



SPECIFICATION - Aerosol Exposure Air-Liquid Interface (AE-ALI) cell culture exposure system

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1. Introduction

The UK Health Security Agency (UKHSA) is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. UKHSA was formed in April 2021.

2. Background

To satisfy the increasing demand for “realistic” *in vitro* toxicological assessment of the hazards posed by airborne pollutants such as nanoparticles, transport-exhaust related materials, e-cigarette vapours and microplastics, UKHSA requires an Aerosol Exposure Air-Liquid Interface (AE-ALI) cell culture exposure system to allow the direct exposure of lung relevant cell cultures to aerosols and gases at the air liquid interface.

The use of advanced aerosol exposure air liquid interface exposure systems (AE-ALI) allows for direct aerosol deposition onto human relevant cell cultures and co-cultures, which is much more physiologically relevant than standard approaches, negates problems with particle modification when added to cell culture medium and is in line with the principle of the 3Rs, to replace, reduce and refine animal use in toxicity studies.

3. Scope of the Contract

UKHSA is looking to purchase a new system (or systems), to increase our capacity for the number of well which can be exposed simultaneously (our current system has 3 wells) to a wide range of particles and gases. This will increase our capacity and resilience and enable us to seek additional collaborative and funding opportunities.

4. Detailed Requirements

To exposure lung relevant cell cultures at the air liquid interface (ALI) to airborne pollutants (e.g. nanoparticle aerosols), the Experimental Toxicology Group at UK HAS's RCE currently has a CULTEX RFS which has the capacity to exposure 3 x 6.5 mm, 12 mm or 24 mm cell culture inserts simultaneously to the same “pollutant”. We need to expand our capacity to exposure more cell culture inserts simultaneously, either to the same or a different aerosol e.g. a different dose, control, or potentially even a different material. More specifically we require the ability to exposure at least 6 individual cell culture inserts at once, either to the same aerosol or two different aerosols (e.g. 3 inserts exposed to one aerosol and 3 inserts simultaneously exposed to a different aerosol). Please note the 6 insert requirement could be in part met with our current 3 well CULTEX RFS if the deposited dose and pattern were guaranteed to be the same. It would be a bonus if more than 6 inserts could be exposed simultaneously, again potentially utilising our current CULTEX system.

The system purchased must be compatible with a wide range of potential airborne “pollutants”, including solid aerosol particles from nano- to micron-sized, high aspect ratio particles (e.g. CNT), vapours (e.g. from e-cigarettes), bioaerosols and gases.

As a lot of our work involves nanosized particles we require the ability to enhance deposition, e.g. with electrostatic precipitation, on all the wells.

The ability to monitor dose is also necessary. Collection of a deposited sample for offline measurement is acceptable but real-time dose monitoring would be advantageous. A further bonus would be if dose monitoring did not take up one of the 6 exposure wells. If both real-time dose monitoring (e.g. using a QCM) and deposition enhancement using electrostatic precipitation are available, the supplier must give details of whether they are able to be used at the same time.

The system must be able to be used with Corning transwell inserts and Falcon inserts of both 6.5mm and 12mm diameters. It would also be nice if 24 mm inserts could be used. Due to the current difficulties in purchasing cell culture inserts if a wider range of insert brands could be used or adapters be easily sourced for different cell culture insert brands (e.g. cellQART) it would be most advantageous.

The system purchased must include equipment to control the flow of the aerosol through the system. Aerosol generation and sampling equipment is NOT required.

The system must allow for the direct aerosol deposition onto human relevant cell cultures and co-cultures. The Supplier shall provide with its tender the site requirements that are necessary for successful delivery and, if applicable, installation.

Maintenance: The Supplier shall advise the relevant maintenance requirements and whether a maintenance contract is available or call out repairs. Maintenance costs (if applicable) will be billed as and when they occur and the Authority may choose to take out a maintenance contract or pay for repairs and call outs as and when they occur. The Supplier shall provide pricing for both options.

The Supplier shall state the typical lifetime expectancy of the machine with its tender response.

Security and safety (site visits): Supplier staff will be required to comply with UKHSA security and safety policies and procedures when visiting the site. The Authority shall (where

relevant) provide policies, site guidelines/instructions in advance of the Supplier attending the site.

The Authority reserves the right to remove immediately from the site any Supplier staff who do not conform to the reasonable instructions, policies, rules and regulations of the Authority.

Warranty: Minimum of one year. The Supplier shall specify warranty exclusions.

Delivery of the equipment system must be before the 31st March 2023 at the latest.

Delivery, Assembly and Installation: The Supplier shall deliver, the equipment to UKHSA, Radiation, Chemical and Environmental Hazards Directorate, Harwell Campus, Chilton, Didcot, OX11 0RQ, UK. The Supplier shall specify its installation and commissioning process and the supporting paperwork that it will supply. The Supplier and the Authority must be able to sign off the installation acceptance.

Sustainability: Supplier to indicate typical energy consumption of the equipment as well as details relating to the recycling of parts, disposal of waste and actions the supplier has taken to minimise emissions related to the manufacturing of the equipment.

5. Service Levels and Key Performance Indicators (KPIs)

Delivery before 31 March 2022: KPI: 100% If the supplier does not deliver prior to 31 March 2022 the Authority reserves the right to cancel the contract.

Performance of Equipment: No instance of breakdown during first year: KPI: 100%

6. Delivery, Assembly, Installation

The site address for delivery, assembly and installation (if applicable) is UKHSA, Radiation, Chemical and Environmental Hazards Directorate, Harwell Campus, Chilton, Didcot, OX11 0RQ, UK.

Where commercial post or couriers service are used, the Supplier will be expected to provide proof of transit if required.

7. Sustainability

UKHSA fully supports the UK Government's commitment to sustainable procurement. Contracted Suppliers are expected to support the Authority achieve its goals to continuously improve its environmental and sustainability performance. This is to meet statutory requirements, reduce energy use and carbon dioxide emission levels and achieve effective management of water, waste and transport.

The Supplier shall detail typical running costs for the equipment in its tender response (e.g. Kw/h electricity consumption).

8. Pricing and Contract Period

Prices submitted within the tender shall be valid for a minimum of 90 days for UKHSA acceptance from date of tender submission. Upon entry into a contract with UKHSA, the pricing submitted by the successful supplier shall be valid for the duration of the Contract Term and any potential extension options stated within the contract.

The contract period will depend on the software licence and maintenance options chosen. However the period will be for a minimum of one year.

The Authority shall have the option to extend the contract period by up to five times on each occasion by up to 12 months.

9. Terms and Conditions

Terms and conditions shall be in accordance with the UKHSA Short Form Contract.