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.
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.

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.

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

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 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
**Modular compact design**

AERO® Single  
AERO®-1  
AERO®-2  
AERO®-3

Airflow up to 2500 m³/h, up to 4000 m³/h, up to 7000 m³/h, up to 12500 m³/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

**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**

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

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.

<table>
<thead>
<tr>
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<th>AERO® Single</th>
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* min. = lower section without siphon, without downstream filter stage  
max. = lower section with siphon, with downstream filter stage
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.

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

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.

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-pressure 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.

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

Radial fan to create the necessary air flow and differential pressure
A secondary filter stage can be installed here as an option for special applications
Main filter stage with MICOS-P fine fiber cartridges
The optional rinsing device is installed here
Pre-separation (demister) for chips and coarse particles
Inflow air chamber
Return flow collector for separated oil mist
Pump for external discharge
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, coalescence 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 ≥ 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.

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

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.

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.

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

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

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.

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

![Graph showing separation efficiency](image)

Example: The following separation values were achieved for particles Ø at 1 µm = 100 % at Ø 0.4 µm = 99 %

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The following separation values were achieved for particles Ø at 1 µm = 100 % at Ø 0.4 µm = 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.

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.

Consulting service

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

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.