

# More than equal to the task

Filter solutions from MANN-FILTER for commercial vehicles



# At MANN-FILTER, we strive for only one thing: the best!



## Quality in research and development

- MANN-FILTER is continuously working on the further development of products and production processes.
- A wide variety of test systems and processes based on ISO standards are already applied in the product development phase.
- Prototypes are tested for functional reliability in large-scale function and endurance tests.
- In series production too, MANN-FILTER products are regularly audited to Group specifications which apply to all locations world-wide.



## Quality in production

- Every production location in the world works according to the production and quality assurance guidelines defined and reviewed by the main factory in Marklkofen (Bavaria, Germany).
- Before they are introduced, all new manufacturing and production processes are tested and approved by an independent quality body.
- Qualified employees ensure that only original equipment quality leaves the factory – no matter where they are in the world.



## Quality in control

- Regular independent certification audits ensure that products are manufactured to the same standards all over the world regardless of the location.
- Every production location has its own quality organisation with a quality officer in charge.
- All production factories are certified to Technical Specification ISO/TS 16949:2002. Certification is reviewed every year and repeated every three years.
- MANN-FILTER complies with the environmental standards contained in DIN EN ISO 14001. All production locations are certified to this international standard.



# Tough performer

Extreme temperatures, long service lives and highly polluted ambient air – commercial vehicle filters must carry out their duty reliably in very tough conditions. More and more commercial vehicles are being equipped with OE quality filter solutions in order to minimise cost- and time-intensive downtimes from the outset. Of course, with filters from MANN+HUMMEL.

For over 70 years, research and development engineers at MANN+HUMMEL have been continuously working on improving the efficiency of commercial vehicle filters. Over the years, a number of innovations have been introduced onto the market to the daily benefit of forwarding companies, bus operators and construction and agricultural machine owners.

Reliable partners and a world-wide sales organisation ensure that commercial vehicle filters from MANN-FILTER are now available almost everywhere in the world – of course in original equipment quality.



Long service life even in the toughest conditions

## MANN-FILTER benefits that pay off for you

- ⊕ Over 70 years' experience in developing new filter solutions
- ⊕ Tested original equipment quality
- ⊕ Long service life
- ⊕ Wide range of filters
- ⊕ Full range of services
- ⊕ and much more

# Oil filters from MANN-FILTER

## Always a clean solution for oil circuits

The combustion process produces dirt particles and combustion residue which find their way into the engine oil. An oil filter removes this residue reliably from the engine oil. Without it, it would no longer be possible to supply the engine with the clean oil it needs or provide the necessary protection from wear. The risk to the engine is a loss of power and an increase in oil consumption. It may even result in engine damage in the worst case.

### Better to be on the safe side

MANN-FILTER oil filters reliably remove impurities from oil circuits. Clean oil reduces friction in the bearings, lubrication gaps and moving parts and helps to maintain the engine service life.

### Good for the environment

Oil filter elements from MANN-FILTER can be fully incinerated and are easy to dispose of. In addition, the development of new filter media places great importance on using as many materials as possible made of regenerative raw materials.

### Meet every requirement

Oil filters from MANN-FILTER for commercial vehicles are perfectly tuned in shape and function to the toughest operating conditions. The MANN-FILTER product portfolio comprises a wide variety of designs for many different applications:

- Oil filter elements and spin-on oil filters for main flow and bypass applications
- Metal-free and very environmentally friendly filter elements
- Gearbox oil filter elements
- Rotor inserts made of metal or plastic for use in the bypass flow of free flow centrifuges

## Advantages of MANN-FILTER oil filters

- ⊕ Optimum protection for the engine
- ⊕ Pressure-resistant and anticorrosion protected spin-on filter housing
- ⊕ Long life filter media
- ⊕ Long life sealing rings
- ⊕ Non-return stop membrane made of high quality silicone
- ⊕ Teflon-coated bypass valves
- ⊕ Fast filter change with practical release devices

### REGULAR OIL FILTER CHANGES

depending on service intervals have a positive effect on engine service life – and also on the efficiency of commercial vehicles.



# Fuel filters from MANN-FILTER

## Sustaining full engine performance sustainably

Modern engines are continually pumping out more and more power from less and less fuel. This is the job of highly sensitive and complex components such as the fuel injection system. Serious damage from wear and corrosion can be avoided by filtering out dirt particles and free water suspended in the fuel.

### Reliable protection

MANN-FILTER fuel filters reliably separate dust, rust, water and all other dirt particles that cause wear. This protects sensitive components and ensures the operational reliability of the engine.

