

LOT 1- Clinical Chemistry & Hematology Equipmen

Semi-Automated Clinical Chemistry Analyzer

#	Technical Specifications	Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
			YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	System Configuration – Semi-automated benchtop clinical chemistry analyzer with open reagent system, programmable operation, and compatibility with commercially available chemistry reagents from different manufacturers.													
5	Bidder shall submit separate pricing for reagents, calibrators, controls, flow cell consumables , cuvettes, cleaning solutions and consumables. Shelf life, storage conditions													
6	Intended Use – Quantitative analysis of clinical chemistry parameters in serum, plasma, urine, cerebrospinal fluid (CSF), and other appropriate biological samples.													
7	Methodology – Absorbance photometry, endpoint, kinetic, fixed-time, differential, bichromatic, and monochromatic measurement modes.													
8	Regulatory Approval – Valid CE-IVD and/or FDA approval.													
9	Manufacturer Quality System – Manufacturer shall operate under ISO 13485 certified quality management system.													
10	Optical System – High-quality interference filter or diffraction grating optical system.													
11	Wavelength Range – Minimum 7 wavelengths 340-405-505-546-578-620-670													
12	Light Source – Long-life LED light source													
13	Photometric Range – The analyzer shall provide a photometric measurement range of at least -0.3 to 3.5 Abs. Wider measurement ranges are acceptable.													
14	Photometric Accuracy – Photometric accuracy shall be ±1% or better, and photometric linearity shall be within ±1% or ±0.01 Abs, whichever is greater, over the specified photometric measurement range.													
15	Flow Cell / Cuvette System – The analyzer shall support both flow cell (aspiration) and cuvette measurement modes. The flow cell shall be quartz with an automatic washing system. The analyzer shall also be compatible with standard reusable and disposable cuvettes.													
16	Temperature Control – Incubation temperature maintained at 37°C ±0.1°C.													
17	Sample Types – Serum, plasma, urine, CSF, and other applicable sample types.													
18	Measurement Modes – Endpoint, kinetic, fixed-time, absorbance, factor, and multi-standard calibration modes.													
19	Calibration – Automatic and manual calibration capability.													
20	Quality Control – Internal QC program with Levey-Jennings charts, Westgard rules, QC statistics, and QC data storage.													
21	Display – Color LCD display or touchscreen interface .													
22	User Interface – User-friendly software with graphical interface and multilingual operation .													
23	Printer – Built-in thermal printer or external printer support.													
24	Data Storage – Storage and retrieval of patient results, calibration records, and quality control data.													
25	Connectivity – USB port and LIS/HIS connectivity .													

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#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
26	Data Export – USB and/or network export capability.													
27	Self-Diagnostics – Built-in self-diagnostic software with troubleshooting messages.													
28	Maintenance – Automated washing and maintenance programs with low-maintenance design suitable for remote locations.													
29	Throughput – Minimum 100 tests per hour equivalent analytical capacity .													
30	Reagent Consumption – Low reagent consumption .													
31	Sample Volume – Adjustable sample volume with low sample consumption .													
32	Assay Menu – Capable of performing routine chemistry assays including but not limited to: Glucose ,Urea ,Creatinine ,Uric Acid ,Cholesterol ,Triglycerides ,HDL Cholesterol ,Total Protein,Albumin ,Bilirubin (Total and Direct) ,ALT (GPT) ,AST (GOT) ,ALP ,GGT ,Amylase ,Calcium , Phosphorus ,Magnesium ,Iron ,LDH ,CK ,Other compatible assays													
33	Quality Assurance – Support for external quality assessment programs and internal quality control monitoring.													
34	Electrical Requirements – 220–240 VAC, 50 Hz operation.													
35	Environmental Conditions: The equipment shall be designed for reliable operation under the climatic conditions prevailing in Yemen, with an ambient operating temperature range of +10°C to +50°C, without degradation of performance.													
36	Accessories – All accessories required for installation and operation shall be included.													
37	Consumables – Initial supply of cuvettes, controls, calibrators, and consumables shall be included. Supplier shall guarantee availability of reagents, controls, calibrators, cuvettes, consumables, and spare parts in Yemen for at least 5 years.													
38	Training – Installation, commissioning, user training, and biomedical engineer training shall be included.													
39	Documentation – User manual, service manual, maintenance procedures, troubleshooting guide, and calibration instructions shall be supplied.													
40	Built-in QC Statistics – Mean, SD, CV%, Levey-Jennings, and Westgard rule evaluation.													
41	Result Memory – Storage of at least 5,000 patient results .													
42	Barcode Reader .													
43	Low Water Consumption													
44	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
Electrolyte Analyzer														
		Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Safety Standards: Equipment shall comply with IEC electrical and laboratory safety standards.													
5	Regulatory Approval: Valid CE marking and/or FDA approval. Manufacturer shall operate under ISO 13485 certified quality system.													
6	Bidder shall submit separate pricing for reagents, electrodes, calibrators, controls, tubing, waste bottles and cleaning solutions. Shelf life, expected electrode life													
7	Regulatory Acceptance: Equipment shall be approved for use in one or more recognized regulatory jurisdictions (EU, USA, Canada, UK, Japan, Australia, etc.).													

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8	General Design: Heavy-duty laboratory-grade electrolyte analyzer utilizing modern ISE technology, designed for continuous clinical laboratory operation with reliable performance, safety features, and user-friendly operation.													
9	Supplier Qualification: Supplier shall be an authorized distributor, agent, or manufacturer representative.													
10	Measurement Principle: Ion Selective Electrode (ISE) technology. Direct or indirect ISE methodology shall be acceptable.													
11	Sample Types: Whole blood, serum, plasma, dialysate, and urine samples shall be supported.													
12	Sample Volume: low sample volume .													
13	Sampling Mode: Open and/or closed tube sampling capability shall be specified.													
14	STAT Function: Analyzer shall support priority STAT sample processing without interrupting routine workflow.													
15	Sample Area: Visible sample aspiration area for easy monitoring and troubleshooting.													
16	Analysis Time: rapid analysis .													
17	Throughput: Minimum 60 samples/hour .													
18	measuring Range: The analyzer shall provide the following minimum analytical measuring ranges: Sodium (Na ⁺): 50–200 mmol/L Potassium (K ⁺): 1.0–15.0 mmol/L Chloride (Cl ⁻): 50–200 mmol/L													
19	Mandatory Parameters: Sodium (Na ⁺), Potassium (K ⁺), , Chloride (Cl ⁻) and (PH)shall be included.													
20	Optional Parameters: Supplier shall specify availability of additional assays such as Ionized Calcium (ICa), Lithium, pH, and others if supported.													
21	Automatic Cleaning: Automatic probe washing and cleaning cycle shall be included.													
22	Calibration: Automatic calibration with calibration monitoring, validity tracking, recalibration alerts, and manufacturer-specified calibration frequency and stability.													
23	Reagent System: the analyzer uses an open reagent system.													
24	Consumables: Availability of alternative consumables and reagent substitution policy shall be specified.													
25	Display: Color LCD touchscreen with intuitive user interface.													
26	Printer: Built-in thermal printer or equivalent reporting capability.													
27	Barcode: Sample barcode reader .													
28	Data Management and Storage: Storage, retrieval, and review of patient results, QC records, calibration history, audit logs, and a minimum capacity of 5,000 patient results.													
29	Connectivity: LIS/HIS connectivity with bidirectional communication .													
30	First Result Time: First result available within ≤60 seconds .													
31	Sample Capacity: Minimum 40 onboard sample positions.													
32	Quality Control: Automatic QC processing with Levey-Jennings charts, QC statistics, and QC history storage.													
33	Carryover: Carryover performance shall be specified and minimized according to manufacturer specifications.													
34	Electrode Life: Electrodes shall provide stable analytical performance throughout their intended service life. The expected electrode life shall be not less than 12 months or 5,000 tests (or equivalent), whichever occurs first, under normal operating conditions.													

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#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
35	Reagents shall remain stable onboard for a minimum of 30 days under normal operating conditions.													
36	User Access: Password-protected multi-user access with audit trail .													
37	Power Supply: 220–240 VAC, 50 Hz operation.													
38	Training: Installation, commissioning, user training, and biomedical engineer training shall be included.													
39	Documentation: Operation manual, service manual, and quick reference guide shall be supplied in hardcopy and electronic format.													
40	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
HbA1c Analyzer														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Safety Standards: Equipment shall comply with IEC electrical and laboratory safety standards.													
5	Equipment Type – Portable Point-of-Care (POCT) HbA1c Analyzer for quantitative determination of glycated hemoglobin (HbA1c).													
6	Bidder shall submit separate pricing for cartridges/cassettes, controls, calibrators and all required consumables. Unit price, number of tests per cartridge, shelf life.													
7	Intended Use – Measurement of HbA1c in whole blood samples for diagnosis and monitoring of diabetes mellitus.													
8	Methodology – HPLC, Boronate Affinity Chromatography, Immunoassay, Enzymatic Method, Capillary Electrophoresis, or equivalent internationally accepted HbA1c methodology. Supplier shall specify methodology.													
9	Manufacturer Quality System – Manufacturer shall operate under ISO 13485 certified quality management system.													
10	Standardization – Analyzer shall be traceable to IFCC reference method and NGSP/DCCT certified.													
11	Reported Units – Results shall be reported in both NGSP (%) and IFCC (mmol/mol) units.													
12	Throughput – Single-test operation with result available within approximately 3–10 minutes. Faster testing .													
13	Sample Type – Capillary fingerstick whole blood and/or venous whole blood according to manufacturer specifications.													
14	Sample Volume – Lower sample volume .													
15	Sample Loading – Disposable cartridge/cassette-based sample loading system. Analyzer shall accept direct insertion of the test cartridge/cassette with minimal operator steps.													
16	STAT Capability – Not mandatory. Single-test immediate analysis suitable for point-of-care use.													
17	Measurement Range – The analyzer shall measure HbA1c over a minimum analytical range of 4.0% to 15.0% (20–140 mmol/mol IFCC) or equivalent.													
18	Precision – CV ≤ 3% at normal and diabetic HbA1c levels.													
19	Calibration – Factory calibrated or automatic calibration.													
20	Quality Control – Internal electronic/procedural quality control. External liquid controls shall be supported where applicable.													
21	Hb Variant Detection – Analyzer shall detect, identify, or flag common hemoglobin variants and abnormal hemoglobin fractions where applicable.													
22	Carryover – Not applicable for disposable cartridge/cassette systems.													
23	Display – Integrated LCD display with clear presentation of patient results and test status.													
24	User Interface – User-friendly software with operator guidance and troubleshooting support.													
25	Data Storage – The analyzer shall provide internal storage for patient results and QC records sufficient for routine clinical use, with a minimum capacity of 500 patient results.													
26	Barcode Reader – Sample barcode reader .													
27	Barcode Reader – Not mandatory. Patient/sample identification capability where available.													
28	Connectivity – USB connectivity shall be provided. Bluetooth, Wi-Fi, LIS/HIS or HL7 connectivity where available.													
29	Data Export – USB, Bluetooth, Wi-Fi and/or network export capability where available.													
30	Maintenance – Automated daily maintenance procedures .													
31	Maintenance – Minimal routine maintenance. Automatic self-checks and cartridge-based operation .													
32	Reagent System – Disposable cartridge/cassette-based reagent system. Cartridges/cassettes shall be ready-to-use and have a minimum shelf life of six (6) months upon delivery. Any onboard or opened cartridge stability shall be in accordance with the manufacturer's validated instructions.													
33	Controls and Calibrators – Initial supply of controls and calibrators shall be included.													
34	Controls and Calibrators – Initial supply of quality control materials and any required calibration materials shall be included where applicable.													
35	Starter Consumables – Minimum 500 tests or 6 months of cartridges/consumables, whichever is greater.													
36	Electrical Requirements – 220–240 VAC, 50 Hz operation.													
37	Electrical Requirements – AC adapter and/or rechargeable battery operation .													

