

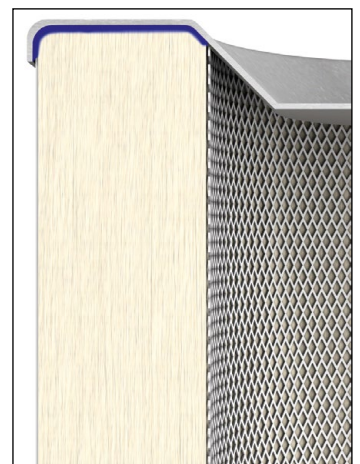
AERO® oil mist separator for cooling lubricant aerosols



Standard for clean air

Emissions from metal processing are reliably separated and filtered

When using coolants can be separated fine aerosols with maximum effect.



The new MICOS-P fine fiber cartridge demonstrates exceptional performance.

Designed and engineered for reliable separation efficiency

AERO® Oil mist separator for coolant aerosols

The growth of highly efficient manufacturing processes leads to a considerable increase in the dirty air load from aerosols (mist, fumes and particulate). This reality requires new solutions to meet contemporary industrial requirements.

The new AERO® oil mist separator was designed and engineered to meet the strictest requirements. The purified air can be exhausted into the workplace or outdoors depending on the operating conditions and clean air regulations.

Universally applicable for coolant and oil mist

Increasing demands produce new solutions. Based on our experience from processes with coolant cooling and cutting oils Keller Lufttechnik developed a new separation concept for a universal application in metal processing.

Separate machines equipped with AERO® are no longer mandatory for special coolant processes.

Investment security with flexibility

The new range of applications offers superior production design options for new equipment planning and acquisition. AERO® also offers more flexibility in production planning.

Retrofitting

New procedures and faster processes result in increased emissions. Since the AERO® can be operational very quickly as a stand-alone system, it is perfectly suitable for urgent applications.

Typical applications

Typical applications include:
Machining processes:
drilling, turning, milling, broaching, honing, grinding
Non-cutting processes:
rolling, deep-drawing, pressing ...



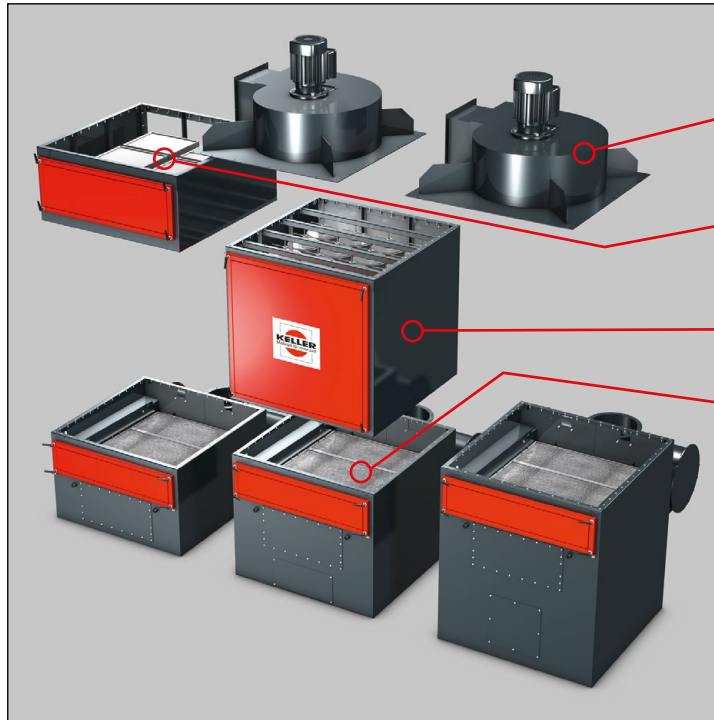
AERO® oil mist separator for coolant aerosols.
Opened inspection door with view of the new MICOS-P fine fiber cartridge

AERO®-3 with secondary filter stage (as an option)
Max. nominal air flow 12500 m³/h
Signature 1540 mm x 1540 mm

The logical concept



Modular compact design



Module illustration example of size 3

- Fan unit – as an option for pressures of 315 or 350 daPa
- Optional module: Secondary filter stage for special requirements such as clean air recirculation
- Module main filter stage for MICOS-P fine fiber cartridges
- Module separation collector with demister in three designs:
 - siphon with drain
 - with additional pump
 - for installation on intermediate platforms; without pump and internal siphon

Four housing sizes



AERO® separators are offered in four sizes.