### Equal to their task

Modern and highly sensitive fuel injection systems require innovative new solutions at the highest quality level. This is another segment which is optimally covered by the wide variety of fuel filters from MANN-FILTER. Take the high performance MULTIGRADE filter media as an example.

### Highest quality

Technical cleanliness is a basic quality feature which is gradually gaining in importance as engines become more and more fuel efficient and fuel injection systems are highly sensitive. MANN-FILTER meets this challenge head on by providing a complete quality management

system along the entire value added chain – from suppliers through to the servicing workshop – to reduce filter element contamination by foreign particles to a minimum. Components sensitive to contaminating particles can therefore be produced under cleanroom conditions – which you can recognise by the CCM label.

### Designed for top performance

MANN-FILTER fuel filters for commercial vehicles are available in various designs:

- Fuel filter elements – some metal-free
- Spin-on fuel filters
- Inline fuel filters

### MULTIGRADE : more performance – more protection

Multilayer MULTIGRADE F filter media have a much higher performance than the usual market standard. Fuel filters produced in this way optimally match the purpose for which they were made.

## Advantages of MANN-FILTER fuel filters

- ⊕ Very high separation efficiency
- ⊕ Very high functional reliability of fuel injection components
- ⊕ Greater engine protection
- ⊕ Extremely reliable over the entire service interval
- ⊕ Maximum safety margins



### FUEL FILTERS IN COMMERCIAL VEHICLES

are expected to work at top performance consistently. But at some point in time, their dirt absorption capacity is exhausted and the filter medium is liable to blockage. To be on the safe side, the filter should be changed within the specified intervals.

# Air filters from MANN-FILTER

## Stop performance biting the dust

Soot, fine dust, pollen and many other substances are constantly present on construction sites, on farmland and of course along every kilometre you drive. If the air filter is not in perfect condition or intact, dirt particles can enter the combustion chamber, create score marks on the pistons and cause premature engine wear. Even electronic components such as sensors located along the path between the air intake and the combustion chamber may also sustain damage due to inadequate filtration and, in the worse case scenario, they may be destroyed. Of course there is an easy solution to all this. Simply rely on original equipment quality air filters for commercial vehicles.

### Tough performer

Through high grade workmanship in original equipment quality, air filters from MANN-FILTER are extremely robust and retain their shape. The filter elements are an easy match for even strong mechanical loads, for example when fitted in confined spaces or locations difficult to access. They filter the intake air efficiently and reliably to ensure optimum composition of the air-fuel mixture – a vital precondition to keep engine output at a constant level.

### Clean solution

The majority of MANN-FILTER air filters can be completely incinerated and can therefore be disposed of without any problem.

### Flame-retardant

Glowing cigarettes may pose a serious danger if the air filter is not treated with a flame retardant impregnation. Numerous MANN-FILTER air filters already have this special impregnation which is insoluble in water. It reliably prevents the air filter from bursting into flames if hot cigarette ash is ingested into the air intake. Valuable protection for capital-intensive commercial vehicles.

### In top shape

Trapezoidal, oval-conical or stepped – MANN-FILTER offers a wide variety of products with hundreds of shapes to meet increasing demands even in confined spaces.

### High performance in a compact size

Micrograde G is MANN-FILTER's response to the automotive industry's demand for space-saving solutions, greater dust capacity and longer service intervals. The cellulose fibre filter medium has a gradient structure which swallows up to 20% more dirt than comparable paper filters containing standard cellulose filter media.

