Emissions from metal processing are reliably separated and filtered

Fumes and aerosols are equally separated at maximum output.

The new MICOS-P fine fiber cartridge demonstrates exceptional performance.
The growth of highly-efficient manufacturing processes leads to a considerable increase in dirty air from aerosols (mist, fumes and particulate). This reality requires new solutions to meet current industrial requirements.

The AERO® coolant and oil mist collector was designed and engineered to meet the strictest requirements. The cleaned air can be exhausted into the workplace (re-circulated) or outdoors, depending on the operating conditions and clean air regulations.

Based on our decades of experience from processes with coolant and cutting oils, Keller developed a new separation concept for universal applications in metal processing.

Special coolant processes can now use a single collector instead of individual units for each machine.

Due to the range of applications (flexibility) and modular design of the AERO® series, superior production design options for new equipment planning and acquisition are possible.

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

**Typical applications**

**Machining processes:** Drilling, Turning, Milling, Broaching, Honing, Grinding

**Non-Cutting processes:** Rolling, Deep-Drawing, Pressing

**AERO® coolant mist and oil mist collector 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).**
AERO® separators are offered in four sizes.

The technology is suitable for most applications because of the different separation stages, including individual machines.

**Four housing sizes**

<table>
<thead>
<tr>
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<th>AERO® Single</th>
<th>AERO®-1</th>
<th>AERO®-2</th>
<th>AERO®-3</th>
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<tbody>
<tr>
<td>Airflow</td>
<td>up to 1,470 cfm (2,500 m³/h)</td>
<td>up to 2,350 cfm (4,000 m³/h)</td>
<td>up to 4,100 cfm (7,000 m³/h)</td>
<td>up to 7,350 cfm (12,500 m³/h)</td>
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<tr>
<td>Floor space</td>
<td>31.5&quot; x 31.5&quot; (800 x 800 mm)</td>
<td>39&quot; x 39&quot; (1,000 x 1,000 mm)</td>
<td>47&quot; x 47&quot; (1,200 x 1,200 mm)</td>
<td>61&quot; x 61&quot; (1,540 x 1,540 mm)</td>
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<tr>
<td>Height (min./max.)*</td>
<td>121&quot; / 144.5&quot; (3,070 / 3,670 mm)</td>
<td>125&quot; / 184&quot; (3,180 / 4,680 mm)</td>
<td>128&quot; / 187&quot; (3,250 / 4,750 mm)</td>
<td>142&quot; / 201&quot; (3,600 / 5,100 mm)</td>
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* min. = lower section without siphon, without down stream filter stage
max. = lower section with siphon, with down stream filter stage
Installation in-line as a central separator

The AERO® can be installed directly at the machine or by ductwork, centrally or adjacent.

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

... with expansion option

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 37,650 cfm (64,000 m³/h))

ProChip: Pre-separation of chips in coolant and oil mist

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

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

ProChip is installed on top of the machine housing.

The size is designed according to each customer requirement.
**Separation process**

With the development of the AERO® coolant and oil mist collector 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 airflow. 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. For those applications, Keller offers the TR-1, a single separator for MQL and dry processing.
**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 filters.

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 $\geq 15,000$ 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 downwards 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 can be equipped with a pump, depending on the design.

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

**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 airflow 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
Overall length: 47" (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 approximately 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 coolant and oil mist.

- Modular compact design with small signature
- Suitable for all AEROP® sizes
- Single-stage main filtration
- Material: Fine-fiber material
- Service life: > 15,000 hours for maintenance-free operation
- Overall length: 47" (1,200 mm)
- Weight: approx. 27 lbs (12 kg)

MICOS-P separation efficiency in a standard design

Example:
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 AEROP® 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.

Electrical switch and control unit

The electrical cabinet is designed according to VDE guidelines and Keller standards. Customer specific electrical control designs can also be used. All functions (including accessories) are controlled and monitored by a PLC. As an alternative, a basic switch without additional functions can be delivered to control the fan.
Extensive system solutions available

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

Consulting service

Do not hesitate to contact us for detailed information on the AERO® coolant and emulsion mist collector or the fine-fiber cartridges, MICOS-P. We will be pleased to offer you a free consultation for your application.

Additional Reference Installations:

Central separation system with three AERO® modules, size 3
Nominal airflow 18,800 cfm (32,000 m³/h)

Application: Oil mist separation for the grinding of vehicle components

With the GREEN BALANCE initiative, Keller commits to Global Sustainability.

We balance Technological, Social, and Economic resources to sustain the environment.