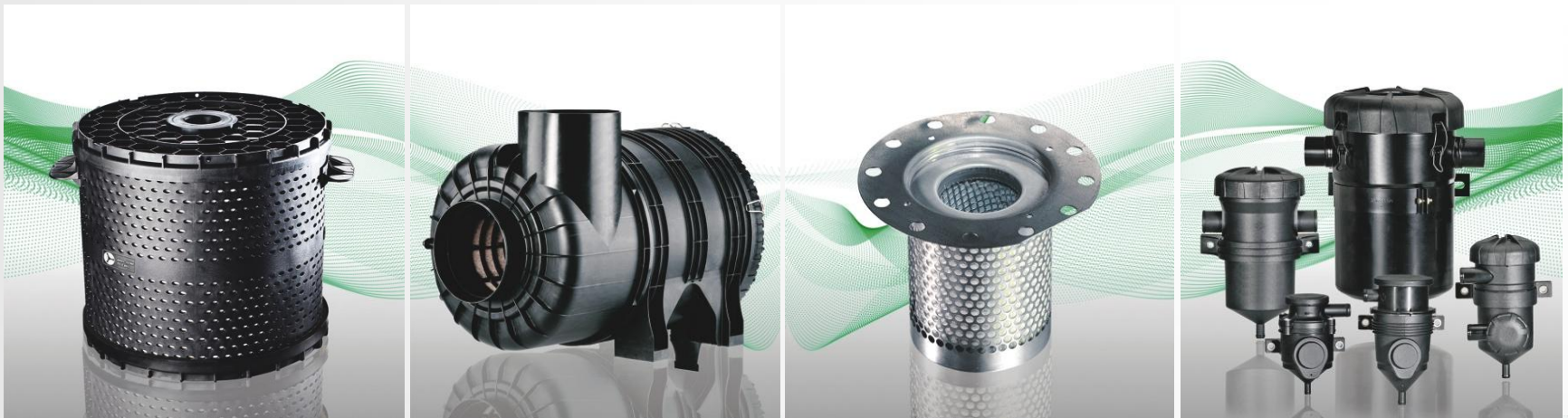


Industrial Filtration Business Unit



Power for our customers

POWER

POWER

MANN+HUMMEL Industrial Filtration.

►► Filtration solutions for original equipment and the aftermarket.

Applications



Products



Industrial filters from MANN+HUMMEL.

- ▶▶ A byword for process reliability, economy and innovation, both as original equipment and in the aftermarket.



Industrial engines and off-highway applications



Compressed air and vacuum technology



Mechanical engineering and production technology

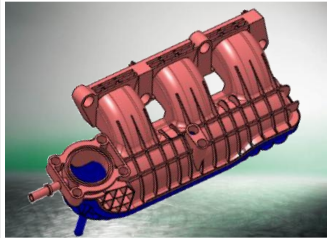
MANN+HUMMEL in China.

►► R&D capability on diversified product portfolios.

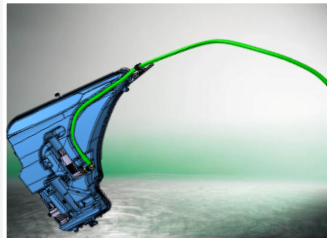
AIS



PIM



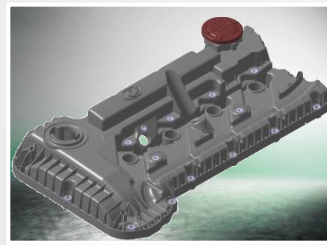
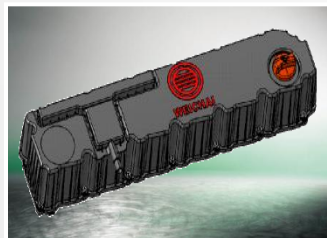
TPP



Liquid Filter



Element



MANN+HUMMEL China.



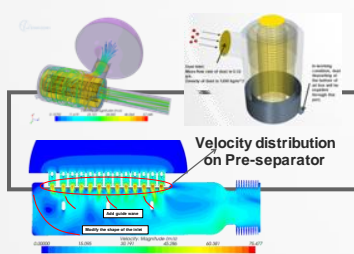
►► CAE&NVH, development & testing resource.



