

SOLUTIONS START WITH IDEAS

THE MANN+HUMMEL GROUP



Commitment and enthusiasm **are worlds apart**

With us, they come together day by day, they work hand-in-hand. They appear in results and cash flow, in figures and balance sheets, growth curves and healthy utilisation of capacity. Both become evident in the satisfaction of our customers and colleagues. They also confirm our philosophy:

“Global Leadership with Filtration in Liquid and Air Systems” – that is the MANN+HUMMEL Vision. This Vision essentially consists of the building blocks innovation, globalisation and increased profitability, and is based on motivated and well-qualified personnel. Our Vision outlines a clear and ambitious path. It provides orientation for the strategic objectives of the MANN+HUMMEL Group, and direction for all Divisions and employees.

Our Group was founded in 1941 as an automotive component supplier in the filtration technology area. Today, we have become a byword for quality and innovation world-wide. We aim to maintain and extend this leading position. Our activities are focussed on this.

It can be achieved through the commitment and enthusiasm of each and every employee. Commitment and enthusiasm supply the momentum for continuing innovation, and secure a competitive edge for you and for us world-wide.

Global Leadership with Filtration in Liquid and Air Systems

We aim to be pro-active and not simply reactive.

- Through innovation, because we owe it to our customers, and we are enthusiastic about technical progress. We offer innovative solutions to our customers which help them to constantly improve their products. With developments which offer them the best price:benefit ratio and make us the preferred business partner.
- Through globalisation, because our customers operate globally, and quite rightly expect the same from us. The ability to carry out international projects effectively and in a customer-orientated way is a basic pre-requisite for successful business partnerships. Through co-ordinating processes and understanding different cultures, through transferring know-how between employees from different countries, we will develop more and more from an international company to a global one.
- Through increased profitability, because our customers want to have a business partner who is not only innovative, but also sound and reliable. A partner who sees market requirements as opportunities, and can implement them profitably. With investment in new technology and opening up new markets – with a powerful strategy for future growth.

We would be pleased to convince and inspire you too: through literature, in personal discussions and by working together as your development partner.

Nothing in heaven and earth **simply appears**

That is the reason we consistently invest more than 5% of turnover in research and development. Consistency also characterises the implementation of our ideas. We concentrate here on the most up-to-date methods such as Simultaneous Engineering, CAD/CAX or Digital Photocopying, and on continuous communication, both internally and with our customers. The synergies created make our solutions distinctive, in innovation and economic efficiency alike.

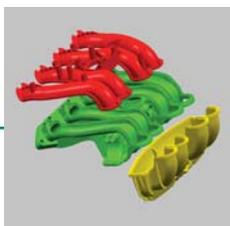
At MANN+HUMMEL, innovation is a tradition: it is a Company principle, clearly defined and firmly established. More than 500 employees world-wide work in the development departments of the business units and in central development. We allocate plenty of space for them and their work in numerous laboratories and test facilities. The creativity of our development work is clearly illustrated, for example, by the fact that we have filed around 1,500 patent applications in the past 5 years.

Three areas – Product Management, Advanced Development and Development Projects – and their precise interaction, ensure that continuous investment leads to a successful result: consistent innovation.

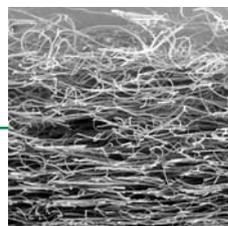
In the Development Projects area, we work in a very target- and result-orientated way to provide solutions

to the specific tasks set by our customers, whilst in Product Management and Advanced Development, we concentrate on basic research and seek answers to tomorrow's requirements. This is quite deliberately carried out without any direct order from the customer, and with a steady, inter-disciplinary dialogue with external partners such as the Max-Planck-Institute or the Fraunhofer Institute. Our attention here is directed towards what is technologically possible, and in addition, towards questions where developments in society, or ecological and economic factors are taken into account. We deliberately analyse given structures to re-define the boundary between the possible and the impossible. In this way, we discover forward-looking materials and methods, develop innovative filtration processes or set new trends.

