

MGM UNIVERSITY | INSTITUTE OF BIOSCIENCES AND TECHNOLOGY

REQUEST FOR QUOTATION (RFQ) — EQUIPMENT TECHNICAL SCHEDULE

Issue: October 2026 | 81 equipment line items | Quantities preserved from the Institute equipment list

Instructions to bidders

Quote item-wise, showing make, model, country of origin, unit price, applicable GST, freight, installation, commissioning, training, warranty, AMC/CMC options and delivery schedule separately. Prices shall be submitted in the commercial bid, not the technical compliance sheet. Bidders shall submit OEM datasheets, clause-wise compliance (Comply / Deviation / Not available), documentary proof, installation requirements and local service arrangements. Equivalent or superior products are acceptable subject to demonstrated compliance; brand/model examples in the working list do not restrict competition.

Supply shall include all accessories necessary for stated functionality, manuals, calibration or validation documents as applicable, electrical safety and commissioning reports, and user training. Site utilities, civil work, exhaust, ventilation, cryogenic oxygen monitoring and applicable statutory approvals shall be identified explicitly in the bid. Acceptance shall be against the quoted specification and agreed site acceptance tests (SAT).

Equipment schedule — minimum technical requirements

1. Basic measurement, solution preparation and general laboratory equipment

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
1	Analytical balance	4	Capacity ≥ 220 g; Readability 0.1 mg; repeatability ≤ 0.1 mg; linearity ≤ 0.2 mg preferred; Internal motorized calibration/adjustment with external calibration option; Draft shield; level indicator and adjustable feet; Stabilization $\leq 3-5$ s; Selectable units; tare/pre-tare; density/counting/check-weighing functions; RS-232 and/or USB data output; GLP printout capability; Overload protection; Calibration certificate traceable to NABL/ISO 17025 preferred; 230 V, 50 Hz.
2	Precision / top-pan balance	1	Capacity 3–6 kg; Readability 0.01 g; repeatability ≤ 0.01 g; Internal or external calibration; Large stainless-steel weighing pan; Stabilization $\leq 2-3$ s; Piece count, percent, check-weighing and totalization functions; RS-232/USB output preferred; Overload protection; bubble level; Traceable calibration certificate.
3	Bench pH meter	4	pH range 0.000–14.000 or wider; Resolution 0.001 pH; accuracy ± 0.002 pH or better; mV range at least ± 1999 mV; resolution 0.1 mV; Temperature range 0–100 °C with automatic/manual temperature compensation; 3–5 point calibration with automatic buffer recognition; user-defined buffer option; Slope/offset diagnostics and electrode-condition indicator; GLP storage of calibration date/time and electrode ID; Data memory ≥ 500 records preferred; USB/RS-232 connectivity; PC software/export; Supplied with refillable combination electrode and ATC probe; IP-rated keypad / spill-resistant housing preferred.
4	Conductivity meter	1	Conductivity range at least 0.01 μ S/cm to 200 mS/cm; Resolution auto-ranging; accuracy $\pm 0.5-1\%$ of reading; Measures conductivity,

