AFS – Strong Performance, Clean Air

Air purification devices and systems for ventilating oil and emulsion mist, ventilation equipment production, HVAC systems, operational environmental protection
AFS Airfilter Systeme (AFS) is a midsize company, one of the leading German manufacturers of oil and emulsion mist separation equipment and a competent partner for ventilation equipment production. For more than 20 years, AFS has developed, produced and distributed air purification devices and systems for purifying the oil and emulsion mists that occur during metalworking processes. We rely on a low-maintenance and energy-efficient combination of filtration and stripping processes. The more than 20,000 AFS air purification devices on the market impress with their high separation rates, durability and low operating costs.

Air is life

Due to constantly increasing cutting and process speeds in machine tools in connection with high coolant lubricant pressures, more and more fine aerosols are being released into the ambient air. This contaminated air should and must not be released into the environment or the production hall unpurified. Because this is the air that we breathe on a daily basis.

AFS provides professional advice and integrated solutions for air purification custom-tailored to each individual customer – regardless of whether they prefer decentralized single extraction systems for their machine tools or comprehensive solutions for ventilating entire production lines including the associated HVAC systems for hall ventilation. We work closely with our customers to develop an array of concepts, from air purification, heat extraction, heat recovery and hall air conditioning to energy and costs savings to achieve a better working climate in the truest sense of the word.

Numerous manufacturers of machine tools and customers in the metalworking industry around the world have relied on air purification devices from AFS for many years.

We don’t just talk about environmental protection, we take action!
AFS

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AFS Technology

The coolant lubricant used in cutting as well as non-cutting metalworking produces aerosols, mists, vapors and smoke that contaminate the air in production facilities and endanger the health of the people who work there as well as pollute the environment.

AFS air purification devices and systems make a significant contribution to complying with current legal regulations for coolant lubricant concentrations in hall air at the workplace and in exhaust air.

AFS air purification devices are the professional solution for collecting and purifying air that has been contaminated by

- Oil and emulsion mist
- Minimum lubrication mist
- Smoke

Plus, they can be used in a variety of ways:

- As a single compact tool for separating oil and emulsion mist from a machining center
- As a central or group exhaust system for separating oil and emulsion mist from multiple machining tools in a single production hall.

AFS air purification devices are based on a mechanical filtration and stripping process that consists of a five-stage pre-separation in conjunction with a variable post-separation process. Pre-separation consists of a perfectly adapted combination of woven metal separators, filter fleece, and, at its core, the AFS Longlife Separator.

H13 class HEPA filters (separation rate ≥ 99.95% based on a particle size of 0.3 µm) or, alternatively, non-wearing metal mesh follow-up separators can be used in the post-separation process.

Because the preliminary separation performance is so good, the downstream H13 filter can be used for a very long time.
The heart of any AFS air purification device is AFS’ own Longlife Separator, which is based on the principle of baffle plate separation.

- Self-cleaning
- Maintenance-free
- Nearly complete separation of all particles and aerosols > 2.0 µm in the exhaust-air current.

Independent investigations confirm the high separation performance of the AFS Longlife Separator:
AFS Air Purification Devices
Individual single units and serial products

AFS single units are the customized solution for suction and exhaust air purification directly on machine tools. AFS air purification devices vibrate very little (balance quality G 2.5-G 6.3) and can be installed onto a machine tool or integrated completely. The machine tool and AFS single unit form a single unit and allow a high degree of flexibility for rearranging equipment.

AFS single units are used to circulate air year-round, which means that purified exhaust air is blown into the production hall.

As an original machine tool equipment manufacturer, AFS has been working with many global machine tool manufacturing leaders for years. AFS air purification devices are available in different frame sizes with specific air extraction volumes from 400 to 16,000 m³/h. Depending on the circumstances around the installation and local conditions, the following AFS air purification device features can be introduced as needed:

- Right or left suction direction
- Suction funnels with optional pipe and hose connections on all sides
- Exhaust vents on all sides of the device
- Optical filter contamination display
- Volumetric flow rate monitoring
- Spaces between leg bases
- Electrical design
- Filter mounts
- RAL color

AFS air purification devices are or can be equipped with EC technology or a frequency converter. This allows the motor speed and extraction flow rate to be adjusted continuously. Benefits include:

