

MAHLE

MAHLE Industrial Filters Filters for marine applications



Advanced systems, modules and components of superior precision and quality, for engines, motor vehicles, and industrial applications – the MAHLE Group has more than 30,000 employees devoting their skills to these solutions at 64 production locations worldwide. At our plant in Öhringen, we have been active in the development and production of industrial filters since 1962. Today, our R&D activities, production, and the international marketing of the product areas liquid technology, dedusting and automatic filters are also concentrated here.

Product expertise – with the added bonus of system competence

MAHLE Industrial Filters

The Öhringen plant employs some 800 highly qualified staff. Our industrial filters production program covers filters and filter systems, equipment and accessories for fluid technology, dedusting equipment and dedusting plants, as well as automatic filtration systems for the coarse and superfine filtration. Through the ongoing process of development work into materials and production technologies, we are able to ensure products of the highest possible quality that meet exacting technical requirements with optimal cost-effectiveness. Our production is certified to DIN EN ISO 9001 and our environmental management to ISO 14001 and EMAS. And, as you may expect, MAHLE products are accepted by classification societies such as GL, Lloyds and DNV. We continue to be successful in constructing our future in keeping with our customers' wishes and requirements.



MAHLE industrial filters, Öhringen plant

Perfection in all application areas

Highly effective filters and filtration systems, equipment and accessories for ensuring the cleanliness of hydraulic fluids – all this ensures MAHLE is the competent partner worldwide for OEM manufacturers and for the operators of mobile and stationary hydraulic plant.

MAHLE dedusting equipment and systems make an active contribution to environmental protection and job safety, and are successfully applied in product recovery.

The benefits of rational non-stop operation, supported by automatic cleaning and waste disposal processes, have led to the application of MAHLE automatic filters for coarse and superfine filtration in a wide range of application areas: the regeneration of cooling lubricants, liquids for use in rolling, drawing, scouring, and similar applications, and the filtration of fuels and lubricants in large diesel engines for use in marine applications and power station technology, to name just a few examples.



Filters for marine applications

With many years experience in complex systems and covering a wide range of applications, MAHLE is a much sought-after partner for manufacturers active in marine engineering and for operators of marine technology. After all, MAHLE is a major systems supplier for large engines, manufacturing pistons and engine components itself – giving it a leading edge in technical expertise and enabling perfectly matched solutions.

and satisfying our customers' ever-increasing service requirements. Reliability, top quality, flexibility and timely delivery: at MAHLE this not only applies to original equipment, but as you would expect to the aftermarket, too.

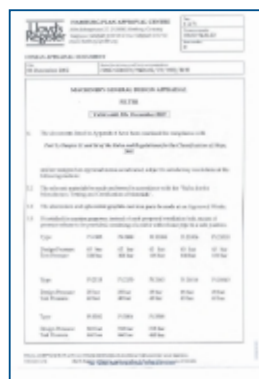
MAHLE industrial filters are applied as:

- Lube oil filters
- Hydraulic filters
- Transmission oil filters
- Fuel filters (gas oil and MDO)
- Media filter and coolant filters
- Intake air cleaners
- Bilge water filters
- Grey water and black water filters



MAHLE services in a word

MAHLE Industrial Filters offers a complete range of products. Whether it's a customized product solution or a standard range featuring filter elements that are also suitable for other manufacturers, as your single-source partner we can process orders efficiently and with optimal cost-effectiveness. Operating with sales partners on a regional basis and through our central warehouse with its state-of-the-art logistical equipment, we deliver to customers all over the world, providing rapid delivery



Since the early 1960s MAHLE has been active with the filtration of hydraulic media and liquid lubricants. Today, this product group forms the heart of the Group's production program. MAHLE's superior technical expertise and the outstanding quality of its products have made MAHLE into a major worldwide manufacturer of filtration systems, equipment and accessories for fluid technology.

The master of every challenge



Pressure filters of various design



MAHLE duplex filter Pi 370

MAHLE hydraulic filters

Highly efficient filtration is a requirement for the proper functioning of modern hydraulic systems. Solid and liquid contaminants causing abrasion, wear and corrosion have a negative effect on the physical and chemical properties of the hydraulic fluid.

As part of a hydraulic and lubricating system, filters have the task of reducing particle contamination to the required level and of maintaining this level during operation over a long period of time. The correct choice of MAHLE filter will ensure the required purity standard is adhered to in conformity with the usual international standards ISO 4406/1999 and NAS 1638.

MAHLE offers a wide range of hydraulic filters for various applications and functions. The product range covers suction filters, pressure filters, duplex filters, return-line filters, partial flow filters, breather filters, filter devices and elements, as

well as accessories and service equipment. You will find details of the various models available in our brochure on fluid technology.

