STATEMENT OF WORK

Procurement of Specialized Laboratory Equipment

Enhancing ENP Capabilities to Investigate Synthetic Drug Trafficking and Support TCO Prosecutions

1. Introduction.

The United States Department of State (DoS), Bureau of International Narcotics and Law Enforcement Affairs (INL), supports partner nations by providing training, technical assistance, and equipment to strengthen law enforcement capacity to counter drug trafficking and other illicit activities.

Through its counternarcotics portfolio, INL Ecuador works with the Ministry of Interior (MOI) and the Ecuadorian National Police (ENP) to improve the detection, investigation, and prosecution of drug-related crimes, including emerging synthetic drug threats.

To strengthen forensic laboratory capabilities, INL Ecuador will support the procurement, delivery, installation, and commissioning of specialized analytical and laboratory equipment for the UNISQ laboratory. The equipment package will include advanced analytical instrumentation, laboratory support equipment, and essential laboratory infrastructure required to enhance the ENP's capacity to analyze controlled substances and support investigations related to synthetic drug trafficking and transnational criminal organizations (TCOs).

2. Purpose and Objectives

2.1. Purpose

The purpose of this project is to strengthen the capacity of the Ministry of Interior and the Ecuadorian National Police (ENP/DNIA/UNISQ) to conduct qualitative and quantitative analysis of drugs of abuse, psychoactive substances, chemical precursors, and other forensic compounds using advanced technology.

2.2. Objectives

2.2.1. Procure, deliver, install, and commission the specialized laboratory equipment package for the UNISQ laboratory, including advanced analytical instrumentation and supporting laboratory equipment, in accordance with the minimum technical specifications outlined in Appendix A.

2.2.2. Provide installation, calibration, operational verification, and technical training for ENP/DNIA/UNISQ laboratory personnel to ensure the proper operation, maintenance, and sustainable use of the procured equipment in support of forensic analysis and investigations related to synthetic drug trafficking and Transnational Criminal Organizations (TCOs).

3. Tasks/Scope

The vendor shall provide a complete, new, factory-manufactured equipment meeting or exceeding all minimum specifications detailed in Appendix A and Appendix A.1.

The scope shall include:

- Delivery under Incoterm - Delivered Duty Paid (DDP) to Quito, Ecuador.
- Installation and full commissioning.
- Installation Qualification (IQ) and Operational Qualification (OQ).
- Performance verification testing.
- For items 1 and 2 provisions of accessories and consumables for two (2) years.
- For items 1 and 2 on-site technical training (40 hours).
- Warranty and preventive maintenance services.

4. Deliverables

The vendor shall provide the following deliverables to National Police and INL Ecuador. All deliverables are subject to review and acceptance by INL.

4.1. Deliverable 1: Supply and Delivery of Laboratory Equipment

The vendor shall supply and deliver all laboratory equipment listed in Appendix A and – A.1Technical Specifications, ensuring that each item meets the minimum technical requirements.

4.2. Deliverable 2: Installation and Calibration

The vendor shall be responsible for the installation, configuration, calibration, and verification of proper operation of all equipment at the designated UNISQ laboratory facility. The vendor should ensure that all instruments are fully operational and compliant with the manufacturer's specifications.

4.3. Deliverable 3: Training

For item 1 and 2, the vendor shall provide on-site (Quito) technical training in **Spanish** for at least three (3) designated ENP laboratory personnel. The training shall cover, at a minimum 40 hours of:

- Operation of the equipment
- Routine maintenance procedures
- Basic troubleshooting
- Safe handling and proper laboratory practices related to the equipment

The vendor shall provide a training agenda in advance for INL approval, deliver training materials in digital format (Spanish), and provide attendance records and training completion certificates. **Training shall include hands-on practical sessions to ensure personnel are capable of independently operating the equipment.**

4.4. Deliverable 4: Documentation and Manuals

The vendor shall provide complete user manuals, technical documentation, and operating instructions for all equipment supplied. Documentation shall be provided in Spanish and English.

All documentation shall be delivered in both:

- **Digital format** (searchable PDF files, organized and indexed, delivered via USB drive or secure electronic transfer), and
- **Physical format** (at least one complete printed set, properly bound).

Digital documentation shall be clearly organized by equipment and include a table of contents or index to facilitate access and use by laboratory personnel.

4.5. Deliverable 5: Final Technical Report

Upon completion of installation, calibration, and training, the vendor shall submit a Final Technical Report summarizing the activities performed, including installation verification, calibration results (when applicable), training conducted, and confirmation that all equipment is fully operational.

5. Requirements

5.1. Contractor Qualifications

Due to the operational need for timely and effective post-sales support—including calibration, maintenance, and warranty services—the vendor is expected to have in-country presence or representation, either directly or through local partnerships, to ensure efficient and responsive service delivery.

5.2. Project Management and Coordination

- The vendor shall designate a primary point of contact responsible for coordination with INL Ecuador and relevant host nation counterparts.
- The vendor shall participate in coordination meetings with INL, as requested, to support implementation and oversight.

5.3. Compliance and Standards

- The equipment and technical services shall be provided in accordance with recognized international laboratory standards and good laboratory practices.
- All work shall be performed in a manner consistent with safety and security requirements applicable to the place of performance.

5.4. Language and Documentation

- Technical documentation, user manuals, and training materials shall be provided in Spanish, as appropriate and agreed with INL.
- All reports and formal deliverables to INL shall be submitted in English and Spanish.

6. Resources

The following resources will be provided by the Government of Ecuador and INL to support project implementation. These resources are not the responsibility of the vendor unless otherwise specified in the contract.

- The Ministry of Interior (MOI) and the National Police of Ecuador (DNIA/UNISQ) will provide access to laboratory facilities and designate technical staff to support coordination and implementation activities.
- DNIA/UNISQ will facilitate access to relevant facilities, personnel, and operational information required for the execution of approved tasks.

7. Place of Performance

The primary place of performance for this project will be the UNISQ laboratory facilities operated by the National Police of Ecuador (DNIA), in Quito - Ecuador.

8. Schedule

The detailed implementation schedule shall be developed and approved following contract award.

9. Special Terms and Conditions

- Delivery and transfer of custody of the equipment shall occur only in the presence of authorized representatives of the National Police and INL.
- Equipment delivery, installation, and calibration: To occur after the laboratory facility is ready for installation and commissioning, as these activities are dependent on the completion of a separate construction contract.
- Technical training: To be conducted following equipment installation and initial operational readiness.