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
			resistivity, TDS and salinity; Temperature range 0–100 °C; automatic temperature compensation; Cell constant selectable/automatic; 2- or 4-pole probe support preferred; 1–5 point calibration with certified standards; Data logging and GLP calibration records; USB/RS-232 or Bluetooth data export preferred; Supplied with conductivity probe and temperature sensor.
5	Digital hotplate magnetic stirrer	4	Speed range ~50–1,500 rpm; Stirring capacity ≥10–20 L water; Top plate ceramic or ceramic-coated chemically resistant surface; Plate temperature ambient to ≥300 °C; External Pt100/Pt1000 probe connection; solution temperature control accuracy ≤±0.5 °C preferred; Digital speed and temperature display; Hot-surface warning and over-temperature protection; Timer and ramp functions desirable; Brushless motor preferred.
6	Magnetic stirrer	4	Speed range ~50–1,500 rpm; Stirring capacity ≥5–10 L water; Digital speed control preferred; Chemical-resistant top plate; Brushless motor; smooth low-speed operation; Overload/stall protection; Compact footprint for buffer/media preparation.
7	Vortex mixer	3	Speed 0–2,500/3,000 rpm; Touch and continuous modes; Orbital diameter ~4–6 mm; Stable heavy base with anti-slip feet; Interchangeable cup head and optional multi-tube rack; Continuous duty motor; overload protection.
8	Water bath	4	Capacity 10–20 L; Temperature range ambient+5 to 100 °C; Display resolution 0.1 °C; control stability ±0.2–0.5 °C; Microprocessor PID controller; Stainless-steel tank with lid and rack; Low-water / over-temperature protection; Timer 1 min to 99 h or continuous; Drain port preferred.
9	Shaking Water Bath	2	Shaking water bath; capacity 10–20 L; ambient +5 to at least 80 °C; control stability ±0.5 °C or better; orbital/reciprocating motion with adjustable 20–200 rpm (or equivalent), adjustable stroke/orbit, stainless steel tank, lid, tube/flask racks, digital temperature/speed/timer, low-water and over-temperature protection.
10	Refrigerated circulating water bath	1	Working temperature range approximately –20 to +100 °C (refrigerated circulator); Cooling capacity ≥200–300 W at +20 °C; Temperature stability ≤±0.05–0.1 °C; Bath volume ≥6–15 L; Integrated circulation pump; adjustable flow; External circulation ports for jacketed vessels; Digital PID controller and timer; Over-temperature and low-liquid protection; Optional RS-232/USB data logging.
11	Dry-block heater	2	Temperature range ambient+5 to 100/150 °C; Accuracy ±0.5 °C; stability ±0.2 °C preferred; Interchangeable aluminum blocks for 0.2, 0.5, 1.5/2, 15 and 50 mL formats; Digital timer; Over-temperature protection; Heated lid optional for PCR/tube applications.
12	Laboratory refrigerator	12	Operating range 2–8 °C; Net volume 300–500 L; Forced-air circulation; uniformity ≤±2 °C; Digital microprocessor controller; High/low temperature, door-open and power-failure alarms; Min/max temperature display and data logging; Lockable door; adjustable shelves; Access port for external probe; Potential-free alarm contact / remote monitoring preferred; Battery-backed display/alarm desirable.
13	Laboratory –20	4	Operating set point –20 °C; range at least –10 to –30 °C; Net volume

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
	°C freezer		300–500 L; Microprocessor controller; High/low temperature and power-failure alarms; Temperature uniformity and recovery suitable for frequent laboratory access; Lockable door; baskets/shelves; Access port and remote alarm contact; Data logging and backup power interface preferred.
14	Research-grade micropipette set	5	Single-channel adjustable air-displacement pipettes covering approximately 0.5–10, 2–20, 20–200 and 100–1,000 µL; ISO 8655 compliant performance; calibration certificate; Volume lock; low operating force; ergonomic design; Autoclavable lower assembly or fully autoclavable model; UV-resistant materials; Tip cone compatible with universal tips; filter-tip compatibility; User calibration/adjustment possible; Supplied with stands/racks and calibration tools.
15	Multichannel pipette	2	8- or 12-channel adjustable pipette; Volume ranges appropriate to 96-well work, e.g., 10–100 and/or 30–300 µL; ISO 8655 performance; Uniform channel loading; easy tip ejection; Rotatable lower manifold; Autoclavable lower portion; Universal tip compatibility.
16	Electronic pipette	2	Programmable pipetting, reverse pipetting, mixing, multidispense, dilution and serial-dilution modes; Volume range selected to cover ~5–1,000 µL; Motorized piston for repeatability; Rechargeable battery with charging stand; User profiles/program memory; Speed adjustment for aspirate/dispense; ISO 8655 calibration capability; Optional PC/Bluetooth connectivity desirable.
17	Oil-free laboratory vacuum pump	1	Oil-free chemically resistant diaphragm design; Ultimate vacuum ≤100–200 mbar or better; Free-air displacement ≥15–30 L/min; PTFE-coated wetted path preferred; Low noise ≤60 dB(A) desirable; Thermal overload protection; Vacuum regulator/gauge and moisture trap; Suitable for filtration and aspiration.
18	Laboratory glassware washer	1	Programmable laboratory washer with ≥100–150 L chamber or equivalent rack capacity; Wash, rinse, purified-water final rinse and heated drying cycles; SS304/316 chamber; Adjustable racks/injectors for flasks, bottles, cylinders and narrow-neck glassware; Temperature up to ≥80–90 °C; Detergent dosing system; Cycle data logging / printer or USB export preferred; Door interlock, leak detection and over-temperature protection.
19	Laboratory ice maker	1	Ice production 20–50 kg/day; Storage bin ≥5–15 kg; Flake/nugget ice preferred for laboratory cooling; Food/lab-grade stainless contact surfaces; Automatic water feed and bin-full shutoff; Easy sanitization/drainage; Low-water and fault alarms.
20	Hot-air oven (gmp)	5	Forced-convection laboratory drying oven, 100–150 L, ambient +10 to at least 250 °C, uniformity within ±3 °C at 150 °C, stainless-steel chamber, adjustable shelves, independent over-temperature cutout, timer, calibration port and certificate. Claims of sterilization or depyrogenation require separately validated cycles and demonstrated performance; GMP qualification documentation to be quoted separately.

