

Advanced in vitro exposure systems



VITROCELL® Cloud MAX

Smallest nebulization volumes and high deposition efficiency

The VITROCELL® Cloud Alpha MAX is our newest innovation in the Cloud family and presents a great leap forward in automated exposure of cell cultures. It combines high throughput testing with ease of use. The development is based on the well-known and frequently published VITROCELL® Cloud formats (6-, 12- and 24-well). It's functionality enables fully automated processes with an all-in-one control unit. Everyday experiments at the air/liquid interface have never been easier.

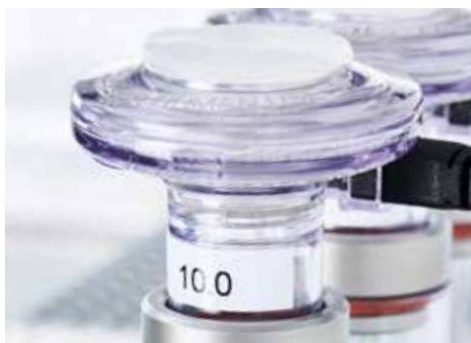
The new Cloud Alpha MAX series was developed as a result of numerous customer requests and is now capable to expose mammalian cell cultures in 6-, 12- or 24-well sized cell culture inserts. All commercial brands are supported.

The Cloud system is suitable for nebulization of solutions and suspensions. Possible fields of application are screening of inhaled drugs, toxicity testing of inhaled substances such as chemicals or nanoparticles and virus research.



The system has integrated controllers for the aerosol generators, adjustable via touchscreen.

Choice of three types of nebulizers



The system comes with a choice of 3 types of vibrating mesh nebulizers having droplet MMAD ranges of

- 2.5 – 4.0 μm
- 2.5 – 6.0 μm
- 4.0 – 6.0 μm

Recommended nebulisation volumes are 10 – 40 μl . So the device is particularly suitable for testing whenever small quantities of testing materials are available.

Dosimetry using Quartz Crystal Microbalance (QCM)



The QCM sensor is integrated in the Cloud Alpha MAX exposure module. It is capable of measuring the deposited mass at a resolution of 10 nanogram/cm² per second.

Results are reported online by the VITROCELL® Monitor software. Data is presented in graphs and stored in MS Excel®.

Ideal for small quantities of test substance



The VITROCELL® Cloud Alpha MAX is designed for lower nebulization volumes and very high deposition efficiency.

This is important when only small quantities of material are available or when expensive test substances need to be tested. The non-cell exposed area is reduced significantly by direct nebulization into exposure chambers with reduced chamber volume.

A set of 3 nebulizers allows for simultaneous testing of 3 concentrations, or a combination of Microbalance, control liquid and suspension of the test substance.



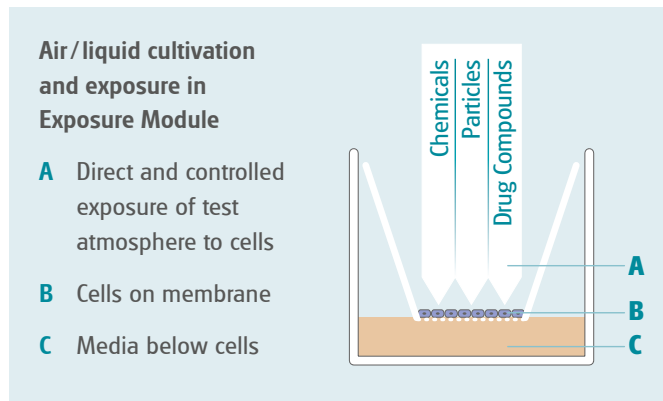
3 positions can be exposed while 3 positions are prepared. Different chamber volumes available. Picture shows the Quartz Crystal Microbalance Sensor in right position.

