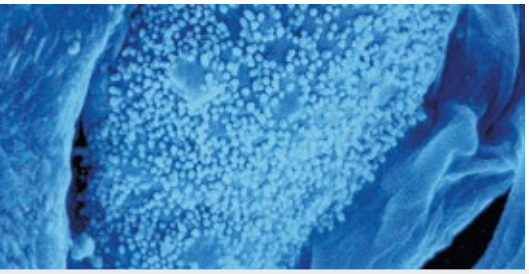
Advanced in vitro exposure systems

VITROCELL® Automated Exposure Station



VITROCELL® SYSTEMS

Automated Test System

- **for 6, 12 and 24-well sized cell culture inserts as well as Petri dishes**

VITROCELL® Automated Exposure Station

User friendly solution with high tech features

The VITROCELL® Automated Exposure Station has been specifically designed and engineered to facilitate the research of mammalian cell cultures in direct exposure to airborne substances such as gases, complex mixtures, nanoparticles and fibers. The system authentically simulates the conditions of human physiological exposure.

It offers a capacity of up to 21-cell culture compartments for exposure and 3 compartments for clean air control.

All key functions for successful exposure such as, aerosol flow rates, humidity, temperature and leak test are edited by touch-screen prior to the experiment. The respective data is shown on live graphs and stored for further analysis. The cells are exposed at the air/liquid interface on 6/12/24-well sized cell culture inserts.

The isokinetic sampling system enables a uniform delivery of the test substance to the cells. High voltage charging increases deposition efficiency.

Post-exposure the cells are further processed to measure a wide range of endpoints, e.g. cytotoxicity, genotoxicity, proliferation, cellular and oxidative stress as well as inflammation.
See also the VITROCELL® assay guide for further information.

Features

- Direct aerosol sampling
- Automated process
- Temperature Controlled System
- Integrated humidification of aerosol
- Aerosol flow control by mass flow controllers
- Touch-screen display
- Central data management system
- Online dose measurement
- Electrostatic deposition enhancement
- Integrated vacuum pump

Developed for NanoMILE program

Engineered nanomaterial mechanisms of interactions with living systems and the environment: a universal framework for safe nanotechnology

Automated Exposure Station with 1 VITROCELL® 6/3 CF and 2 x VITROCELL® 6/4 CF modules

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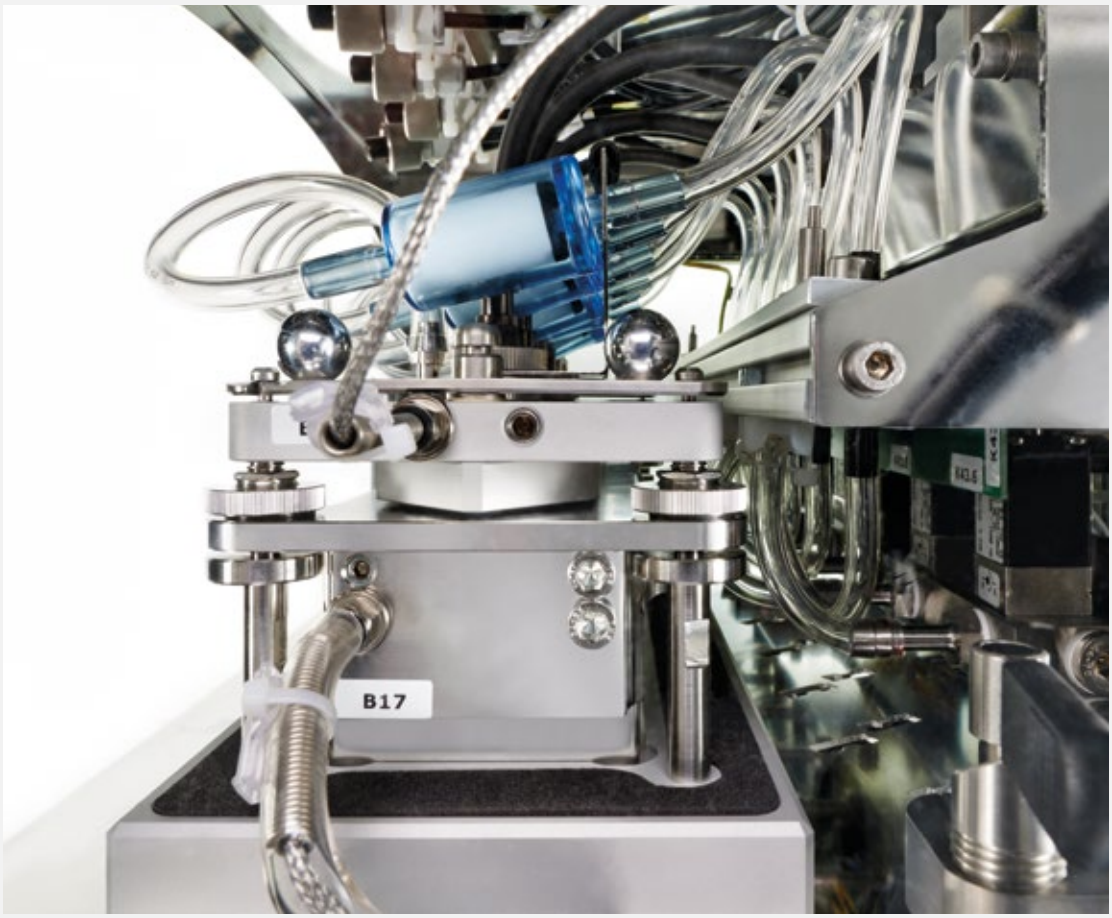