2. Microbiology, aseptic processing and culture equipment

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
21	Class II Type A2 Biological	6	Nominal width 4–6 ft; Class II Type A2; approximately 70% downflow recirculation and 30% exhaust via HEPA filtration; Supply and exhaust HEPA H14 filters with $\geq 99.995\%$ efficiency at MPPS; Inflow velocity ≥ 0.5 m/s (NSF/ANSI 49) or ≥ 0.4 m/s (EN 12469) with controlled vertical downflow per the applicable standard; NSF/ANSI 49 and/or EN 12469 certification preferred; SS304 one-piece work tray with spill retention; UV lamp optional; LED illumination ≥ 800 lux; Real-time airflow display; alarms for low airflow, sash position and filter loading; Motorized/weighted sash with safe working height; EC blower; negative-pressure contaminated plenums; Two utility ports and electrical sockets; Annual field certification capability; DOP/PAO test ports; Optional exhaust thimble connection.
22	Laminar-flow clean bench	8	Horizontal or vertical unidirectional HEPA-filtered clean-air workbench; Working width ~ 1.2 m (4 ft); HEPA H14 final filter; prefilter; Air velocity ~ 0.3 – 0.5 m/s; SS304 work surface; LED illumination ≥ 800 lux; UV lamp with timer/interlock optional; Digital blower control and filter-life indicator preferred; Not to be used for hazardous biological material.
23	Vertical autoclave	3	Chamber capacity 100–150 L; SS316 chamber preferred; SS304 outer body; Operating temperature 121–134 °C; pressure up to ~ 2.1 bar gauge; Microprocessor-controlled programmable sterilization cycles; Independent temperature and pressure display; F_0 value, exposure time and drying/slow exhaust options desirable; Safety interlocks preventing opening under pressure; Low-water, over-temperature and over-pressure protection; Validation port and load probe capability; Cycle data logging via printer/USB; audit-ready records preferred; Conformance to applicable pressure-vessel safety standards.
24	Orbital incubator shaker	3	Temperature range ambient+5 to 60 °C; Speed range 20–300 rpm; Orbit 25 mm or larger; Platform capacity ≥ 10 – 20×250 mL or equivalent; interchangeable clamps/sticky mats; Temperature accuracy ± 0.5 °C; uniformity ± 1 °C; Brushless drive; Programmable speed/temperature/time segments desirable; Door-open stop and over-temperature protection; Data logging/USB preferred.
25	Refrigerated incubator shaker	2	Temperature range approximately 4–60 °C; Speed 20–300 rpm; Orbit 25–50 mm; Large universal platform for flasks up to 2 L; Temperature accuracy ± 0.5 °C; uniformity ± 1 °C; Programmable profiles and timer; CO ₂ -resistant option not required unless used for mammalian shake-flask culture; Data logging and remote alarm preferred.
26	Static laboratory incubator	5	Temperature range ambient+5 to 60/70 °C; Capacity 100–250 L; Forced-air or natural convection with uniformity $\leq \pm 1$ °C; Digital PID controller; timer; SS304 inner chamber; Over-temperature cutout; Adjustable shelves; Access port and optional data logger.
27	BOD / refrigerated incubator	2	Temperature range 5–60 °C; Capacity 150–300 L; Refrigeration with CFC-free refrigerant; Temperature accuracy ± 0.5 °C; uniformity ± 1 °C; Programmable controller and timer; Interior illumination optional; High/low temperature alarm and data logging

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
			preferred.
28	Research compound microscope	3	Trinocular research microscope; Infinity-corrected optical system; Objectives: 4×, 10×, 40× and 100× oil immersion; plan achromat minimum; Wide-field eyepieces 10×, field number ≥20; Brightfield with Köhler illumination; phase contrast kit preferred; Mechanical stage; coaxial fine/coarse focus; LED illumination with intensity control; Camera port and imaging software compatibility; Optional fluorescence upgrade path desirable.
29	Programmable peristaltic pump	2	Flow range selected to cover approximately 0.1 mL/min to ≥1 L/min via interchangeable heads; Speed control resolution ≤0.1 rpm preferred; Forward/reverse operation; Programmable volume, time and ramp profiles; Calibration by tubing size; Remote start/stop and analog/digital control; RS-485/USB desirable; Multiple tubing materials compatible with bioprocess use; Tool-free tube loading.