Pressure filters

MAHLE pressure filters are designed for use as full or partial-flow filters, for operation in the low pressure range (up to 25 (60) bar), the medium pressure range (up to 210 bar) and the high pressure range (up to 450 bar). They are installed downstream of the pump and the pressure limitation valve, and upstream of the components that are to be protected, thus ensuring protection against various types of contamination within the system. Pressure filters are available in a variety of designs, as line filters, flange filters and filters in sandwich plate design – with excellent flow characteristics and equipped with a rugged casing.



Vario system on the ship Mersk Arun



MAHLE duplex filter Pi 210



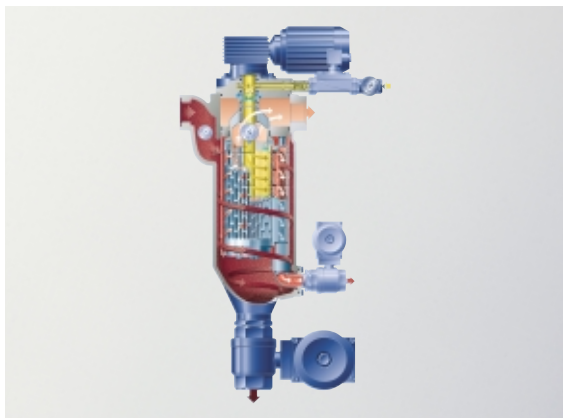
MAHLE lube oil filter Pi 3000

Duplex filters

MAHLE duplex filters with patented single-hand operation and loss-free change over of flow provide maximum economy. Designed for application in the low and medium-pressure ranges, or as return-line filters with uninterrupted operation 24 hours a day, service work can be carried out while the filters remain fully functional – filtration performance remains unimpaired.

Lube oil filters

MAHLE lube oil filters provide highly efficient filtration, long service life, and low flow resistance, even when coping with high viscosity media. Whether as simplex line filters or in duplex filter design with patented single-hand operation, as automatic filters with backwashing or as metal-edge filters, they perform impressive service in marine applications with all types of lubrication.



Structure of an automatic filter, vario series AF 173

MAHLE automatic filters AF 113 and AF 173, from the vario series, are ideally suited for engine oil maintenance. With their simple systems technology and compact controllers, vario filters easily adapt to virtually any application. And with their patented segment cleaning they achieve particularly high specific filtration performance. The degree of filtration can be selected to between 100 μm and 5 μm , depending on the application location, with 24 hour unsupervised operation, thus saving space and the unnecessary costs associated with oil cleaning processes.

The low-maintenance, trouble-free operation of the prime mover over the longest possible length of time depends to a great extent on the design, quality and construction of the fuel filter. MAHLE offers a wide range of filter materials and filter casings with excellent flow characteristics. And MAHLE air cleaners ensure that compressors, vacuum pumps and combustion engines receive a continuous supply of clean intake air.

Full steam ahead, at all times



MAHLE high-performance filter Pi 230



MAHLE automatic filter, vario series AF 113 GM

MAHLE fuel filters

MAHLE Industrial Filters develops and manufactures optimal solutions for large engines – in superior quality and state-of-the-art design technology.

The tried and tested duplex filters of the Pi 210 and Pi 370 series, with patented single-hand reversal, and the Pi 230 series as a modular filtration system for separation in the range between 25 µm – 2 µm are designed for application in fuel systems.

The compact MAHLE automatic vario systems, AF 173 GM and AF 113 GM, are ideal for meeting the requirements of large diesel engines and gas turbines. At degrees of filtration of 10 µm and 20 µm, vario filters are capable of cleaning up to 24 tonnes of fuel per day, and considerably more when arranged in parallel. Approved by various classification societies, these MAHLE fuel filters ensure the uninterrupted operation of engines and turbines.



The ship of one's dreams, sailing the high seas with MAHLE



MAHLE suction filters



MAHLE 7000 series air cleaner system

MAHLE suction filters

MAHLE suction filters ensure compressors, vacuum pumps and internal combustion engines receive a continuous supply of intake air. State-of-the-art filter elements make possible low flow resistances and high dust removal capacities. Equipping the filters with suction noise suppressors also makes it possible to reduce the noise level.

MAHLE dust filters

MAHLE dust filters and suction filters for turbines are designed to cope with heavy dust loads. MAHLE dust filter elements are especially designed for dedusting systems, operating reliably in continuous mode. The patented MAHLE multi-jet nozzle provides a greatly reduced noise level while maintaining optimal cleaning.



MAHLE filter elements



MAHLE filter systems are becoming increasingly important for the treatment of various types of water. Filters designed for "oily" liquids are optimized for application in water, and are currently being successfully applied in sewage works, vehicle washing plant and part washing units. Free water causes clouding in oils and fuels and reduces the effectiveness of the system. A filtration concept comprising water filters, water identification and water removal makes it possible to effectively combat this potential contamination hazard.