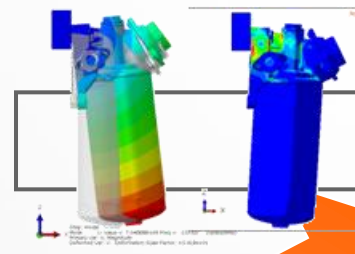
3D-CAD-System



3D-CAD-System



CFD Simulation



FEA Simulation



Unigraphics NX

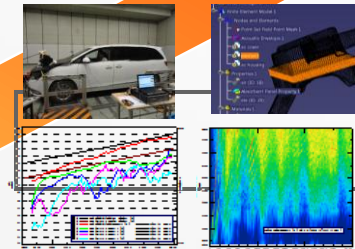
3D-CAD-System



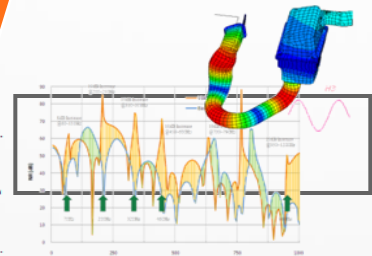
Multipass Test Stands with online Particle-Counting



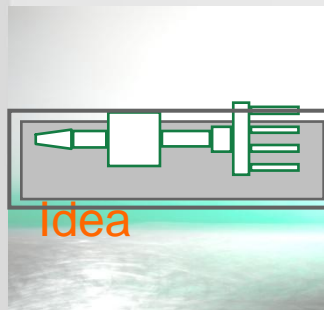
Liquid Filter Test Rigs for Life and Efficiency Testing



Acoustic Tuning for AIS



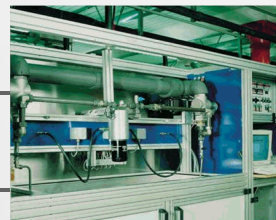
Acoustics Simulation



Idea



Water Separation Test Rig for Diesel Filters



Test Benches for Differential Pressure Test



Air filter Test Rigs for Life and Efficiency Testing



Shaker & climate chamber for thermal vibration Testing

MANN+HUMMEL in China.

▶▶ OE Key Customer Logo.



MANN+HUMMEL in China.

▶▶ Industry OE Key Customer Logo.



► **POWER** ... and innovative solutions for our customers !



MANN+HUMMEL GmbH
Business Unit Industrial Filters

▶▶ Aftermarket Product Range - Comprehensive & Extensive



From original equipment air filter systems to intake manifold systems to filter elements, our product portfolio covers it all for major vehicle and engine assemblers

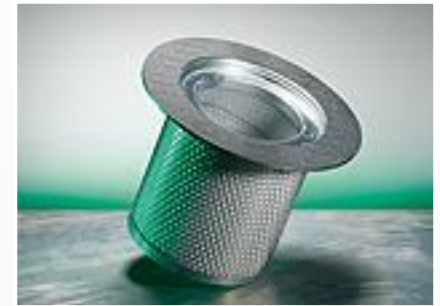
▶▶ Industrial Product Range



EDM



Centrifuges



Air Oil Separators



Air Cleaners



Crank Case Ventilation



Starbox® Air Oil Separators

MANN-FILTER

Air Cleaners

➤ Picolight



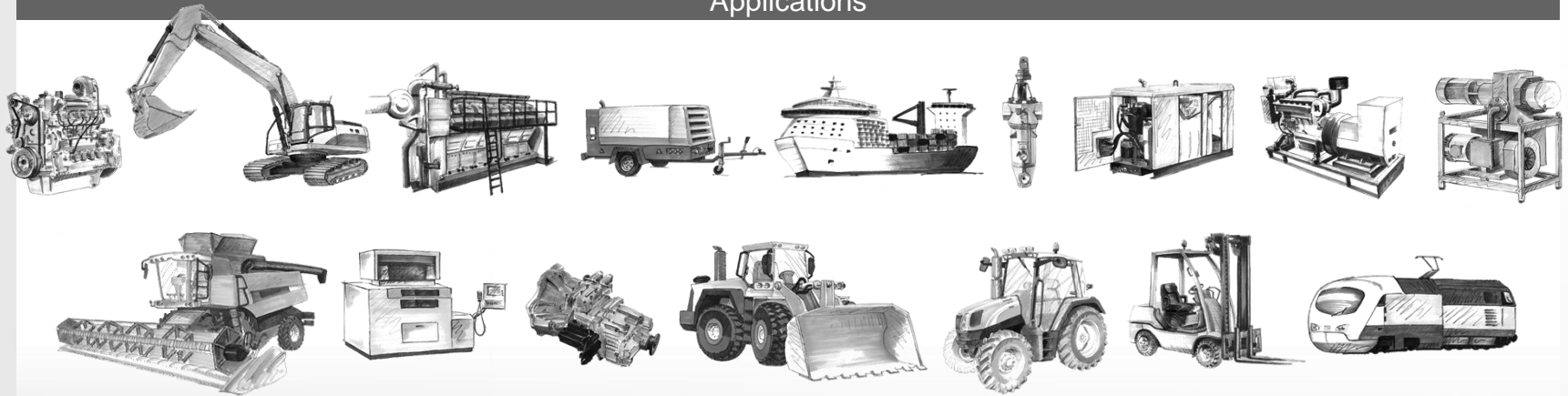
- 1-stage filter without housing for light dust conditions
- Typical applications: compressors and marine engines
- Covers up to about 80m³/min

