

# mycon GmbH

The new dimension of industrial cleaning



**JetMaster**

**PowerMaster**

**TubeMaster**

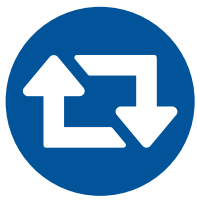
**IceMaster**

**SpeedMaster**

**FilterMaster**

## Application examples for cleaning and stripping

[www.mycon.info](http://www.mycon.info)

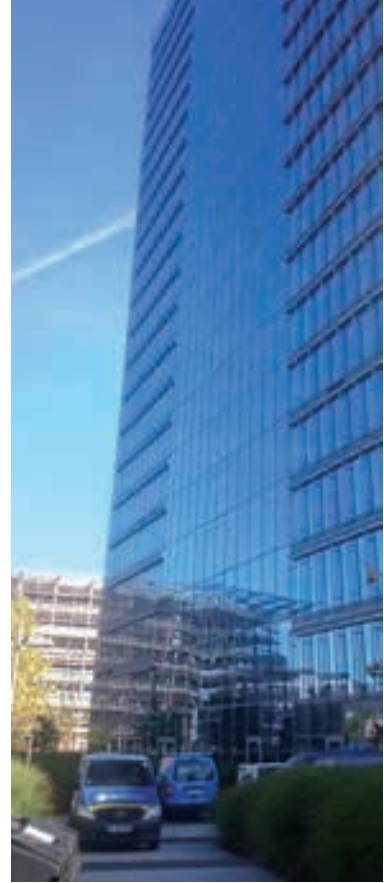
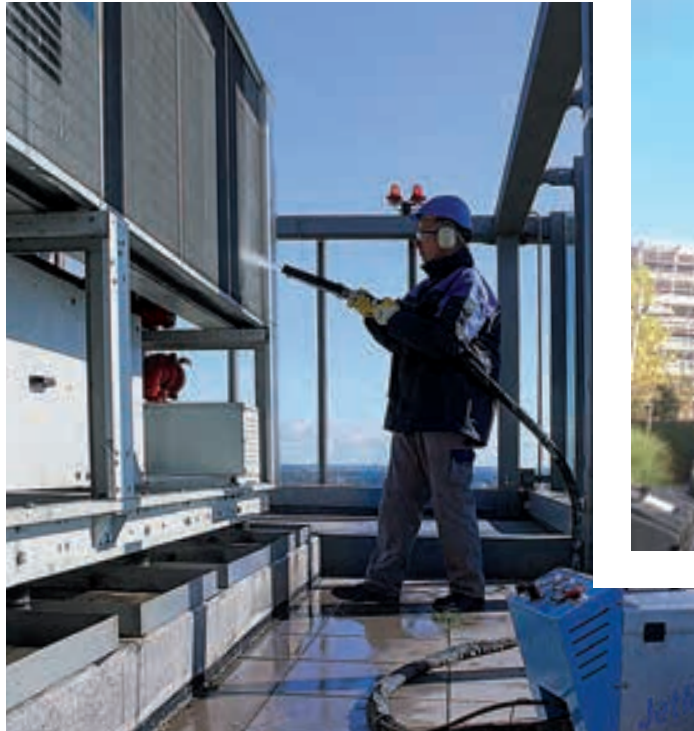


## Heat exchanger cleaning **JetMaster**



^ Deep cleaning with a special nozzle

Cleaning of the fin heat exchanger  
of the air conditioning systems  
in the Weser Tower (height 82 m)  
in Bremen



# Cleaning of fins

Fin heat exchangers can be found in a variety of fields and are important devices, e.g. for engine cooling, for cold stores and for air conditioning systems. They are the most used energy transmission systems.

The proportion of the worldwide overall energy needs for air conditioning is considerable and amounts to about 20%. Moreover, in the developing countries, the energy demand for air conditioning is increasing by 7% every year. According to the forecasts, this increase shall last at least until 2050. An increase in efficiency of the systems by only 5% would therefore be of high importance worldwide.





## Advantages of the JetMaster procedure

- High cleaning efficiency
- Rapid cleaning speed
- Only compressed air and pure water
- Reduced energy consumption
- Reduced water consumption



^ Heat exchanger of a tram



before



after

Heat exchanger of a train



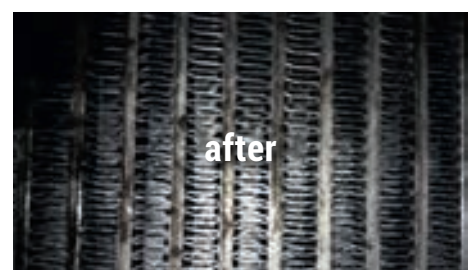
Fin heat exchangers quite often get soiled by sand, dust, pollen and other suspended solids from the surrounding. The soiling forms an insulating layer. This reduces the energy efficiency considerably. Thus the energy cost rapidly increases by 10-20% and more. In addition, corrosion resulting from the soiling, reduces the service life of the devices. Until now, the cleaning of fin heat exchangers is often performed by using chemicals (spraying processes). In most cases, compressed air is used afterwards. The cleaning success of this procedure is often not satisfactory and in addition, it is harmful for the environment and also for the employees.

Another way would be the use of high pressure cleaning apparatuses, which are in this case operated with relatively low pressure and by adding chemical cleaning agents. However, the dense water jet might quite rapidly twist the fragile fins, in particular if the water jet hits the fins diagonally. In case of large basic depths, the dense water jet cannot completely penetrate the fin heat exchanger. The front part will be cleaned but the jet does not reach all inner surfaces. In comparison to our JetMaster procedure, this common method has a higher water consumption and additionally, the water is loaded with cleaning agents harmful to the environment.