- The exhaust volume can be kept constant as filter contamination increases
- The motor speed and exhaust volume can be adjusted as needed
- The devices can operate at partial load, which means the energy requirement is reduced and filter lifetime is significantly increased
- There are provisions for future system expansion
- Energy is conserved
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### AFS AIRFILTER SYSTEME

#### Individual single units and serial products

AFS Air Purification Devices

#### Volume flow

<table>
<thead>
<tr>
<th>Type</th>
<th>Volume flow [m³/h]</th>
<th>a₁</th>
<th>a₂</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>Power consumption [kW]</th>
<th>Electrical connection</th>
<th>Weight [kg]</th>
<th>Energy efficiency</th>
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<tbody>
<tr>
<td>AFS 400 C</td>
<td>400</td>
<td>825</td>
<td>785</td>
<td>400</td>
<td>520</td>
<td>150</td>
<td>320</td>
<td>0,5 0,86</td>
<td>400 V ± 10%, 50/60 Hz</td>
<td>70</td>
<td>ErP 2015</td>
</tr>
<tr>
<td>AFS 600</td>
<td>600</td>
<td>825</td>
<td>785</td>
<td>400</td>
<td>520</td>
<td>150</td>
<td>320</td>
<td>0,5 0,86</td>
<td>230/400 V ± 10%, 50/60 Hz</td>
<td>50</td>
<td>ErP 2015</td>
</tr>
<tr>
<td>AFS 1000 C</td>
<td>1.000</td>
<td>1.315</td>
<td>1.050</td>
<td>470</td>
<td>625</td>
<td>200</td>
<td>425</td>
<td>0,95</td>
<td>380 ... 480 V, 50/60 Hz</td>
<td>100</td>
<td>ErP 2015</td>
</tr>
<tr>
<td>AFS 1100</td>
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<td>1.315</td>
<td>1.050</td>
<td>470</td>
<td>625</td>
<td>200</td>
<td>425</td>
<td>0,5</td>
<td>380 ... 480 V, 50/60 Hz</td>
<td>72</td>
<td>ErP 2015</td>
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<td>625</td>
<td>200</td>
<td>425</td>
<td>0,95</td>
<td>380 ... 480 V, 50/60 Hz</td>
<td>72</td>
<td>ErP 2015</td>
</tr>
<tr>
<td>AFS 3000</td>
<td>3.000</td>
<td>1.635</td>
<td>1.235</td>
<td>750</td>
<td>785</td>
<td>300</td>
<td>515</td>
<td>1,6</td>
<td>380 ... 480 V, 50/60 Hz</td>
<td>150</td>
<td>ErP 2015</td>
</tr>
<tr>
<td>AFS 4000</td>
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<td>1.635</td>
<td>1.235</td>
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<td>785</td>
<td>350</td>
<td>515</td>
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<tr>
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<td>1.115</td>
<td>400</td>
<td>620</td>
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<td>300</td>
<td>ErP 2015</td>
</tr>
<tr>
<td>AFS 8000</td>
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<td>1.680</td>
<td>930</td>
<td>1.115</td>
<td>450</td>
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<tr>
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<td>3.010</td>
<td>2.110</td>
<td>1.390</td>
<td>1.455</td>
<td>560</td>
<td>800</td>
<td>8,6</td>
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<td>850</td>
<td>IE 2 ✱</td>
</tr>
<tr>
<td>AFS 16000</td>
<td>16.000</td>
<td>3.010</td>
<td>2.110</td>
<td>1.390</td>
<td>1.455</td>
<td>630</td>
<td>800</td>
<td>16,8</td>
<td>208 ... 480 V ± 10 %, 50/60 Hz</td>
<td>850</td>
<td>IE 2 ✱</td>
</tr>
</tbody>
</table>

1) UL design available upon request  
2) also available in 200...240 V, 50/60 Hz models  
3) incl. frequency converter

Subject to change without notice
Air purification with air exchange

Central air purification systems are the practical alternative for ventilating multiple machine tools. The individual processing machines are connected to a central AFS air purification device via a pipe system.

The purified exhaust air can then be blown as exhaust air directly outside or as circulating air back into the hall. Managing the exhaust air and the associated air exchange reduces the relative humidity, heat and odors in the production hall. Alternatively, the purified exhaust air can be routed to an HVAC system with heat recovery. A heat exchanger recovers residual heat from the exhaust air, which is then used to preheat the air supplied from the outside. HVAC systems are also used to condition the hall air.