VITROCELL® 6/6 CF modules

Automated Exposure Station
with 4 VITROCELL® 6/6 CF modules
for highest exposure capacities

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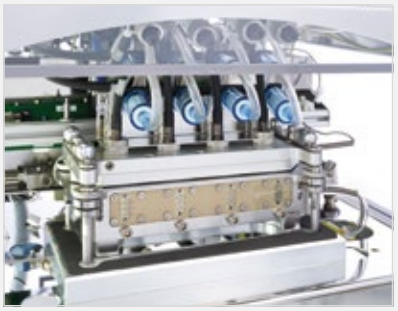
Inlet with particle separation

Larger particles than 2.5 µm are separated. Temperature, humidification and aerosol flow rates are monitored.

Exposure modules

The base module accepts up to 6-cell culture inserts. Each cell culture compartment has an independent medium reservoir. A transparent control window facilitates the external monitoring of media levels.
The temperature is controlled by means of a central heating system; therefore an additional incubator is not required during the experiment. The temperature for each module is individually monitored. The base module is made of electropolished stainless steel. It is autoclavable at 121° C (250° F) for 20 min.



Aerosol exposure top

The aerosol inlet stream flows through specifically shaped inlets which are optimized for electrostatic deposition. They are made of stainless steel with VITROGLIDE surface treatment.
The stainless steel / VITROGLIDE inlets are specifically designed for the work with nanoparticles. The aerosol flow rate is controlled by mass flow controllers with data recording by the central data management system.

Isokinetic sampling system

The aerosol is guided into the central reactor of the system where it is humidified if needed. Distribution to the modules via isokinetic sampling probes enables high uniformity of results.

High voltage charging

Charging by high voltage can be added to the process should a significant increase in deposition efficiency be required.

Integrated Quartz Crystal Microbalance

The microbalance sensor is capable of measuring the deposition in the module at a resolution of 10 nanogram/cm^2 per second. The sensors can be placed in all medium compartments to validate the mass deposition in the module. After validation they can be removed so that the experiment can be carried out using the cell culture inserts. One microbalance sensor can remain in the module to monitor the dose during exposure. The data is displayed online using the VITROCELL® Monitor Software.

Touch-screen operation

All functions such as aerosol and vacuum flows, temperature, humidity automatic leak test, charging, start/end of the experiment can be edited using a large 15" touch-screen display. The central data management system provides valuable information on experiment parameters with user-friendly charts. The system can be networked and has a remote service module.

Keyboard

The keyboard can be used alternatively to the touch screen.