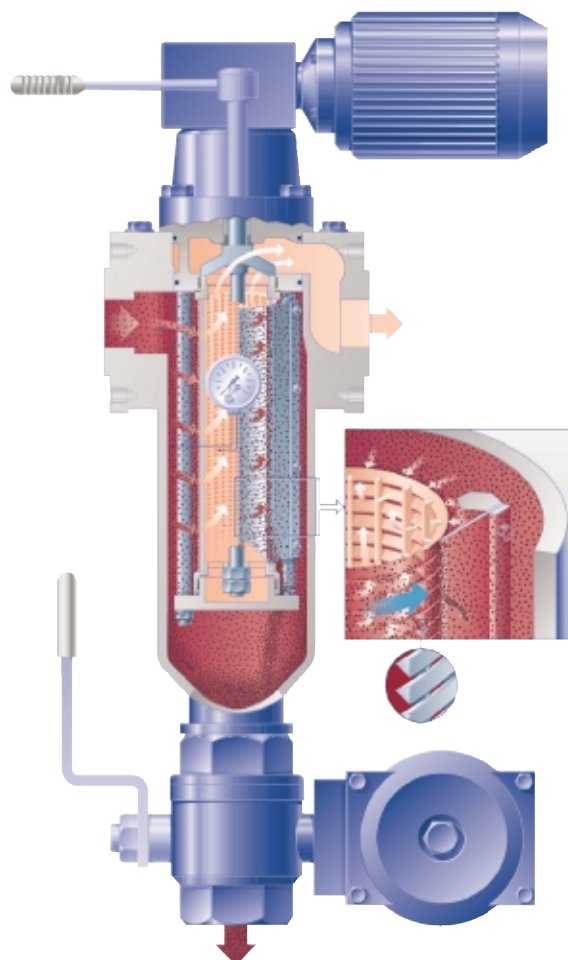
All-round protection against downtimes

Water filters

Many of the filtration principles found in MAHLE automatic filters can be applied in cleaning water of all kinds. In these applications, the interior parts of the filters are made of stainless steel. The casings are also made of stainless steel, or of nodular cast iron provided with a special coating.

The principle of metal-edge filters is applied, e.g., when cleaning bilge water in order to protect the jets, the oil separators and the separator plates. Automatic filters are applied when reprocessing grey water and black water in order to produce process water.

Automatic filters of the vario series really come into their own where cleaning strategies are concerned. In-situ high-pressure cleaning removes even stubborn contamination by grease, fibers and sticky substances at pressures of up to 120 bar. Filters with combined cleaning systems complete the scope of supply.





MAHLE turbidity sensor PIT 400



MAHLE coalescer filter PIW 1975

Water identification

The MAHLE PIT 400 turbidity sensor quickly and reliably identifies the ingress of water in a system. It can be effectively applied in hydraulic and fuel systems where there is the risk of contamination by water.

Water removal

To remove free water from oils and fuels, MAHLE Industrial Filters has developed the coalescer filter, PIW 1975. It functions simply and inexpensively, without absorption media: specially arranged filter elements made of special materials collect the small water droplets suspended in the liquid and effectively remove them.



3-piece compact system AF 173

Having proved themselves in countless practical applications, MAHLE filters provide trouble-free, economical operation in engines and plants all over the world – a fact that is ensured by consistently high standards guaranteed by our meticulous testing to all major international standards. MAHLE Industrial Filters also provides features such as mobile measuring equipment, as well as the required accessories for continuous controls on site.

The brand for powerful products



MAHLE filter elements



MAHLE particle counter PIC 9100

The MAHLE filter concept

With the vast array of information, data, statistics and system parameters available, the technically and economically optimized design of a filter is a complex task which can only be effectively performed by experienced specialists. Starting from the source of contamination, the entire system needs to be taken into account; only then can the degree of filtration be determined and the site where the filter is to be installed upstream of the component you wish to protect planned.

MAHLE is a competent systems partner for companies active in the marine and machine engineering industries – for engine builders such as MAN B&W, for transmission engineers such as Reintjes, Sauer & Sohn, or Hatlapa, for the manufacturers of deck machines, for operators such as URAG tugboat services, Fairplay, and Interscan, and for the constructors of wind turbines such as Vestas. The areas of application for MAHLE filters ranges from

supplying water to an offshore drilling rig to providing transmission oil for a wind turbine.

MAHLE filter elements

Our comprehensive range of products in standard and DIN versions also contains particularly economical alternatives to other brand products. MAHLE filter elements for trade application (replacement part requirements) are manufactured in the same production plants and to the same quality criteria as genuine MAHLE filter elements – also as special customized versions if required.

MAHLE service equipment

Specially designed for the mobile online measurement of fluid contamination, MAHLE offers the portable particle counter, the PIC 9100. This easy-to-handle device measures and displays the absolute number of particles and purity standards in conformity with ISO 4406 and NAS 1639.