AFS central purifying systems should always be viewed as an integrated approach. This allows the use of additional heat sources, like thermal discharge from compressors, to be integrated into the overall concept.

AFS air purification systems utilize the AFS circulating air and exhaust air concept or a combination of air purification system and air supply system to sensibly and efficiently exploit the heat contained in the exhaust air.
AFS central exhaust systems do not only purify air, but also offer the following benefits:

- Air exchange with outside air backflow
- Heat recovery (in the winter months)
- Reduction of hall temperature (in case of excessive heat in the summer months)
- Reduction of relative humidity
- Reduction of odors
- Reduction of maintenance (compared to single units)
- Controlled hall ventilation in combination with HVAC systems
- Complete separation of supply air and exhaust air flows in combination with HVAC systems
- Cooling and conditioning of the hall air in combination with HVAC systems and a cooling device.

AFS central exhaust systems are designed so that associated pipes and ducts do not interfere with production processes, logistics routes or crane tracks. Mostly leak- and oil-sealed Jacob flange pipes are used on the raw gas side; with a modular design, they are able to be converted and adjusted quickly.

AFS air purification devices are available with air extraction volumes of 400 to 16,000 m³/h. This means the right air purification device for every central exhaust system. To achieve exhaust volumes higher than 16,000 m³/h, all AFS air purification devices can be combined and supplemented without problem.
The AFS exhaust and circulating air concept

The AFS exhaust and circulating air concept is achieved on the basis of a central exhaust system (see page 8/9). A central AFS air purification device extracts and purifies the exhaust air from multiple machine tools. A circulating and exhaust duct is installed onto the exhaust side of the AFS air purification device. An optional automated or manual valve control can lead the purified and heated exhaust air to the outside or, proportionately, as circulating air for heat recovery in the production hall. Depending on the current weather conditions and the application, the circulating and exhaust air flows are individually adjustable. The purified exhaust air from the production hall that is blown outside is replaced by freely inflowing outside air, which flows through doors, gates, windows or roof openings into the hall and to the machine tools that have been extracted. The hall is atmospherically aerated and employees are constantly supplied with fresh air.

Exhaust mode

The AFS air purification system can operate exclusively in exhaust mode when hall temperatures become too high. Constantly high volumes of heated and moist air can be blown from the production hall to outside with an equal amount of fresh outside air pumped into the production hall. The fresh air flowing through the hall doors and windows is generally drier and colder than the hall air, which helps to reduce the temperature and relative humidity in the hall. Furthermore, exhaust mode helps to achieve atmospheric cooling at night when outside temperatures are cooler.

Proportional circulation mode

Particularly on cold days and when hall temperatures are low, directing some of the cleaned and heated exhaust air back into the production hall is a good idea as far as energy is concerned. In comparison to exclusive exhaust mode, considerably less cool outside air needs to pumped in and heated. Proportional circulation mode can thus save heating costs. The proportional fresh air supply reduces the relative humidity in the production hall.

The circulating air that is led back into the hall is also filtered using an H13 HEPA filter and blown through a circulating air duct with air outlet louvres into the hall.
The AFS circulating and exhaust air concept
Air purification and atmospheric hall ventilation: simple and economical

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AFS air purification device
Circulating/exhaust air flaps
Filterbox with H13 filter
Exhaust air (purified)
Outgoing air
Outside air
Circulation
Machine exhaust air (unpurified)
Coolant lubricant removed
Analogous to the system concepts described on pages 8-11, a central AFS air purification device extracts and purifies the exhaust air from multiple machine tools. Using a duct system, the purified outgoing air is routed to an HVAC system and blown to the outside year-round as outgoing air. When necessary, a heat exchanger in the HVAC system mostly draws the residual heat from the exhaust air current and uses it to preheat the cool outside air.

The outside air sucked in by the HVAC system is filtered and preheated by the heat exchanger, when necessary. If the preheating in the heat exchanger is insufficient (e.g., lack of heat in the outgoing air or when outside temperatures are extremely cold), then a reheating register also heats the outside air to the target temperature.

The supply air can be air-conditioned by an additional cooling register in the HVAC system. The heat register is supplied, for example, by pump warm water and the cooling register by an external cold generator.

