

Advanced in vitro exposure systems

VITROCELL® Dilution Systems / Distribution Systems



VITROCELL® Dilution Systems

For dynamic dilution of the test aerosol

VITROCELL® has developed specific dynamic dilution systems using unique double-jet systems which allow for a homogeneous mixing of the test aerosol with air.

This principle facilitates highly flexible dose/response relationships. The dilution systems are made of stainless steel with unique VITROGLIDE surface treatment.



Universal dilution system for VITROCELL® 6 and 12 module family

This universal dilution system has entry and exit nozzles for the aerosol stream plus 2 jets for air. 3 or 4 fittings lead to the VITROCELL® module inlets. The inlets aspirate the required dose from the constant flow of diluted test substance through the dilution system.



Single dilution system for VITROCELL® HD distribution systems

The dilution system has entry and exit nozzles for the aerosol stream plus 2 jets for air. The exit fitting is connected to the entry nozzle of the VITROCELL® HD Distribution System and the aerosol is then further distributed to the module.



6-fold dilution system for VITROCELL® 24

The dilution system has entry and exit nozzles for 6 different aerosol streams. Each of which has 2 jets for air. Their exit fittings are connected to the 6 entry fittings of the VITROCELL® 24 module and the aerosol is then further distributed in the module.



Connection of the special dilution system to the VITROCELL® 12 module

Features

- Dilution of the test substances for greater variation of doses
- Unique double-jet system for superior mixing results
- Material: stainless steel with unique VITROGLIDE surface treatment to minimize deposition



VITROCELL® Distribution Systems for Gases

For distribution of the test gas
to the inlets of the VITROCELL® modules

The VITROCELL® distribution systems deliver clean air or the airborne test substances to the module inlets.

- **Clean Air Distribution System**

The clean air system has an entry and exit for the clean air stream. 1 tube leads to the SPIDER which distributes the air to the module inlets. The inlets aspirate the required air from the constant flow of test substance through the distribution system.

The distribution system is made of boron silicate glass with PTFE fittings.



Distribution system for clean air

- **Universal distribution system for gases**

This universal distribution system has entry and exit nozzles for the aerosol stream. 3 exit nozzles lead to the VITROCELL® module inlets. The inlets aspirate the required dose from the constant flow of test substance through the distribution system.

The distribution system is made of high-quality boron silicate glass with PTFE fittings.



Distribution system for gaseous test substances

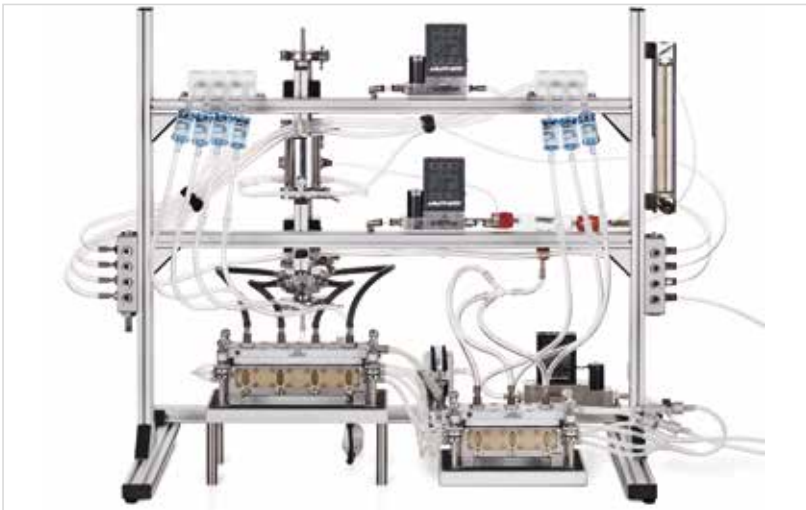
Features

- **Distribution from the source of the test substances and clean air to the module inlets**

VITROCELL® Isokinetic Distribution System

For Gases, Complex Mixtures and Particles
to the inlets of the VITROCELL® modules

VITROCELL® isokinetic distribution systems are universal systems to deliver airborne test substances to the module inlets.



Rack with Isokinetic Distribution System and Clean Air Control Setup

The aerosol is guided from the central duct to the modules via isokinetic sampling probes enabling high reproducibility and uniformity of results. The inlets aspirate directly from the constant flow of test substance.

The isokinetic distribution system is made of stainless steel.