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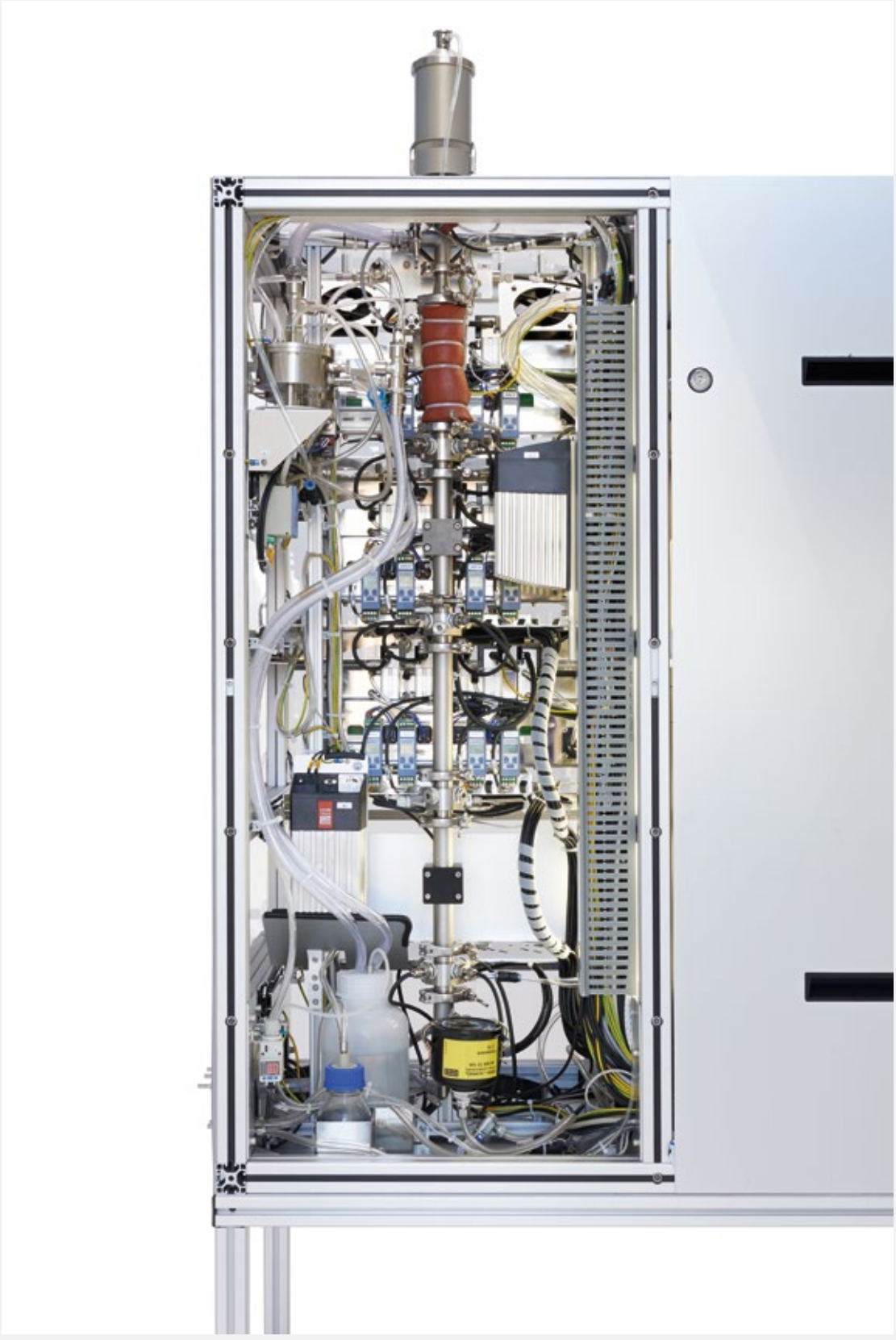

Back view

Available Configuration

Level 1	Clean Air Control Module	Option Microbalance	Option High Voltage
		—	✔
		—	✔
		—	✔
Level 2	**Exposure Module**	**Option Microbalance**	**Option High Voltage**
		✔	✔
		✔	✔
		✔	✔
Optional Level 3	**Exposure Module**	**Option Microbalance**	**Option High Voltage**
		✔	✔
		✔	✔
		✔	✔
Optional Level 4	**Exposure Module**	**Option Microbalance**	**Option High Voltage**
		✔	✔
		✔	✔
		✔	✔

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Technical Data

Dimensions:	1.124 x 623 x 2.187 mm (L x W x H)
Weight:	240 kg
Voltage:	230 V / 50 Hz, other voltages upon request
Rating:	1.8 kW
Fuse:	16 A
Compressed air:	5 bar (72 psi)

Nozzles for connection to external equipment

VITROCELL® SYSTEMS

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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