1 | Filtration solutions – Products and their applications

►► Filtration solutions for many fields, for OEM and the aftermarket



Applications



Modular products



Customised solutions

Products



1 | Product range

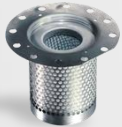
Overview:



Air cleaners



Centrifuges



Air/oil separators



Fuel filters



Cyclone precleaners



Crankcase ventilation



Oil filters



Liquid containers



Cabin filters



Preliminary fuel filters



Special filters



EDM filters

1 | Filtration solutions – modular products

►► Our solution strategy – a modular range of products



Customer benefits

- quick availability
- customised adaption
- excellent flexibility regarding modification to customer wishes
- no development costs
- economic solution based on modular concept



ENTARON XD

Developed for the highest requirements

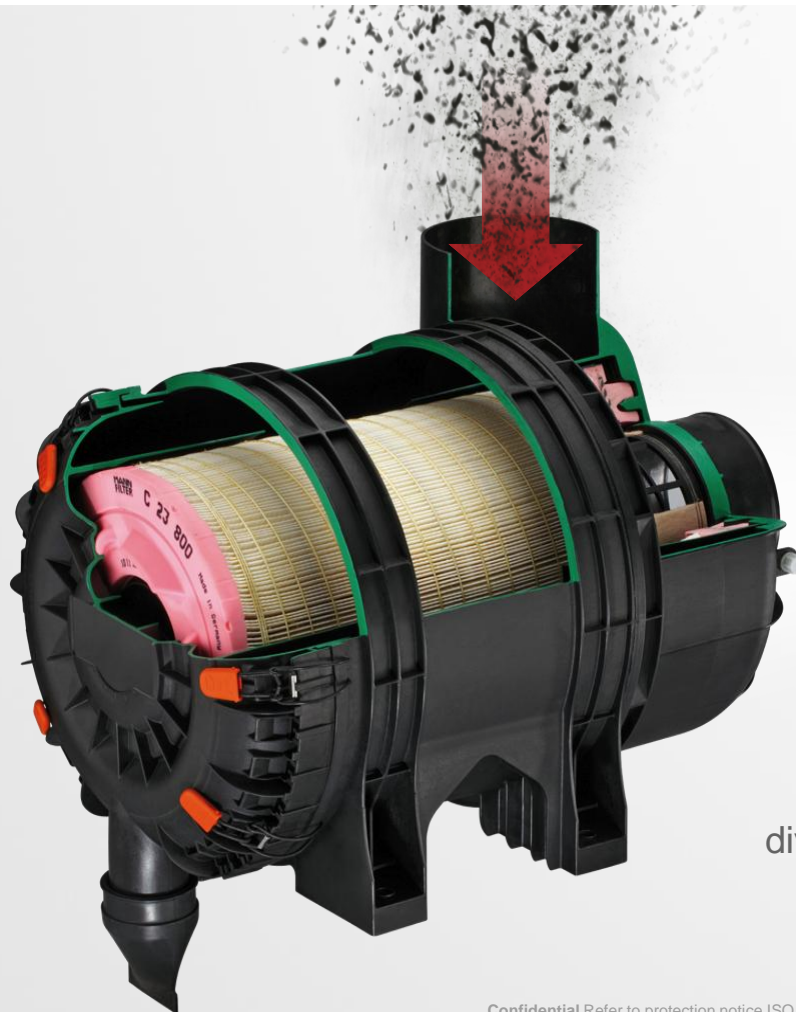
MANN+HUMMEL



ENTARON XD

Developed for the highest requirements

- ▶▶ Introduction / The flexible all-rounder for the most extreme requirements



diverted (angular) flow path

ENTARON XD

Developed for the highest requirements

►► Introduction / Features and benefits

The filtration performance – excellent protection for your engines

- final filtration efficiency higher than 99.99%*
- equipped with a high performance filter element
- two-stage filter with tangential inlet and a pre-separation efficiency higher than 85%*
- safety element (option) available for maximum engine protection during servicing and operation of the combustion engine
- dust discharge through pulsation via a standard dust valve
- extended housing for longer service life

Heavy duty tested!



