



TECHNICAL REQUIREMENTS AND SPECIFICATIONS

MARCHÉ PUBLIC DE FOURNITURES COURANTES ET DE SERVICES

**Acquisition, livraison, installation et mise en service
d'un système d'exposition in vitro de cultures
cellulaires en interface air-liquide (ALI) pour aérosols
et fumées**

Université de Reims Champagne-Ardenne
2 avenue Robert Schuman
51100 Reims

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TECHNICAL REQUIREMENTS AND SPECIFICATIONS - 2026PAEUF009

Technical Specifications for an *In Vitro* Air-Liquid Interface (ALI) Cell Exposure System for Aerosols and Smoke

1. Scope of the procurement

The purpose of this procurement is the supply, installation, and commissioning of an Air-Liquid Interface (ALI) cell exposure system intended primarily for the study of the toxicity of aerosols generated from vaping products and combustion-derived smoke.

The system shall enable reproducible exposure of cell cultures under controlled experimental conditions.

Proposed solutions may consist of dedicated inhalation exposure platforms or modular cell culture systems, provided that they meet the functional requirements described below.

2. Functional Requirements

2.1 Aerosol Generation and Delivery

The system shall allow:

- generation of aerosols from vaping devices, combustion products (cigarettes), and/or other airborne particle sources;
- controlled puff generation with reproducible puff profiles;
- implementation of recognized standards (ISO and/or Health Canada protocols, or equivalent);
- generation of variable puff profiles, including non-linear profiles (e.g., square puff profile or equivalent functionality);

- adaptation to different types of aerosol generators (cigarettes, electronic devices, gas cartridges, etc., or equivalent systems).

2.2 Cell Exposure Module

The system shall allow:

- exposure of Air-Liquid Interface (ALI) cell cultures;
- simultaneous use of at least seven cell culture inserts with a diameter of 12 mm (or equivalent functional configuration);
- compatibility with both 12-well and 24-well insert formats through appropriate adapters;
- homogeneous exposure conditions across all inserts;
- a modular architecture allowing future system expansion;
- minimization of adsorption of aerosol constituents on materials in contact with the aerosol stream;
- exposure of the cellular surface to aerosols as directly as possible.

2.3 Cell Culture Medium Management

Depending on the configuration, the system shall provide:

- static culture medium supply;
- the possibility of intermittent and/or continuous medium renewal;
- maintenance of physiological cell culture conditions during exposure.

The bidder shall specify the available operating modes and any optional components required.

2.4 Flow Control and Exposure Conditions

The system shall include or be compatible with:

- precise gas flow regulation;
- mass flow controllers;
- aerosol dilution systems;
- flow calibration devices;
- a vacuum pump suitable for the intended experimental conditions.

2.5 Deposited Dose Measurement

The system shall enable quantification of the deposited dose on cell cultures through:

- a real-time measurement device based on quartz crystal microbalance (QCM) technology or an equivalent approach;
- an associated data acquisition and analysis system.

2.6 Quality Control and Metrology

The system shall include or allow:

- verification of generated puff volumes;
- leak testing of pneumatic circuits;
- flow calibration;
- the tools required for qualification and verification of experimental performance.

2.7 Experimental Environment

The system shall provide or be compatible with:

- gas stream humidification;
- temperature control of experimental conditions (thermostatic water bath or equivalent device);
- support structures required for exposure modules;
- materials suitable for inhalation toxicology applications, facilitating cleaning, decontamination and, where applicable, sterilization by autoclaving of removable components.

3. Software

The system shall be supplied with:

- control and data acquisition software;
- interfaces for management of experimental parameters;
- data export functions in standard formats (CSV or equivalent).

4. Installation and Training

The supplier shall provide:

- delivery and on-site installation;
- complete system commissioning;
- user training.

5. Warranty and Support

The system shall include a minimum twelve (12)-month warranty period from the date of final acceptance including:

- remote technical assistance;
- user support;
- access to software updates;
- troubleshooting and diagnostic assistance.

6. Documentation

The supplier shall provide documentation in either English or French, including:

- user manuals;
- technical documentation;
- maintenance procedures;
- connection and installation diagrams;
- certificates of conformity;
- preventive maintenance recommendations.

7. Expected Content of the Proposal

The bidder shall provide:

- a detailed quotation;
- technical datasheets for all proposed equipment;
- a description of the system architecture;
- delivery and installation lead times;

- warranty and maintenance terms and conditions.

8. Complete System Proposal

The proposal shall cover a complete, integrated and fully operational solution meeting all the requirements defined in these Technical Specifications.

All proposed equipment shall constitute a single integrated system whose different modules are fully compatible and interoperable, both in terms of hardware and software.

The system components shall be designed to operate together and shall support harmonized procedures for cleaning, decontamination and maintenance, while ensuring the reproducibility of experimental conditions.

Proposals covering only part of the requested equipment or including components that do not constitute a complete and fully integrated system meeting the requirements of these Technical Specifications will not be considered.