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38	Documentation – User manual, service manual, maintenance procedures, troubleshooting guide, and calibration instructions shall be supplied.													
39	First Result Time – First result preferably available within ≤ 10 minutes.													
40	First Result Time – First result available within ≤10 minutes.													
41	Program Storage – Internal memory for patient results.													
42	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
Hemoglobinometer (Digital Portable Hemoglobin Analyzer)														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Safety Standards: Equipment shall comply with IEC electrical and laboratory safety standards.													
5	Equipment Type – Portable digital hemoglobin analyzer for quantitative determination of hemoglobin concentration in human blood.													
6	Intended Use – Measurement of hemoglobin concentration for anemia screening, diagnosis, and patient monitoring in laboratory, clinic, and field settings.													
7	Analyzer Design – Lightweight handheld or portable analyzer suitable for point-of-care testing.													
8	Methodology – Photometric, reflectance photometry, microcuvette-based technology, or equivalent hemoglobin measurement methodology.													
9	Regulatory Approval – Valid CE-IVD and/or FDA approval.													
10	Manufacturer Quality System – Manufacturer shall operate under ISO 13485 certified quality management system.													
11	Calibration – Factory calibrated. No routine user calibration required.													
12	Result Time – Test results available within 15 seconds or less.													
13	Measurement Range – Hemoglobin measurement range not less than 0–25.6 g/dL.													
14	Accuracy – Supplier shall provide accuracy specifications and validation data.													
15	Precision – Supplier shall provide repeatability and reproducibility performance data.													
16	Sample Type – Capillary and/or venous whole blood.													
17	Sample Volume – Low sample volume requirement preferred (typically ≤10 µL).													
18	Display – Digital LCD display with clear numerical result presentation.													
19	Units of Measurement – Results displayed in g/dL. Additional units acceptable if available.													
20	Data Storage and Management – Storage and retrieval of patient results with date and time, historical records, and minimum storage capacity of 500 patient results.													
21	Power System – Battery-powered operation suitable for field use with rechargeable battery and/or AC adapter supplied. The analyzer shall support at least one working day of normal operation without recharging and be optimized for operation in areas with unstable electricity supply.													
22	Quality Assurance – Internal electronic quality control, system self-check functions, built-in diagnostics, and availability of quality control materials from the supplier.													
23	Field Use and Portability – Compact lightweight analyzer suitable for outreach activities, nutrition screening campaigns, mobile clinics, and primary healthcare facilities. A protective carrying case shall be supplied.													
24	Environmental Conditions: The equipment shall be designed for reliable operation under the climatic conditions prevailing in Yemen, with an ambient operating temperature range of +10°C to +50°C, without degradation of performance.													
25	Connectivity – USB, Bluetooth, or data transfer capability.													
26	Training – Installation, commissioning, and user training shall be included.													
27	Documentation – User manual, quick reference guide, and maintenance instructions shall be supplied.													
28	Barcode Capability													
29	Consumables – Compatible microcuvettes/test cuvettes shall be supplied. Minimum 6 months starter consumables shall be included, and the supplier shall guarantee availability of microcuvettes and consumables in Yemen for at least 5 years.													
30	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													

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#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
LOT 2 - Immunology & Serology Equipment														
ELISA Reader														
			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications ELISA Reader	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
1	Manufacturer : State manufacturer name and provide manufacturer authorization letter.													
2	Model Number: State exact model number and year of manufacture.													
3	Safety Standard: Valid EU CE or US FDA regulatory approval as Medical Devices or Comply with IEC 61010 and relevant electrical/medical laboratory safety standards.													
4	Equipment Type: Stand-alone ELISA microplate reader designed for independent operation and routine clinical laboratory ELISA testing using standard 96-well microplates.													
5	Intended Use: Qualitative and quantitative ELISA absorbance reading for infectious diseases, hormones, fertility, tumor markers, serology, autoimmune and other immunological assays according to validated kit instructions.													
6	Bidder shall submit separate pricing for ELISA kits, controls, calibrators, wash buffer, cleaning solution, microplates and all required consumables. Shelf life, storage conditions a.													
7	Measurement Principle: Direct optical absorbance measurement in microplate wells using monochromatic and dual-wavelength/bichromatic photometric measurement.													
8	Microplate Format: Compatible with standard flat-bottom 96-well ELISA microplates; compatibility with strip plates and standard plate dimensions shall be supported.													
9	Optical System: High-quality optical system using interference filters, monochromator, diffraction grating or equivalent clinically validated optical technology.													
10	Light Source: Long-life, stable illumination source utilizing LED (preferred) or Tungsten Halogen lamp, capable of providing stable and accurate absorbance measurements across the specified wavelength range without compromising photometric performance.													
11	Wavelength Range: Minimum wavelength coverage of 400–750 nm or wider for routine ELISA assays.													
12	Filters / Wavelengths: Supplied with a minimum of eight (8) optical filters or selectable wavelengths, including at least 405 nm, 415 nm, 450 nm, 492 nm, 570 nm and one reference wavelength within 620–650 nm. Additional wavelengths such as 490 nm, 540 nm, 630 nm and/or 690 nm are acceptable.													
13	Reference Wavelength: Reader shall support reference wavelength correction within 620–650 nm to reduce optical interference, plate imperfections and background effects.													
14	Reading Modes: Single wavelength and dual wavelength reading; endpoint absorbance measurement; cutoff calculation; qualitative and quantitative analysis.													
15	Photometric Range: Minimum absorbance range 0.000–3.000 Abs or wider. Wider ranges up to 4.000 Abs are acceptable.													
16	Photometric Accuracy: Accuracy shall be ±1% or ±0.010 Abs, whichever is greater, or better over the normal clinical operating range.													
17	Photometric Precision / Repeatability: Repeatability shall be CV ≤1.0% or SD ≤0.005 Abs at clinically relevant absorbance levels, or better.													
18	Linearity: Photometric linearity shall be within ±1% or better across the specified measurement range, supported by manufacturer documentation.													
19	Resolution: Display and reporting resolution shall be at least 0.001 Abs.													
20	Reading Speed: Reading time for one standard 96-well plate shall not exceed 10 seconds for single wavelength reading; faster performance is acceptable.													
21	Plate Capacity: One standard 96-well microplate per reading cycle.													
22	Plate Shaking: Built-in plate shaking/mixing function is with adjustable time and speed where available.													
23	Incubation: Built-in incubation is optional. If provided, temperature control shall be suitable for ELISA assays and clearly specified by the manufacturer.													
24	Blank Correction: Reader shall support blank well correction, reagent blank correction and user-defined blank assignment.													
25	Calibration Curves: Software shall support multiple curve fitting methods including linear regression, point-to-point, log-log, semi-log, spline and 4-parameter logistic (4PL) or equivalent.													
26	Quality Control Functions: Software shall support QC review, control ranges, assay validation, positive/negative determination, cutoff calculation and abnormal result flags.													
27	Data Storage: Instrument/software shall store test protocols, plate layouts, calibration data, QC data and patient/sample results with backup/export capability.													
28	Software Operation: Supplied with integrated or PC-based software for test setup, plate layout, reading, result calculation, reporting and data management.													
29	User Interface: Color LCD/touchscreen or PC-based graphical interface showing plate layout, assay settings, reading status, results and instrument messages.													
30	Connectivity: USB connectivity shall be provided. LAN/RS232 and LIS/HIS connectivity .													
31	Printer Support: Built-in printer or external printer connectivity shall be available for result reports, or results shall be exportable for printing from PC software.													

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#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
32	Result Export: Results shall be exportable in commonly used formats such as PDF, Excel/CSV, text or LIS-compatible format.													
33	Protocol Storage: Reader shall allow storage and recall of multiple assay protocols and plate configurations.													
34	Open System: System shall be open and compatible with commercially available ELISA kits from different manufacturers, provided kit instructions are followed.													
35	Sample Identification: barcode compatibility . Software shall allow sample ID, patient ID and test ID management.													
36	Security / User Access: Password protection and user-level access control to protect assay protocols, QC data and patient results.													
37	Audit Trail: Audit trail or traceability of user actions, protocol changes and result modifications .													
38	Electrical Requirements: 220–240 VAC, 50/60 Hz, suitable for Yemen power supply; supplier shall provide suitable plug/adaptor if required.													
39	Environmental Conditions: Suitable for reliable operation under local environmental conditions in Yemen, ambient operating temperature +10°C to +50°C and relative humidity up to 90% non-condensing, unless manufacturer specifies stricter limits.													
40	Accessories: Supplied complete with power cable, communication cable, dust cover, software media/license if applicable, calibration/verification tools if normally supplied, and all standard accessories required for operation.													
41	Starter Kit / Consumables: Supplier shall provide starter consumables sufficient for installation, demonstration and user training, including at least one compatible 96-well plate or verification plate where applicable.													
42	Installation & Commissioning: Supplier shall install, configure and commission the reader at site and demonstrate successful operation using validated test/protocol or verification procedure.													
43	IQ/OQ Documentation: Supplier shall provide Installation Qualification and Operational Qualification documentation or equivalent commissioning/acceptance report.													
44	Training: Supplier shall provide on-site training for laboratory staff on operation, assay setup, plate layout, QC, calibration, result interpretation, data export, cleaning and basic troubleshooting.													
45	Regulatory Compliance: CE-IVD, IVDR compliance, FDA listing/clearance or equivalent regulatory approval is required as applicable to the offered model.													
46	Quality System: Manufacturer shall be ISO 13485 certified or equivalent quality management system for medical devices.													
47	Technical Evaluation Requirements: Bidder shall submit original catalogue/datasheet, model number, manufacturer authorization, country of origin, compliance statement, warranty terms, service plan and documentary evidence for all major technical claims.													
48	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
Technical Specifications ELISA Washer														
1	Manufacturer : State manufacturer name and provide manufacturer authorization letter.													
2	Model Number: State exact model number and year of manufacture.													
3	Safety Standard: Valid EU CE or US FDA regulatory approval as Medical Devices or Comply with IEC 61010 and relevant electrical/medical laboratory safety standards.													
4	Equipment Type: Stand-alone automated ELISA microplate washer designed for independent operation and routine washing of standard 96-well ELISA microplates.													
5	Intended Use: Automated washing, soaking and aspiration of ELISA microplates used in clinical laboratory immunoassay procedures.													
6	Plate Compatibility: Compatible with standard 96-well flat-bottom ELISA microplates and strip plates with standard dimensions.													
7	Wash Head: Equipped with precision washing head suitable for 96-well plates and removable/cleanable manifold design.													
8	Wash Channels: Minimum 8-channel washing head.													
9	Dispensing System: Accurate and uniform dispensing of wash buffer into each well with adjustable dispense volume.													
10	Aspiration System: Efficient aspiration from each well with adjustable aspiration height and speed to minimize residual liquid.													
11	Residual Volume: Residual volume after washing shall be ≤5 µL per well or better under recommended operating conditions.													
12	Dispensing Accuracy: Dispensing accuracy shall be within ±5% or better, supported by manufacturer documentation.													
13	Dispensing Precision: Dispensing precision shall be CV ≤5% or better across channels.													
14	Wash Programs: System shall store multiple user-defined washing programs/protocols suitable for different ELISA assays.													
15	Wash Cycles: User-programmable number of wash cycles, dispense volume, aspiration mode, soaking time and plate shaking where available.													
16	Soak Function: Programmable soaking time between wash cycles shall be available.													
17	Shaking Function: Plate shaking/mixing function with adjustable time and intensity if available.													