10. Security Requirements

- The vendor shall comply with all applicable security requirements and access controls established by the ENP and DNIA/UNISQ at the place of performance.
- Access to UNISQ laboratory facilities shall be coordinated in advance with INL Ecuador and designated DNIA/UNISQ points of contact.
- The vendor shall ensure that all personnel performing work under this vendor comply with host nation security procedures while on site.
- The vendor shall safeguard sensitive technical and operational information and shall not disclose such information without prior written authorization from INL Ecuador.

11. Industry Standards

- Comply with and honor the manufacturer's warranty period for all supplied equipment.
- For items 1 and 2, three (3) on-site preventive maintenance visits during warranty period to be determined with National Police.

- For the other items one (1) on-site preventive maintenance visits during warranty period to be determined with National Police.
- Remote technical response within 24 business hours.
- On-site intervention within 3 business days in case of the use of the warranty.

APPENDIX A: TECHNICAL SPECIFICATIONS

All equipment requested shall be new. The Government does not intend to limit competition to any specific manufacturer. Offerors may propose any equipment that meets or exceeds the technical specifications outlined in Appendix A and A.1.

Item No.	Item	Description	QTY
1	Triple Quadrupole Gas Chromatography–Tandem Mass Spectrometry (GC-MS/MS) System with Autosampler, FID, and Gas Generators	Triple Quadrupole Gas Chromatography–Tandem Mass Spectrometry system with autosampler, Flame Ionization Detector (FID), and integrated gas generator	1
2	FTIR System	Fourier Transform Infrared Spectroscopy (FTIR) system with infrared microscope and ATR accessory	1
3	Ultrapure Water System	Type I ultrapure water purification system suitable for chromatographic applications	1
4	Analytical Balance	Semi-micro analytical balance with 5 decimal places (0.00001 g) resolution	1
5	Stereo Microscope	Zoom stereoscopic microscope for examination of solid samples and forensic evidence	1
6	Laboratory Refrigerator	Laboratory refrigerator (≥250 L capacity) operating in the 2–8 °C temperature range	1
7	Drying Oven	Laboratory heating and drying oven (approx. 50 L capacity)	1
8	Hotplate Stirrer	Hotplate magnetic stirrer with heating and digital control	1
9	Bench pH Meter	High-precision benchtop pH/ORP meter with temperature compensation	1

APPENDIX A.1 :TECHNICAL ANNEX

Consolidated Technical Equipment Specifications

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1. TRIPLE QUADRUPOLE GAS CHROMATOGRAPHY-MASS SPECTROMETRY SYSTEM (GC-MS/MS) WITH AUTOSAMPLER, FID DETECTOR, AND GAS GENERATORS

1.1. Gas chromatograph with oven, injection system, and electronic flow control.
1.2. Triple quadrupole mass spectrometry detector (MS/MS) coupled to the GC.
1.3. FID detector installed on the same GC (or equivalent integrated module).
1.4. Liquid autosampler for vials.
1.5. Complete vacuum system
1.6. Gas generators sized for operation of the GC-MS/MS and FID.
1.7. Control, data acquisition, and data processing software for GC and MS.

1.8. Workstation (PC and monitor with the corresponding licenses)

1.9. Accessories, initial consumables, and spectral libraries.

Technical Specifications

1.1 Gas Chromatograph

1.1.1 Oven and temperature control

a) Oven temperature range:

– From ambient temperature + 4-5 °C up to at least 450 °C.

b) Temperature ramps:

– Capacity to program at least 10 segments (ramps + holds).

c) Heating rate:

– Up to at least 60 °C/min (>= 120 °C/min preferred).

d) Repeatability and stability:

– Temperature repeatability of ±0,1-0,5 °C, or in accordance with the manufacturer's specification for modern instruments.

e) Column capacity:

– Space for at least two capillary columns with switching capability or connection to different detectors (MS and FID).

1.1.2 Injection system and electronic flow control

a) Electronic flow/pressure control (EPC) for the following gases:

– Carrier gas (He and/or H2).

– FID gases (fuel, air, make-up gas).

b) Carrier gas:

– The system shall be capable of operating with helium and/or hydrogen as carrier gas.

– Specific optimization for hydrogen operation shall be preferred (validated methods, safety, flow recommendations).

c) Main injector:

– At least one split/splitless injector with electronic flow control.

– Injector temperature range up to at least 400 °C.

d) Splitless injection:

– Capability for splitless injection for trace analysis.

e) Additional options (not mandatory, but desirable):

– Availability of ports for connection of headspace and/or SPME modules, according to the manufacturer's offering.

1.2 Triple quadrupole mass spectrometry detector (MS/MS) coupled to the GC.

1.2.1 Analyzer and mass range

a) Type:

– Triple quadrupole mass spectrometer (Q1-q2-Q3) designed for GC-MS/MS.

b) Mass range:

– From m/z 10 up to at least m/z 1,000.

c) Resolution:

– Resolution in Q1 and Q3 of approximately 0,7 u FWHM or equivalent (unit mass).

1.2.2 Operating modes

a) MS and MS/MS modes:

– Full scan, SIM, MRM (SRM), scan/MRM, or equivalent.
– Scan modes (product ion scan, precursor ion scan, or neutral loss, or their functional equivalents), according to each manufacturer's capabilities.

b) Acquisition speed:

– Capability to acquire at least 500 MRM transitions/s; capacity of 800 MRM/s or greater, compatible with fast chromatography, is preferred.

1.2.3 Sensitivity

a) EI sensitivity (MS/MS mode):

– Detection limit for OFN or another reference standard, according to the manufacturer's protocol, of <= 10 fg (<= 5 fg preferred).

b) Linear dynamic range:

– Equal to or greater than 10^5 (>= 10^6 preferred).

1.2.4 Ionization and source

a) Electron impact ionization source (EI):

– Included as the standard configuration.

b) Other ionizations:

– It will be strongly preferred that, upon delivery, the system include operational positive and/or negative chemical ionization capability (PCI/NCI), or alternatively that the manufacturer explicitly offer it as an option fully compatible with the proposed system.

c) Source maintenance:

– Design allowing cleaning or replacement of critical components (filament, source liner, etc.) without excessive disassembly of the instrument.
– Any technology that minimizes downtime will be preferred (e.g., the possibility of accessing the source without fully venting the system).