Of course, this doesn't happen "just like that". Changes, advances and innovations require time, ideas, people, money and the continuous and consistent commitment of all concerned. A network of knowledge from very different disciplines is created, and thus made available whenever and wherever it may be required. This availability pays off for our customers when, for example, they need a tailor-made and economic solution extremely quickly.



CAD/CAX – for fast and economic development processes



Fully synthetic air filter medium with gradient structure



An idea is like a plant. Everything is already laid out, so to speak, within the seed. However, both ideas and plants need optimum conditions to enable them to develop, to blossom and to mature to the full. We give ideas the space they need.



Triple loop multi-pass test rig



Engine performance test rig



There is no better or more complete air management system than photosynthesis. We do not however take this perfection as a model, but rather as an incentive for us to develop new and better solutions.



The world's first fully-synthetic oil filter element



The plastic air intake module: it is lighter in weight, helps to reduce emissions, and optimises acoustic characteristics

There's a lot in the air

There are however other things that we have to seek and find. As a development partner and original equipment supplier for the international automotive industry, we know how sensitive modern engines, their immediate surroundings and the environment in the broadest sense of the word are. The standards against which we measure our ideas and results are suitably high. The service we offer, which is also always orientated towards developments and trends in vehicle construction, is appropriately varied and complex.

Legal requirements, increased performance per litre cylinder capacity, and a reduction in induction noise are just a few of the demands which influence our work.

From these, we find solutions which are quite literally in the air. They are solutions demanded by society, our customers and their customers: to supply the most up-to-date air intake systems perfectly matching the particular application in function, construction and maintenance. Just how important they really are would be obvious if we had to do without them. The result of their absence would have little to commend it: pollution, residues from combustion, engine wear and greater fuel consumption.

We never simply look at what is possible and feasible in the short term. Our attention is focussed on asking what is really useful and effective in the long term. The amount of space available in the engine compartment has become increasingly restricted in recent years. In addition, fluid and air intake systems have had to meet more complex and stringent requirements. As a result, we have set radical development objectives and devised ground-breaking solutions. As well as applying

conventional injection moulding technology, we have optimised blow moulding techniques. Through this, the design of the component can be more specific, precisely tailored and adapted to the increasingly complex geometry in the engine compartment.

To meet these demands, we are constantly developing innovative systems solutions with new materials. One example is the plastic pressurised-air duct for turbo-charged engines, which offers many advantages: it is lighter in weight, contains additional integrated functions, is easier to fit and offers excellent performance at economic prices. When selecting materials to be used, recyclability and environmental impact were of course essential criteria for us.

With all our enthusiasm for innovation, our work is nevertheless characterised by many traditional values. For us, these are accurately meeting deadlines, quality, a world-wide presence, economic thinking and action, and consistently working with our customers from the concept phase to system supply.

Our leading role as an automotive OE supplier is the result of our standard. Our focal point is always our commitment to make improvements, and thus enhance the air filter and intake systems world through solutions which are both innovative and sensible. As a result of this, we have received many awards as a system partner for the motor industry. Awards which also contain a lot for our customers: constructive dialogue, joint responsibility, the most modern process and manufacturing procedures for economic systems and the guarantee that in us, they have a partner through all stages of development.



Design air filter system



Charge air ducts

Our ideas **branch out in all directions**

At first glance, oil and fuel filters cannot be seen. Nevertheless, MANN+HUMMEL filters perform important functions in the area of fluid management. Whether installed as full-flow filters, by-pass filters, or as combi-filters comprising both full-flow and by-pass types, they are in the background, making their contribution to the optimum life and maximum performance of engines.

For this, our oil and fuel filters must display exceptional quality characteristics. We are constantly and consistently developing through many trials and test processes.

The spectrum extends from extremely fine filtration across large filter areas and high dirt absorption capacity through to low flow resistance. Every filter corresponds to our standard of performance, our maxim always to have a brighter idea. A promise of performance which meets or even exceeds the high expectations of our customers.