Features:

- Lowest nebulization volumes: ≤ 40 µl per exposure and well
- High deposition efficiency
- Cloud dynamics by vibrating mesh nebulizers
- Easy handling with no external air-flow required
- High reproducibility
- Air Liquid Interface (ALI) exposure
- Direct and efficient guidance of substance exposure to the cells
- 80, 40, 10 mm tube length

VITROCELL® Exposure Systems for Inhalation Toxicology

Direct Exposure Technology at Air/Liquid Interface



In response to the scientific need to expose in physiologically relevant conditions, VITROCELL® exposure modules have been specifically designed and engineered to enable direct exposure of mammalian cells or tissue at the Air/Liquid Interface where the cell systems are not covered with culture medium.

Researchers can thus use all cell types cultivated on microporous membranes.

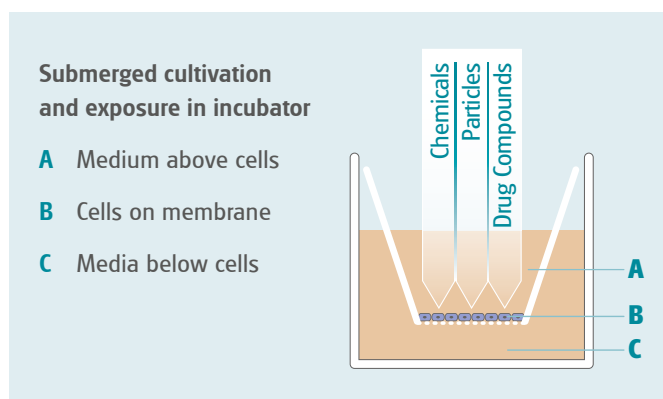
This approach allows for more credible and authentic results than by submerged exposure due to a closer replication of the human physiology.

The advantages

- No losses
- No dissolution
- No reaction of constituents with culture medium
- High sensitivity



Disadvantages of submerged exposure



The exposure of mammalian cells or tissues to airborne substances is frequently performed under submerged conditions. In doing so, the test substances are dosed into the culture medium. This procedure results in an undesired interaction of the formerly airborne substances with the medium, causing limitations for authentic analysis.

Therefore VITROCELL® recommends the air/liquid interface exposure technology.

Exposure Principle

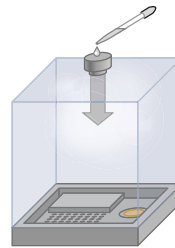
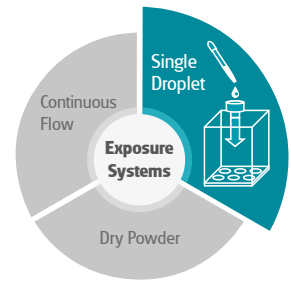
Single Droplet Sedimentation (Cloud Exposure)

Single Droplet Sedimentation Systems are specifically designed for dose-controlled and spatially uniform deposition of liquid aerosols on cells. Test substances are chemicals or particles brought into suspension with e.g. PBS.

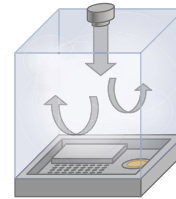
The aerosol is applied for a short time of approx. 3–6 minutes.

This method is well suited for scarce and expensive materials, such as new drug candidates or particle samples from the environment.

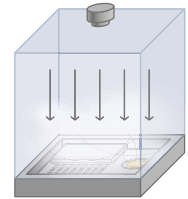
Nebulization volumes range from 15 to 300 µl. Aerosolization is performed directly into the cell culture exposure chamber. Aerosolization can be repeated several times to obtain a dose-response profile.



Phase 1
Emission of Cloud



Phase 2
Homogeneous Mixing



Phase 3
Gravitational Settling

Main application areas



- Particles/nanoparticles in suspensions
- Pharmaceutical compounds/liquids
- Chemicals
- Virus research

Cloud Exposure Systems



Cloud Alpha 12



Cloud Alpha MAX



Cloud Alpha MOVE



Cloud Alpha TRIO

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.

For more information please scan the QR-Code:



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