EQUIPMENT SPECIFICATIONS

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« TECHNICAL SPECIFICATIONS FOR THE PURCHASE, DELIVERY, AND INSTALLATION OF AN AEROSOL SPECTROMETER AT THE CEA GRENOBLE »

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I. Introduction

I.1 Overview of this document

This document is aimed to define conditions and requirements related to the delivery of a table top aerosol spectrometer for the account of the CEA. The evaluation of the proposal will be done on the technical level, safety level (EU regulation).

I.2 Equipment Localization

The equipment must be delivered in the site of CEA Grenoble. The delivery address is:

Pièce A149, Ground Floor
Building 42
CEA de Grenoble
17 avenue des martyrs,
38054 Grenoble cedex 9

I.3 Specificity of the Working place

The equipment will be installed in a laboratory room Temp [18-25]°C, Hr [30-70]%

I.4 Delivery

The delivery should occur 4 months after the release of the PO by CEA

All crates must include tilt and shock indicators.

The delivery should be made in accordance with Article 5 of the “Projet de marché”.

I.5 Installation

CEA will establish, in collaboration with the supplier and his subcontractors, the global safety plan for the installation and the start of the equipment.

The supplier and his subcontractors should supply the safety material necessary to avoid the specific risks generated by their intervention (Personal Protective Equipment)

All delivered equipment must bear the purchase order reference as well as the recipient's name:

GUILLAUME BLAIRE

Packaging, delivery, and any potential customs clearance fees shall be included in the offer.

The supplier undertakes, under the terms of the contract, to handle the transport and installation of the system, as well as the provision of suitable accessories for the installation, start-up, and calibration of this equipment.

II. Customer – Service Provider Interface

Contact for further technical information:

Mr Guillaume BLAIRE
Tel: +33 (0)4 38 78 25 50
email: guillaume.blaire@cea.fr

III. Confidentiality

The supplier commits to keep confidential all information and/or knowledges of the CEA related to the use of such equipment.

IV. Technical specifications of the equipment

IV.1 Aerosol Spectrometer Requirements for Bioaerosol Characterization

The LSMB laboratory routinely employs aerosol spectrometers, such as Optical Particle Counters (OPCs), to characterize airborne particles in its test chambers. These instruments provide particle size distribution and concentration data for particles spanning 10 nm to 50 µm, encompassing nanoparticles to coarse aerosols.

While OPCs rely on laser light scattering, their accuracy is compromised for bioaerosols due to inherent assumptions:

- Spherical particle shape.
- Fixed refractive index.

These limitations lead to size misclassification, distorting the interpretation of bioaerosol behavior. To overcome this, LSMB seeks to enhance its instrumentation with **an aerodynamic diameter-based aerosol spectrometer**, as aerodynamic diameter better reflects the real-world behavior of non-spherical bioaerosols in airflow.

The instrument must be capable of **measuring aerodynamic diameter across the 0.5–10 µm range**.

IV.2 Technical specifications

The proposed equipment must meet the following minimum technical specifications:

Parameter	Value	Remarks
Size Range	**0.5–10 µm**	**Aerodynamic diameter**
Resolution	32 channels per decade	
Sampling Flow Rate	[1–5] L/min	Fixed flow rate
Accuraty	**± 10%**	**on particle diameter**
Sensitivity	< 1 particle/cm³	
Response time	< 1 minute	
Power supply	220 V- 50Hz	
Weight	< 20 kg	
Dimension	< 50 × 50 × 15 cm	
Temperature	15 °C to +40 °C	
Relative Humidity	0–95% (non-condensing)	
Connectivity	USB or RS232	

IV.3 Computer material-Software

The CEA will provide the computer used to control the selected spectrometer.

To enable the CEA to identify the appropriate computer, the contractor must provide the computer's specifications upon notification of the contract award.

The spectrometer must be supplied with an acquisition software allowing users to view spectra and the temporal evolution of particle counts, and to export this data to CSV or XLS files

The contractor must:

- provide the CEA with all software modifications necessary for the proper functioning of the equipment (upgrades, new versions, bug fixes, etc.)
- install them free of charge during the warranty period
- specify the procedures for updating the software after the warranty period

IV.4 Start-up time

The start-up time must be less than 15 minutes (including initialization).

V. MAINTAINABILITY

V.1 Maintenance Operations

The supplier shall provide comprehensive maintenance recommendations for the equipment.

- Ease of cleaning will be a key evaluation criterion.
- Consumables required for proper operation must be standardized and readily available. A detailed list shall be provided.
- First-level maintenance must be user-performable with minimal tools and maximum simplicity.