The technology is perfectly suitable for most applications because of the different separation stages – including single small machines.

A suitable size can be selected for various applications directly at one machine, for several machines or centralized systems.

	AERO® Single	AERO®-1	AERO®-2	AERO®-3
Airflow	up to 2500 m ³ /h	up to 4000 m ³ /h	up to 7000 m ³ /h	up to 12500 m ³ /h
Floor space	800 x 800 mm	1000 x 1000 mm	1200 x 1200 mm	1540 x 1540 mm
Height (min./max.)*	3070/3670 mm	3180/4680 mm	3250/4750 mm	3600/5100 mm

* min. = lower section without siphon, without down stream filter stage
 max. = lower section with siphon, with down stream filter stage

AERO® – the ultimate solution

Installation in line as a central separator

... with expansion option

Essentially, the application can be installed directly at the machine or by ductwork, centrally or adjacent. Future capability to increase the machine pool can be taken into account.

The modular construction is especially advantageous for further expansion of the central separation unit.



Two AERO® modules with transition channel and top mounted fan

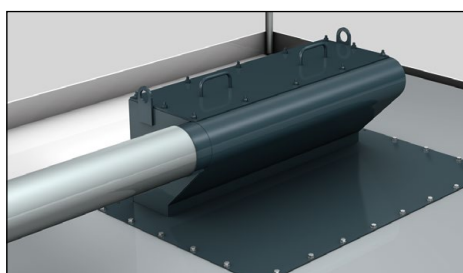


Central separator consisting of five AERO® modules of size 3 and one fan (nominal air flow of 64 000 m³/h)

ProChip

Preseparation of chips in oil mist

The ProChip collection device prevents the un-wanted separation of chips. Resultant deposits in the ductwork are thereby prevented – and further separation in the AERO® is unnecessary.



ProChip is installed on top of the machine housing.

The size is designed according to each requirement.

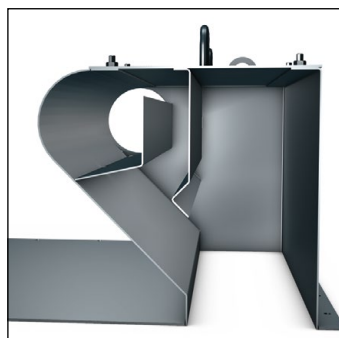


Illustration:
Because of the flow lock, collected chips bounce off and fall back into the workplace. The centrifugal force further ensures that the extracted dust and coolants are partially pre-separated.

AERO® provides excellent separation results



Separation process for ultimate filtration efficiency in the smallest available space

With the development of the new AERO® oil mist separator for aerosols there now exists a fully integrated, flow-optimized separation system that is compact in design for machining or shaping metalworking processes.

Demisters are installed horizontally into the pre-separation stage. These demisters help to adjust the dirty air flow. The MICOS-P fine fiber cartridge, a high performance filter element was designed for the main filtration stage.



AERO® rear view with attached inflow chamber for optimal air flow



AERO® oil mist separator for coolant aerosols, size 3
Floor space 1 540 x 1 540 mm

Nominal air flow up to 12 500 m³/h
Equipped with 16 MICOS-P fine fiber cartridges

Typical aerosol concentrations

Basic premise:

Relatively small concentrations (up to 100 mg/m³) are created by milling and drilling machines.

Medium concentrations (up to 200 mg/m³) are typical for multi-spindle turning machines and grinding machines but also for broaching and honing. Heavy applications with high-pres-

sure pumps and universal gear hobbing machines create high concentrations (more than 200 mg/m³)

Machining processes with MQL are designed for dry processes. To that end, Keller offers the TR-1, a single separator for MQL and dry processing.

MICOS-P – the new fine fiber cartridge

**Newly developed:
MICOS-P**

**... a fine fiber cartridge
for the main filter stage**

For effective and reliable separation of the smallest coolant aerosol particulate, Keller developed an entirely new filtration concept with MICOS-P.