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#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
18	Bottom Washing / Crosswise Aspiration: Washer shall support effective bottom washing and aspiration modes suitable for flat-bottom ELISA plates.													
19	Cross-Contamination Control: Design shall minimize carryover and cross-contamination between wells through proper aspiration and dispense manifold design.													
20	Anti-Clogging Function: Washer shall include automatic rinse/prime function and anti-clogging procedures for wash needles/manifold.													
21	Automatic Rinse: Automatic rinsing/cleaning program shall be available to clean fluid lines and prevent salt crystallization.													
22	Liquid Level Detection: Wash and waste bottle level detection to prevent dry running or waste overflow.													
23	Overflow Protection: Waste overflow protection or alarm shall be provided.													
24	Bottle System: Supplied with wash buffer bottle and waste bottle of adequate capacity for routine operation; minimum 1–2 L each or manufacturer standard acceptable.													
25	Display / User Interface: LCD/touchscreen or clear keypad interface displaying program, cycle status, alarms and error messages.													
26	Software / Control: Microprocessor-controlled operation with programmable protocols and memory for multiple wash programs.													
27	Alarm System: Audible/visual alarms for low wash liquid, full waste bottle, aspiration/dispensing errors, door/plate errors or system faults where applicable.													
28	Electrical Requirements: 220–240 VAC, 50/60 Hz, suitable for Yemen power supply; supplier shall provide suitable plug/adaptor if required.													
30	Environmental Conditions: Suitable for reliable operation under Yemen local conditions, ambient temperature +10°C to +50°C and relative humidity up to 90% non-condensing, unless manufacturer specifies stricter limits.													
31	Accessories: Supplied complete with wash and waste bottles, tubing, power cable, cleaning tools, spare fuses, dust cover and all standard accessories required for operation.													
32	Starter Kit / Consumables: Supplier shall provide starter consumables for installation and training, including tubing/connectors and cleaning solution if normally required by the manufacturer.													
33	Spare Parts Availability: Supplier shall confirm availability of essential spare parts for at least ten (10) years, including manifold/wash head, tubing, pump, valves, sensors, bottles, seals and electronic boards.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
34	Installation & Commissioning: Supplier shall install, configure and commission the washer at site and demonstrate successful washing performance using a standard microplate.													
35	Training: Supplier shall provide on-site training on operation, programming wash protocols, cleaning, priming, decontamination, troubleshooting and routine maintenance.													
36	Manufacturer shall be ISO 13485 certified or equivalent. CE-IVD / IVDR, FDA or equivalent regulatory approval is required as applicable.													
37	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
LOT 3 - Coagulation & Blood Collection Equipment														
Coagulation Analyzer														
			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Equipment Type: Semi-Automated Coagulation Analyzer for routine coagulation testing.													
5	Intended Use: Quantitative determination of coagulation parameters in citrated human plasma.													
6	Measurement Principle: Mechanical clot detection or optical clot detection.													
7	Bidder shall submit separate pricing for cartridges/cassettes, controls, calibration materials and consumables. Unit price, tests per cartridge, shelf life.													
8	Test Parameters: Mandatory PT, APTT, TT and Fibrinogen (Clauss). Optional assays such as D-Dimer, Protein C/S and coagulation factors													
9	Number of Channels: Minimum four (4) independent measuring channels.													
10	Throughput: Suitable for routine laboratory workload with four independent measuring channels.													
11	Sample Type: Citrated platelet-poor plasma.													
12	Sample Volume: Adjustable sample volume from 20–100 µL.													
13	Reagent Volume: Adjustable reagent volume according to assay requirements.													
14	Incubation Positions: Minimum 12 incubation positions.													
15	Reagent Positions: Minimum two (2) reagent positions with temperature control where applicable.													
16	Incubation Temperature: Automatic incubation at 37 ±0.5°C.													
17	Temperature Stability: Temperature variation shall not exceed ±0.5°C during operation.													
18	Pipetting: Manual pipetting with automatic timing and measurement.													
19	Test Timer: Automatic programmable timer for coagulation assays.													
20	Display: Color LCD or touchscreen display.													
21	User Interface: User-friendly menu-driven software.													
22	Minimum storage capacity of 2,000 patient results with QC data.													
23	Data Management: Storage, retrieval and printing of patient and quality control results.													
24	Connectivity: USB connectivity shall be provided. LAN and LIS/HIS connectivity													
25	Printer: Built-in thermal printer or support for an external printer.													
26	Quality Control: Multi-level internal QC with Levey-Jennings charts and Westgard rules													
27	Calibration: Manual and/or automatic calibration shall be supported.													
28	Open Reagent System: Open reagent system compatible with reagents from different manufacturers.													
29	Reagent Compatibility: Compatible with commercially available coagulation reagents.													
30	Reaction Detection: Automatic clot detection and endpoint determination.													
31	Measurement Accuracy: Coefficient of variation (CV) shall not exceed 3% for routine coagulation assays.													
32	Repeatability: Coefficient of variation (CV) shall not exceed 3%.													
33	Carryover: Carryover between consecutive samples shall be negligible.													
34	Warm-up Time: Ready for operation within 15 minutes or less after power-on.													
35	Operating Modes: Routine, STAT and QC operating modes shall be available.													
36	Sample Identification: Manual patient ID entry or barcode reader.													
37	Alarm System: Audible and visual alarms for errors, reagent shortage, incubation status and system faults.													
38	Power Supply: 220–240 VAC, 50/60 Hz.													
39	Accessories: Supplied complete with starter kit, reaction cuvettes, pipettes, printer paper, waste container and all accessories required for routine operation.													
40	Consumables: Initial consumables sufficient for installation, calibration, QC and routine operation shall be supplied.													
41	Installation: Installation, commissioning and operational qualification shall be included.													

		Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
42	Training: On-site user and basic maintenance training shall be included.													
43	Standards & Certification: Equipment shall comply with applicable IEC 61010 safety and IEC 61326 EMC requirements or equivalent recognized standards.													
44	Regulatory Compliance: CE-IVD/IVDR, FDA or equivalent regulatory approval shall be provided where applicable.													
45	Manufacturer Quality: Manufacturer shall be ISO 13485 certified or equivalent.													
46	Technical Evaluation Requirements: Bidder shall submit original catalogue/datasheet, model number, manufacturer authorization, country of origin, compliance statement, warranty terms, service plan and documentary evidence supporting all major technical specifications.													
47	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
Monitor and Shaker for Blood Collection														
		Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Equipment Type – Blood Collection Monitor and Shaker for blood donation and blood collection procedures.													
5	Intended Use – Continuous monitoring and gentle mixing of blood bags during blood collection to ensure proper anticoagulant mixing and accurate collection volume.													
6	Operation Principle – Simultaneous blood collection monitoring and automatic agitation/mixing of blood bags.													
7	Display and Monitoring – Digital display showing collection volume, collection weight, flow rate, operational status, and continuous monitoring of collected blood volume and weight.													
8	Collection Capacity – Suitable for standard blood collection bags (350 mL, 450 mL, and 500 mL blood bags).													
9	Mixing System – Automatic horizontal agitation/shaking system providing uniform blood-anticoagulant mixing throughout collection.													
10	Mixing Speed – Controlled and adjustable mixing speed optimized for blood collection applications.													
11	Collection Accuracy – Collection volume accuracy within ±1% or better.													
12	Automatic Clamp System – Automatic tubing clamp activated when target collection volume is reached.													
13	Flow Monitoring – Continuous blood flow monitoring during collection.													
14	Low Flow Alarm – Audible and visual alarm for low blood flow conditions.													
15	Collection Complete Alarm – Audible and visual indication when target volume is achieved.													
16	Error Alarm – Alarm for operational faults, sensor failure, and abnormal collection conditions.													
17	Tare Function – Automatic tare/zero adjustment function.													
18	Weight Measurement Range – Suitable for blood collection bags and associated tubing systems.													
19	Measurement Resolution – Weight measurement resolution shall be 1 g or better, with measurement accuracy of ±1 g or ±1%, whichever is greater.													
20	Microprocessor Control – Microprocessor-controlled operation with automatic collection management.													
21	Data Storage – Storage of collection data .													
22	User Interface – Simple and user-friendly operation.													
23	Power Supply – 220–240 VAC, 50 Hz operation.													
24	Battery Backup – Internal rechargeable battery backup .													
25	Battery Operation Time – Minimum 1 hours battery operation .													
26	UPS Compatibility – Compatible with external UPS systems.													
27	Construction – Robust laboratory-grade construction with corrosion-resistant, easy-to-clean surfaces and anti-vibration design for stable operation.													
28	Environmental Conditions: The equipment shall be designed for reliable operation under the climatic conditions prevailing in Yemen, with an ambient operating temperature range of +10°C to +50°C, without degradation of performance.													
29	Calibration – Factory calibrated with calibration certificate supplied.													
30	Accessories – All accessories required for installation and operation shall be included.													
31	Documentation – User manual, service manual, maintenance instructions, and calibration certificate shall be supplied.													
32	Installation – Delivery, installation, commissioning, and operational verification shall be included.													
33	Training – User training and technical training shall be included.													
34	Target Collection Volumes – Programmable collection volumes for 350 mL, 450 mL, and 500 mL blood bags.													
35	Collection Time Monitoring – Display and recording of collection duration .													
36	Battery Status Indicator .													
37	Data Export – USB data export capability .													