To give just one example from many: our oil modules with completely plastic housings. Until now, the standard material for housings has been die-cast aluminium. However, we have developed the world's first oil modules with completely plastic housings ready for series production.

An increasing number of MANN+HUMMEL oil and fuel filters contain the new MULTIGRADE filter media. This recently developed generation of filter media from MANN+HUMMEL has a multi-layered structure and specific fully-synthetic filter media layers

for finest filtration. MULTIGRADE can retain up to twice as much dirt as conventional cellulose-based media. In addition, filtration efficiency is significantly enhanced, thus helping to protect modern engines and fuel injection systems from wear. This MANN+HUMMEL filter media innovation can be found in nearly all modern passenger cars with Diesel engines. As far as oil filtration is concerned, we have commenced series production of MULTIGRADE filter media for luxury and upper mid-range passenger cars, and have thus successfully introduced the automotive world's first fully-synthetic oil filter element with superior performance characteristics.

As oil and fuel filters are of the utmost importance for engine reliability, we devote to them considerable attention and apply a great deal of inventiveness.

MANN+HUMMEL offers an extremely wide range of oil and fuel filters. They are always manufactured in accordance with strict quality standards, and are perfectly adapted to meet the most varied requirements of the automotive market.

We are also involved in the development and production of containers and container systems for cooling fluids, screen washing systems, brake, steering and transmission oils. The increasing demands for greater security and comfort when driving has led to ever more sophisticated fluid management which makes optimum use of the increasingly restricted space, and meets all legal and environmental standards.



Screenwash system (SWA) for cleaning headlamps and windscreens



PreLine® fuel pre-filter with MULTIGRADE filter media and excellent water separation capability



Big oaks from little acorns grow: our ideas don't just appear, either, they have to grow. To enable them to develop properly, they need a functioning network.



The world's first oil filter module with fully plastic housing and many integrated functions



Oil filter module with integrated crankcase ventilation



A good idea can be measured by the radius of its effectiveness. There is however literally no limit. Just like MANN cabin filters, which stand for fresh air inside the vehicle, as well as top quality.



MANN cabin filters ensure fresh air in the passenger compartment



MANN filters – more than 2,500 types provide virtually complete market coverage

There are many steps *on our road to success*



To be successful is a fine thing. This aim presents us every day with the task of doing a little bit more, and making progress with pioneering ideas.

This applies equally to the products we supply as original equipment and our range for the automotive aftermarket. The MANN-FILTER brand is recognised throughout the world, renowned for quality, safety and innovative competence. It is a strong, leading brand, the result of our continuous and consistent activity, the result of landmark product quality, innovative service concepts, competitive prices and the most up-to-date logistics.

Our product range, which is both broad and in line with market requirements, makes us a strong partner in the automotive aftermarket business, which we support through targeted and effective sales promotions. We thus maintain our principle of partnership, valuing our co-operation with distributors and workshops alike. With our prices, you can gladly count on our products, as they are offered under such terms, particularly in the aftermarket, that new customers are gained and existing customers retained.

As well as providing our standard range with guaranteed OE quality, we are constantly optimising and developing MANN-FILTER products for specific market segments and requirements, such as for example filters for construction and agricultural machinery, motorcycles, marine applications, hydraulic filters or environmentally-friendly non-metallic filter elements.

Logistics which are focussed on adherence to schedules and speed, even over long distances, ensure that the concept of “prompt availability” is maintained. In addition, we offer our customers up-to-date information and user-friendly, fast methods of ordering, for example through the online catalogue and through eCRM (Electronic Customer Relationship Management).

The result: MANN filters currently rank among the leading products in the independent automotive aftermarket business world-wide, and a global and first-class service network ensures that these products are easily available everywhere.

This is just one point among many which sets us apart. We place great value on this difference, which we cultivate and build on.



*Plastic spin-on oil filter
with metal-free filter element*



Oil filters for motorcycles

Our ideas carry a lot of weight

There is no denying that the demands made on our customers are increasing all the time. It is therefore becoming ever more necessary for companies to offer innovative and economic solutions which safeguard production processes, increase service life and conserve resources. For the industrial sector, regardless of the specific branch, filters play a central role in the most diverse functions and areas of application.