Exhaust and supply air systems are operated automatically using intelligent control and adjustment technology. Time programs enable different operating modes. Protecting the hall from cooling down during production downtimes can also be achieved as well as nighttime atmospheric cooling in summer.

Using an AFS exhaust system with supply air system, clean, pollen-free and dust-free air that is optimally conditioned for the hall is supplied year-round.
Supply air with heat recovery
Air purification and conditioned hall ventilation: the professional solution

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The supply air can be air-conditioned by an additional cooling register in the HVAC system. The heat register is supplied, for example, by pump warm water and the cooling register by an external cold generator. The supply air is then routed to the hall by way of a defined duct system and distributed evenly and draught-free through outlet louvres or displacement diffusers.

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AFS AIRFILTER SYSTEME

Significant capital and operating costs can be saved by taking an integrated approach to exhaust air purification and hall air supply and the associated hall temperature control in the sense of optimally coordinated air purification and supply systems.

AFS central exhaust systems in combination with HVAC systems

Exhaust air (purified)
Outgoing air
Outside air
Supply air (heating/cooling)
Machine exhaust air (unpurified)
Coolant lubricant removed

1 AFS air purification device
2 Circulating/exhaust air flaps
- Exhaust air (purified)
- Outgoing air
- Outside air
- Supply air (heating/cooling)
- Machine exhaust air (unpurified)
- Coolant lubricant removed
Air purification with activated carbon
Special solutions for hazardous material purification and odors

AFS air purification devices with downstream active carbon filtration

Industrial processing installations and the use of special coolant lubricant oftentimes lead to increased odors in the workplace. This is frequently accompanied by contamination of the air with hazardous materials. Particularly the high concentration of hazardous materials in the gas phase contributes significantly to air pollution. Special air purification processes are required for filtering pollutants from the gas phase and process air.

The AFS air purification devices with attached active carbon box combine different applications into a single device:

The efficient separation of aerosols, mist, vapor and smoke is combined with downstream active carbon filtration for purifying the exhaust air of hazardous materials and odors.

The AFS 400 C and AFS 1000 C are two such air purification devices with exhaust volumes of 400 m³/h and 1000 m³/h, respectively. If higher exhaust volumes are needed, we are also happy to provide you with individual solutions.
Service

Planning

AFS’ years of expertise are in play from the first on-site inspection to executing the air purification system. Before any offer is even made, AFS consults and supports its customers and develops customized planning proposals. Special customer requirements, operational requirements, legal regulations and environmental concerns are the basis of ever system. The customer is always closely involved in the detailed planning for AFS air purification systems so that we can quickly and flexibly respond to changes and additions on short notice.

This integrated approach has produced individual solutions that are customized for the particular application. Finally, an AFS air purification system will contribute to an improved work environment in production facilities for many years.

Assembly and commissioning

AFS air purification devices and systems are assembled by AFS’ own trained, knowledgeable specialists. Customers benefit from their many years of experience in ventilation system construction and fast and professional assembly at AFS. AFS mostly assembles the systems amid ongoing business and without interrupting the course of production. Our air purification systems go into operation immediately after they are assembled. Qualified AFS employees set the suction output, adjust the air balance and instruction operational staff during operation and maintenance.

Training

A complete all-round service goes without saying for AFS. This includes training the operational and maintenance staff on-site. We also offer additional training and workshops at our company headquarters or at your location.

AFS regularly trains the employees of our sales partners and machine tool manufacturers. This way, you as the end customer can be assured that you are always receiving qualitatively high-value and reliable AFS products.

Spare and wear parts directly from AFS

All spare and wear parts for AFS air purification devices and systems can be obtained directly from AFS. Please contact us with questions about AFS products. We will be happy to help you.

Most spare and wear parts are in stock and available to ship within one to two business days.

Maintenance Agreement

Upon request, we offer our customers complete maintenance and repair for AFS air purification devices and systems as well as HVAC systems. Regardless of whether maintenance, repair work, system overhaul, system inspection or cleaning – we are happy to do the job for you.

AFS as a General Contractor

As a general contractor, AFS assumes full responsibility for project management and logistics in the construction of AFS air purification systems. AFS engineers coordinate the construction sequence, assembly, and startup and, where necessary, coordinate closely with other companies that are participating in the project.