

MAHLE

Industrial Filtration

FILTRATION EXPERTISE FOR METALWORKING

PLANT AND MACHINERY CONSTRUCTION

NFV



EXPERTISE AND EXPERIENCE FOR YOUR APPLICATION

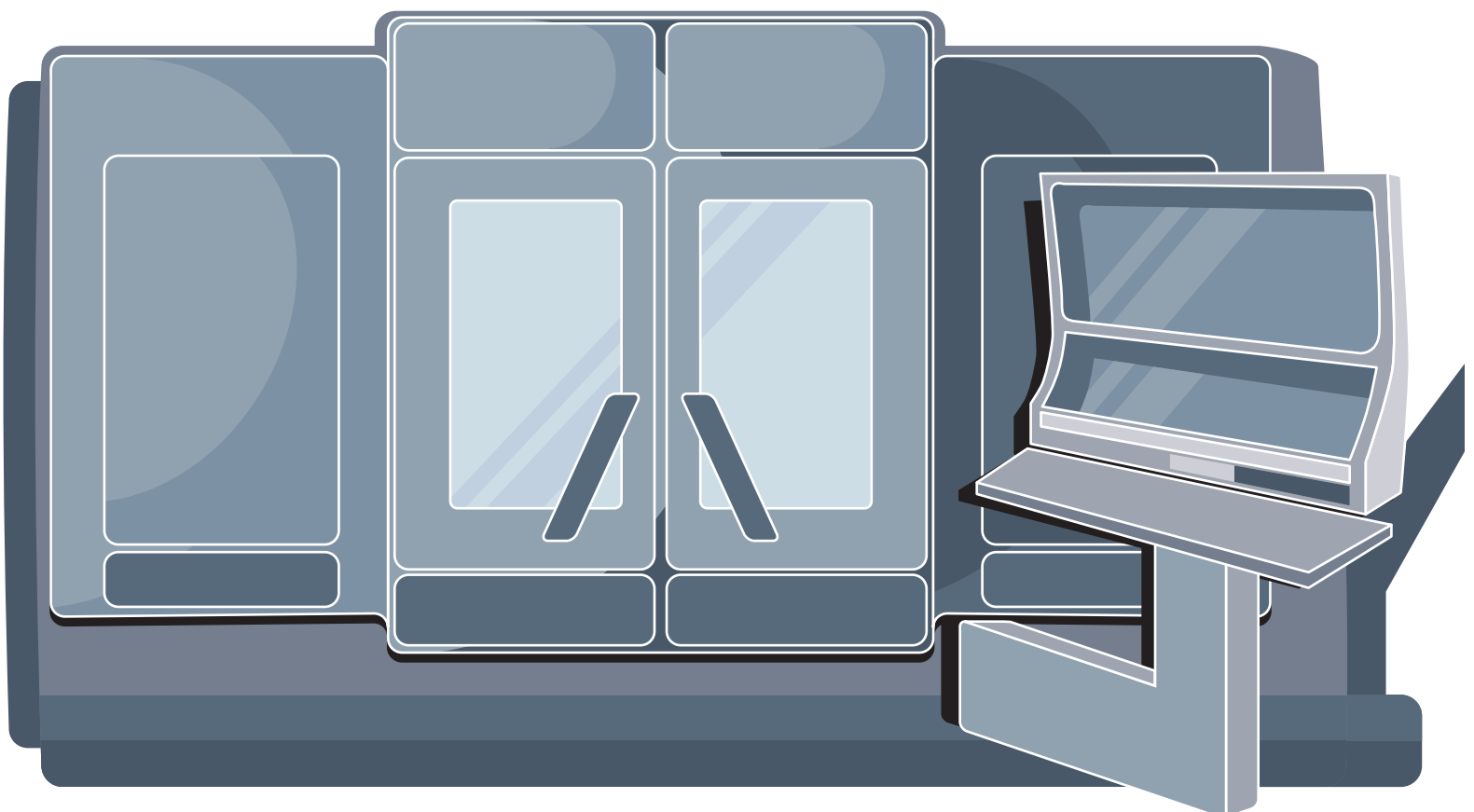
An innovative solution partner in your industry

MAHLE Industriefiltration has been producing high-quality industrial filters for fluid technology, dust filtration, and process technology for many years. They are used cost-effectively in plant and machinery construction, but also in many other applications, and are included as mandatory equipment in the plant equipment specifications of many industrial sectors.