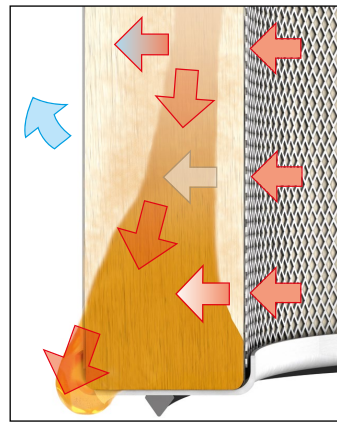
Its efficiency is based on a combination of inertia, barrier effect, coales-

cence and diffusion. This enables it to continuously separate coolant fumes and aerosols for optimal, and long-lasting results, without a secondary filter stage.

Service life \geq 15 000 hours.

Droplets and particulate are separated and discharged by forming large droplets

Upon contact with the fine fiber material, fumes and oil droplets are collected, as well as aerosol particulates. As a result, smaller droplets agglomerate into larger droplets. This separated matter flows downward into the fine fiber compound, enhanced by its drainage effect. The hydrostatic pressure inside the MICOS-P fine fiber cartridge forces the sedimentation out for a self-cleaning result.



The diagram shows the downward flow of the droplets. The combination of flow and hydrodynamics forces the sedimentation out.

Coolant and oil residue flows into the return flow collector which is can be equipped with a pump, is depending on the design.

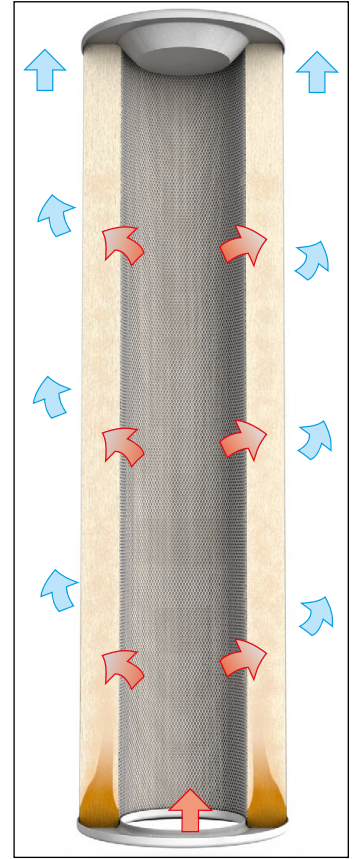


Diagram above:
MICOS-P fine fiber cartridge
Illustration of the flow of dirty air/clean air. Below the forming of sediment
Overall length: 1 200 mm
Suitable for all AERO® designs

Free and fine aerosol particles are collected and trapped by the fine fiber material

The different surface sizes between the dirty air side and clean air side of the filter continuously decreases the speed of the clean air flow upon penetration of the fine fiber.

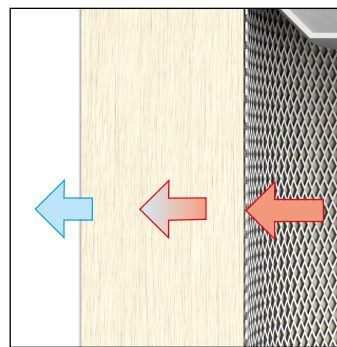
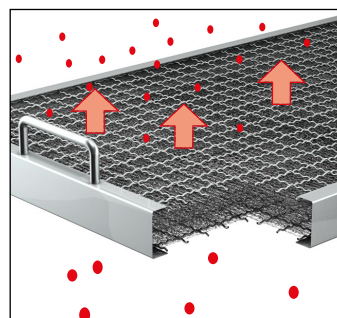


Diagram left:
The large exterior surface reduces the exit speed in comparison to speed of entry by approx. 30 %. This constant slowdown creates the diffusion effect.

Aerosol particles, not yet coagulated into droplets, or which are bonded to droplets, become inactive due to the reduced flow, and are then collected as single particles adhering to the fine fiber material.

Continuous inflow at the main filter by a demister

A demister cleans the extracted dirty air from the coarser particles and pollutants. A stainless steel mesh filter optimizes the dirty air flow.