ENTARON XD

* ISO 5011, test dust ISO coarse

ENTARON XD

Developed for the highest requirements



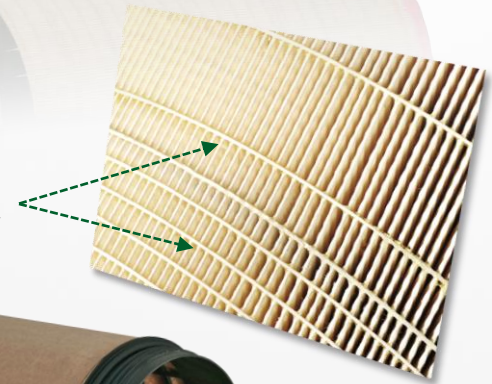
►► Introduction / Features and benefits

The core – filter element technology

- filter medium with higher performance, high dust capacity with large filter surface area
- stability through plastic support ring and centre tube
- glue string for reliable pleat stabilisation
 - extreme long service life during use in the field
 - enables improved rigidity after contact with water
 - protection against improper handling for better operational reliability
- patent pending
- secondary element (option) with mounted on housing
 - highest possible safety for the engine during servicing work



MANN+HUMMEL
glue string technology



Secondary element

MANN+HUMMEL filters for compressors

Energy efficient and reliable



PreLine

Prefilters for diesel fuel



PreLine

Prefilters for diesel fuel

►► The protection system for diesel injection systems



Full Range Available

In order to reduce fuel consumption, modern engines today use even higher injection pressures. The respective injection systems have very high requirements with regard to fuel purity:

Hardly any particles and almost no water (condensate) are now allowed in the fuel.

The solution is the
MANN+HUMMEL PreLine filter system

PreLine

Prefilters for diesel fuel

►► Why filtration? – Risks of insufficient filtration

- insufficient water separation leads to corrosion and cavitation
- insufficient particle separation leads to abrasion and clogging