1.3 FID detector installed on the same GC (or equivalent integrated module)

a) The GC shall include a fully operational FID detector with electronic gas and flow control.

b) FID block temperature range:

– Up to at least 400 °C.

c) Minimum performance:

– Adequate sensitivity for routine quantification of volatile and semi-volatile organic compounds, according to the manufacturer's standard specifications.
– Linear dynamic range >= 10^6 (>= 10^7 preferred).

d) Parallel operation:

– It shall be possible to connect the FID to one of the oven columns while the other is directed to the MS (whether by means of flow splitters or valves, depending on the equipment design).

1.4 Liquid autosampler for vials

a) Type:

– Vial autosampler controlled by the system software.

b) Minimum capacity:

– At least 100 vials of 1,5-2 mL (higher capacity preferred).

c) Injection volume:

– Range of at least 0,1-50 uL, with fine adjustment increments.

d) Accuracy and precision:

– Injection accuracy <= ±1 % at typical volumes.

– Precision (RSD) <= 1 %, or according to the manufacturer's standard specification.

e) Carry-over:

– Low carry-over between samples, compatible with trace analysis; the typical autosampler performance shall be documented.

1.5 Complete vacuum system

a) High-vacuum and roughing vacuum pumps suitable for the GC-MS/MS, supplied by the manufacturer.

b) Control system enabling safe and automatic start-up and shutdown.

c) An oil-free or low-maintenance primary pump will be preferred; otherwise, the required maintenance frequency and type shall be clearly specified.

1.6 Gas generators sized for operation of the GC-MS/MS and FID

The bidder shall supply an in-situ gas generation solution covering the operational requirements for carrier gas, combustion gas (FID), and collision gas (MS/MS) for the proposed system. Individual modular generator configurations or compact combined units shall be accepted, provided that they comply with the following technical purity and flow specifications:

1.6.1 Hydrogen generator (carrier gas and FID fuel)

a) Technology: Proton exchange membrane (PEM) or equivalent, suitable for use as a carrier gas.

b) Production flow rate: >= 500 mL/min (cc/min).

c) Purity: >= 99.99% (analytical grade).

d) Outlet pressure: Adjustable, capable of delivering at least 100 psi (approx. 6.9 bar) to meet the requirements of the electronic flow control system (EPC/EFC).

e) Safety: It shall include integrated safety systems such as internal leak detection, overpressure sensor, and automatic shutdown in the event of failure.

f) Operation: Designed for continuous operation (24/7).

1.6.2 Nitrogen generator (collision gas / make-up)

a) Application: Nitrogen supply for collision gas in the MS/MS detector and/or make-up gas.

b) Technology: PSA (Pressure Swing Adsorption) or membrane, with integrated or external compressor (preferably integrated to save bench space and reduce noise).

c) Production flow rate: >= 250 mL/min (cc/min). Note: Flow sized for the specific consumption of the collision cell and make-up gas.

d) Purity: >= 99.999, with low oxygen and moisture content.

e) Integration: Units integrating Nitrogen and Zero Air generation in a single module ("Gas Station" type) to optimize bench space are acceptable.

1.6.3 Zero air generator (hydrocarbon-free air for FID)

a) Sufficient capacity to feed the flame of at least one FID detector, in accordance with the GC manufacturer's requirements. The bidder shall explicitly state the flow rate and pressure of the zero air supplied (Suggested flow rate: >= 1000 mL/min).

b) Purity: Hydrocarbon-free air (< 0.1 ppm THC), produced by a high-temperature catalyst or equivalent filtration system.

c) Operation: May be a standalone unit or integrated into the nitrogen module described in section 1.6.2.

1.6.4 General generator requirements

a) Power supply: Compatible with the local electrical grid (110-120 VAC or 220-240 VAC / 60 Hz).

b) Noise level: Quiet operation suitable for a laboratory environment (< 60 dB at 1 meter).

c) Accessories: Must include all connection kits, tubing, filters, and moisture/oxygen traps required for immediate installation and start-up with the chromatograph.

d) The bidder shall demonstrate that the proposed generators are officially compatible with the proposed GC, FID detector, and MS/MS mass spectrometer, indicating for each gas its specific function, purity, flow rate, outlet pressure, and connection scheme to the system.

1.7 Control, data acquisition, and data processing software for GC and MS.

a) The system shall include a software package that allows:

– Full control of the GC, FID, MS, and autosampler.
– Method programming and execution, including oven, injector, gas, and MRM sequence parameters.
– Programming of sequences for samples, calibrators, blanks, and quality controls.
– Peak integration, calibration curve construction, and concentration calculations with dilution factors.
– Specific MS/MS data processing (MRM, full scan, library search, etc.).
– Generation of customizable and exportable reports (PDF, Excel/CSV).

b) Data integrity (21 CFR Part 11 / ALCOA+):

– User management with different access levels.
– Personal credentials (username and password).
– Audit trail for relevant operations.
– Preservation of raw data without overwriting; possibility of reprocessing without altering the original data.
– Electronic signatures for approval of methods and results, where applicable.

1.8 Workstation (PC and monitor with the corresponding licenses)

a) Minimum features:

– Processor with at least 8 logical cores (e.g., Intel Core i7 or equivalent).
– RAM >= 32 GB.
– NVMe SSD >= 1 TB for operating system, software, and active projects.
– Additional storage >= 2 TB (internal HDD or equivalent option) for historical data archiving.
– Gigabit Ethernet network card.
– Full HD monitor or higher, at least 24 inches.
– Operating system officially supported by the software manufacturer, with original license.

b) The system shall allow storage and backup of data on network drives (NAS/institutional server), when ICT infrastructure is available. The computer, monitor, peripherals, software, licenses, and connection cables shall be delivered installed, configured, and fully operational with the proposed GC-MS/MS system.

1.9 Accessories, initial consumables, and spectral libraries

1.9.1 Capillary columns

At least two new capillary columns compatible with GC-MS/FID, suitable for the analysis of drugs, new psychoactive substances, and other organic compounds of forensic interest, including at a minimum:

a) one low-polarity column of the 5 % phenyl - 95 % dimethylpolysiloxane type, or functional equivalent; and

b) one intermediate/medium-polarity column, functional equivalent, for confirmation or complementary separation. Typical dimensions of 30 m x 0,25 mm x 0,25 um, or equivalents technically justified by the manufacturer for the proposed system, shall be accepted. Inclusion of backup columns, retention gaps, or equivalent additional columns for initial replacement will be preferred.