MAHLE Industriefiltration is an independent service area with its own engineering, production, and sales teams, integrated in the MAHLE Group, and thus is backed by the strength of a worldwide market leader.

Whatever the application—we are there for you

Based on our experience across many industries, we combine all our expertise in a worldwide network, use synergies, and, as your partner, use the power of innovation to develop the optimal solution for your application, from filter elements to modules. With certified quality, of course. Designed and tested to DIN and ISO standards, with associated industrial approvals. In short, an engineering partnership for complete system solutions, with the extra service. For more functionality, more safety, more reliability and efficiency.





Filter solutions for hydraulic and lubricating fluids

As one of the worldwide leading partners in fluid technology, we provide machine manufacturers with highly effective filters and filter systems, units, and accessories, especially for metalworking, to keep hydraulic and lubricating fluids clean.



Filter solutions for cooling lubricants

Our automatic filters ensure automatic cleaning and disposal operations in metalworking. For the mechanical processes of filtration and separation, we provide tailored solutions.



Filter solutions for parts cleaning

In industrial parts cleaning, our filter solutions ensure high purity of the cleaning fluids and the components.



Filter solutions for air cleanliness

Our filters, equipment, and systems for the dust filtration of air and other gases increase productivity and contribute to product reclamation as well as increased environmental protection and safety at work.



Condition monitoring

Starting with the appraisal and evaluation of the condition of your filtration systems, we provide all necessary services for preventive, condition-oriented maintenance and repair. For optimal availability and safety.



Service

Our services range from analysis to engineering, commissioning, diagnostics, repair, and maintenance.

Our service team is on the spot for you.



Hydraulic filters

- Suction filters
- Pressure filters
- Duplex filters
- Return-line filters
- Bypass filters
- Air breathers
- Spin-on cartridges
- Filter assemblies
- Filter elements in standard design and acc. DIN 24550

More cleanliness, more safety—with efficient filter solutions

In plant and machinery construction, highly sensitive systems require effective filtration of fluid media, to remove solid or liquid impurities that cause abrasion, wear, and corrosion. The prescribed cleanliness classes of the fluid media must be maintained under all conceivable circumstances. We provide a unique filter program for this purpose, in both a standard version and a DIN 24550-compliant version.

Our filters separate water from oil circuits, and oil from water circuits. They reduce solid contamination to the prescribed contamination class, prevent intrusion of extraneous dirt, and maintain the properties of the pressure fluid over the long term. A clear advantage for you: longer service life, increased reliability, opera-

tional cost savings, and increased efficiency and profitability of your plants and machinery.

The multi-layered construction of MAHLE filter elements allows a broad range of applications and high dirt holding capacity. The filtration performance of the elements remains constant, even with increasing differential pressures, and provides maximum protection even under pulsating loads. Long filter service life with low flow resistance, guarantees optimal, economical application. With MAHLE maintenance indicators, maintenance is simplified and maximum economic efficiency is achieved with complete utilization of the dirt holding capacity of the filter elements.

HIGH LEVEL OF OPERATIONAL FOR YOUR PLANTS AND MACHINES

System competence provides safety

Due to the diversity of the information, data, facts, and system parameters to be considered, technically and economically optimal filter layout is a complex task that can truly be mastered only by an experienced expert. With decades of experience in fluid technology, and as an innovative development and reliable supply partner for the leading manufacturers of hydraulic systems and devices all over the world, MAHLE Industriefiltration is your expert systems partner in all areas of filtration of pressure fluids.