Demister to optimize the flow and for pre-separation purposes.

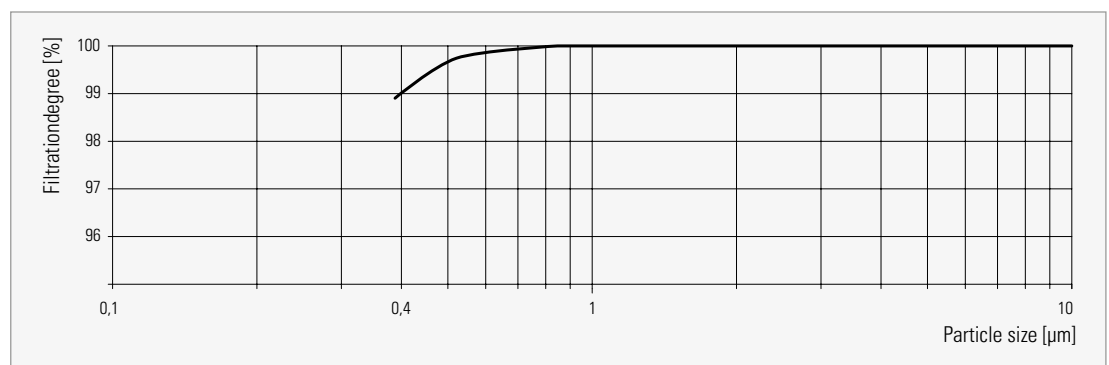
An automatic rinsing device to clean the demisters can be installed as an option.

MICOS-P Summary

Fine fiber cartridge for high-quality separation of aerosols from oil mist.

- Modular compact design with small signature
- Suitable for all AERO® sizes
- Single-stage main filtration
- Material: Fine fiber material
- Service life: ≥ 15000 hours for maintenance-free operation
- Overall length: 1200 mm
- Weight: approx. 12 kg

MICOS-P separation efficiency in a standard design



Example:
The following separation values were achieved for particles \varnothing at $1 \mu\text{m} = 100\%$ at $\varnothing 0.4 \mu\text{m} = 99\%$

In practice, the separation efficiency depends on the specific characteristics of the substance (viscosity, evaporation

loss...), the particle size, the temperature, the dirty air load and the filter load.

Discharge of the coolants and exchanging the MICOS-P fine fiber cartridges

The separated liquid accumulates in the basin and is emptied into the treatment system for discharge or recycling. The MICOS-P elements can be exchanged without tools and are

easy to handle because of their light weight. New cartridges are preconditioned to ensure the quality of separation.

Integrated radial fans



As an alternative to the integrated fan section, an external fan can be installed for the simultaneous operation of several AERO® separation systems at once. This may also be necessary for single systems, depending on the location of the application and

required differential pressure. It is necessary to equip the fan's exhaust side with a silencer.

View of the AERO®'s clean air zone.
Easy maintenance of MICOS-P cartridges.

Electrical switch and control unit

The electrical cabinet is designed according to VDE guidelines and Keller standards. Customer specific designs can be achieved.

All functions (including accessories) are controlled and monitored by an PLC. As an alternative, a basic switch without additional functions can be delivered to control the fan.

AERO® oil mist separator for cooling lubricant aerosols



Extensive system solutions available

AERO® the universal oil mist separator is part of the newly designed, high-efficiency, energy and flow-optimized separation solution to protect air quality in metal treatment.

We will be pleased to provide you with the details on our technologies and solutions.

Consulting service

Do not hesitate to contact us for detailed information on the AERO® oil mist separator for coolants and the fine fiber cartridge MICOS-P. We will be pleased to offer you an exploratory interview without obligation as your dialog partner in the assessment phase of a project.

You will benefit from our experience!



Central separation system with twelve AERO® modules, size 3
Nominal air flow 140 000 m³/h

Application: Oil mist separation during the processing of crankcases.



With GREEN BALANCE Keller Lufttechnik GmbH + Co. KG commits to reliable, far-sighted treatment of all resources – to bring into line technological progress, operational issues and social targets in order to protect the environment.

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