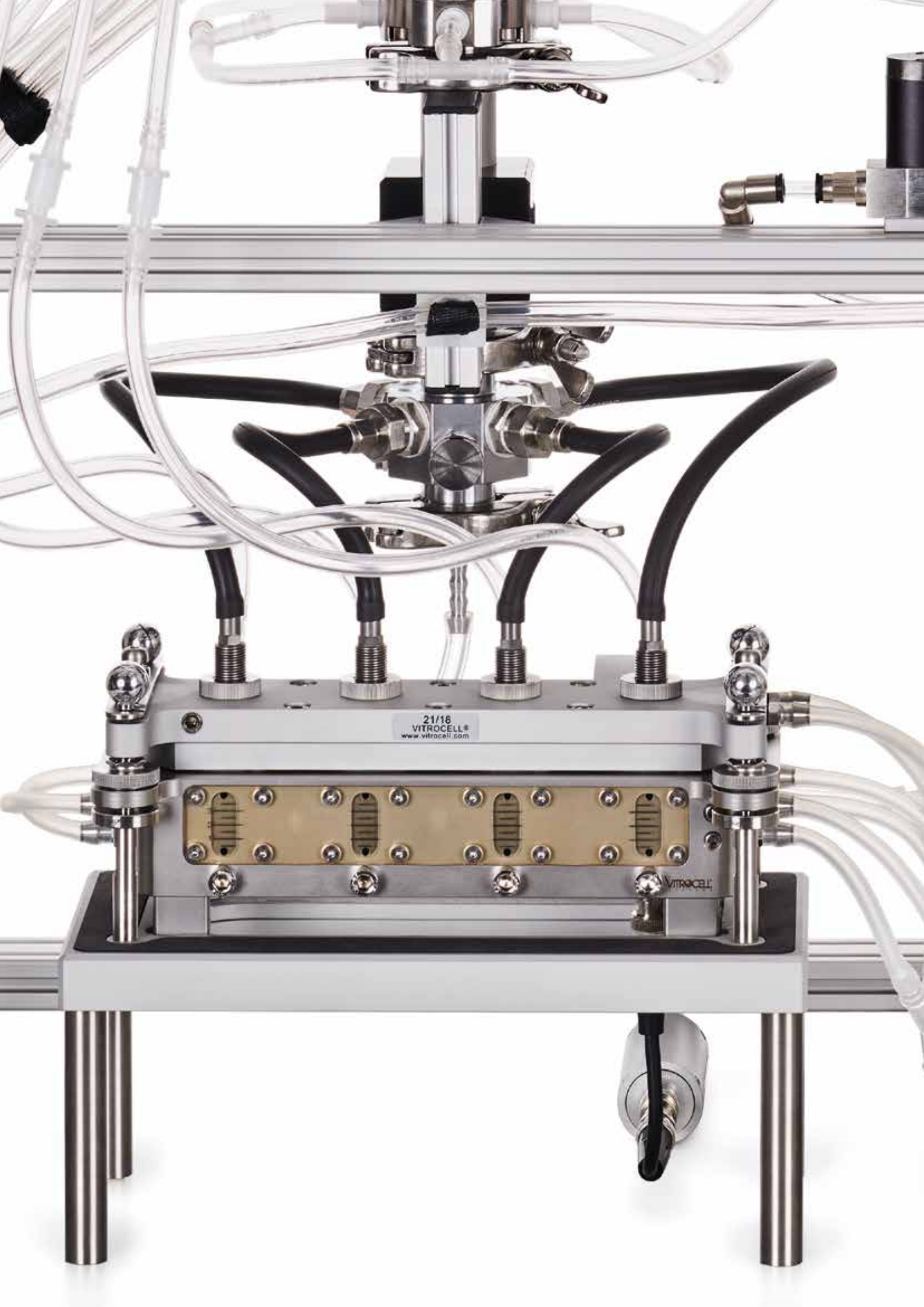


Optional Dilution System

Optional dilution system with air jets for dynamic dilution to obtain dose / response results.

Features

- Distribution from the source of the test substances to the module inlets
- High reproducibility
- Optional dilution system
- Available for VITROCELL® 6 and VITROCELL® 12 series
- 3- and 4-fold distribution



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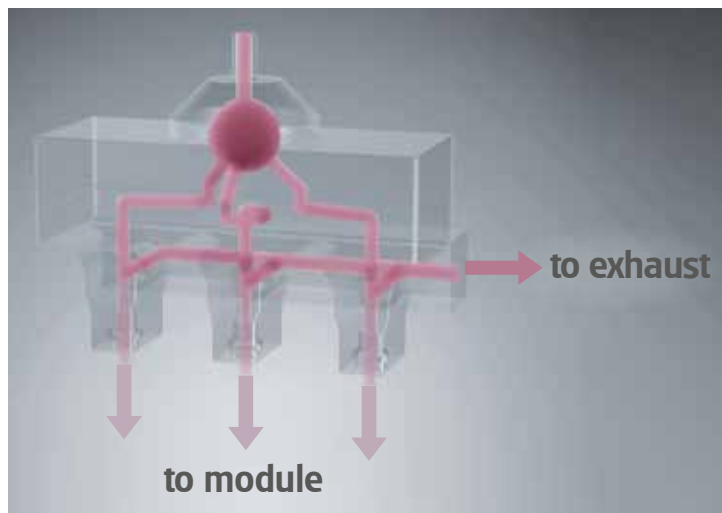
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VITROCELL® HD Distribution System

For enhanced delivery of airborne particles to the VITROCELL® modules

This highly developed distribution system guides airborne substances and particles from one sampling point directly to the inlets of the exposure modules. The special delivery path makes optimized distribution possible.