*Low-pressure filters**Duplex filter*

SAFETY



AUTOMATICALLY CLEAN

FOR MORE PERFORMANCE IN THE PRODUCTION

Automatic filters

- Automatic filter vario series
- Automatic metal-edge filters
- Automatic filters with internal-pressure segment cleaning
- Automatic filters with external-pressure segment cleaning
- Back-flushing filters with internal-medium cleaning
- Back-flushing filters with external-medium cleaning
- Screen basket filters as simplex and duplex filters

Non-stop safety with automatic filters

In metalworking and processing, even today, over 90 percent of the cooling lubricants in use must be cleaned in order to be able to meet the high quality requirements of the workpieces being machined, and to run production processes without interruption. For economical and safe treatment of all kinds of cooling lubricants for metal machining operations, as well as for rolling and drawing oils in sheet metal forming, we provide an extensive range of fluid filters—individually tuned solutions for your application.

MAHLE automatic filters allow rational non-stop operations with no downtime—with automatic cleaning and disposal operations. They clean most efficiently using internal-pressure segment cleaning or compressed-air segment cleaning, and meet the most strict environmental regulations.

Automatic filters with variable cleaning system

MAHLE automatic filters with internal-pressure segment cleaning are connected downstream of a central system for defined fine filtration. The filtered fluid is brought to the machine directly or via a storage reservoir, and the flow from the valves is returned to the central system for secondary treatment. The cleaning cycle is started automatically after the differential pressure is reached, and not later than after a defined period of time. Automatic filters with compressed-air segment cleaning can also be used as full-flow filters.

I PROCESS

Back-flushing filters with internal and external medium cleaning

The large back-flushing filters with varying cleaning can be used directly at the central system. The sophisticated design allows large filter surfaces in very small spaces. Continuous filtration ensures constant availability of the cooling medium. Fully automatic back-flushing of the pleated fabric, using the proven flushing nozzle principle, guarantees targeted cleaning with very small backflush volumes.

Screen basket filters as long-life universal units

Simplex and duplex filters from MAHLE are suitable for use with fluids of any kind, due to their fully developed design. They are equipped with cleanable metal filter elements that combine ease of use and cleaning with high durability and long service life. Screen basket filters ensure continuous filtration of coolants and lubricants and thus support the rational flow of production processes.



Automatic filter vario series



Automatic filter elements



Internal-medium back-flushing filter



PURITY LAW

SOLUTIONS FOR INDUSTRIAL PROCESS TECHNOLOGY

Cleaning without compromise

In metalworking, industrial cleaning of workpieces and components with sometimes different material combinations is becoming increasingly important—whether for the automotive or electronics industries, machinery and plant construction, medical technology, aerospace, hydraulics and pneumatics, precision engineering or fine mechanics.

The requirements on modern cleaning processes are increasing, not only with regard to surface quality, surface cleanliness, and the defined residual dirt values or residual particle values. Process reliability and environmental friendliness are also at center stage. In order to meet all the requirements in a cost-effective manner, the cleaning systems and installations must be equipped with powerful filter technology.

Our optimally tuned filtration and separation systems meet the rising quality standards in the industry for media preparation and cleaning. They ensure that cleaning fluids are available at a high degree of cleanliness for as long a time as possible—for greater economic efficiency, environmental compatibility, and shorter process times.

Filter solutions for the entire spectrum of parts cleaning

Products and systems these days must meet ever higher requirements. In order to meet these requirements, stricter and stricter objectives must be met in production. This can only be accomplished with high-quality components that are always clean. Parts cleaning is an essential step that affects the quality of individual components and entire systems. Due to

the importance of cleanliness in the production process, MAHLE provides efficient filter solutions for the entire spectrum of parts cleaning.

In the manufacture of complex parts, our automatic or bag filters ensure that coarser contaminants are reduced in the cooling lubricants, and thus prevent the need for premature cleaning and possible loss of quality in the process flow. In the next step of parts cleaning, individual customer requirements determine the product selection. In addition to the filter solutions already described for particles, MAHLE also provides mechanical emulsion and foam breaker (MESB) for attentive oil separation in critical process media, such as detergents. The MESB series for treating washing water works according to the basic principle of coalescence. They continuously consolidate fine droplets into larger drops, which then precipitate out of the main phase as a secondary phase under gravity. The main areas of application for these systems are washing bath or cooling lubricant treatment.