1.9.2 GC/MS/FID consumables

– Injection liners, septa, FID jets, O-rings, autosampler syringes, filters, and other wear items sufficient for at least 24 months of work at a rate of 40 samples/day.

1.9.3 Standards

– Reference standards or standard mixtures suggested by the manufacturer for performance and verification tests (auto-tune, sensitivity check, etc.).

1.9.4 Spectral libraries and search

- The system shall include at least one broad-coverage GC/MS spectral library, installed and operational, such as the current NIST library or a functional equivalent demonstrable by the manufacturer.
- Inclusion of complementary libraries focused on drugs of abuse, chemical precursors, and new psychoactive substances (NPS) will be additionally preferred.

2. FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR) SYSTEM WITH MICROSCOPE AND ATR

2.1. High-resolution benchtop FTIR spectrometer.
2.2. Automated infrared microscope.
2.3. Monolithic diamond ATR accessory.
2.4. Workstation (PC) and unified control software.
2.5. Forensic spectral libraries.

Technical Specifications

2.1 High-resolution benchtop FTIR spectrometer

2.1.1 Optical system and interferometer

- Interferometer: robust sealed and desiccated design, not requiring manual alignment by the user. Extended manufacturer warranty for the interferometer will be preferred. The source and laser shall be covered by the manufacturer's standard warranty.
- Spectral Range: Minimum from 7,800 cm^-1 to 350 cm^-1.
- Spectral Resolution: Better than or equal to 0.5 cm^-1 (high-resolution standard).
- Signal-to-Noise Ratio (S/N): Greater than 50,000:1 (1-minute scan, 4 cm^-1 resolution, peak-to-peak) to ensure sensitivity in dirty samples.

2.1.2 Source and detector

- IR Source: High intensity and long service life (minimum 5 years), air-cooled, electronically stabilized.
- Main Detector: High-linearity DTGS (Deuterated Triglycine Sulfate) or thermoelectrically cooled detector, with moisture-resistant window.

2.2 Automated infrared microscope

2.2.1 Design and automation

- Type: Research-grade microscope directly coupled to the FTIR.
- Stage: Motorized in X, Y, and Z axes. Controlled by software and/or joystick for mapping and autofocus.
- Illumination: Integrated LED for transmission and reflection modes (visible light).

2.2.2 Visualization system (camera)

- Video Camera: integrated digital camera, at least 5 megapixels or equivalent higher resolution.
- Visualization: Must allow the sample to be viewed in real time on the PC monitor ("Live View") with image and video capture capability for chain-of-custody purposes.

2.2.3 Analytical performance and detectors

- Spatial Resolution: Capability to resolve and analyze individual particles or fibers down to 5 to 10 microns (diffraction-limited).
- Analysis Modes: Transmission and Reflection; the system shall be compatible with Micro-ATR, whether integrated or through an official accessory from the same manufacturer, which shall be clearly identified in the bid.
- Microscope Detector: Must include a high-sensitivity detector specific for microscopy, of the MCT type (Liquid Nitrogen Cooled) for maximum signal-to-noise ratio in tiny samples. (Acceptable option: TE-Cooled detector if it meets the 10-micron spatial resolution requirement).

2.2.4 Microscope software functions

- Auto-Focus: The system must automatically focus the sample.
- Mapping/Chemical Imaging: Capability to perform spectral mapping over a selected area by automatic or semi-automatic scans. Advanced chemical imaging generation will be preferred.

- Particle Detection: Software with the capability to locate and analyze regions or particles of interest on filters or surfaces. Automatic particle detection and sequential analysis will be viewed favorably.

2.3 Monolithic diamond ATR accessory

- Type: Single-bounce ATR module with automatic software recognition.
- Crystal: Solid Monolithic Diamond (Type IIa). Note: laminated diamonds or diamond coatings on ZnSe/KRS-5 are not acceptable due to the risk of delamination with strong acids.

2.4 Workstation (PC) and unified control software

The supplier shall include one (1) complete, dedicated, and preconfigured workstation for full operation of the FTIR spectrometer, infrared microscope, visualization camera, and acquisition and processing software. The workstation shall include, at a minimum:

a) Computer with operating system officially supported by the manufacturer and original license.

b) Full HD monitor or higher, at least 22 inches.

c) Keyboard, mouse, and all cables, adapters, and communication interfaces required.

d) Installed, configured, and licensed software for control of the FTIR and microscope, real-time sample viewing (live view), acquisition, processing, library search, and export of results.

e) IT security and audit tools (Audit Trails) for forensic data integrity.

f) Adequate storage capacity for spectral data, images, and video generated by the system.

g) The system shall be delivered fully installed, interconnected, tested, and ready for on-site operation.

2.5 Forensic spectral libraries

- Includes perpetual licenses for forensic spectral libraries for drugs of abuse, pharmaceuticals, precursors, solvents, polymers, and fibers, with a minimum cumulative total content of 10,000 spectra, or a functional equivalent demonstrable by the manufacturer.
- Multicomponent search algorithms for identifying mixtures (e.g., Cocaine + Levamisole + Caffeine).

3. TYPE I (ULTRAPURE) WATER PURIFICATION SYSTEM FOR CHROMATOGRAPHY

3.1. System for obtaining water quality (Type I)
3.2. Combination of treatment stages
3.3. Flow rate and dispensing
3.4. Control, display, and monitoring
3.5. Feed water
3.6. Construction and electrical characteristics

Technical Specifications

3.1 System for obtaining water quality (Type I)

A benchtop water purification system, or equivalent mounting configuration, capable of producing Type I ultrapure water from pretreated feed water (reverse osmosis, deionized, or distilled), in accordance with the manufacturer's recommendations, with the following characteristics consistent with ASTM Type I for chromatography use:

a) Water type: Ultrapure, ASTM Type I, suitable for preparation of mobile phases and buffer solutions for HPLC/UHPLC, LC-MS, GC-MS, and IC.

b) Resistivity: >= 18,0 MOhm·cm at 25 °C (equivalent to a conductivity of approx. 0,055 uS/cm).

c) Total organic carbon (TOC): maximum 5 ppb (typical value <= 2-5 ppb, depending on feed water quality).

d) Bacterial content:

– Bacterial count < 1 CFU/mL or better in the Type I water produced.

e) Particles:

– No particles > 0,22 um in the produced water, with a 0,22 um final filter or equivalent at the point of use.

f) It will be preferred that the system provide online TOC reading or monitoring, or at least UV lamp status control to ensure proper reduction of organic carbon.