MANN+HUMMEL industrial filters are of particularly high quality and are always custom-made to meet the specific requirements. In our Engineering department with its own testing laboratories, innovative product solutions are created in close dialogue with our customers. Our customers come from all areas and branches. Manufacturers of construction and agricultural machinery, combustion engines and compressed-air plant rank alongside companies in the general mechanical engineering and production technology fields. As a result, our range of products is appropriately versatile, our standards of performance and economy correspondingly high for each application: from the efficient standard product to the special development made for a specific customer.

In our development and testing department, the main focus of our work is to maximise benefits to the customer through the high quality and speed of development. The feature which makes the development and product competence of MANN+HUMMEL industrial filters stand out is the ability to consider the commercial and marketing-orientated aspects of the

customer. For us, QFD (Quality Function Deployment) is therefore more than just a modern method to establish the relevant technical specification. Using modern methods such as TRIZ workshops, innovative ideas are worked out and evaluated. Speed is a crucial factor. More than ever before, it is necessary to accelerate development processes. We achieve this through optimising components and component characteristics in computer-simulated processes, and carrying out virtual testing. Only then do we validate their performance on our own test rigs.

Customer-orientation is of course also the guideline for our advice, service and sales. An extensive global network of MANN+HUMMEL subsidiaries and agents ensures close proximity to customers and constant availability throughout the world. Availability and supply capability are our maxims. We are supported by customer-specific supply systems and a flexible, strong logistic chain.

Competence, convincing products, global presence and powerful logistics are the values on which MANN+HUMMEL industrial filters are based. They are put into practice every day by our staff in the Sales, Engineering, Marketing and Production departments. The result can be clearly seen – from process filtration to compressed-air technology. Industrial filters from MANN+HUMMEL are among the first-mentioned system solutions in many branches of industry, significantly helping to provide and enhance benefits and profit for our customers.



High performance in a small package – the MANN+HUMMEL PicoFlex® air filter



MANN+HUMMEL ProVent® – powerful crankcase ventilation



The whole is only as good as its smallest detail. Everything is mutually dependent: the correct filtration technology facilitates longer service life and greater durability improves the cost situation and competitiveness. That is why, with our ideas, we always pay attention to the smallest detail.



*MANN air oil separator element
for compressed air systems*



*Greater capacity, but in the same package –
long life EDM filters from MANN+HUMMEL*

Sometimes, not a stone **is left unturned**

Economic solutions for efficient material preparation are essential, especially in the plastics and recycling industries. MANN+HUMMEL ProTec has proved itself to be a perfect partner in every field. Our solutions guarantee maximum possible flexibility whilst adapting to changed requirements, thus providing considerable advantage.

This advantage is made up of a number of individual achievements. We plan very accurately, taking into account the possible, yet also achieving the apparently impossible. With far-sighted design, and made to the highest quality standards, we supply and assemble on schedule modular system components for the treatment of granular and powdery bulk materials. We take great care to include the complex processes both upstream and downstream of our own installations – no stone is left unturned until it is in its right place and our solutions perfectly match the particular application. There is a bonus for our customers: our system components are so flexible that they easily evolve with the production conditions on site. Flexibility is only one of the advantages which characterise our concepts for plastics processing.

Equally important for us are the economy and productivity of our equipment and machinery, both today and in the future. Our potential achievement is not only convincing in its detail however, but through its versatility. It embraces precise dosing, accurately mixing according to the recipe, efficient conveying and sophisticated drying techniques. It guarantees quality solutions to the modern bulk materials industry, regardless of individual area boundaries.

To ensure that our know-how and the competence of our experts are sought after in the future too, we are constantly looking for new methods. Assisted by specialised computer programmes, our staff simulate and investigate revolutionary methods of material handling. Everything bears the hallmark of highly qualified engineers and staff in development, design and production – from the individual piece of equipment to the complete turnkey system, from planning advice to customer service.

Thus “Made by MANN+HUMMEL ProTec” has become a stamp of quality for complex all-round engineering.



