ
  - SOP Templates
  - Statements of Compliance
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