3.2 Combination of treatment stages

The system shall include a combination of treatment stages, with at least one complete initial set, capable of achieving the quality specified in 3.1, such as:

a) Pretreatment by activated carbon, sediment filtration, or others, according to the manufacturer's design.

b) Reverse osmosis (RO) stage and/or feed with pretreated water (RO, DI, or distilled), followed by deionization and polishing by ion-exchange resins and/or specific cartridges for ultrapure water.

c) Integrated UV radiation module (typical wavelengths 185/254 nm) for TOC reduction and microbiological control.

d) Final 0,22 um filter (or equivalent) at the dispensing point, of the replaceable sterile capsule type.

e) Configurations integrating Type II and/or Type III water production in the same unit shall be accepted, provided that the Type I water outlet meets the indicated quality specifications.

f) Specific modules for biological applications (endotoxins, RNase/DNase-free) shall not be a mandatory requirement; such modules may be accepted as added value, but shall not be required as a minimum condition, in order to optimize equipment cost.

g) Reservoir or storage tank (when applicable), with volume and material consistent with the system design, suitable for maintaining the quality of the produced water.

h) Installation accessories (hoses, connections, supports) necessary to leave the equipment operational with the pretreated water feed source available in the laboratory.

3.3 Flow rate and dispensing

a) Type I water dispensing flow rate:

– Minimum 1 L/min.

– A flow rate of up to 2 L/min will be preferred to improve productivity in preparing mobile phases and solutions.

b) Manual dispensing system by button/key, with the possibility of stopping the flow at any time.

c) It will be preferred that the system include volumetric and/or timed dispensing, allowing specific water volumes to be programmed.

d) Systems with an integrated dispenser or with a flexible remote arm shall be accepted, provided they allow convenient filling of flasks, elution bottles, mobile phase funnels, etc.

3.4 Control, display, and monitoring

a) Microprocessor-based control with digital panel.

b) Display (ideally LCD or graphic screen) showing, at a minimum:

– Water quality (resistivity/conductivity).

– System operating status (production, recirculation, alarm).

– Basic error or maintenance messages (cartridge change, UV lamp, etc.).

c) Preferred features:

– TOC monitoring and/or display.

– Basic alarm and event logging.

– Data output (RS-232, USB, or similar) for printing or recording, though not mandatory.

3.5 Feed water

The manufacturer shall clearly specify the feed water requirements. As a minimum reference:

a) Feed source: water pretreated by reverse osmosis, deionization, or distillation, according to design.

b) Maximum feed water conductivity: typically < 100 uS/cm.

c) Feed water TOC: <= 50 ppb (or according to the manufacturer's indications).

d) Inlet water operating temperature: approximately 2-30 °C (or equivalent range).

e) Feed pressure: range compatible with the equipment design (for example 0-6 bar or equivalent), with indication of recommended pressure.

3.6 Construction and electrical characteristics

a) Benchtop equipment or wall/support-mounted installation, suitable for laboratory use.

b) Cabinet and construction components of robust design, suitable for a chemical laboratory environment.

c) Power supply: 100-240 V / 50-60 Hz (or equivalent range), with cable and plug compatible with Ecuador's electrical network, according to model.

d) The system shall comply with applicable safety and electrical compatibility standards (e.g., CE, CSA, or equivalent international standards).

4. SEMIMICRO / ANALYTICAL BALANCE WITH 5 DECIMAL PLACES (0,00001g)

4.1. Metrological performance
4.2. Design and construction
4.3. User interface and functions
4.4. Connectivity and documentation
4.5 Environmental and electrical conditions

Technical Specifications

4.1 Metrological performance

a) Balance type: Benchtop semimicro/analytical balance.

b) Maximum capacity: minimum 120 g (equipment with higher capacities will be accepted, provided they maintain the same resolution).

c) Resolution (readability): 0,00001 g (0,01 mg) minimum.

d) Repeatability (standard deviation), limit value: <= 0,02 mg or better, for an appropriate test mass.

e) Linearity (limit value): <= ±0,2 mg or better.

f) Stabilization time: maximum 5 s to stable reading; <= 3 s under normal environmental conditions will be preferred.

g) Adjustment/calibration system:

- Automatic internal adjustment/calibration (by temperature variation and/or time) by means of an internal motorized weight, or equivalent manufacturer's system.
- Possibility of external adjustment/calibration with certified masses (GLP), according to the manufacturer's protocols.

h) The manufacturer shall indicate the recommended minimum weight of use (Minimum Weigh), calculated for a maximum relative error of 1 % (U=1 %, k=2), which shall be <= 10 mg for a readability of 0,01 mg.

i) Manufacturer's certificate of conformity and factory calibration certificate (or equivalent metrological verification certificate).

4.2 Design and construction

a) Robust housing made of metal alloy or equivalent material, designed for use in a chemical laboratory and resistant to common cleaning agents.

b) Draft shield (enclosure) system with at least three glass doors or equivalent material (front and sides), allowing:

- Easy access to the weighing pan.
- Easy cleaning (components removable without tools or with simple tools).

c) Removable weighing pan made of stainless steel or equivalent material, compatible with the use of glass containers and other typical laboratory containers (around 70-80 mm in diameter or side length).

d) Bubble level and adjustable feet accessible from the front or side to facilitate leveling of the equipment.

e) It will be preferred that the balance include additional ergonomic features, such as:

- On-screen leveling guide.
- Design minimizing the influence of air currents and static electricity (e.g., grid-type pans or antistatic solutions).

4.3 User interface and functions

a) Clear digital display, preferably a graphic display or color TFT with backlighting, allowing easy reading of mass and menus.

b) Simple menu navigation suitable for configuring units, tare, basic adjustments, application functions, and print parameters.

c) Minimum required functions:

- Standard weighing and tare.
- Weighing in different units (g, mg, and at least one additional unit).
- Percentage weighing (%).
- Difference calculation (Δ) and formulation weighing (sum of components), or equivalent functions.

d) Availability of built-in methods or applications (e.g., formulation, density, totalization) and the possibility of saving frequent methods will be preferred.