MAHLE service performance

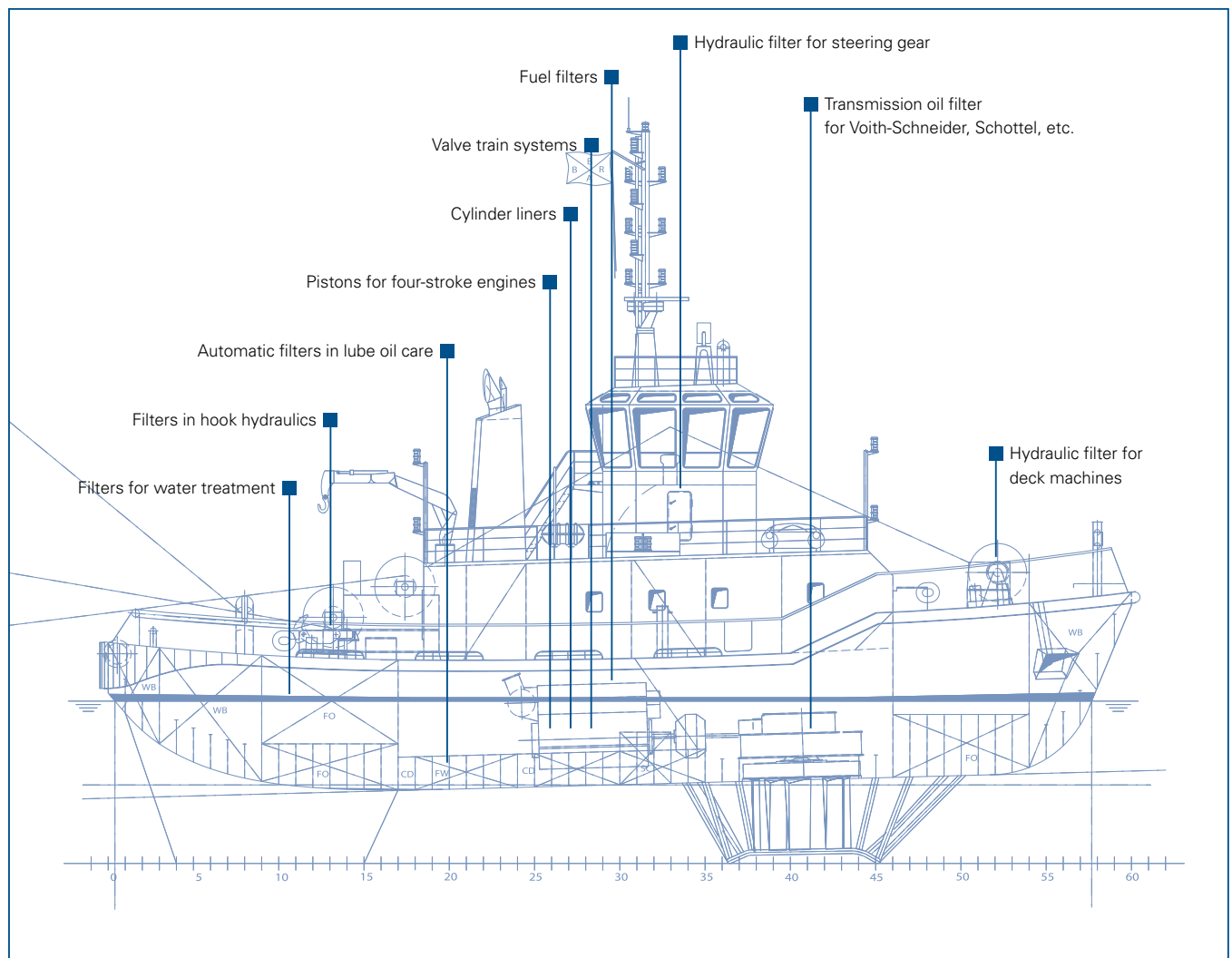
To assess just how efficient the filtration process is, a large number of tests can be carried out in MAHLE's laboratories:

- Total contamination to ISO 4405, expressed as particle count or concentration
- Gravimetric screen analysis, in classes from 1 µm to 100 µm
- Automatic particle counting to ISO 4406 (1999) and NAS 1638
- Microscopic analysis, visually or with electronic image evaluation
- Examination via scanning electron microscope or EDX

To make sampling easier, MAHLE has put together a sampling kit. The kit comes complete with sample bottles to ISO 5884.



MAHLE sampling kit



MAHLE on board



MAHLE Filtersysteme GmbH
Bereich Industriefilter
Schleifbachweg 45
D-74613 Öhringen
Phone +49 (0) 79 41/67-0
Fax +49 (0) 79 41/67-4 29
E-Mail ub2.industrie@mahle.com
www.mahle.com