#	Technical Specifications	Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
			YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
38	Anti-Vibration Design													
39	Automatic Restart Protection													
40	IQ/OQ Documentation – Installation Qualification (IQ) and Operational Qualification (OQ) documentation .													
41	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
LOT 4- General Laboratory Equipment														
Laboratory Microscope, binocular														
#		Supplier Technical Specification	Certificates			Warrantee			ified local agent or authoriza			Model	Brand	Country of Origin
			YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production model.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Standards & Regulatory Compliance: Microscope shall comply with applicable IEC electrical and laboratory safety standards and possess valid CE marking and/or FDA registration where applicable. Manufacturer shall operate under ISO 13485 quality management system.													
7	General Design: Heavy-duty laboratory-grade binocular compound microscope designed for routine clinical and laboratory applications, utilizing current optical and illumination technology.													
9	Microscope Type: Binocular compound microscope suitable for hematology, microbiology, parasitology, urinalysis and routine laboratory examination.													
10	Optical System: High-quality optical system with plan achromatic objectives and superior image clarity.													
11	Viewing Head: Binocular viewing head inclined approximately 30° with 360° rotation or equivalent ergonomic design.													
12	Interpupillary Adjustment: Adjustable interpupillary distance approximately 50–75 mm.													
13	Eyepieces: Pair of WF10x eyepieces with individual diopter adjustment and field number not less than 20 mm .													
14	Objectives: 4x, 10x, 40x spring-loaded and 100x oil immersion objectives as standard.													
15	Objective Nosepiece: Quadruple revolving nosepiece with smooth ball-bearing rotation and positive click-stop positioning.													
16	Mechanical Stage: Mechanical stage with integrated slide holder, graduated scale, and smooth X-Y movement for precise specimen positioning.													
17	Focusing System: Coaxial coarse and fine focusing mechanism with rack-and-pinion adjustment, focus tension control, and precision fine-focus suitable for oil immersion microscopy.													
20	Illumination System: Long-life LED illumination with adjustable brightness control preferred; halogen acceptable if equivalent performance is demonstrated. Spare illumination source or replacement module shall be available where applicable.													
21	Filters: Daylight blue filter and other standard optical filters required.													
22	Field of View: Wide field optical system with field number approximately 20–22 mm or better.													
25	Accessories: Dust cover, power cord, immersion oil (if applicable), user manual, protective accessories, and all items required for operation shall be supplied.													
26	Magnification: Total magnification range from 40x to 1000x minimum.													
27	Condenser: Abbe condenser NA 1.25 or better with iris diaphragm.													
29	Optics Protection: Optical components shall be anti-fungal treated for tropical environments.													
30	Power Supply: 220–240 VAC, 50 Hz operation.													
32	Documentation: English user manual and service documentation shall be supplied.													
33	Training: User training and installation support shall be included.													
	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													

		Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin	
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Centrifuge, Tabletop														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Safety Standards: Equipment shall comply with applicable IEC electrical safety standards and laboratory centrifuge safety requirements.													
5	Regulatory Approval: Valid CE marking and/or FDA approval. Manufacturer shall operate under ISO 13485 certified quality management system.													
6	Warranty: Minimum 2 years comprehensive warranty including parts, labor, and service support.													
7	General Design: Heavy-duty microprocessor-controlled bench-top centrifuge of current production model utilizing modern centrifuge control and safety technology for routine clinical laboratory operation.													
8	Control System: Microprocessor-controlled centrifuge with programmable operation and digital user interface.													
9	Display and Monitoring: Digital display showing actual/set RPM, RCF, time, lid status, alarms, operating mode, and system messages.													
10	Programming: User-programmable operation with configurable speed, RCF, time, acceleration, deceleration, rotor type, and braking profiles. Minimum 10 user-defined programs.													
11	Speed Range: Variable speed up to at least 6000 rpm or better.													
12	Acceleration and Deceleration – The centrifuge shall provide user-selectable acceleration and braking profiles, including gentle braking suitable for blood tubes, PRP, and other sensitive laboratory samples.													
13	RCF Range – Variable relative centrifugal force (RCF) adjustable from at least 100 × g up to a minimum of 5,000 × g or higher.													
14	Timer: Adjustable timer up to at least 60 minutes with continuous operation mode.													
15	Rotor System: Swing-out rotor with four buckets and sealing lids suitable for routine laboratory sample processing.													
16	Adapters: Adapters for 10 mL tubes and microbiology microtubes shall be included.													
17	Temperature Management – The centrifuge shall be equipped with an efficient air circulation or equivalent cooling system to minimize chamber temperature rise during operation. The chamber temperature increase shall not exceed 10°C above ambient temperature during continuous operation at maximum speed.													
18	Motor: Brushless induction motor for low maintenance, reliability, and smooth operation.													
19	Construction: Stainless steel chamber and lid interior or equivalent corrosion-resistant materials.													
20	Rotor Maintenance: Rotor shall be removable for cleaning and maintenance.													
21	Safety Chamber: Internal steel safety chamber or equivalent protective construction.													
22	Noise and Vibration – The centrifuge shall operate with low noise and vibration during normal operation. The maximum operating noise level shall not exceed 60 dB.													
23	Stability: Non-slip anti-vibration feet shall be provided.													
24	Lid Safety: Lid opening shall be prevented while rotor is rotating.													
25	Emergency Stop: Emergency stop function shall be available.													
26	Imbalance Detection: Automatic rotor imbalance detection and shutdown protection.													
27	Alarms: Visual and audible alarms with error code display and fault identification.													
28	Lid Locking: Electromagnetic lid locking system with manual override in case of power failure.													
29	Pulse Function: Pulse operation mode preferred.													
30	Rotor Recognition: Automatic rotor identification and verification preferred.													
31	Overspeed Protection: Automatic overspeed detection and protection.													
32	Power Supply: Universal input 100–240 VAC, 50/60 Hz preferred; minimum requirement 220–240 VAC, 50 Hz single-phase operation.													
33	Maintenance Package: Preventive maintenance support, PM kits, calibration tools, maintenance documentation, and associated maintenance accessories shall be supplied.													
34	Documentation: Operation manual, service manual, spare parts list, calibration procedures, and technical documentation shall be supplied in hardcopy and electronic format.													
35	Software: All required software, interfaces, and licenses shall be included.													
36	Service Life: Expected service life of at least 10 years.													
37	Training: User training and biomedical engineer training for operation, preventive maintenance, troubleshooting, and calibration shall be included.													
38	Self-Diagnostics: Built-in self-diagnostic system with error messages, troubleshooting guidance, and calibration alerts.													
39	Additional Features: Supplier shall declare all additional features and accessories offered.													
40	Maximum RCF – The centrifuge shall provide a maximum relative centrifugal force (RCF) of at least 5,000 × g. Higher RCF values are acceptable.													

		Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origon	
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
41	Rotor Capacity – Swing-out or angle rotor with a minimum capacity of 24 × 15 mL tubes. The rotor shall accommodate standard blood collection tubes (13 × 75 mm, 13 × 100 mm, and 16 × 100 mm) using suitable adapters where required.													
42	Bio-Safety: Aerosol-tight buckets or sealed rotor lids preferred for handling biological samples.													
43	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
Roller Mixer														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origon
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Safety Standards: Equipment shall comply with applicable IEC laboratory electrical safety standards.													
5	Regulatory Approval: Valid CE marking and/or equivalent international regulatory approval. Manufacturer shall operate under ISO 9001 and/or ISO 13485 quality management systems where applicable.													
6	Warranty: Minimum 2 years comprehensive warranty including parts, labor, and service support.													
7	General Design and Construction: Heavy-duty bench-top laboratory roller mixer with robust corrosion-resistant construction, designed for safe, reliable, user-friendly, and continuous laboratory operation.													
8	Mixing Performance: Suitable for gentle, uniform rolling of blood tubes, vacutainers, and biological sample containers, providing low-shear mixing while maintaining sample integrity.													
9	Speed Control: Variable speed control with adjustable range approximately 5–80 rpm or better.													
10	Mixing Modes: Continuous rolling, reverse rolling, oscillation, or equivalent programmable mixing modes.													
11	Operation and Controls: Continuous and timed operation with adjustable timer, speed control, and user-friendly control panel.													
12	Display: Digital display showing speed, operating mode, and remaining time.													
13	Load Capacity: Minimum load capacity of 2 kg or greater.													
14	Dimensions – The equipment shall have a compact benchtop design suitable for installation and operation on a standard laboratory bench.													
15	Electrical Requirements: 220–240 VAC, 50 Hz single-phase operation with built-in protection against over-voltage, over-current, and power fluctuations.													
16	Service Life: Expected service life of at least 10 years under normal operating conditions.													
17	Additional Features: Supplier shall declare all additional features and accessories offered.													
18	Tube Capacity – The roller mixer shall accommodate a minimum of 20 standard blood collection tubes or equivalent sample containers simultaneously.													
19	Roller Configuration – The roller mixer shall be equipped with a minimum of six (6) rollers with a minimum roller length of 280 mm or equivalent, providing adequate mixing capacity for routine laboratory applications.													
20	Noise Level: Low-noise operation (<60 dB if specified).													
21	Roller Material: Non-slip roller surface suitable for blood collection tubes and laboratory sample containers.													
22	Maintenance: Equipment shall require minimal routine maintenance.													
23	Training: User training and installation support shall be included.													
24	Documentation: User manual and maintenance documentation shall be supplied.													
25	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Water Bath 10 L														
#	Technical Specifications	Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Safety Standards: Equipment shall comply with applicable IEC electrical safety and laboratory equipment standards.													
5	Regulatory Approval: Valid CE marking and/or equivalent international regulatory approval. Manufacturer shall operate under ISO 9001 and/or ISO 13485 quality management systems where applicable.													
6	Regulatory Acceptance: Product shall be approved for use in recognized regulatory jurisdictions (EU, USA, Canada, UK, Japan, Australia, etc.).													
7	General Design: Heavy-duty laboratory-grade water bath of current production model utilizing modern temperature control and safety technology, designed for safe, reliable, user-friendly, and continuous laboratory operation.													
8	Supplier Qualification: Supplier shall be an authorized distributor, agent, or manufacturer representative.													
9	Application: Laboratory water bath suitable for incubation, sample warming, reagent preparation, and routine laboratory procedures.													
10	Construction: Stainless steel chamber and corrosion-resistant exterior suitable for laboratory environments.													
11	Control System: Microprocessor/PID-controlled water bath with digital display showing actual and set temperature, timer, and operating status. Internal circulation system shall ensure uniform temperature distribution.													
12	Safety System: Independent over-temperature protection, low-water protection, automatic shutdown, and visual and/or audible alarm system for faults and overheating.													
13	Accessories & Spare Parts: The equipment shall be supplied complete with a corrosion-resistant perforated shelf/rack, insulated lid/cover, removable tube holder, and one (1) spare heating element. The supplier shall confirm the availability of essential spare parts, including heating elements, temperature sensors, digital controllers, fuses, and other critical components, for a minimum period of 10 years after installation.													
14	Capacity: Water bath capacity 10 liters.													
15	Temperature Range: Adjustable from ambient +5°C to 99°C, with digital temperature control, display resolution of 0.1°C, and temperature stability of ±0.5°C or better.													
16	Timer: Adjustable timer with continuous operation mode.													
17	Temperature Accuracy: Temperature control accuracy ±0.2°C or better.													
18	Temperature Uniformity: Temperature uniformity ±0.1°C or better throughout the bath.													
19	Heating System: Heater power not exceeding 1500W while maintaining specified performance.													
20	Service Life: Expected service life of at least 10 years under normal operating conditions.													
21	Documentation: Operation manual, service manual, and maintenance instructions shall be supplied in hardcopy and electronic format.													
22	Software: Any required software or electronic interface supplied by the manufacturer shall be included.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
23	Power Supply: Universal input 100–240 VAC, 50/60 Hz, single-phase operation with hospital-compatible power plug and cable.													
24	Additional Features: Supplier shall declare all additional features and accessories offered.													
25	Temperature Stability: Temperature stability shall be $\pm 0.1^{\circ}\text{C}$ or better during continuous operation.													
26	Drain System: Drain valve or equivalent system for easy water replacement and cleaning.													
27	Bath Dimensions – Internal bath capacity shall be approximately 10 L ($\pm 10\%$) and shall provide a usable working area suitable for laboratory vessels, test tubes, flasks, and racks used in routine laboratory procedures.													
28	Calibration: Calibration certificate and calibration procedure shall be supplied.													
29	Training: User training and installation support shall be included.													
30	Spare Parts: Availability of heating elements, sensors, controllers, and other critical spare parts shall be guaranteed for at least 5 years.													
31	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
Laboratory Drying Oven 50 L														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Safety Standards: Equipment shall comply with applicable IEC electrical and laboratory equipment safety standards.													
5	Regulatory Approval: Valid CE marking and/or equivalent international regulatory approval. Manufacturer shall operate under ISO 9001 and/or ISO 13485 quality management systems where applicable.													
6	Temperature Range: Adjustable from Ambient $+5^{\circ}\text{C}$ to at least 250°C .													
7	General Design: Heavy-duty laboratory-grade tabletop hot air oven of current production model utilizing modern temperature control and safety technology, designed for safe, reliable, user-friendly, and continuous laboratory operation with long service life.													
8	Application: Suitable for laboratory drying, heating, sterilization, and general laboratory applications.													
9	Control System: Microprocessor/PID-controlled temperature regulation with digital display showing actual and set temperature, timer, operating status, and rapid user-adjustable temperature settings.													

		Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
10	Construction: Double-walled insulated chamber with corrosion-resistant stainless-steel interior and powder-coated exterior cabinet.													
11	Thermal Safety: External surfaces shall remain at safe operating temperatures during normal operation.													
12	Timer: Adjustable timer with automatic start/stop and continuous operation mode.													
13	Heating System: Multi-element heating system with forced-air circulation to ensure uniform temperature distribution throughout the chamber.													
14	Air Circulation: Low-noise forced-air circulation fan system.													
15	Heating Performance: Rapid heat-up capability with efficient temperature recovery. The recovery time to the set temperature after door opening at 200°C shall not exceed 3 minutes.													
16	Self-Diagnostics: Built-in self-diagnostic system with fault detection and error indication.													
17	Safety System: Independent over-temperature protection, adjustable safety thermostat, over-current protection, automatic shutdown, and visual/audible alarm system.													
18	Door and Alarm System: Silicone gasket door with visual and audible over-temperature alarm system.													
19	Shelving: Adjustable shelf positions with minimum 3–4 shelves supplied.													
20	Monitoring Port: External temperature monitoring port .													
21	Door Design: Door opening angle not less than 180° with secure latch mechanism.													
22	Temperature Sensitivity: Control sensitivity $\pm 0.1^{\circ}\text{C}$ or better.													
23	Capacity: Minimum chamber volume 50 L.													
24	Electrical Requirements: 220–240 VAC, 50 Hz single-phase operation compliant with applicable IEC electrical safety standards.													
25	Service Life: Expected service life of at least 10 years under normal operating conditions.													
26	Additional Features: Supplier shall declare all additional features and accessories offered.													
27	Temperature Uniformity: Temperature uniformity throughout the chamber shall be $\pm 1^{\circ}\text{C}$ or better.													
28	Temperature Stability: Temperature stability shall be $\pm 0.5^{\circ}\text{C}$ or better during continuous operation.													
29	Documentation and Calibration: Operation manual, service manual, maintenance instructions, calibration certificate, and calibration procedures shall be supplied.													
30	Chamber Dimensions – Internal chamber volume shall be approximately 50 L ($\pm 10\%$). The chamber shall include a minimum of two (2) adjustable stainless steel shelves with a usable shelf area suitable for routine laboratory applications.													
31	Ventilation: Adjustable air vent system .													
32	Data Logging: Temperature recording or data logging capability .													
33	Training and Technical Support: User training, installation support, preventive maintenance guidance, and technical support shall be provided.													
34	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origen
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Laboratory Incubator 30 L														
#	Technical Specifications	Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origen
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Equipment Type – Laboratory Incubator, benchtop type.													
5	Intended Use – Controlled incubation of microbiological cultures, laboratory samples, reagents, and biological materials.													
6	Capacity – Minimum 30 liters internal chamber volume.													
7	Temperature Range – Ambient temperature +5°C to at least 70°C. Models capable of operation up to 90°C are acceptable .													
8	Temperature Control System – Microprocessor-controlled PID temperature controller.													
9	Temperature Display – Digital display showing actual and set temperature values.													
10	Temperature Accuracy – ±0.5°C or better.													
11	Temperature Uniformity – ±1°C or better throughout the chamber.													
12	Temperature Stability – ±0.5°C or better during operation.													
13	Heating System – Electric heating system with efficient heat distribution.													
14	Air Circulation – Forced-air convection ; natural convection .													
15	Chamber Material – Stainless steel inner chamber (Grade 304 or equivalent), corrosion-resistant and easy to clean.													
16	External Construction – Powder-coated steel or equivalent corrosion-resistant construction suitable for laboratory environments.													
17	Shelves – Minimum two adjustable stainless steel shelves supplied.													
18	Door System – Solid insulated outer door with tempered glass observation window or internal glass observation door .													
19	User Interface – Digital control panel with temperature adjustment and monitoring functions.													
20	Timer Function – Built-in programmable timer .													
21	Safety System – Independent over-temperature protection with automatic shutdown function.													
22	Alarm System – Audible and visual alarms for: Over-temperature condition , Sensor failure ,System malfunction													
23	Interior Lighting – Internal chamber illumination .													
24	Power Supply – 220–240 VAC, 50 Hz operation.													
25	Environmental Conditions – Suitable for operation under local environmental conditions in Yemen.													
26	Energy Efficiency – Energy-efficient operation .													
27	Calibration – Factory calibrated with calibration certificate supplied.													
28	Documentation – User manual, service manual, maintenance instructions, and calibration certificate shall be supplied.													
29	Accessories – All accessories required for installation and operation shall be included.													
30	Installation – Delivery, installation, commissioning, and functional testing shall be included.													
31	Training – User training and basic maintenance training shall be included.													
32	After-Sales Support – Availability of spare parts, preventive maintenance, corrective maintenance, and technical support for at least 5 years after installation.													
33	Local Technical Support – Supplier shall demonstrate availability of trained service engineers and technical support within Yemen.													

		Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
34	Temperature Recovery Time – Rapid temperature recovery after door opening .													
35	Data Logging – Temperature data logging capability .													
36	USB Data Export													
37	Lockable Door													
38	Low Noise Operation .													
39	IQ/OQ Documentation – Installation Qualification (IQ) and Operational Qualification (OQ) documentation .													
40	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													
Distilling Unit Laboratory														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Equipment Type – Laboratory Water Distillation Unit.													
5	Intended Use – Production of distilled water for laboratory testing, reagent preparation, equipment cleaning, microbiology applications, and general laboratory use.													
6	Construction Material – Borosilicate glass, stainless steel, or combination construction suitable for laboratory-grade distilled water production.													
7	Output Capacity – Minimum 8 liters/hour.													
8	Water Quality – Capable of producing pyrogen-free distilled water suitable for laboratory applications.													
9	Distillation Method – Single-stage distillation or equivalent laboratory distillation process.													
10	Heating System – Electrically heated distillation system with efficient energy utilization.													
11	Condenser System – High-efficiency condenser ensuring continuous production of distilled water.													
12	Boiler Material: High-quality corrosion-resistant AISI 316L stainless steel or borosilicate glass construction.													
13	Distillate Conductivity – The distilling unit shall produce distilled water with conductivity not exceeding 5 µS/cm at 25°C. Lower conductivity values are acceptable.													
14	Water Quality Performance – Distilled water shall be free from dissolved impurities, pyrogens, and contaminants according to manufacturer specifications.													
15	Safety Protection – Automatic over-temperature protection system.													
16	Low Water Protection – Automatic shutdown in case of insufficient water supply.													
17	Boil Dry Protection – Automatic protection against dry operation.													
18	Overcurrent Protection – Electrical protection against overload conditions.													
19	Water Level Control – Automatic water level monitoring and control .													
20	Display – Digital or visual operating status indicators .													
21	Operation Mode – Continuous operation capability.													
22	Cooling Water Requirement – The distilling unit shall operate using a continuous cold-water supply with a maximum cooling water consumption of 60 L per liter of distilled water produced or better.													
23	Water Collection System – Suitable connection to external distilled water collection containers, reservoirs, and storage tanks.													
24	Maintenance and Cleaning – Easy access for cleaning, inspection, descaling, and routine maintenance, with integrated drain system .													
25	Power Supply – 220–240 VAC, 50 Hz operation.													
26	Electrical Safety – Compliant with applicable IEC electrical safety standards.													
27	Environmental Conditions: The equipment shall be designed for reliable operation under the climatic conditions prevailing in Yemen, with an ambient operating temperature range of +10°C to +50°C, without degradation of performance.													
28	Accessories – All accessories required for installation and operation shall be included.													
29	Documentation – User manual, service manual, maintenance instructions, and installation guide shall be supplied.													
30	Installation – Delivery, installation, commissioning, and operational verification shall be included.													
31	Training – User training and basic maintenance training shall be included.													
32	spare heating element shall be supplied with the equipment.													
33	Service Life – Expected service life of at least 10 years under normal laboratory use.													
34	Automatic Water Feed – Automatic feed-water control .													
35	Energy Efficient Operation .													
36	Distillate Temperature Control													
37	Low Maintenance Design													
38	Water Purity Certificate – Supplier shall provide manufacturer water quality specifications.													
39	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origon
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Automatic Adjustable Micropipette (0.5–10 µL - 10–100 µL -100–1000 µL) final														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origon
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Safety Standards: Micropipettes shall comply with applicable laboratory equipment quality and safety standards.													
5	Regulatory Approval: Valid CE marking and/or equivalent international regulatory approval. Manufacturer shall operate under ISO 9001 and/or ISO 13485 quality management systems.													
6	Warranty: Minimum 2-year warranty covering manufacturing defects and performance failures.													
7	General Design: Ergonomic, lightweight, high-quality automatic adjustable micropipettes utilizing modern precision dispensing technology, with robust construction suitable for continuous laboratory use.													
8	Micropipette Set and Volume Range: Complete set consisting of adjustable micropipettes covering 0.5–10 µL, 10–100 µL, and 100–1000 µL volume ranges.													
9	Ergonomics: Lightweight design with comfortable single-hand operation and reduced user fatigue.													
10	Sterilization: Entire micropipette shall be fully autoclavable at 121°C, 15 psi.													
11	Material Resistance: High resistance to laboratory chemicals and UV exposure.													
12	Accuracy and Precision: High accuracy and repeatability throughout the full volume range. Micropipettes shall comply with ISO 8655 performance requirements.													
13	Volume Adjustment: Clear digital volume display with volume-locking mechanism to prevent accidental volume changes.													
14	Operation: Smooth low-force plunger movement for precise aspiration and dispensing.													
15	Dispensing System: Two-step plunger mechanism for accurate aspiration and blow-out dispensing.													
16	Tip Ejection: Integrated tip ejector for contamination-free tip removal.													
17	Tip Compatibility: Compatible with standard universal disposable tips and filter pipette tips.													
18	Sealing System: Airtight sealing mechanism to ensure precise liquid handling.													
19	Internal Components: Wear-resistant and shock-resistant internal mechanism.													
20	Identification: Color-coded or clearly marked volume ranges for easy identification.													
21	Operating Conditions: Suitable for operation between 5°C and 40°C.													
22	Environmental Conditions: Suitable for routine laboratory environments.													
23	Calibration: Individual calibration certificate supplied for each micropipette. User-accessible recalibration capability .													
24	Maintenance Kit: Maintenance tools and lubricant supplied.													
25	Documentation: User manual and maintenance instructions supplied.													
26	Accessories: Protective stand or holder supplied.													
27	Consumables: Starter set of compatible disposable tips supplied for each volume range.													
28	Service Life: Expected service life of at least 5 years under normal laboratory use.													
29	Additional Features: Supplier shall declare all additional features and accessories offered.													
30	Performance – The adjustable micropipette shall comply with ISO 8655 or equivalent. Accuracy and precision at the minimum, nominal, and maximum volume settings shall meet or exceed the maximum permissible errors specified in ISO 8655 for the respective pipette volume range.													
31	Spare Parts: Availability of seals, O-rings, pistons, and replacement components shall be confirmed.													
32	Training: User training on calibration verification, operation, and maintenance shall be included.													
33	Service Support: Calibration support, spare parts availability, and technical assistance shall be available for at least 5 years.													
34	After-Sales Service and Spare Parts: Supplier shall guarantee availability of seals, pistons, O-rings, ejector assemblies, calibration tools, replacement springs, preventive maintenance support, corrective maintenance, and technical assistance for at least 5 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
LOT 5- Biosafety & Infection Prevention														
Biological Safety Cabinet														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Equipment Type – Class II Biological Safety Cabinet (BSC), suitable for laboratory use.													
5	Intended Use – Protection of personnel, products, and laboratory environment during handling of biological specimens and potentially infectious materials.													
6	Cabinet Class – Class II Type A2 Biological Safety Cabinet or equivalent.													
7	Compliance Standards – Certified in accordance with NSF/ANSI 49, EN 12469, WHO Laboratory Biosafety Manual, or equivalent international standards.													
8	Regulatory Approval – Valid CE certification or equivalent international approval.													
9	Manufacturer Quality System – Manufacturer shall operate under ISO 9001 and/or ISO 13485 quality management system.													
10	Working Width – Minimum 0.9 m (3 ft); 1.2 m .													
11	Work Area Material – Stainless steel work surface (Grade 304 or equivalent), corrosion resistant and easy to clean.													
12	Cabinet Construction – Heavy-duty steel construction with chemical-resistant coating suitable for continuous laboratory use.													
13	Airflow System – Vertical laminar airflow system providing personnel, product, and environmental protection.													
14	HEPA Filtration – Supply and exhaust HEPA filters with minimum 99.995% efficiency at MPPS or equivalent.													
15	Air Recirculation – Class II A2 airflow configuration with recirculated and exhausted filtered air.													
16	Face Velocity – Average inflow (face) velocity shall be not less than 0.45 m/s (90 fpm), compliant with NSF/ANSI 49, EN 12469, or equivalent international standards.													
17	Digital Display – Digital display showing airflow status, filter status, operating parameters, and alarm conditions.													
18	Control System – Microprocessor-controlled operation with continuous monitoring.													
19	Alarm System – Audible and visual alarms for: Low airflow - High airflow -Filter blockage -Sash position - System malfunction													
20	Front Sash – Motorized or manual sliding front sash with safety position indicator.													
21	Interior Lighting – LED lighting providing adequate work area illumination.													
22	UV Lamp – UV germicidal lamp with safety interlock .													
23	Electrical Outlet – Internal electrical outlet(s) for laboratory equipment .													
24	Noise Level – Less than 67 dBA .													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
25	Vibration Level – Low vibration design suitable for laboratory procedures.													
26	Decontamination – Interior surfaces designed for easy cleaning and decontamination.													
27	Power Supply – 220–240 VAC, 50 Hz operation.													
28	Environmental Conditions – Suitable for operation under local environmental conditions in Yemen.													
29	Certification – Cabinet shall be factory tested and supplied with certification report.													
30	Accessories – All accessories required for installation and operation shall be included.													
31	Installation – Delivery, installation, commissioning, and performance verification shall be included.													
32	Training – User training and biomedical/laboratory staff training shall be included.													
33	Documentation – User manual, service manual, maintenance procedures, and certification documents shall be supplied.													
34	Filter Life Monitoring – Automatic HEPA filter life monitoring .													
35	Hour Counter – UV lamp and cabinet operating hour counters .													
36	Energy Efficient Operation – Low power consumption .													
37	Remote Monitoring													
38	Spare Filter Availability – Supplier shall guarantee availability of HEPA filters and UV lamps for at least 5 years.													
39	IQ/OQ Documentation – Installation Qualification (IQ) and Operational Qualification (OQ) documents .													
40	Warranty and Technical Support – Minimum 2-year comprehensive warranty. Supplier shall provide local and remote technical support, preventive maintenance, corrective maintenance, availability of spare parts, HEPA filters, UV lamps, trained service engineers within Yemen, and after-sales support for at least 3 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Waste segregation bins														
#	Technical Specifications	Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
			YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
1	Manufacturer: Supplier shall specify manufacturer name and country of manufacture.													
2	Model: Supplier shall specify exact model number and production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Material: High-quality HDPE, PP, or equivalent durable, corrosion-resistant, easy-to-clean material suitable for healthcare facilities.													
5	Color Coding: Bins shall comply with national healthcare waste management guidelines and WHO recommendations for color-coded waste segregation.													
6	Supply of color-coded, foot-operated healthcare waste segregation bins in the following minimum capacities: 10 L (Yellow – Infectious Waste), 20 L (Red – Highly Infectious Waste), 40 L (Black – General Waste), and 60 L (Blue – Pharmaceutical/Glass/Recyclable Medical Waste), complete with tight-fitting lids, internal bag retaining system, biohazard labels where applicable, and compliant with WHO healthcare waste management guidelines and applicable national regulations.													
7	Operation: Hands-free foot-operated pedal mechanism required to minimize hand contact and reduce infection risk.													
8	Identification and Markings: Each bin shall display clear color coding, waste category identification, and permanent biohazard symbols where applicable in accordance with healthcare waste management guidelines.													
9	Bag Retention System: Internal liner retention system or bag holder shall be provided and compatible with standard waste collection bags.													
10	Cleaning: Smooth internal and external surfaces suitable for routine disinfection and cleaning.													
11	Construction and Durability: Stable heavy-duty construction resistant to tipping, cleaning agents, disinfectants, and routine healthcare facility use.													
12	Mobility: Wheels for larger-capacity bins.													
13	Compatibility: Compatible with standard sharps containers and healthcare waste collection systems where applicable.													
14	Training: Basic user instructions and waste segregation guidance shall be supplied.													
15	Additional Features: Supplier shall declare all additional features and accessories offered.													
16	Color Configuration: Minimum set shall include Black, Yellow, Red, and Green bins (or according to MoH/WHO waste management policy).													
17	Lid Design: Tight-fitting lid to reduce odors and contamination.													
18	Material Protection: UV-resistant material.													
19	Safety: Flame-retardant material.													
20	Warranty and After-Sales Support: Minimum 2-year warranty against manufacturing defects. Supplier shall guarantee availability of replacement lids, pedals, wheels, bag-retention components for at least 3 years.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Sharps containers														
#	Technical Specifications	Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
			YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
1	Manufacturer: Supplier shall specify manufacturer name and country of manufacture.													
2	Model: Supplier shall specify exact model number and production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Safety Standards: Sharps containers shall comply with applicable WHO, UN3291, ISO 23907-1, or equivalent healthcare waste management standards.													
5	Quality Certification: CE marking or equivalent quality certification preferred. Manufacturer shall operate under ISO 9001 or equivalent quality management system.													
6	The supplier shall provide on-site training for healthcare staff on the correct use of sharps containers and the safe segregation, handling, storage, transportation, and disposal of sharps waste and other healthcare waste in accordance with WHO guidelines and national infection prevention and control (IPC) requirements.													
7	General Design and Application: Heavy-duty sharps container utilizing modern healthcare waste management principles, designed for safe containment and disposal of needles, syringes, lancets, scalpels, broken glass, and other sharp medical waste.													
8	Use Environment: Suitable for laboratories, hospitals, clinics, vaccination campaigns, and healthcare facilities.													
9	Material and Construction: High-quality puncture-resistant HDPE, PP, or equivalent medical-grade plastic with rigid, leak-proof, puncture-proof, impact-resistant, chemical-resistant construction and smooth surfaces suitable for routine cleaning and disinfection.													
10	Safety Features: Puncture-resistant and tamper-resistant construction designed to minimize needle-stick injuries and comply with ISO 23907-1 or equivalent sharps injury protection standards.													
11	Sharps Safety System: Permanent biohazard labeling, wide disposal opening, temporary closure mechanism, and overflow protection to ensure safe sharps disposal.													
12	Needle Removal: Integrated needle removal notch.													
13	Handle: Integrated carrying handle for safe transportation.													
14	Environmental and Regulatory Compliance: UV-resistant construction capable of withstanding normal handling and accidental drops without leakage and compliant with WHO and national healthcare waste management regulations.													
15	The containers shall be supplied in the following minimum capacities: 1 Litre – Portable / Point-of-care use. 3 Litres – Phlebotomy rooms and outpatient clinics. 5 Litres – Clinical laboratories and general treatment rooms. 10 Litres – High-volume clinical areas and hospital departments.													
16	Warranty and After-Sales Support: Minimum 2-year warranty against manufacturing defects. Supplier shall guarantee availability of identical sharps containers, replacement lids, closure mechanisms for at least 3 years.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origon	
#	Technical Specifications		Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO				Not Applicable
Biohazard waste containers															
#	Technical Specifications		Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origon
1	Manufacturer: Supplier shall specify manufacturer name and country of manufacture.														
2	Model: Supplier shall specify exact model number and production version.														
3	Country of Origin: Supplier shall specify country of manufacture and origin.														
4	Safety Standards: Biohazard waste containers shall comply with WHO healthcare waste management guidelines and applicable national regulations.														
5	Design and Construction: Heavy-duty biohazard waste container manufactured from durable HDPE, PP, or equivalent material with leak-proof, puncture-resistant, impact-resistant, and chemical-resistant construction suitable for safe healthcare waste management.														
6	Warranty: Minimum 1-year warranty against manufacturing defects.														
7	General Design: Heavy-duty biohazard waste container designed for safe collection, storage, and transport of infectious healthcare waste.														
8	Material: High-quality HDPE, PP, or equivalent durable material resistant to chemicals, UV exposure, and preferably flame-retardant.														
9	Identification and Compliance: Container shall display permanent biohazard symbols, yellow color coding, and comply with WHO healthcare waste management recommendations and applicable national regulations.														
10	Lid System: Tight-fitting lid designed to minimize contamination, odor release, accidental exposure, and environmental contamination.														
11	Operation: should be Foot-operated hands-free opening mechanism .														
12	Bag Retention System: Internal liner retention system compatible with standard biohazard waste bags.														
13	Capacity: sizes as one of each 10 , 20 , 30 and 60 liter .														
14	Cleaning: Smooth internal and external surfaces suitable for routine cleaning and disinfection.														
15	Stability: Stable base resistant to tipping during routine use.														
16	Mobility: Wheels with lock brake mechanism for large-capacity 60 liter containers.														
17	Supply Condition: Delivered assembled and ready for immediate use.														
18	Service Life: Expected service life of at least 5 years under normal healthcare facility use.														
19	Additional Features: Supplier shall declare all additional features and accessories offered.														
20	Handling: Integrated carrying handles preferred.														
21	Warranty and After-Sales Support: Minimum 2-year warranty against manufacturing defects. Supplier shall guarantee availability of replacement lids, pedals, wheels, bag-retention components, and spare parts for at least 3 years after installation.														