4.4 Connectivity and documentation

a) At a minimum, the balance shall include one of the following communication interfaces:

- RS-232 and/or
- USB (USB-A and/or USB-B) for connection to a printer, PC, or other recording device.

b) The presence of multiple ports (e.g., several USB ports and one LAN port) to facilitate integration with laboratory information systems will be preferred.

c) The equipment shall allow printing or export of results in compliance with GLP/GMP, including at a minimum: weighing value, date and time, balance identification, and, where applicable, sample identification.

d) Compatibility with advanced data management software (e.g., LabX or others) shall be considered a desirable feature, but shall not be required as a minimum specification, in order to optimize equipment cost.

4.5 Environmental and electrical conditions

a) Typical operating conditions:

- Approximate ambient operating temperature: 10-30 °C (or range declared by the manufacturer for proper operation).
- Relative humidity according to the manufacturer's specifications (for example, up to 80 % without condensation).

b) Power supply: 100-240 V, 50/60 Hz (wide range) or fixed voltage (e.g., 115 V / 60 Hz), provided that the appropriate adapter or transformer for Ecuador is included.

c) The equipment shall comply with applicable electrical safety and electromagnetic compatibility standards (e.g., UL, CSA, CE, or equivalent).

5. ZOOM STEREO MICROSCOPE

5.1. Instrument type and optical configuration
5.2. Magnification and zoom
5.3. Working distance and field of view
5.4. Eyepieces
5.5. Illumination
5.6. Mechanics, base, and ergonomics
5.7. Electrical conditions

Technical Specifications

5.1 Instrument type and optical configuration

a) Greenough-type zoom stereo microscope or equivalent optical system, designed for three-dimensional observation of solid and plant samples.

b) Inclined binocular head (approx. 45°), with interpupillary distance adjustment (for example 55-75 mm or equivalent range).

c) Diopter adjustment on at least one eyepiece.

d) Trinocular configurations (additional photo port) shall be accepted as an enhanced option, without being a mandatory requirement.

5.2 Magnification and zoom

a) Continuous zoom system (not stepwise), with a minimum zoom ratio of 1:6,5 (for example 0,7x-4,5x) or higher (for example 0,6x-5,5x).

b) With 10x eyepieces, the equipment shall provide an approximate total magnification range of at least 7x to 45x; higher ranges (for example 6x to 55x), according to the model offered, shall be accepted.

c) The manufacturer shall clearly indicate the minimum and maximum magnification values, as well as the system zoom ratio.

5.3 Working distance and field of view

a) Minimum working distance: 100 mm or greater, at the standard zoom position, to allow comfortable sample manipulation (tweezers, tools, containers).

b) Field of view consistent with wide-field eyepieces (for example >= 20 mm), with the manufacturer indicating the field diameters at minimum and maximum magnification.

c) The system shall provide good depth of field in the usual magnification range (10x-40x), suitable for observation of three-dimensional samples.

5.4 Eyepieces

a) Pair of wide-field 10x eyepieces, with a minimum field of view of 20 mm (for example 10x/20) or equivalent value.

b) Eyepieces with rubber eyecups or comfortable edge design allowing prolonged observation without discomfort.

c) The possibility of using higher-magnification eyepieces (for example 15x or 20x) as optional accessories will be preferred.

5.5 Illumination

a) Incident (upper) LED illumination system for illuminating the sample from above.

b) Transmitted (lower) LED illumination system for observation of semi-transparent samples when necessary.

c) Incident and transmitted illumination power not less than 3 W for each system, or equivalent, ensuring sufficient and homogeneous illumination across the equipment's magnification range.

d) Both illuminations shall be independently intensity-adjustable by accessible controls.

e) The illumination system shall be designed for continuous laboratory use, with long service life (typical of LED technology) and low heat generation on the sample.

5.6 Mechanics, base, and ergonomics

a) Base/stage of suitable dimensions for observation of laboratory samples (tablets, fragments, vials, etc.), with a stable and resistant surface.

b) Stage equipped with:

- Frosted glass plate or equivalent for transmitted illumination.
- White/black opaque plate or equivalent to optimize contrast under incident illumination.
- Sample clips or holding elements, where applicable.

c) Solid support column or arm allowing smooth and precise adjustment of head height while maintaining stability during observation.

d) Combined coarse and fine focus movement or equivalent mechanism allowing precise focusing without abrupt jumps.

e) Ergonomic design minimizing user fatigue during prolonged observations (head inclination, control layout, accessibility of zoom and focus controls).

5.7 Electrical conditions

a) Illumination powered by an adapter/power supply compatible with Ecuador's electrical grid, for example:

- Input: 100-240 V~, 50/60 Hz.
- Output: operating voltage required by the equipment (e.g., 12 V DC), according to the manufacturer's specifications.

6. LABORATORY REFRIGERATOR (>= 250 L, 2-8 °C)

6.1. Type and construction
6.2. Temperature range and control.
6.3. Refrigeration system.
6.4. Alarms and safety
6.5. Internal shelving and load capacity
6.6. Electrical and environmental conditions
6.7. Temperature recording (desirable)

Technical Specifications

6.1 Type and construction

a) Laboratory refrigerator for exclusive use with laboratory materials (non-domestic), vertical configuration.

b) Minimum usable internal volume: 250 L. Equipment with larger volumes (e.g., 250-400 L) shall be accepted, provided that all other specifications are met.

c) Interior chamber made of stainless steel or equivalent material suitable for laboratory use, corrosion-resistant, and easy to clean.

d) Exterior in painted steel or equivalent coating, with adequate thermal insulation.

e) Front side-opening door, with secure closure.

- Solid or glass doors shall be accepted; in the case of a glass door, it shall be double-paneled or equivalent to minimize condensation.

f) Interior lighting system (LED or equivalent) allowing visualization of the contents without the need to leave the door open for extended periods.

6.2 Temperature range and control

a) Working range: +2 °C to +8 °C, user-adjustable.

b) Normal operating temperature: typical setpoint of +4 °C, suitable for preservation of reagents and sensitive samples.

c) Temperature control by electronic digital controller (microprocessor-based or equivalent), with display of the internal temperature.

d) Temperature indication resolution: at least 0,1 °C.

e) Thermal stability and uniformity in the 2-8 °C range consistent with professional mid-range laboratory refrigerators; typically:

- Fluctuation (stability) <= ±1-2 °C.
- Chamber uniformity <= ±2-3 °C. The manufacturer shall declare the achieved stability and uniformity.