All MAHLE products can be combined into complete, customer-specific systems and can be applied without any problems and with excellent performance. We test every customer solution in advance, with all of its complex components, in order to provide you with high operational reliability, low maintenance costs, and significantly reduced change-over cycles of your washing baths.

Parts cleaning

- Cartridge filter elements
- Replacement for bag filter elements
- Stainless steel housings for cartridge filters
- Automatic back-flushing filters
- Mechanical emulsion and foam breakers



Mechanical emulsion and foam breaker



Automatic back-flushing filter



Cartridge filter elements



Replacement for bag filter elements



Stainless steel housings for cartridge filters

SEPARATE
DUST AND OIL
EFFICIENTLY AND RELIABLY



Less dust, less oil—more effective

For dedusting technology and oil aerosol separation in metalworking, which are especially challenging, we provide our customers with solutions that are optimized for their technical application, with specially developed cleaning systems. The compact, reliable, and easy-to-use filter systems stand out for their high dust retention efficiency and extremely economical service life. They exceed all requirements for air quality in workspaces and permissible exhaust air contamination.

Dry processing with maximum filter element service life

Dry processing and minimal lubrication are becoming increasingly significant for machine tools. Especially when machining gray cast iron, machining steels, and brass, they provide significant advantages.

Machining gray cast iron, for example, generates short chips that are very abrasive and a considerable proportion of fine dust. In order to keep the dust exposure on the machine and its surroundings as low as possible, the dust must be drawn off through suitable collection devices. Depending on the size of the machine, fine dust and chips are collected separately or together. MAHLE dust collectors for machine tools sepa-



Oil mist collector unit



Dust collector

rate the coarse chips effectively in the inlet area—with maximum filter element service life due to optimal flow guidance. All wear components can be replaced easily and inexpensively.

Oil aerosol separation in a closed cycle

For efficient, peripheral extraction and separation of oil aerosols and mists from the machine tool exhaust air, we provide an economical solution with our innovative LGA 600 oil mist collector unit. It is suitable for all non-water-soluble cooling lubricants, such as cutting oil, grinding oil, and bore oil. The principle: Oil aerosols are extracted from the machining space of the machine tools. The oil-bearing stream of air flows through the coalescer element, from inside to outside. The oil builds up on the fiber

mat as it flows through the filter. The smallest oil droplets are joined together into larger drops—they “coalesce”. The oil collects on the floor of the housing and is returned, through the oil drain hose, to the cooling lubricant reservoir of the machine tool. A high-pressure fan draws off the cleaned air stream and blows it upward through a silencer.

Air cleanliness

- Filter elements
- Cleaning systems
- Cleaning units
- Small dust units
- Top silo filters
- Product separators
- Bag dumpers
- Individual place dust collector
- Central dust collectors
- Filters for potentially explosive areas
- Cleanable inlet air filters
- Customized variants
- Accessories
- Test bench acc. VDI/DIN Directive 3926
- Oil mist collector unit

OBSERVE, INTERPRET, ACT

CONSTANT AVAILABILITY



Photo: Kuhnke

Condition monitoring—the basis for preventive maintenance

Today, no one can afford plant and machine downtime anymore. Continuous monitoring and evaluation of the condition of your filter system is therefore the best place to start to ensure uninterrupted availability of production. With our condition monitoring, all necessary maintenance and repair actions can be carried out early, if needed, to reduce stoppage time to the absolute minimum, or even prevented entirely.

From continuous monitoring of production to service

Condition monitoring allows production machines to be monitored around the clock. All measurement values relevant to filter performance are captured, formatted, displayed on the machine, and made available centrally or for access via internet. On the basis of these data, maintenance and service work can be initiated at the optimal time, necessary spare parts can be ordered, and the employment of service specialists can be coordinated.