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
LOT 6- Cold Chain & Storage Equipment														
Blood Bank Refrigerator														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Equipment Type : Blood Bank Refrigerator for safe storage of whole blood and blood components.													
5	Intended Use : Storage of whole blood, packed red blood cells (PRBC), and blood products under controlled temperature conditions in blood banks, hospital laboratories, and transfusion services.													
6	Storage Temperature Adjustable operating temperature: 2°C to 6°C Factory preset at 4°C Temperature uniformity maintained throughout storage chamber.													
7	The refrigerator shall provide a minimum net storage capacity for at least 100 blood bags of 350 mL or 450 mL, arranged in dedicated blood bank baskets/drawers to ensure proper organization, air circulation, and easy access while maintaining uniform storage conditions.													
8	Construction Vertical upright cabinet design. Heavy-duty laboratory/medical-grade construction. Corrosion-resistant exterior with antibacterial coating . Interior constructed from stainless steel or equivalent non-corrosive material. Rounded internal corners for easy cleaning.													
9	Refrigeration System Forced-air circulation system. Fan-assisted cooling ensuring uniform temperature distribution. CFC-free refrigerant compliant with environmental standards. Automatic defrost system without compromising blood storage temperature.													
10	Temperature Control Microprocessor-controlled temperature regulation. Digital temperature display with continuous monitoring. Temperature display resolution: 0.1°C or better.													
11	Temperature Uniformity – Temperature variation throughout the storage chamber shall not exceed ±0.5°C under normal operating conditions. Documentary evidence of factory temperature mapping or performance validation shall be submitted with the bid.													
12	Blood Storage Configuration Dedicated stainless steel or coated steel blood bag drawers/baskets. Adjustable shelving system . Suitable for standard blood bags: 250 mL 350 mL 450 mL 500 mL													
13	Display Digital display showing: Cabinet temperature. Set temperature. Alarm status. Power status. The refrigerator shall be equipped with an internal rechargeable backup battery to maintain the alarm system, temperature display, and controller functions during power failure. The display shall indicate the backup battery charging and operating status.													

					Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable					
14	Alarm System Audible and visual alarms for: High temperature. Low temperature. Door open. Power failure. Sensor failure. Battery low. System malfunction.															
15	Monitoring and Data Management: Continuous temperature monitoring with integrated temperature recorder, minimum 30-day data storage, event logging, high/low temperature alarm history, USB data export, and remote monitoring capability . GSM/SMS alarm notification and network monitoring support .															
16	Access Control Lockable door. Key lock or electronic lock. Unauthorized access protection.															
17	Door Design Full glass door with anti-condensation heater . Self-closing door mechanism. High-quality removable magnetic door gasket providing a tight airtight seal to prevent air leakage, maintain stable internal temperature, improve energy efficiency, and ensure proper preservation of blood products.															
18	Interior Lighting LED interior lighting with automatic switching.															
19	Backup Power System Internal rechargeable battery backup for alarms and temperature monitoring. Minimum 48-hour alarm backup .															
20	Power Supply 220–240 VAC. 50 Hz. Suitable for Yemen electrical network.															
21	Power Protection and Compatibility: Operates on 220–240 VAC, 50 Hz and shall be compatible with external UPS systems and generators. Unit shall include protection against voltage fluctuations, surges, low voltage, and high voltage, with automatic restart after power restoration .															
22	Environmental Conditions Suitable for operation under: Ambient temperature: 10–43°C minimum. Relative humidity up to 85%.															
23	Compliance Standards Comply with: WHO Blood Cold Chain requirements. AABB recommendations . CE certification or equivalent. IEC 61010 safety standards. ISO 13485 manufacturer quality system															
24	Calibration Factory calibrated. Calibration certificate supplied. Traceable temperature calibration .															
25	Accessories Supply shall include: Blood storage baskets/drawers. Temperature probe(s). User manuals. Power cable. Keys. All accessories required for operation.															
26	Documentation Supplier shall provide: User Manual. Service Manual. Preventive Maintenance Manual. Calibration Certificate. Electrical Schematic . Spare Parts List.															