*The world's first small-quantity granulate dryer
with integrated dry air conveying system*



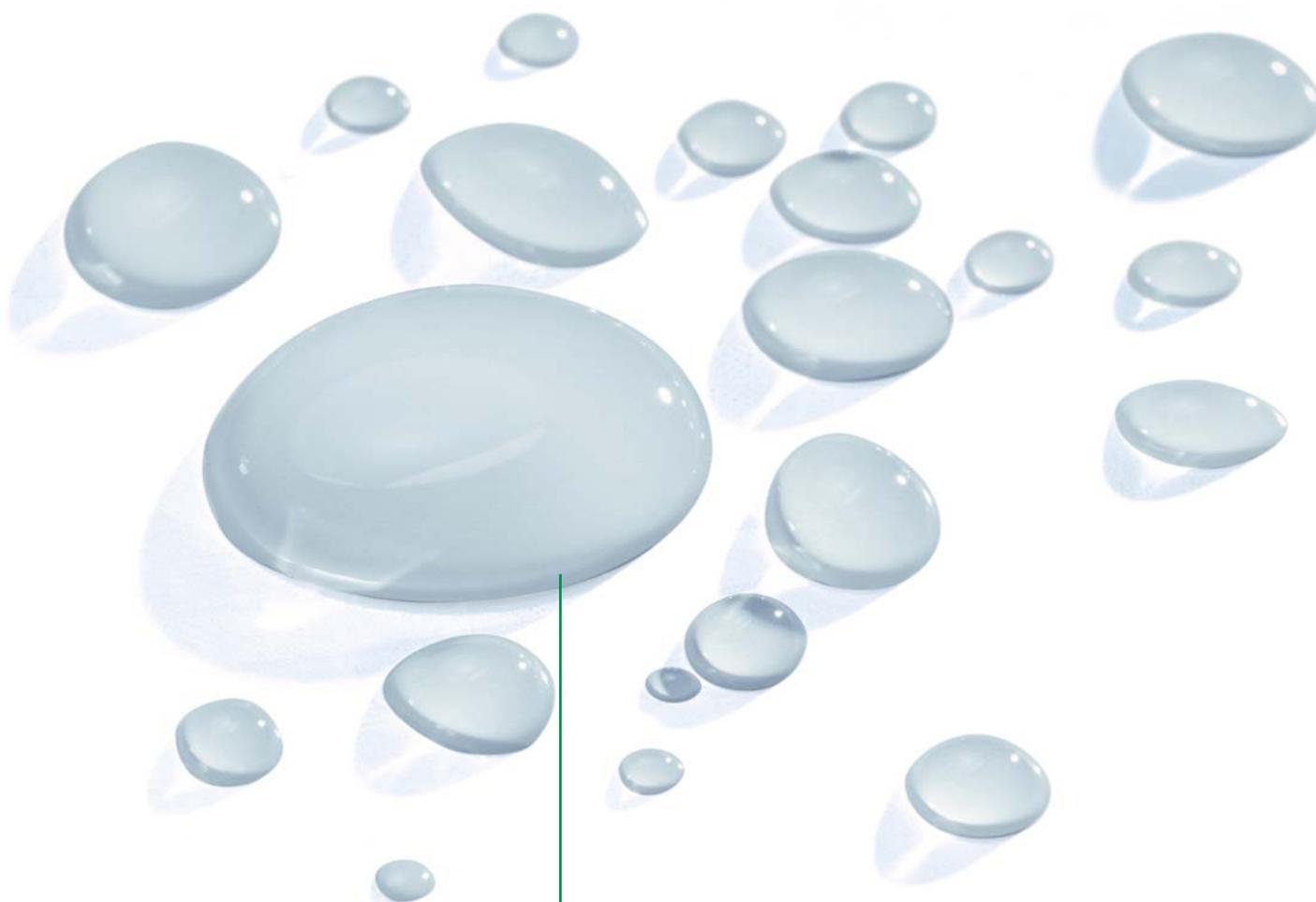
The quest for the philosopher's stone has preoccupied mankind to this day. The answers we have found today for our customers claim to withstand the questions of tomorrow.