V.2 Maintainability Commitments

The supplier must confirm its ability to provide the following long-term maintainability:

- Preventive and corrective maintenance for the supplied equipment beyond the warranty period, for **a minimum of 10 years**.
- At the end of the warranty period, CEA Grenoble shall have the option to subscribe to a maintenance contract under a separate procurement agreement.

VI. Safety, EU and French regulation compliancy

As explained in the general information section, security is key for the selection of the equipment manufacturer. On the proposal, the supplier shall explain how the plan to address the safety aspect of the equipment and its compliancy to EU and French regulations.

1. The equipment including its safety enclosure must comply with the laws and regulations into force at the time of the delivery in Europe and France.
2. Especially, the equipment must fulfil the European Union (EU) and French safety regulations. Among them a non-exhaustive list is given here after
   - Electromagnetic Compatibility 2004/108/EC and 2004/40/EC
   - “RoHS2” 2011/65/CE Restriction of the use of certain Hazardous substances in electrical and electronic equipment,
   - Directive “Low tension” 2006/95/CE,
   - Low tension wiring will be compliant with NF C 15-100 regulation and implementing legislation
   - The conception, implementation and labeling of lasers should be in accordance with the standard EN 60825. The lasers should have the CE marking
3. To achieve this goal, CEA requests that the manufacturer proceed to the analysis by a CE advisor (such as VERITAS – APAVE, …) of a standard equipment in order to list all mismatches with CE regulations. This analysis will be paid by the equipment manufacturer.
4. At the Customer Site acceptance, the CE compliancy of the equipment must be validated by the CE advisor. This final review will be paid by CEA. The report must be free from any mismatched with the EU (European Union) and French regulations. In case of mismatch, the supplier of equipment must perform the modification of the equipment without any compensation from the CEA.
5. Commitment of the supplier to store in Europe based company all CE documents, the risk analysis and the contingency plan. The proposal must include the company name, address, contact name, telephone number, email. The absence, incorrect or partial information will automatically reject the proposal.
6. An CE certificate, edited and signed by the equipment manufacturer, must be available at the acceptances of the equipment.

7. An CE label attesting that the equipment fulfils the regulations must be fixed on the equipment.

8. The supplier will explain on the equipment documentation all appropriate individual and collective protections which are useful especially those related to mechanical and electrical risk.

VII. Documentation

One set of the manual will be supplied. The document will be written on clean room compatible paper and will contain the following chapter:

- Safety instructions during operations with special focus on servicing in **French**
- Instructions and operating manual. It will describe how to program and setup the equipment.
- Maintenance manual it will include:
  - The method to adjust the equipment parameters and the mechanical parts.
  - A back-up copy of the software which enable to reload the PLC configuration in case of failure.
  - Adjustment procedures, mechanical, electrical.
  - Maintenance procedures, including preventive maintenance planning and the description of operations, with the relevant spare parts needed (reference and price).
  - Troubleshooting procedures based on experience on similar equipment.

An CE certificate, edited and signed by the equipment manufacturer.

VIII. Acceptance conditions

The Customer Acceptance is pronounced at CEA in the presence of the technical representatives of CEA

Criteria of the Customer Acceptance pronouncement

- Analysis review of the CE compliancy. No mismatch with the CE regulation is authorized
- Measurement of an aerosol containing latex microparticle and NaCl particles. Latex particles has to be identified in the measurement data.

At the issue of the Customer Acceptance, a report will be signed:

A report will be signed by the CEA and the supplier.

IX. Training at the CEA laboratory

Upon completion of the installation, the supplier agrees to provide initial training and first-level maintenance for the staff who will be using the equipment (3 to 5 people; duration to be specified by the supplier).

This training must cover:

- The theoretical aspects necessary for a thorough understanding of the equipment.
- The use of the software.
- First-level maintenance that users can perform independently.

The supplier will provide a list and description of the first-level maintenance tasks to be performed on the equipment

X. Warranty

Notwithstanding the legal warranty, the equipment is warranted **2 years** against defective materials, manufacture, assembly and operation, in accordance with the technical specifications, from the date of provisional acceptance.

This warranty covers parts (excluding consumables), labour, transport and travel.

During the warranty period, the supplier undertakes to intervene for repair within 72 hours (in case of line down) after receiving a fax or an email of request for assistance from the CEA.

During the warranty period, the supplier undertakes to answer to question within 24 hours after receiving a fax or an email of request for assistance from the CEA.

In case of the unavailability, the warranty period is extended by a period equivalent to the downtime of equipment.

XI. ENVIRONMENTAL CLAUSE

The supplier may propose equipment of the following types to CEA Grenoble:

- A used model,
- A demonstration model, or
- A refurbished model.

The proposed equipment must fully comply with the technical specifications of this document and deliver performance equivalent to that of new equipment.

XII. Spare parts

All the components or equivalent parts must be available on the market for at least **10 years** after the end warranty period.