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
27	installation Supplier shall include: Delivery. Installation. Commissioning. Performance verification. Temperature validation at installation.													
28	Training On-site training for: Laboratory personnel. Blood bank staff. Biomedical Engineer/Technicians.													
29	Cold Chain Security Continuous temperature monitoring. High/low temperature alarm history. Data logging for audits and donor safety.													
	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origon
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Laboratory Refrigerator														
#	Technical Specifications	Supplier Technical Specification	Certificates			Warrantee			ified local agent or authoriza			Model	Brand	Country of Origon
1	Manufacturer: Supplier shall specify manufacturer name and provide manufacturer authorization letter where applicable.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and country of origin.													
4	Safety Standards: Refrigerator shall comply with applicable IEC electrical safety standards and laboratory refrigeration equipment requirements.													
5	Regulatory Approval: Valid CE marking and/or equivalent international regulatory approval. Manufacturer shall operate under ISO 9001 and/or ISO 13485 quality management systems where applicable.													
6	Regulatory Acceptance: Product shall be approved for use in recognized regulatory jurisdictions (EU, USA, Canada, UK, Japan, Australia, etc.).													
7	General Design: Heavy-duty laboratory refrigerator of current production model utilizing modern refrigeration and temperature monitoring technology, designed for safe, reliable, user-friendly, and continuous storage of laboratory reagents, controls, calibrators, and biological materials.													
8	Supplier Qualification: Supplier shall be an authorized distributor, agent, or manufacturer representative.													
9	Application: Laboratory refrigerator suitable for storage of reagents, controls, calibrators, kits, and laboratory consumables requiring +2°C to +8°C storage.													
10	Temperature Range: Internal operating temperature shall be maintained between +2°C and +8°C with digital temperature monitoring and control.													
11	Construction and Interior Design: Corrosion-resistant refrigerator with easy-to-clean interior surfaces, adjustable removable shelving system, and laboratory-grade construction suitable for long-term use.													
12	Lighting: Internal LED lighting system .													
13	Cooling System: High-efficiency refrigeration system designed for stable temperature control and reliable continuous operation.													
14	Alarm System: Audible and visual alarms for high temperature, low temperature, door open, sensor failure, and power failure. Remote alarm contact .													
15	Capacity: Net storage capacity between 300 liters minimum.													
16	Security: Lockable door supplied with minimum two keys.													
17	Display: Digital display showing actual temperature, set temperature, alarm status, and operating conditions.													
18	Spare Parts: Availability of spare parts shall be guaranteed for a minimum of 10 years.													
19	Equipment Condition: Equipment shall be brand new, unused, current production model, and not refurbished, demo, or discontinued.													
20	Service Life: Expected service life of at least 10 years under normal operating conditions.													
21	Documentation and Software: Operation manual, service manual, maintenance procedures, technical documentation, and any required software, monitoring interface, or communication module shall be supplied.													
22	Accessories: Refrigerator shall be supplied with 4–5 adjustable removable shelves and all accessories required for operation.													
23	Power Supply: 100–240 VAC, 50/60 Hz single-phase operation with hospital-compatible power cable and plug.													
24	Additional Features: Supplier shall declare all additional features and accessories offered.													
25	Temperature Uniformity – Temperature variation throughout the storage chamber shall not exceed ±1.0°C under normal operating conditions.													
26	Temperature Stability: Temperature stability shall be maintained during continuous operation.													
27	Temperature Logging: Built-in temperature recording/data logging capability .													
28	Monitoring: Continuous temperature monitoring with historical record retention .													
29	Battery Backup: Alarm and temperature monitoring system shall continue operating during power failure using internal battery backup.													
30	Door Alarm: Audible and visual door-open alarm shall be provided.													
31	Remote Alarm: Dry-contact remote alarm output .													
32	Refrigerant: Environmentally friendly refrigerant .													
33	Training: User training and installation support shall be included.													
34	Documentation, Warranty & Technical Support: User manual, service manual, and calibration certificates shall be provided. Supplier shall demonstrate availability of trained service engineers and spare parts within Yemen and provide a minimum 2-year comprehensive warranty with guaranteed availability of spare parts, consumables, preventive maintenance, corrective maintenance, and technical support for at least 3 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
LOT 7- Laboratory Furniture														
Chair, Clinical, Blood Draw-Phlebotomy final														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and country of manufacture.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Construction: Heavy-duty reinforced steel frame with corrosion-resistant finish, medical-grade ABS covers, and high mechanical strength suitable for continuous healthcare use.													
5	Safe Working Load: Minimum 150 kg patient weight capacity.													
6	Storage: Integrated storage drawer.													
7	Stability: Non-slip rubber feet with floor protection and adjustable leveling feet for uneven floor surfaces.													
8	Accessories: Provision for IV pole and stainless-steel basin support.													
9	Upholstery and Infection Control: Seamless antimicrobial medical-grade vinyl upholstery resistant to blood, disinfectants, and routine cleaning agents, designed to support infection prevention and easy cleaning.													
10	Ergonomics: Anatomically contoured cushions designed for patient comfort during prolonged procedures.													
11	Armrest System: Fully adjustable padded armrests with height, angle, and position adjustment, 360° rotation, fold-away function, and suitability for both left- and right-arm blood collection procedures.													
12	Service Life: Expected service life of at least 10 years.													
13	Backrest: hydraulic adjustable backrest with multiple locking positions.													
14	Leg Section: hydraulic adjustable leg section with secure locking mechanism.													
15	Height Adjustment: hydraulic adjustable height system													
16	The chair shall be equipped with a rapid emergency Trendelenburg positioning system, operable either by a hydraulic mechanical release or a dedicated foot pedal, enabling immediate transition to the Trendelenburg position within a maximum of 3 seconds. The system shall provide a head-down tilt angle of 12–15° with simultaneous elevation of the leg section to facilitate prompt management of vasovagal syncope and other patient emergencies.													
17	Privacy System: Mobile privacy screen/divider supplied where required by facility workflow.													
18	Mobility: Lockable medical-grade casters or heavy-duty stationary base with non-slip feet.													
19	Minimum 2-year comprehensive warranty. Supplier shall guarantee availability of spare parts, upholstery components, armrest assemblies, adjustment mechanisms, casters (if supplied)													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Swivel chairs for Technician														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and country of manufacture.													
2	Model: Supplier shall specify exact model number and current production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Safety Standards: Chair shall comply with applicable office/laboratory furniture safety and ergonomic standards.													
5	Quality Certification: ISO 9001 certified manufacturer preferred. CE certification acceptable where applicable.													
6	General Design and Construction: Ergonomic heavy-duty swivel chair designed for technician and laboratory use, providing safe, stable, and comfortable operation during prolonged working hours with a robust structure suitable for continuous laboratory use.													
7	Load Capacity: 150 kg or higher.													
8	Duty Rating: Suitable for continuous daily use of at least 8–12 hours.													
9	Seat System: High-density molded polyurethane foam seat with minimum dimensions of 450 mm (W) x 430 mm (D), featuring water-resistant and easy-to-clean surfaces suitable for healthcare and laboratory environments.													
10	Backrest System: Ergonomically contoured backrest with lumbar support, adjustable height and tilt mechanism, and breathable or medical-grade PU surface.													
11	Upholstery: Industrial-grade PU, synthetic leather, or equivalent durable upholstery material.													
12	Resistance: Resistant to oils, laboratory chemicals, and cleaning agents.													
13	Fire Safety: Fire-retardant upholstery material.													
14	Anti-Static: Anti-static properties													
15	Height Adjustment System: Pneumatic gas-lift height adjustment mechanism (Class 3 or Class 4 certified) with adjustable seat height approximately 450–600 mm.													
16	Base: Heavy-duty 5-star nylon or chrome-plated steel base.													
17	Castors: Heavy-duty twin-wheel castors suitable for laboratory floors.													
18	Rotation: Smooth 360-degree swivel rotation.													
19	Armrests: Adjustable padded armrests													
20	Foot Support: Adjustable foot ring for laboratory bench-height workstations.													
21	Rotation Control: Swivel lock mechanism.													
22	Mobility: Castors shall operate smoothly and quietly.													
23	Surface Finish: Upholstery shall be resistant to disinfectants commonly used in healthcare facilities.													
24	Identification: Safe working load shall be clearly identified by the manufacturer.													
25	Supply Condition: Delivered fully assembled or with simple assembly instructions.													
26	Warranty and After-Sales Support: Minimum 2-year comprehensive warranty. Supplier shall guarantee availability of spare parts including gas lifts, castors, armrests, cushions, bases													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origen
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
LOT 8-Power Protection , Elctrical Equipment and Fire & Safety Equipment														
Online Double-Conversion UPS (10 kVA)														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origen
1	Manufacturer: Supplier shall specify manufacturer name and country of manufacture.													
2	Model: Supplier shall specify exact model number and production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	UPS Technology – True online double-conversion UPS utilizing VFI (Voltage and Frequency Independent) architecture compliant with IEC 62040 classification.													
5	Capacity: Minimum 15 kVA / 10 kW output capacity (PF ≥ .8) .													
6	Input Voltage Range: Wide input voltage range suitable for unstable utility power conditions. range.from 110-270													
7	Output Voltage: 220–240 VAC single phase output.													
8	Frequency: 50/60 Hz automatic synchronization.													
9	Backup Time – The UPS, including the supplied battery bank, shall provide a minimum backup time of 30 minutes at the specified critical laboratory load.													
10	Battery System: Maintenance-free sealed batteries lithium batteries. Supplier shall specify technology.													
11	Display: LCD display showing input voltage, output voltage, frequency, battery status, load level, alarms, and operating mode.													
12	Alarm System: Audible and visual alarms for overload, battery low, bypass operation, battery fault, and system failure.													
13	Bypass System: Automatic and manual bypass functions.													
14	Protection: Surge, overload, short-circuit, over-voltage, under-voltage, and battery protection.													
15	Communication Interfaces: USB, RS-232, SNMP, dry contact, or equivalent remote monitoring interface.													
16	Monitoring: UPS monitoring and shutdown software included.													
17	Configuration: Tower type ; rack-mount acceptable if specified.													
18	Efficiency: Minimum 90% efficiency in online mode.													
19	Cooling System: Automatic intelligent cooling with temperature monitoring.													
20	Generator Compatibility: Compatible with standby generators.													
21	Waveform: Pure sine wave output under all operating modes.													
22	Battery Expansion: Capability to connect external battery banks .													
23	Maintenance: Hot-swappable batteries .													
24	Emergency Power Off: EPO function .													
25	Power Conditioning: Protection against voltage fluctuations, harmonics, spikes, and brownouts.													
26	Monitoring: Environmental monitoring capability .													
27	Installation: Delivery, installation, commissioning, and load testing included.													
28	Training: User and biomedical/technical staff training included.													
29	Warranty and Technical Support – Minimum 2-year comprehensive warranty including batteries. Supplier shall provide local and remote technical support, preventive maintenance, corrective maintenance, trained service engineers within Yemen, and availability of batteries, battery modules, fans, power modules, control boards, communication cards, bypass modules, and spare parts for at least 3 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Automatic Voltage Stabilizer (10 kVA)														
#	Technical Specifications	Supplier Technical Specification	Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origin
1	Manufacturer: Supplier shall specify manufacturer name and country of manufacture.		YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
2	Model: Supplier shall specify exact model number and production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Equipment Type: Automatic Voltage Stabilizer (AVR), servo-controlled or equivalent electronic voltage regulation technology.													
5	Capacity: Minimum 10 kVA continuous rating suitable for laboratory equipment protection.													
6	Input Voltage Range: Wide input operating range suitable for unstable utility power conditions in Yemen from 110 up to 270.													
7	Output Voltage: 220–240 VAC regulated output with $\pm 1-3\%$ regulation accuracy.													
8	Frequency: 50 Hz operation.													
9	Voltage Regulation System – Automatic voltage regulation using servo-controlled stabilization or equivalent electronic regulation technology, providing automatic correction of under-voltage and over-voltage conditions without manual intervention.													
10	Response Time: Fast correction response time suitable for sensitive laboratory equipment.													
11	Monitoring System – Digital display showing input voltage, output voltage, operating status, and fault conditions, with communication interface and remote monitoring capability.													
12	Protection: Over-voltage, under-voltage, overload, short-circuit, surge, and overheating protection.													
13	Cooling: Automatic air-cooled system with temperature protection.													
14	Efficiency: Minimum 95% efficiency or better.													
15	Alarm System: Audible and/or visual indication for abnormal operating conditions and faults.													
16	Bypass System: Manual bypass for maintenance purposes.													
17	Construction: Heavy-duty industrial-grade construction suitable for continuous laboratory operation.													
18	Configuration: Floor-standing tower design.													
19	Generator Compatibility: Compatible with standby generators.													
20	Power Conditioning: Protection against voltage fluctuations, spikes, brownouts, and line disturbances.													
21	Electrical Safety: Compliant with applicable IEC electrical safety standards.													
22	Installation: Delivery, installation, commissioning, and load testing included.													
23	Training: User and technical staff training included.													
24	Output Quality: Output waveform shall remain suitable for laboratory analyzers and electronic equipment.													
25	Isolation: Isolation transformer where required for sensitive laboratory loads.													
26	Environmental Conditions: Suitable for operation under local temperature and humidity conditions in Yemen.													
27	Surge Protection: Integrated surge suppression system.													
28	Compatibility: Fully compatible with online UPS systems and laboratory analyzers.													
29	Warranty and Technical Support – Minimum 2-year comprehensive warranty. Supplier shall provide local and remote technical support, preventive maintenance, corrective maintenance, trained service engineers within Yemen, and availability of spare parts including control boards, transformers, cooling fans, relays, displays, protection modules, and voltage regulation components for at least 3 years after installation.													

			Certificates			Warrantee			Certified local agent or authorization			Model	Brand	Country of Origon
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable			
Fire Extinguisher (CO2 / Powder)														
#	Technical Specifications	Supplier Technical Specification	YES	NO	Not Applicable	YES	NO	Not Applicable	YES	NO	Not Applicable	Model	Brand	Country of Origon
1	Manufacturer: Supplier shall specify manufacturer name and country of manufacture.													
2	Model: Supplier shall specify exact model number and production version.													
3	Country of Origin: Supplier shall specify country of manufacture and origin.													
4	Standards and Certification: Fire extinguishers shall comply with EN3, ISO 7165, NFPA, UL, or equivalent recognized fire safety standards. Valid CE certification and ISO 9001 manufacturer certification .													
5	General Requirement: Supply portable fire extinguishers suitable for healthcare and laboratory facilities, including ABC Dry Powder and CO2 types.													
6	ABC Extinguisher: Multipurpose dry powder extinguisher suitable for Class A, B, and C fires.													
7	CO2 Extinguisher: Carbon dioxide extinguisher suitable for Class B fires and energized electrical equipment.													
8	Capacity: ABC extinguishers: 6 kg . CO2 extinguishers: 5 kg .													
9	Cylinder Construction: Seamless steel cylinder with corrosion-resistant finish and durable protective coating suitable for humid healthcare and laboratory environments.													
10	Pressure Indicator: ABC extinguishers shall include an easy-to-read pressure gauge.													
11	Hose and Nozzle: Flexible discharge hose and nozzle suitable for extinguisher type.													
12	Marking and Identification: Clear operating instructions, fire classification labels, manufacturing date, serial number, and other required markings shall be permanently affixed to the extinguisher body.													
13	Installation Accessories: Wall-mounting bracket or stand shall be supplied, and installation/placement support shall be included.													
14	Safety Features: Tamper seal and safety pin provided.													
15	Inspection Record: Inspection and maintenance tag shall be supplied.													
16	Serviceability: Rechargeable and serviceable extinguisher design.													
17	Extinguishing Agent Quantity – CO2 extinguishers shall have a minimum net extinguishing agent weight of 5 kg, and dry powder (ABC) extinguishers shall have a minimum net extinguishing agent weight of 6 kg, in accordance with EN 3, ISO 7165, or equivalent international standards. Fire Rating – CO2 extinguishers shall have a minimum Class B rating, and ABC dry powder extinguishers shall have a minimum fire rating of 34A:183B:C or equivalent.													
18	Service Life: Expected service life of at least 10 years with proper maintenance.													
19	Annual Inspection Requirement: Supplier shall provide inspection schedule and maintenance recommendations according to applicable fire safety standards.													
20	Fire Rating – CO2 fire extinguisher shall have a minimum fire rating of 89B or higher in accordance with EN 3, ISO 7165, or equivalent international standards.													
21	Cylinder Testing: Cylinders shall be hydrostatically tested and certified according to applicable standards.													
22	Operating Conditions: Suitable for operation and storage in local environmental conditions.													
23	Training: Basic fire extinguisher user training .													
24	Warranty and After-Sales Support: Minimum 2-year warranty against manufacturing defects. Supplier shall provide maintenance instructions, spare parts availability (valves, hoses, gauges, seals, nozzles), refill services													