It is available for VITROCELL® 6 and VITROCELL® 12 modules with a choice of 3- or 4-fold distribution. The optional heating capability is of particular interest to avoid condensation or to maintain certain chemical properties of the test substance.



3-fold distribution system HD3



4-fold distribution system HD4

Features

- Optimized distribution to module positions
- Available materials: POM and Stainless Steel/VITROGLIDE surfacetreatment
- Optional heating capability
- Available for VITROCELL® 6 and VITROCELL® 12 series
- 3- and 4-fold distribution



Exposure Systems



Dose Supply



Dilution



Racks & Carts



Dose Monitoring

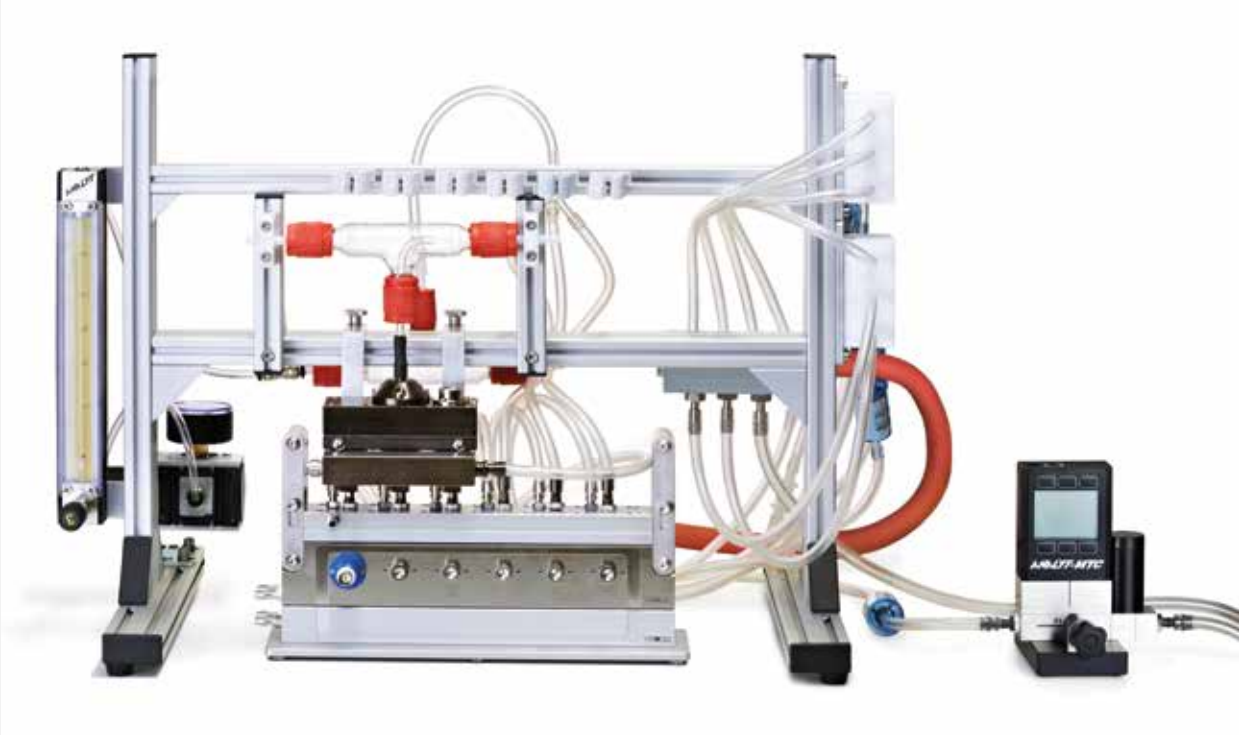


Skin Exposure



Auxiliary Equipment

Application examples



VITROCELL® 12/6 CF with HD3 distribution system, sampling probe, flow controller and rack



VITROCELL® 12 CF module with 2 HD Distribution Systems
Made of stainless steel with unique VITROGLIDE surface treatment.

VITROCELL® Sidestream Chamber

For testing and dilution of atmospheric substances

This highly developed system guides airborne substances and particles from a singular aerosol inlet point to the inlets of the exposure modules. The special delivery path using 2 heated chambers ensures optimized aerosol transportation and dilution.

In the standard version, the test atmosphere enters the first chamber at a regulated flow rate of 50 – 150 m³/h. Optional VITROCELL® Particle

Photometers can be used to monitor the particle concentrations. An isokinetic probe guides the sample flow to the second chamber. The atmosphere can then be diluted with up to 6.7 l/min of clean air resulting in a total maximum flow rate of 12.5 l/min.

The samples progress to the exposure module at 5 ml/min by means of isokinetic probes, the surplus is expelled.

The entire system is heated in order to avoid condensation and to ensure that the chemical properties of specific test substances are maintained. It can be combined with VITROCELL® 6 and VITROCELL® 12 modules.



Features

- Reduction of high flows of test atmosphere by means of isokinetic sampling
- Integrated dilution system
- Heating capability
- Optimized distribution to module positions
- Combinable with VITROCELL® 6 and VITROCELL® 12 series
- Optional monitoring of test atmosphere using VITROCELL® Particle Photometers

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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