Corrosion



Cavitation



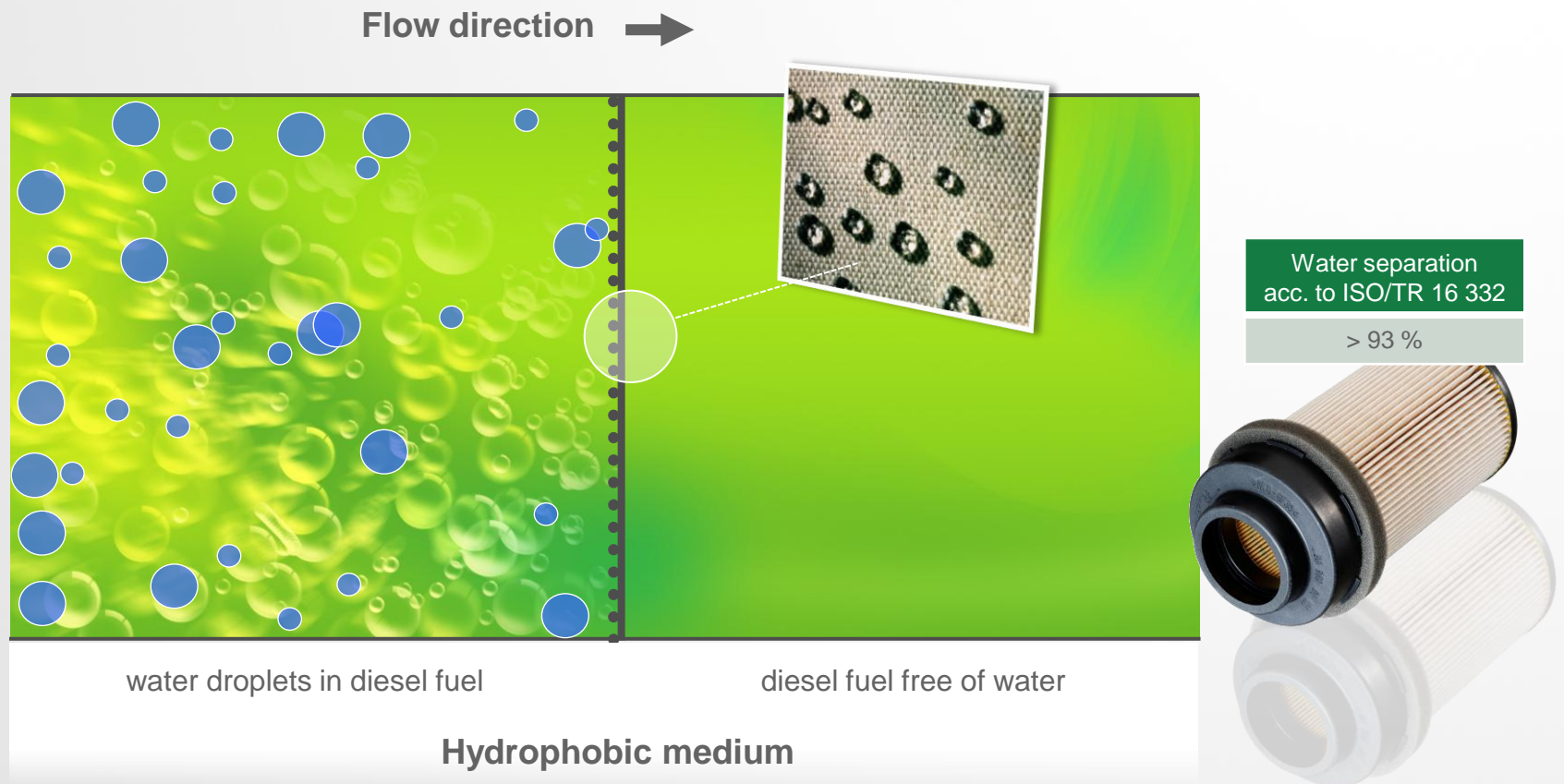
Abrasion and clogging

➔ Result: engine damage

PreLine

Prefilters for diesel fuel

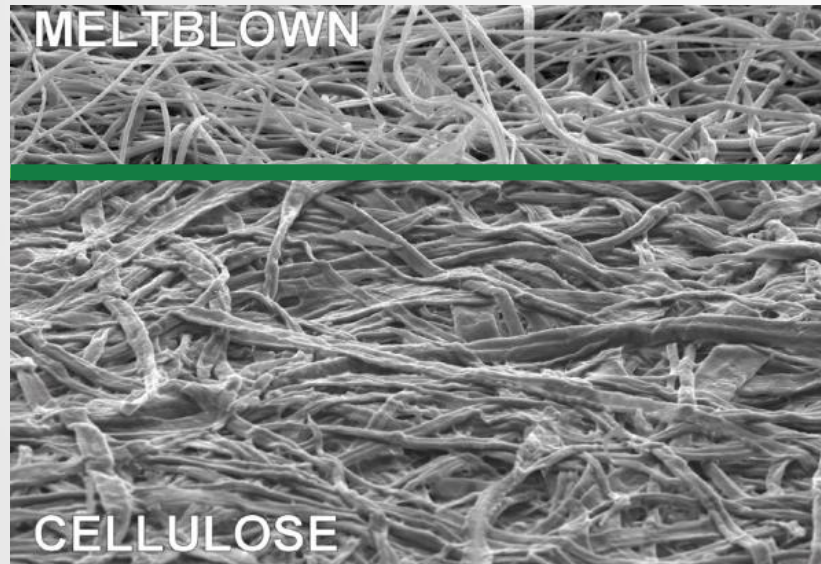
►► How does filtration work? – Water separation



PreLine

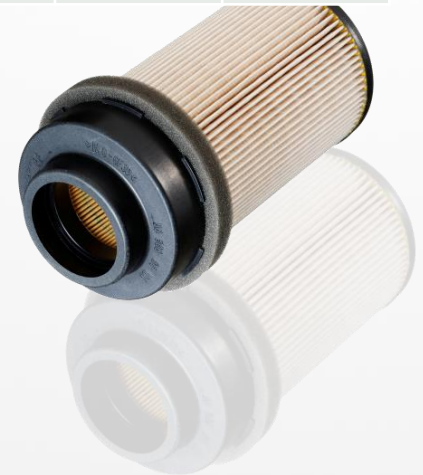
Prefilters for diesel fuel

►► How does filtration work? – Particle separation



- **MELTBLOWN:** defines the filter service life (dust holding capacity)
- **CELLULOSE:** defines the filter fineness

Initial separation efficiency acc. to ISO 19 438:2003		
Multigrade classes	4 µm (c)	6 µm (c)
PFO	≥ 10 %	≥ 30 %
PF	≥ 40 %	≥ 70 %
HE	≥ 95 %	≥ 99.5 %



MANN-FILTER

Air Cleaners

➤ Picolight



- 1-stage filter without housing for light dust conditions
- Typical applications: compressors and marine engines
- Covers up to about 80m³/min

➤ Picolino



- 1-stage air cleaner for smaller applications
- Range of 5 sizes from 0,15 m³/min to 3,2 m³/min
- Extensive selection of connectors and adapters