3. Centrifugation, cell disruption and sample preparation

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
30	Microcentrifuge	4	Maximum RCF ≥15,000–21,000 ×g; 24 × 1.5/2.0 mL rotor; Speed setting in rpm and RCF; Timer 10 s to 99 min or continuous; Fast acceleration/deceleration with selectable brake; Lid lock and rotor imbalance detection; Aerosol-tight rotor option preferred; Noise ≤60 dB(A).
31	Refrigerated microcentrifuge	4	Maximum RCF ≥20,000–25,000 ×g; 24 × 1.5/2.0 mL aerosol-tight rotor; Temperature range –10 to +40 °C; Fast precooling; 4 °C maintained at max speed preferred; Speed accuracy ≤±50 rpm; Timer and quick-spin function; Automatic rotor recognition preferred; Imbalance, over-speed and over-temperature protection.
32	Refrigerated multipurpose centrifuge	1	Maximum RCF ≥20,000–25,000 ×g with fixed-angle rotor; Refrigerated range –10 to +40 °C; Interchangeable swing-out and fixed-angle rotors; Capacity to handle 1.5/2 mL, 15 mL, 50 mL, microplates and ≥250 mL bottles; Automatic rotor recognition; Programmable acceleration/deceleration profiles; Aerosol-tight buckets/rotors; Speed accuracy ±50 rpm; temperature accuracy ±1 °C; Data logging and user programs desirable.
33	Probe sonicator	2	Ultrasonic power approximately 500–750 W at ~20 kHz; Programmable amplitude 10–100%; Pulse on/off programming and timer; Standard 13 mm probe plus microtip ~2–6 mm; Sample-volume range from ~0.2 mL to several hundred mL depending on probe; Temperature probe / automatic shutoff desirable; Sound enclosure included; Overload protection and calibration check capability.
34	High-pressure homogenizer (Panda-class)	1	Bench-top high-pressure homogenizer, PandaPLUS 2000 class or equivalent; Continuously adjustable operating pressure up to 2,000 bar (≥1,500 bar minimum) with digital pressure readout and trend display; Rated flow ~9–10 L/h (~150 mL/min) for continuous lab/pilot processing; Minimum sample volume ≤30–50 mL; feed hopper ≥0.4 L, jacketed hopper preferred; Wear-resistant homogenizing valve suitable for cell disruption and abrasive suspensions; single- and two-stage valve options; SS316L product-

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
			contact parts with FDA-compliant gaskets; Multiple-pass capability; Outlet heat exchanger with recirculating chiller (approximately –20 to +40 °C) to offset product temperature rise of ~1.5–2.5 °C per 100 bar; Built-in over-pressure protection and safety interlocks; CIP-compatible flow path; Cell-disruption performance data (E. coli and yeast); Site readiness: vendor to confirm electrical supply (3-phase in many configurations) and bench load of ~100 kg before installation.
35	Ducted chemical fume hood	1	Ducted chemical fume hood, nominal width 1.2–1.5 m; chemically resistant liner/worktop and spill retention; sash safety stop; continuous airflow indication and low-flow alarm; face velocity target 0.4–0.6 m/s at designated working opening, subject to containment testing; EN 14175 or ASHRAE 110 evidence; corrosion-compatible exhaust blower, ductwork, discharge design and make-up air assessment. Include on-site containment/airflow testing and commissioning. Acid and flammable-solvent storage cabinets to be separately compliant and priced. Perchloric acid use excluded unless specially designed.

4. Bioreactors, fermentation and upstream control

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
36	Microbial stirred-tank bioreactor	2	Autoclavable borosilicate vessel; total volume ~3–7 L; working volume 2–5 L; Top-driven or bottom-driven agitation; speed ~50–1,200/1,500 rpm; Interchangeable Rushton/segment/pitched-blade impellers; pH, polarographic/optical DO, temperature and foam probes included; Temperature control via jacket or heating blanket; 20–60 °C minimum; Air flow control by rotameter or MFC; O ₂ enrichment option; At least 4 peristaltic pumps for acid, base, antifoam and feed; DO cascade to agitation, air and O ₂ ; Software for trends, alarms, recipes and data export; Sampling port, harvest port, condenser and exhaust filter; CIP not required for glass bench system; SIP/autoclave compatibility required; Validation/calibration kit for pH/DO and pump flow.
37	External programmable feed pumps	2	Precision peristaltic pumps for nutrient/base/inducer feeds; Flow range ~0.01 mL/min to ≥100 mL/min depending head; Calibration by tubing size; Programmable ramps, step feeds, bolus and total-volume endpoints; Forward/reverse operation; Remote analog/digital control and start/stop; Data logging desirable.