6.3 Refrigeration system

a) Forced-air refrigeration system (forced convection or internal fan) or equivalent technology, ensuring homogeneous temperature distribution inside.

b) CFC/HCFC-free refrigeration, with environmentally friendly refrigerants (for example R290 or other equivalents permitted by current regulations).

c) Appropriate defrost system (automatic or semi-automatic) preventing excessive ice accumulation in the evaporator and ensuring easy maintenance.

d) The equipment shall be designed for continuous operation under laboratory conditions.

6.4 Alarms and safety

a) The refrigerator shall include at least the following alarms (visual and/or audible):

- High-temperature and low-temperature alarm, with configurable or predefined trigger points.
- Door-open alarm (after a configurable period or as defined by the manufacturer), if the model allows it.

b) The presence of additional alarms will be preferred, such as:

- Power supply failure.
- Temperature sensor failure.
- Low battery alarm (if the equipment includes a battery for memory or recording).

c) The equipment shall include electrical safety measures in accordance with current standards (e.g., compressor thermal protection, fuses, grounding).

6.5 Internal shelving and load capacity

a) Minimum four (4) shelves or trays (including the base), height-adjustable, made of corrosion-resistant material and suitable for the usual weight of laboratory bottles, flasks, and boxes.

b) The manufacturer shall indicate the maximum recommended load per shelf and the total permissible chamber load.

c) The possibility of installing additional shelves (optional) if future interior reconfiguration is required will be preferred.

6.6 Electrical and environmental conditions

a) Power supply compatible with Ecuador's electrical grid, for example:

- 115 V / 60 Hz (or another standard voltage, provided that the bidder includes the appropriate transformer).

b) Installed power appropriate to the equipment volume and technology (the manufacturer shall indicate maximum power and typical energy consumption).

c) The equipment shall be suitable for operation under the environmental conditions of a laboratory (temperature and humidity) normally used by the manufacturer as the "climatic class" for laboratory refrigerators.

6.7 Temperature recording (desirable)

a) At a minimum, the equipment shall allow continuous reading of the internal temperature on a front digital indicator.

b) It will be preferred that the refrigerator include:

- Integrated electronic data logger or interface (USB, RS-232, Ethernet) for downloading temperature records.
- Port or pass-through for connection of an external probe (thermometer or independent monitoring system).

c) If an integrated recording system is not included, the supplier may offer it as an optional accessory.

7. HEATING AND DRYING OVEN (APPROX. 50 L)

7.1. Type and construction
7.2. Heating and convection system
7.3. Control and display
7.4. Safety
7.5. Interior, trays, and load capacity
7.6. Electrical conditions

Technical Specifications

7.1 Type and construction

a) Benchtop laboratory heating and drying oven, with horizontal internal chamber.

b) Minimum usable internal volume: 50 L (approximate ranges of 50-70 L, according to model, are acceptable).

c) Interior chamber made of stainless steel or equivalent corrosion-resistant material, suitable for use with glassware and containers that may contain chemical residues.

d) Exterior in painted steel or equivalent coating, with thermal insulation minimizing heat loss and excessive surface heating.

e) Front drop-down or side-opening door, with adequate thermal seal ensuring closure and minimizing heat leakage.

f) As an optional feature, a door with a high-temperature-resistant viewing window will be preferred.

7.2 Heating and convection system

a) Electric heating system with air convection in the chamber (natural/gravitational or mechanical/forced), ensuring homogeneous temperature distribution.

b) Minimum operating temperature range:

– From approximately ambient temperature +5 °C up to at least 250 °C.

– It will be preferred that the equipment be capable of reaching higher temperatures (e.g., up to 280-300 °C).

c) Temperature stability and uniformity consistent with modern laboratory ovens within their operating range; typically:

– Stability: ±1-2 °C or better.

– Chamber uniformity: ±5 °C or better (better uniformity preferred).

d) The manufacturer shall officially declare the oven's temperature stability and uniformity, according to standards or in-house tests.

7.3 Control and display

a) Temperature control by digital electronic temperature controller (PID or equivalent), with simple setpoint adjustment.

b) Digital display showing, at a minimum:

– Programmed temperature (setpoint).

– Current chamber temperature.

c) Temperature setting resolution: at least 1 °C.

d) The presence of an integrated timer for programming heating times and temperature holding periods will be preferred.

7.4 Safety

a) Independent adjustable safety thermostat or limiter protecting against overtemperature (heating cut-off when a threshold is exceeded).

b) Adequate protection of resistive and electrical elements, in accordance with electrical safety standards for laboratory equipment.

c) Visual and/or audible indication of operation and overtemperature alarm.

d) The equipment shall comply with applicable electrical safety and marking standards (for example CE, UL, or equivalent).

7.5 Interior, trays, and load capacity

a) Internal chamber with smooth surfaces or rounded corners facilitating cleaning.

b) Minimum two (2) perforated trays/racks or equivalent, height-adjustable, made of stainless steel or material suitable for high temperatures.

c) Load capacity appropriate to the oven volume (the manufacturer shall indicate the maximum load per tray and total load).

d) The existence of multiple guide positions allowing the trays to be placed at different heights to optimize drying space will be preferred.

7.6 Electrical conditions

a) Power supply compatible with Ecuador's electrical grid, for example:

– 110-120 V / 60 Hz (or another declared standard voltage, provided that the bidder includes the appropriate transformer).

b) Installed power appropriate to the volume and temperature range (the manufacturer shall indicate the maximum power).

8. HOTPLATE STIRRER

8.1. Capacity, plate, and construction
8.2. Temperature range and control
8.3. Stirring
8.4. User interface and safety
8.5. Electrical and environmental conditions

Technical Specifications

8.1 Capacity, plate, and construction

a) Stirring capacity in water (H2O): minimum 5 L; a capacity of 10 L or greater will be preferred.

b) Heating plate made of ceramic or equivalent ceramic material, chemically resistant and easy to clean.

c) Plate dimensions approximately 7" x 7" (≈ 178-180 mm x 178-180 mm) or similar.

d) Housing with a design resistant to chemicals commonly used in laboratories and that remains at a touch-safe temperature during normal operation.

e) Compact weight and dimensions, suitable for use on laboratory benches (typical weight between 2,5-4 kg).