Turbidity sensor



Maintenance indicators



Portable contamination measuring system

Data acquisition with modern monitoring metrology

With modern metrology from MAHLE, the physical measurement parameters for the system, such as particle size, temperature, pressure, viscosity, dielectric constants, and so forth, are precisely captured—the basis for all further actions. Various measurement systems are available for this purpose:

- for temperature measurement
- for fill level measurement
- for flow measurement
- for water measurement
- particle counters acc. ISO
- sensors for various measurement parameters that provide data on the condition of the oil
- data collection systems with query capability
- differential pressure measurements

Data storage and interpretation for preventive maintenance

The data acquired are stored and available for later access at any time. A sensible interpretation of the condition of the filter system is derived from the data. Depending on the condition of the system, it indicates the necessary actions for preventive, condition-oriented maintenance and service.

Condition monitoring—your advantages:

- Higher availability of production systems
- No uncontrolled machine downtime
- Storage of measured data on the condition of the machine
- Optimum timing for planned service work (not too early, not too late)
- More economical service intervals
- Reliable availability of MAHLE replacement filters

MORE INNOVATION, MORE PERFORMANCE MORE SERVICE

FROM DEVELOPMENT TO OPERATION

Setting standards with customer-oriented solutions

The thoroughness with which we perfect solutions down to the smallest detail, and tune them to our customers' individual applications, is surely one of the reasons for our worldwide success. Because we know the complex interactions of filter technology better than anyone, from many industries and from our own research and development activities. That is why we always look at the complete system so as to develop a technically and economically optimized filter design. We take into consideration a great deal of information, data, and system parameters in order to tailor everything to your needs, from the fineness to the location of the filter.

In our own research and development labs, we create the foundation for groundbreaking innovations. Using modern application technology, we carry out basic experiments, volume flow measurements, sample tests, particle size analyses, and pressure and leak testing. The knowledge gained continuously flows into new material and product developments, which will need to stand up to the most severe daily conditions at our customers. To do this, for example, we start with practical principle experiments with test filters at our customers' sites.

Performance that can be measured

In order to evaluate the efficiency of filtration, we can provide a wide range of experiments in our lab. For mobile online measurement of impurities in fluids and for sampling, we have mobile measurement systems available.

Service, from spare parts supply to training to maintenance contracts

Our extensive filter technology program also includes high-performance spare parts service for worldwide availability. The replacement filter elements are manufactured according to the same strict quality criteria as the original MAHLE filter elements. Customer-specific special versions available upon request. We teach professional service and maintenance in practical training sessions. And for commissioning or maintenance on site, our service technicians are available worldwide. Upon request, we also provide complete maintenance contracts—so you don't have to worry about a thing. The result: more reliability, more efficiency, and more performance for you.

We will be happy to provide more information about MAHLE filtration processes in metalworking. We will provide thorough, expert consultation on the development of a customized solution for your special requirements.



Oil sample analysis in the lab



Sampling case



Filter elements

MAHLE

Industrial Filtration

MAHLE Filtersysteme GmbH
Industriefiltration
Schleifbachweg 45
D-74613 Öhringen
Phone +49 (0) 79 41-67-0
Fax +49 (0) 79 41-67-234 29
industriefiltration@mahle.com
www.mahle-industriefiltration.com

MAHLE Industriefiltration GmbH
Plant Hamburg
Tarpenring 31-33
D-22419 Hamburg
Phone +49 (0) 40 -53 00 40-0
Fax +49 (0) 40 -52 76-567
mahle.nfv@mahle.com
www.mahle-industriefiltration.com

MAHLE Industriefiltration GmbH
Plant Flintbek
Hörn 14
D-24220 Flintbek
Phone +49 (0) 43 47-904-0
Fax +49 (0) 43 47-904-120
mahle.ako@mahle.com
www.mahle-industriefiltration.com

www.mahle-industriefiltration.com

76946172.08/2008