5. Harvest, clarification, filtration and TFF/UF/DF

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
38	Vacuum filtration assembly	1	Reusable borosilicate or SS filtration holder; Compatible membrane diameter 47–90 mm preferred; Receiver capacity ≥1–2 L; Vacuum gauge/regulator and trap; Autoclavable product-contact components; Quick-connect tubing and clamps; Suitable for 0.22–0.45 µm membranes and clarification.
39	Advanced automated TFF system	1	Automated control of feed flow, retentate pressure/TMP and permeate flux; Process volume ~0.1–20 L or higher; Multiple pressure and flow sensors; conductivity/UV optional; Recipe-based concentration and

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
			diafiltration modes; Gravimetric control using balances; Automated constant-volume diafiltration; Scalable cassette/hollow-fiber modules; Electronic batch report and data export; Single-use flowpath option preferred; Alarm and interlock functions.
40	Turbidity meter	1	Nephelometric measurement; range ~0–1,000/4,000 NTU; Resolution ≤0.01 NTU at low range; Accuracy ±2% or better; Calibration with traceable polymer/formazin standards; Sample vial and flow-through option desirable; Data logging/USB output.

6. Chromatography and protein purification

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
41	Manual chromatography column kits	2 sets	Glass or acrylic columns with adjustable bed height; Column IDs covering ~10–30 mm; Pressure rating ≥3 bar or as applicable; Flow adapters and frits suitable for 20–100 µm resins; Compatible with IEX, affinity, HIC and SEC media; Luer/sanitary tubing adapters; Column stand and packing accessories.
42	Lab-scale FPLC system	1	Automated biocompatible lab FPLC; flow 0.001–25 mL/min or wider; pressure capability appropriate to quoted pumps, valves, tubing and columns (state individual limits); binary gradient; UV 280 nm with multiwavelength capability, conductivity, optional in-line pH, pressure and air detection; column selection, fraction collector, chromatography software, audit trail option; starter IMAC/IEX/desalting/SEC columns and commissioning kit. Bidder to specify supported column dimensions and operating pressure limits.
43	Preparative chromatography system	1	Process-development flow range approximately 10 mL/min to 1–5 L/min; Pressure rating ≥5–10 bar for process columns; Sanitary SS316L/PEEK flow path; UV 280 nm, conductivity, pH, pressure and flow monitoring; Automated buffer selection and gradient formation; Air/bubble detection and column-protection alarms; Fraction collection or product diversion valve; CIP capability; Scalable columns 1–10 cm ID or larger; Electronic batch record / audit trail preferred.

7. Protein, molecular biology and routine analytical instrumentation

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
44	Double-beam UV-Vis spectro-photometer	2	Wavelength range approximately 190–1,100 nm; Spectral bandwidth ≤1–2 nm; selectable bandwidth preferred; Wavelength accuracy ±0.1–0.3 nm; Photometric accuracy ±0.002–0.005 A; Stray light ≤0.05%T; Scan speed selectable up to ≥2,000 nm/min; Kinetics, wavelength scan, quantitative and multi-wavelength modes; Quartz cuvette holder; temperature-controlled 6-cell holder optional; USB/LAN and PC software; 21 CFR Part 11-ready software desirable for research/regulated work.
45	Microvolume spectro-photometer	1	Sample volume ~1–2 µL; Wavelength range ~190–850 nm; Absorbance range equivalent to 0.02–300 A using pathlength control; Pathlength 0.05–1 mm automatic; DNA/RNA/protein quantification with purity ratios A260/A280 and A260/A230; Fluorometric module desirable; Pedestal and cuvette modes preferred; Data export via USB/LAN; User