8.2 Temperature range and control

a) Plate temperature range: from approximately ambient temperature +5 °C up to at least 300 °C. Equipment reaching higher temperatures shall be accepted, provided that all other specifications are met.

b) Digital temperature control, with minimum setting resolution of 1 °C.

c) Connection for external temperature probe (Pt100, Pt1000, or equivalent), allowing measurement/control of the medium temperature in the vessel.

d) It will be preferred that the equipment allow sample temperature regulation with accuracy better than or equal to ±1-2 °C in the typical working range (up to around 100 °C) when using the external probe.

8.3 Stirring

a) Magnetic stirring system with brushless motor or equivalent, designed for continuous operation.

b) Stirring speed range:

- Minimum speed <= 100 rpm.
- Maximum speed >= 1,500 rpm.

c) Electronic/digital speed control, with fine adjustment and clear reading of the selected speed.

d) The system shall ensure stable and uniform stirring throughout the range, with the ability to maintain stirring up to the nominal capacity offered without significant loss of synchrony.

8.4 User interface and safety

a) Digital display (LCD or equivalent) showing at least:

- Programmed and/or actual plate temperature.
- Stirring speed.

b) Clear status indicators, including:

- Active heating indicator.
- Active stirring indicator.
- Hot plate warning ("hot top") when the surface remains at elevated temperature, even after heating has been switched off.

c) Protection systems and alarms, such as:

- Overtemperature protection (heating safety shutoff).
- Audible/visual alarms in the event of sensor failure or out-of-range temperature (desirable).

d) Non-slip base and stable design to prevent accidental tipping during stirring.

8.5 Electrical and environmental conditions

a) Power supply suitable for Ecuador's electrical grid, for example:

- 115 V / 60 Hz (or other voltage, provided that the appropriate transformer/cable is included).

b) Maximum input power appropriate to the temperature range (typically >= 500-800 W).

c) Splash protection rating suitable for laboratory use (for example IP21 or equivalent).

d) Safe operation in a laboratory environment (approx. 5-40 °C, up to 80 % RH, non-condensing).

9. BENCH PH METER / POTENTIOMETER (HIGH PRECISION)

9.1. pH measurement
9.2. Redox potential (ORP) measurement
9.3. Temperature measurement and compensation
9.4. pH electrode
9.5. Benchtop unit and user interface
9.6. Memory, GLP, and data management
9.7. Connectivity
9.8. Electrical and construction conditions

Technical Specifications

9.1 pH measurement

a) pH measurement range: at least 0,00 to 14,00 pH.

b) pH resolution: user-selectable, with options of 0,1 / 0,01 / 0,001 pH, with 0,001 pH as the maximum resolution.

c) pH accuracy (instrument): <= ±0,002 pH or better, within the working range specified by the manufacturer.

d) pH calibration:

- Multi-point calibration capability, minimum 5 calibration points, with automatic recognition of standard buffers (NIST, DIN, or other groups according to the manufacturer).
- Display of electrode slope (%) and offset after calibration, with warnings when values are outside acceptable ranges.
- Storage of the last calibration data (date, time, buffers used, slope).

e) Automatic temperature compensation (ATC) throughout the working range when the corresponding temperature sensor is used.

9.2 Redox potential (ORP) measurement

a) mV measurement range: at least -2000 mV to +2000 mV or equivalent range.

b) mV resolution: minimum 0,1 mV.

c) mV accuracy: consistent with professional-grade laboratory equipment (for example ±0,2-0,5 mV or better).

d) Shall allow the use of standard ORP electrodes (BNC connector or equivalent according to the manufacturer's design).

9.3 Temperature measurement and compensation

a) Temperature measurement range: at least 0 to 100 °C (wider ranges, e.g., -5 to 130 °C, according to model, shall be accepted).

b) Resolution: minimum 0,1 °C.

c) Accuracy: better than or equal to ±0,3 °C, or according to the manufacturer's specifications for professional-grade equipment.

d) Shall include automatic temperature compensation (ATC) by means of a Pt100, Pt1000, or NTC sensor (integrated or external), and manual temperature compensation (MTC) option.

9.4 pH electrode

a) Combined glass pH electrode, suitable for general laboratory use, with:

- pH range compatible with 0-14 pH.
- Temperature range consistent with that of the instrument (minimum 0-80 °C or greater, according to manufacturer).

b) The electrode shall be suitable for buffer solutions and mobile phases typical of chromatography, including aqueous solutions with moderate organic solvent content (for example methanol, acetonitrile) and buffer salts (phosphates, acetates, etc.), according to the manufacturer's recommendations.

c) Appropriate connection to the instrument (for example BNC for pH and separate or combined connector for temperature).

d) It will be preferred that the electrode be low-maintenance (for example gel-filled or prefilled), or, if refillable, that the refill solutions and their frequency be clearly indicated.

9.5 Benchtop unit and user interface

a) Single-channel benchtop instrument designed for laboratory use.

b) Digital display of sufficient size for clear reading (LCD or TFT), showing at a minimum:

- Measured value (pH or mV).
- Sample temperature.
- Calibration status (electrode condition icon/indicator).
- Measurement stability indicators.

c) The presence of a color and/or touch screen will be preferred, although it shall not be a mandatory requirement in order to optimize cost.

d) Intuitive menus, preferably with Spanish language available.

e) Minimum functions:

- Continuous reading and HOLD function.
- Selection of the number of pH decimals (0,1 / 0,01 / 0,001).
- Adjustment of calibration parameters (buffer types, number of points, acceptance criteria).
- Date and time records (internal clock).

9.6 Memory, GLP, and data management

a) Internal memory for storage of at least 500 results (measurements), including at a minimum: value, unit, date, time, and temperature.

b) Storage of calibration data (date/time, buffers, slope, and offset).

c) It will be preferred that the equipment include basic GLP functions, for example: instrument identification, user log, or other relevant data.

d) The presence of configurable periodic calibration reminders will be preferred.

9.7 Connectivity

a) The equipment shall include at least one communication interface, for example:

- USB (host and/or device), and/or
- RS-232, for data transfer to PC or printer.

b) It will be preferred that the manufacturer offer data management software (for PC).

9.8 Electrical and construction conditions

a) Power supply by means of an adapter compatible with Ecuador's electrical grid (for example 100-240 V~, 50/60 Hz, with output suitable for the instrument).

b) Power consumption appropriate to a benchtop instrument of this type (typically < 30 W).

c) Minimum splash protection rating IP54 or equivalent, suitable for a laboratory environment.

d) Housing materials resistant to common laboratory cleaning agents (isopropyl alcohol, mild detergents, etc.).