### Stable performance

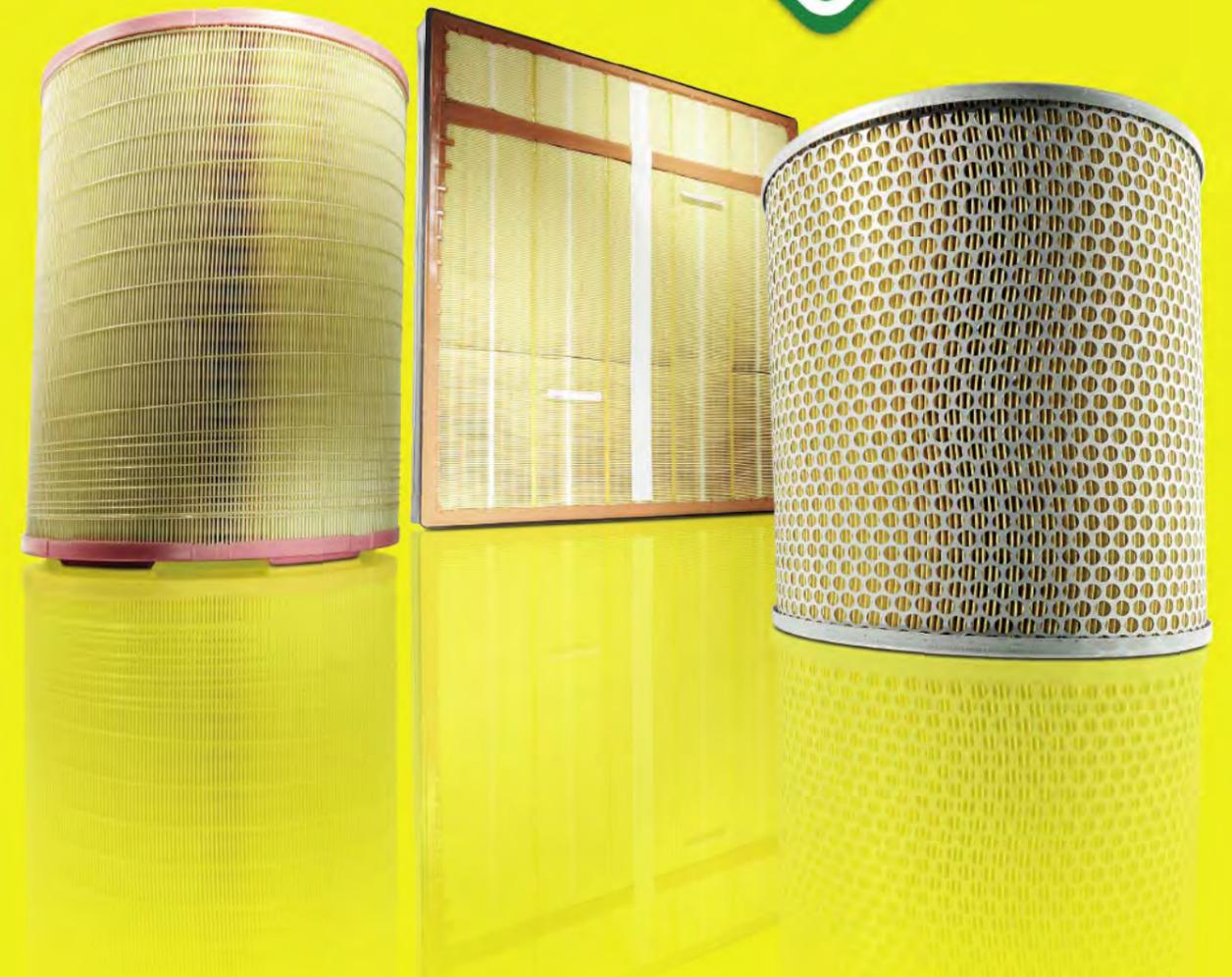
The stabilising spiral wound strap technology not only reduces weight, it also lengthens service life, improves water rigidity and lowers differential pressure. This pioneering technology is gradually being introduced to more and more MANN-FILTER air filters.

## Advantages of MANN-FILTER air filters

- ⊕ Functional reliability over the entire service interval
- ⊕ Very high level of dirt separation efficiency and low flow resistance
- ⊕ Low flow resistance
- ⊕ Long term 100% impermeability
- ⊕ Special paper impregnation provides highly stable pleats
- ⊕ Optimum protection for engine, air flow meters and other sensitive components
- ⊕ Extreme flame resistance due to specific impregnation

## AIR FILTERS IN COMMERCIAL VEHICLES

operate in very heavy duty conditions every day. They require replacement at regular intervals – preferably with a MANN-FILTER air filter in original equipment quality. Refer to the automotive manufacturer's specifications for the date of the next filter change.



# Cabin filters from MANN-FILTER

## Breathe freely despite heavily polluted ambient air

Dust, pollen, soot and pollutants such as nitrogen oxides or ozone play a considerable role in reducing driver concentration. Asthma sufferers in particular really appreciate good air at the workplace. People who spend a lot of their time at the wheel should at least be able to breathe freely. Cabin filters from MANN-FILTER are the solution here.

### Effective protection

MANN-FILTER cabin filters offer almost 100% protection against undesired particles – in the form of combination filters which even separate pollutant gases. They create a pleasant atmosphere of well-being in the vehicle interior, especially for persons suffering from allergies or asthma. MANN-FILTER cabin filters also provide effective protection for air conditioning systems. They make a major contribution in protecting air conditioning systems from contamination so that they can operate efficiently for longer periods.

### Reliability from the factory

More and more commercial vehicles are being equipped with cabin filters. More and more manufacturers select products from MANN+HUMMEL in original equipment quality.