Gravimetric dosing and mixing system to produce special plastic film for the food industry.



Crystallisation and drying plant for PET, gravimetric dosing of ingredients through an extruder



Fluid circulation, separation, elimination, cleaning. There are many names for what we do. The aim is always the same: purity. To obtain clean process fluids and thus achieve trouble-free production. Progress and innovation. We don't let matters just go with the flow.



Flat bed filters

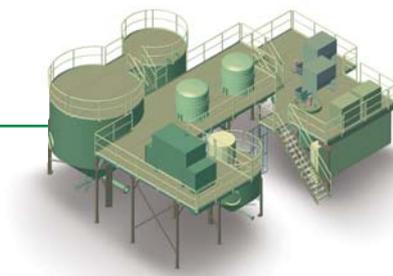
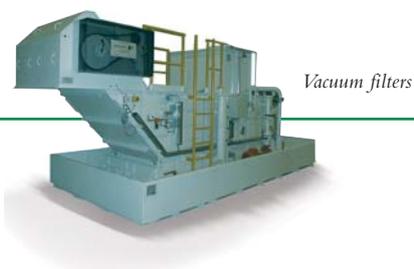
For clean solutions, **clear concepts are needed**

In manufacturing processes, lubricooling equipment is a particularly important topic, because clean solutions ensure longer life of the tools. They also improve surface quality and dimensional accuracy of the parts produced, and consistently prevent premature wear on machines, equipment and tools. Lubricoolants are increasingly important in the chip separation industry in particular. They lubricate tools and parts so they do not “overheat”.

MANN+HUMMEL HYDROMATION has specialised in meeting these requirements. For cleaning, handling or removing processing fluids, our solutions are convincing through their economy and efficiency. Our concepts are always characterised by attention to detail, from the smallest component to the complete turnkey system. Our strength lies in our diversity, our specialist knowledge which is of benefit to our customers in their respective areas – from the motor industry to toolmaking equipment manufacturers.

We supply, for example, state-of-the art filtration and feeding equipment for the central plants for large-scale production in the automotive sector. In the wire drawing industry on the other hand, we have developed special filter machines which can isolate and remove the particles of copper and steel produced. Then again, our product range for machine tools extends from individual gravity bed filters right through to complete high-pressure feeding units.

Our ideas are varied and individual. Their aim in all cases is to guarantee the best possible solution for the particular application. This standard is a distinguishing feature which sets a clear example over and over again on the world market. You can therefore recognise our solutions very easily from the principle “Added value through greater achievement”.



CAD-assisted Project Engineering

The basis of our organisation is **customer-orientation**

Automotive Original Equipment Division

Air Filter Systems

- Air filters, systems and components
- Air induction components
- Crankcase ventilation systems and components
- Broadband silencers
- Symposers

Intake Manifold Systems

- Intake manifold systems and modules
- Components for swirl and tumble control
- Secondary air chargers

Liquid Filter Systems

- Oil filters and oil filter systems
- Self powered centrifuges
- Fuel filters and fuel filter systems

Other important modules and components in and around the engine

- Cylinder head covers
- Covers for the engine compartment
- Fluid reservoirs
- Technical plastic parts for the engine compartment

Filter Elements and Systems for Industry and Aftermarket Division

Automotive Filters

- Filter elements for air and liquids
- Cabin filters
- Air-drying boxes
- Cooling-water filters
- Spin-on oil filters and fuel filters
- Elements for oil mist separators

Industrial Filters

- Filter elements and modules for industrial engines, construction and agricultural machinery, compressors, vacuum pumps and mechanical engineering
- Cabin filters
- Air-oil separator elements

Industrial Equipment and Components Division

ProTec

- Equipment and systems for material handling and processing in the plastic, rubber, recycling and chemical industries

HYDROMATION

- Systems and equipment for the filtration of machining liquids in mechanical production
- Chip handling equipment and chip transport systems

*Available for our customers world-wide:
the MANN+HUMMEL Group*





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