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
			account and audit trail desirable.
46	Multimode microplate reader	1	96- and 384-well plate compatibility; Absorbance 200–1,000 nm via monochromator or filters; Fluorescence intensity with top/bottom reading; Luminescence capability preferred; Temperature control ambient+4 to 45 °C; Orbital/linear shaking; Endpoint, kinetic and spectral scan modes; Injector module optional for enzyme kinetics; Low crosstalk and high dynamic range; Analysis software with standard curves and export.
47	SDS-PAGE electrophoresis system	5	Mini vertical electrophoresis apparatus for 8×10 cm-class gels; Run 2–4 gels simultaneously; Hand-cast and precast gel compatibility; Leak-proof buffer chamber; Glass plates, spacers, combs and casting stand included; Compatible with 1D SDS-PAGE and native PAGE; Safety lid interlock.
48	Horizontal agarose gel electrophoresis unit	5 sets	Horizontal submarine electrophoresis units in mini (gel ~7 × 7–10 cm) and midi (gel ~15 × 10–15 cm) formats, with at least 3 mini and 2 midi across the 5 sets; UV-transparent gel trays with gasketed or tape-free casting system; Combs of 8–32 wells in 1.0–1.5 mm thickness, including multichannel-pipette-compatible (9 mm pitch) combs; Leak-proof moulded acrylic buffer tank; Platinum electrodes (≥99.9% purity); Safety lid with interlocked leads so that power connects only with the lid in place; Compatible with the electrophoresis power supplies in this section; Casting stand, levelling base and gel-handling accessories included.
49	Electrophoresis power supply	5	Output at least 10–300 V, 1–500 mA and 1–150 W; Constant voltage/current/power modes; Programmable timer; ≥4 output jacks; Automatic crossover and no-load/short-circuit protection; Pause/resume function; Memory for common protocols desirable.
50	Gel documentation imaging system	1	High-resolution scientific CMOS/CCD camera ≥4–6 MP; UV transilluminator and blue-light illumination; Imaging of ethidium bromide and safer alternative nucleic-acid stains (e.g., SYBR Safe/GelRed), DNA/RNA gels and Coomassie-stained protein gels; Motorized/manual zoom lens; Dynamic range ≥3 orders of magnitude; Automatic exposure and saturation warning; Densitometry, molecular-weight and band-quantification software; Network/USB export; Optional white-light tray.
51	Western blot transfer unit	2	Wet or semi-dry electrotransfer; Compatible with mini and midi gels; Uniform transfer field; Programmable voltage/current/time; Cooling capability for wet transfer preferred; Transfer cassettes, pads and trays included; Support PVDF and nitrocellulose membranes.
52	Chemi-luminescence / fluorescence imager	1	Cooled CCD/sCMOS camera with high sensitivity; Chemiluminescence, fluorescence and visible imaging; Dynamic range ≥4–5 logs; Multiple fluorescence channels preferred; Motorized focus and automatic exposure; Image quantification and densitometry; 21 CFR Part 11-ready software desirable; Network data storage and raw-image export.
53	Gradient PCR thermal cycler	2	96-well × 0.2 mL block compatible with tubes, strips and plates; Temperature range 4–99 °C; Temperature accuracy ±0.2 °C; well-to-well uniformity ≤±0.3–0.5 °C; Gradient function with span up to ≥20 °C (gradient range ~30–100 °C); independent-zone temperature control preferred; Maximum block ramp rate ≥4 °C/s; Adjustable heated lid

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
			~30–110 °C with automatic pressure adjustment; Reaction volume ~5–100 µL; Storage of ≥100 protocols with user accounts; Touchscreen interface; USB/LAN data export and remote run monitoring; Calibration/verification certificate.
54	Real-time PCR / qPCR system	1	96-well format; At least 4–6 optical channels; multiplex capability; LED excitation and photodiode/CCD detection; Temperature range 4–100 °C; Block uniformity ≤±0.4–0.5 °C; accuracy ≤±0.25 °C preferred; Fast ramp rate ≥3–5 °C/s; Melt-curve analysis; Absolute/relative quantification and standard-curve analysis; ROX and non-ROX chemistry compatibility; USB/LAN; user management and audit trail desirable.
55	Electroporator	1	Electroporation system for bacteria, yeast/fungi and mammalian cells; Exponential-decay pulse mandatory; square-wave pulse desirable for CHO/mammalian transfection; Output voltage ~10–3,000 V; Capacitance selectable (e.g., 10, 25 and 50 µF in high-voltage mode; up to ~3,000 µF in low-voltage mode); Parallel resistance selectable ~50–1,000 Ω and ∞; Display of delivered voltage, time constant and pulse length; Arc detection and protection; Preset protocols for E. coli, Pseudomonas, Saccharomyces/Candida and mammalian cells, plus user-programmable memory; Shocking chamber with safety interlock for 0.1, 0.2 and 0.4 cm gap cuvettes; Starter pack of sterile cuvettes.