### Easy to handle

Detailed workshop manuals help MANN-FILTER workshops and car owners to change filters. The easy to understand instructions describe how to find the fitting location quickly and it takes no time at all to fit the new filter.

### Well made

MANN-FILTER cabin filters come in two versions: firstly a high quality particle filter and secondly a combination filter with activated carbon. The activated carbon layer embedded in fleece bonds pollutant gases such as nitrogen oxides, fuel vapours or ozone in the pores which are 10,000 times finer than a human hair. This stops the ingress of undesired visitors and ensures a pleasant workplace for drivers.

## Advantages of MANN-FILTER cabin filters

- ⊕ Optimum ventilation of the vehicle interior due to very high air flow rates
- ⊕ Even the smallest of particles is reliably filtered
- ⊕ Constant filtration performance over the entire service interval
- ⊕ Excellent filtration results by combining mechanical and electrostatic separation
- ⊕ Perfect fit
- ⊕ Excellent air-tightness
- ⊕ Detailed mounting instructions
- ⊕ Easy to fit
- ⊕ Wide range coverage

### DIRT, POLLEN, DUST AND BACTERIA

not only burden cabin filters as they become older, but also drivers. Changing the filter regularly is indispensable to ensure safe driving and maintain driver concentration.



# Special solutions from MANN-FILTER

## Valuable hardware for heavy duty commercial vehicles

Special tasks require special solutions. MANN-FILTER offers a wide range of products specially designed for use in commercial vehicles. So if you refuse to make any trade-offs when it comes to the quality and service life of special filters, air dryer cartridges and centrifuge rotors, then opt for the tested original equipment quality from MANN-FILTER.

### Drying agent boxes

The compressed air system is one of the most important safety and function related components in a commercial vehicle. Dry, clean air is particularly important for the pneumatic brake systems in commercial vehicles and buses since it protects the system against corrosion and malfunctions. MANN-FILTER drying agent boxes reliably dehumidify compressed air, trap oil droplets and so provide optimum protection to the entire compressed air system. No matter whether it is a question of pressure, pulsation or vibration resistance, drying agent performance or sealing material durability: MANN-FILTER drying agent boxes meet all the requirements: they are safe, high-performing and functional.

### Cooling water filters

Cooling fluid has an important task: it dissipates heat from the engine and protects it from overheating. In order to guarantee reliable cooling in extremely cold conditions in winter or in very hot conditions in summer, the narrow conduits in the engine block and cooling system must remain free from deposits.

This is where the robust and durable MANN-FILTER cooling water filters show their true colours: they consistently filter suspended particles and impurities from the cooling fluid. The result is an engine that stays cool under all conditions.

### Transmission oil filters

High performance, high gear shifting convenience, maximum operating safety: modern transmission designs are dependent on perfect lubrication and therefore require filter media that reliably free transmission oil from undesirable particles over long periods. High-quality MANN-FILTER transmission oil filters ensure a high degree of oil purity and provide optimum protection against wear in sensitive transmission components. We individually adapt the design, filter medium and housing materials of our filter solutions to meet the diverse requirements of different transmission designs. Our high-performance filter media, made from paper, non-woven material and glass fibre, are therefore used in many different housing types, e.g. as compact flat filters in fully plastic designs or as cost-effective spin-on filters.

### Centrifuge rotors

Soot particles result from the combustion of diesel fuel and some of these particles are then entrained in the lubricating oil. Modern oils containing additives keep these soot particles in suspension to prevent sludge deposits from forming in the engine. The consequence: more and more wear-inducing particles thicken the engine oil. The solution lies in a process in which part of the lubricating oil is diverted and filtered finely by a secondary flow centrifuge. The MANN-FILTER centrifuge can even separate very fine soot particles (1 µm) from the oil and so support the main flow filter.

The centrifuge rotor turns by the pressure of the diverted oil flow. Depending on oil temperature and viscosity, the rotor can rotate at more than 10,000 rotations per minute. This presses impurities suspended in the oil against the outer wall of the centrifuge where they are compressed and adsorbed. Centrifuge rotors are therefore a reliable means to free oil from even very fine solid particles, such as dust, abraded metal and soot particles.

### Urea filters

As exhaust emission limits become more and more severe, the use of SCR systems is becoming indispensable a growing number of commercial vehicles. In order to reduce pollutant emissions by up to 80 per cent, a urea-water solution is added to transform pollutant gases into harmless nitrogen and water. Urea filters from MANN-FILTER protect sensitive injectors and other system components from wear and lengthen the service life of the entire dosing unit.

