Advanced in vitro exposure systems









Aerosol Sampling System

VITROCELL® SYSTEMS

VITROCELL® Aerosol Sampling System

Controlled aerosol sampling and delivery to Analyzers



To investigate the effects of aerosols on human cell cultures, accurate knowledge of the test aerosol composition is essential in addition to exposure at the Air-Liquid Interface (ALI). Ideally, this involves a comprehensive characterization of the aerosol's chemical and physical properties. Various analytical instruments are used for this purpose, each with specific sampling requirements.

Representative Aerosol Samples

The VITROCELL® Aerosol Sampling System has been specifically designed to obtain a reproducible and representative aerosol sample from a test environment and distribute it to multiple analytical instruments. This ensures that all measurement systems receive a comparable and meaningful sample for reliable analysis.

Sampling at the Source

An integrated pump enables direct sampling from the environment or any aerosol source and transfers the aerosol into the stainless steel sampling system. The sampling flow rate is configured via the control software and precisely regulated by a mass flow controller. Sensors at the inlet continuously monitor key parameters such as temperature, humidity, and pressure.



Isolated stainless steel tubing of the aerosol sampling system with different sampling and measuring ports.

Isokinetic Sampling

Sub-samples for individual analytical instruments are taken from the main sampling stream. Where required, these are provided through application-specific isokinetic sampling arrangements (e.g., according to Baron & Willeke, Hinds, or VDI 2066 guidelines).

This ensures that each instrument receives the test aerosol under optimal conditions for its respective analytical method. In applications with variable flow rates, the isokinetic sampling conditions can be adjusted dynamically.

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Real-Time Monitoring & Safety

Key aerosol process parameters, including flow rate, temperature, humidity, and pressure, are recorded in real time and visualized through the control software. Changes in inlet conditions can provide early indications of deviations, allowing users to inspect and adjust the aerosol source if necessary. In addition, user-defined alarm limits can automatically stop the sampling process to protect sensitive analytical equipment from potential damage.

Particle Fractionation

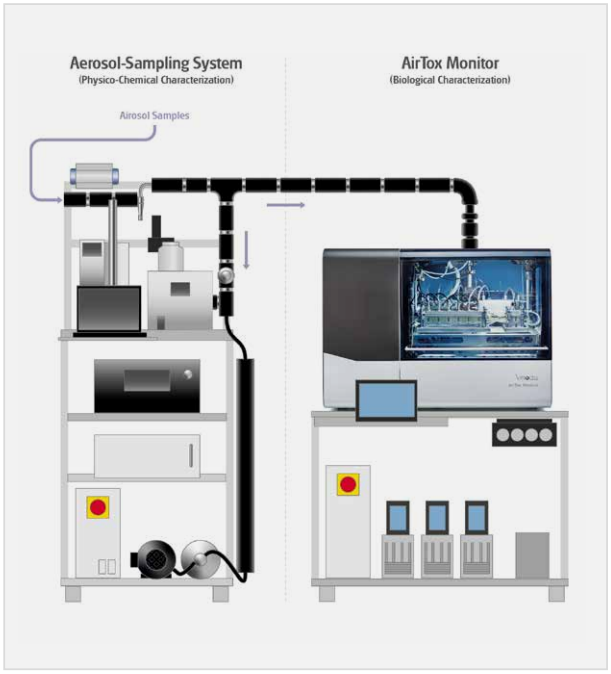
For aerosol fractionation, the system can optionally be equipped with an impactor or cyclone separator. Standard configurations are available for PM10 and PM2.5 size fractions.



HMI for the software-controlled operation of the aerosol sampling system.

Customized Solutions

Customized solutions, such as integrated purge air supply, calibration gas injection, or software-controlled sampling sequences, can be individually developed and seamlessly integrated into the system's control software.



Application example of aerosol sampling system in combination with automated exposure system AirTox Monitor.

Key Features

- Automated sampling directly at the source
- Reproducible sample distribution to all analytical instruments
- Software-controlled operation and process monitoring
- Integrated safety routines
- Stainless steel aerosol pathway
- Aerosol fractionation capability
- Easy assembly and disassembly

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About VITROCELL®

VITROCELL® exclusively concentrates on the developing, producing, installing, training and servicing of advanced *in vitro* exposure systems.

The VITROCELL® Systems' team is driven by their vision for new in-vitro standards through state-of-the-art technology, highly qualified workmanship and absolute client dedication. VITROCELL® has successfully collaborated with clients from leading research institutes, contract research organizations, regulatory authorities or industrial laboratories across the world. Working with our team experts, all modules have been tailored to create durable and complete turnkey-systems for *in vitro* inhalation toxicology. Gases, environmental atmospheres, nano particles and complex mixtures are analyzed on lung cells at the air/liquid interface using these systems. VITROCELL® technologies are also applicable to solutions for skin research.

Over a decade of devotion to research in this specific field has given our team of design & precision manufacturing specialists the opportunity to mentor highly diversified and complex projects from conception to completion. We strive to become a constructive member of each research team, providing support when it is needed, advice when it is required and modules of the highest quality, which are even polished by hand before leaving here to be integrated into your workspace. Every piece of our German engineered equipment is manufactured to the highest of standards – yours.

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