8. Advanced biopharmaceutical analysis

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
56	Research HPLC system	1	Binary or quaternary solvent delivery; Flow range ~0.001–10 mL/min; Flow precision ≤0.1% RSD; pressure capability ≥600 bar preferred; Autosampler ≥100 vials; injection range ~0.1–100 µL; Column oven 10–80 °C; PDA detector ~190–800 nm with ≥80 Hz acquisition desirable; In-line degasser; Gradient composition accuracy ≤±0.5%; Chromatography data system with audit trails, system suitability and report templates; LAN connectivity; 21 CFR Part 11-ready option; Biocompatible upgrade path desirable; Detector configuration to include the PDA plus the refractive-index detector listed below, in series under the same data system; Flow path compatible with dilute-acid (5 mM H ₂ SO ₄) mobile phases.
57	HPLC refractive-index detector with ion-exclusion column kit	1	Refractive-index detector fully compatible with item 56 and the same chromatography data system; thermostatted cell, low-noise/stable baseline, reference purge and protection from excess backpressure; H⁺-form ion-exclusion analytical columns (300 × 7.8 mm class) with guards, compatible 50–65 °C column oven, dilute-acid compatible wetted path, standards and demonstration of representative sugars, organic acids and ethanol. RI detector shall be positioned last in detector flow path. Performance thresholds to be documented by OEM.

9. Mammalian cell culture and biosimilar research

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
58	CO ₂ incubator	2	Capacity 150–200 L; Temperature range ambient+3 to 55 °C; stability $\leq \pm 0.1-0.2$ °C; CO ₂ range 0–20%; control accuracy $\pm 0.1-0.2\%$; IR CO ₂ sensor preferred; Relative humidity $\geq 90-95\%$ via water pan or active control; High-temperature sterilization/decontamination cycle $\geq 90-180$ °C depending model; HEPA-filtered chamber air preferred; O ₂ control 1–20% optional for advanced research; Inner glass door and segmented doors preferred; Alarm/data logging and remote monitoring; Copper or stainless-steel chamber.
59	Inverted phase-contrast microscope	1	Inverted trinocular microscope; Phase-contrast objectives 4×, 10×, 20× and 40×; Long-working-distance condenser; Stage suitable for flasks, dishes and multiwell plates; LED transmitted illumination; Digital camera ≥ 5 MP and imaging software; Fluorescence upgrade path with common channels desirable; Environmental chamber compatibility preferred.
60	–80 °C ultra-low-temperature freezer	3	Storage volume 500–700 L; Operating range –50 to –86 °C; Setpoint –80 °C; Microprocessor controller with ± 1 °C display resolution; High/low temp, power, door and filter alarms; Insulated inner doors; CO ₂ /LN ₂ backup interface; Remote alarm contact and USB/Ethernet monitoring; Low-energy cascade or variable-speed compressor; Racks included; lockable access.
61	Liquid-nitrogen cryostorage system	1	Vapor-phase storage ≤ -150 °C preferred; Capacity $\geq 10,000$ cryovials or scalable; Automatic LN ₂ level control; Temperature and level monitoring; High/low alarms and remote alarm contact; Low-level filling safety interlock; Racks/canes and inventory system; Lockable lid; oxygen-deficiency monitoring in room required; Vacuum-insulated vessel.
62	Mammalian suspension shaker	1	CO ₂ -resistant orbital shaker for use inside CO ₂ incubator or integrated CO ₂ shaking incubator; Speed ~30–250 rpm; Orbit 19–25 mm; Capacity for shake flasks 125 mL–2 L; Low heat generation for incubator use; Remote controller outside incubator preferred; Sticky mat/clamps compatible with vented shake flasks.

10. Product recovery, formulation and lyophilization

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
63	Laboratory lyophilizer	1	Laboratory lyophilizer with condenser temperature at or below –80 °C, ice capacity at least 3 kg, ultimate vacuum at or below 0.1 mbar, appropriate shelf/manifold configuration, sample temperature monitoring and data logging. For controlled shelf freezing and primary/secondary drying, bidder must include temperature-controlled shelves and programmable recipes; manifold-only systems do not qualify for that use. Specify actual usable shelf area, condenser capacity and vacuum pump inclusion.

11. Additional laboratory and process equipment

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
64	Ultrasonic cleaning bath	2	Heated ultrasonic bath, 5–30 L, 20–40 kHz, timer, SS tank, drain; for cleaning probes, spargers, small fittings, glassware parts and reusable accessories.
65	Overhead stirrer	3	Variable speed, suitable torque for 5–20 L carboys/viscous solutions; SS shaft/impeller; stand and clamp; digital speed display.
66	Media dispenser / peristaltic dispensing pump	1	Programmable dispensing 1–100 mL; autoclavable tubing; foot switch; anti-drip nozzle; calibration function; for uniform PTC media/jar filling and buffer dispensing.
67	Microwave oven / media melting	3	Laboratory-grade or dedicated media-melting microwave; temperature-safe vessels; overheat protection; for agar/gellan medium reheating and melting.
68	Tube rotator / roller / rocker	3	Variable speed, end-over-end or roller type; cold-room compatible option; for hybridization, cell suspension, lysis and staining.
69	Deep-well plate shaker/incubator	2	Deep-well plate shaker/incubator supporting 24- and/or 96-deep-well plates, orbital agitation 300–1,000 rpm as suitable for plate format, controlled temperature at least 25–37 °C, secure plate clamping, anti-evaporation covers and programmable time. A stationary microplate incubator without shaking is not equivalent.
70	CO ₂ -controlled shaking incubator	1	Controlled CO ₂ and temperature shaking incubator for suspension mammalian/CHO seed train or cell-based assays; flask clamps and humidity control.
71	-20 / -40 °C freezer	2	Laboratory freezer: bidder shall separately identify –20 °C and –40 °C models; if –40 °C storage is required, operating setpoint ≤–40 °C, high/low alarms, temperature monitoring, lock and racks are mandatory. A –18 to –22 °C showcase freezer is not equivalent to a –40 °C unit. Final temperature class to be confirmed by purchaser before award.
72	LN ₂ storage tank / Dewar	1	100–200 L LN ₂ tank or smaller Dewar as needed; vapor/liquid phase storage, cryobox racks/canisters, level monitoring, safety relief and cryo PPE.
73	Controlled-rate freezer / cryopreservation container	1	Controlled-rate cryopreservation system: provide either (A) programmable controlled-rate freezer with user-defined cooling profiles, temperature logging and alarms, or (B) passive freezing container delivering approximately –1 °C/min in a compatible –80 °C freezer. These are alternative technologies, not equivalent; bidder shall state offered option and quote separately.
74	Blue-light transilluminator and gel cutter	2	Blue LED transilluminator with amber shield, gel excision platform and safety filter; for clone-safe DNA band excision.
75	Qubit / fluorometer	1	High-sensitivity dsDNA/RNA/protein quantification with assay kits; low-volume tubes; for NGS, microbiome and cloning quantification.
76	DNA shearing / focused sonication system	1	Dedicated DNA fragmentation/shearing system with documented fragment-size control and reproducibility for specified input DNA mass/volume; sealed microtube compatibility, sample cooling, programmable energy/time and supporting application data for library preparation. A generic 5 L ultrasonic cleaning bath alone is not acceptable as equivalent.
77	Recirculating	1	Recirculating chiller, temperature range –10 to +40 °C or wider,

No.	Equipment	Qty	Minimum technical specification / acceptance requirements
	chiller		closed-loop circulation, specified cooling capacity (W at +20 °C and at 0 °C), flow and pressure ratings, stability $\leq \pm 0.5$ °C, over-temperature/low-fluid protection and hose fittings matched to intended equipment. Capacity to be confirmed against connected load.
78	French press / small cell disruptor	1	Bench-scale high-pressure cell disruption system; maximum operating pressure and usable sample volume to be documented; 35 mL pressure-cell class acceptable where appropriate; cooling, pressure relief, safety enclosure and operator training mandatory. Vendor shall confirm electrical requirements, spare seals and compatibility with microbial cell disruption.
79	Spray dryer	1	Laboratory spray dryer; evaporation capacity and feed range to be stated; adjustable inlet/outlet temperatures, two-fluid nozzle, atomizing air, cyclone/product collector, peristaltic feed pump, inlet filtration and safety interlocks. Organic-solvent work only with OEM-certified inert-loop/explosion-risk controls, quoted separately. Demonstrate performance on purchaser-approved aqueous sample.
80	Soxhlet / reflux extraction system	1	Single or multi-position Soxhlet/reflux glassware, 100–1000 mL, heating mantle, condenser and solvent-safe clamps; for crude phytochemical extraction.
81	Ultrasonic bath for extraction	1	Ultrasonic bath for extraction/degassing; 5–20 L, nominal 20–40 kHz, adjustable timer and temperature, stainless-steel tank, drain and lid, continuous-duty rating. If offered as the same model as item 64, quote separately but identify potential functional duplication for purchaser review.