## Cooling tower of a locomotive



before



after

## Water consumption from 0.2–0.75 l/min

The innovative JetMaster procedure has been developed in cooperation with an university and offers considerable advantages regarding the success and costs of cleaning along with environmental friendliness. JetMaster works using compressed air and a small amount of water (drinking water quality).

The water is mechanically pre-treated in the JetMaster device and can then be conveyed in the compressed air stream using a special designed nozzle. The required amount of water depends on the operation purpose and the used nozzle. Generally the water consumption is between 12-50 litres per operating hour. The high cleaning strength is mainly based on the cavitation effect when the jet hits the surface to be cleaned. This cleaning strength even removes oil and grease without using any additives. Possible applications are mainly in the field of cleaning sensitive surfaces such as fin heat exchangers. The JetMaster can also be used to clean solar panels, rotor wings, wind turbines or glass and other facades. Since the JetMaster works with compressed air (oil free compressors or standard compressors with fine filter attachments are used) and using small amounts of water only, the procedure can also be used at sensitive places without having environmental impact. JetMaster works mostly in the low pressure range of 2–6 bar.

## Impact on the environment

Only air and pure water without chemicals are used for cleaning. Solely operating an air compressor has consequences on the environment.

## Energy consumption

The energy consumption for air conditioning systems, cooling systems and engine radiators is considerably reduced after cleaning. The energy input for the JetMaster cleaning procedure is well below the energy amount saved after the cleaning process.

## Protection of water resources

Since only very small amounts of water are used to operate the JetMaster (about 12–50 litres per hour, depending on the required power and attached nozzle) the JetMaster contributes to protecting water resources on a large scale.

## Occupational safety

The procedure cannot cause any injuries even if the jet directly hits the skin. Since only compressed air and pure water without chemicals are used, there is no damage to the respiratory tract caused by operating the appliance.

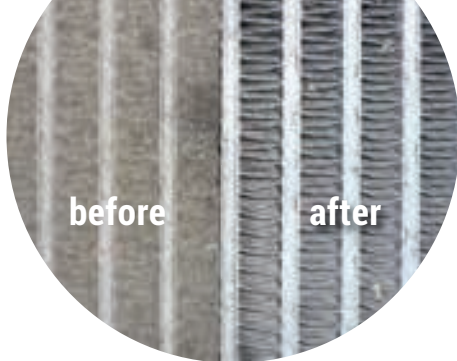
## Maintaining the service life of the appliances

The cleaning procedure is used as preventive maintenance. The service life of the appliances will be increased by gentle cleaning since the cleaning prevents corrosion and other possible damages.

When cleaning bus radiators, up to three exchanger units positioned one behind another can be cleaned without disassembly







before

after

^ Fin heat exchanger



^ Cleaning of a hotel facade

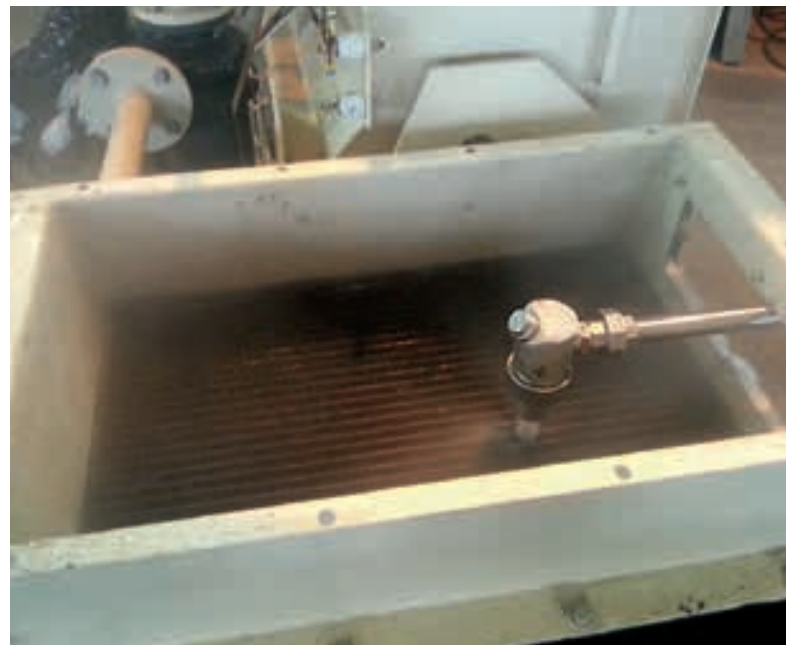


Wood working industry in Belgium

Cleaning heat exchanger on a train



^ Cleaning heat exchanger on a train (exit of the jet)



Transformator cleaning in railway sector

Cleaning of air conditioning systems on trains





## Cleaning and decoating **PowerMaster**

Stripping of  
train wheelsets



# Cleaning/decoating gentle,

Cleaning and polishing  
of an engine block



Exposure of welded  
seams on a train  
for visual inspection



The jet procedure **PowerMaster** is based on an environmental friendly and water soluble granulate, which is fed into a compressed air jet.

Shortly before exiting the nozzle, the granulate will be wetted with a small amount of water (0.2–max. 1 l/min), in order to increase the kinetic energy when the jet hits the object. The jet has a high speed up to the supersonic range due to the used Laval nozzles. Metal surfaces are not attacked by the soft granulate. Also plastic surfaces can be cleaned easily with reduced jet pressure.

## **PowerMaster**



Stripping and  
repainting of a forklift truck



Stripping parts of bogies

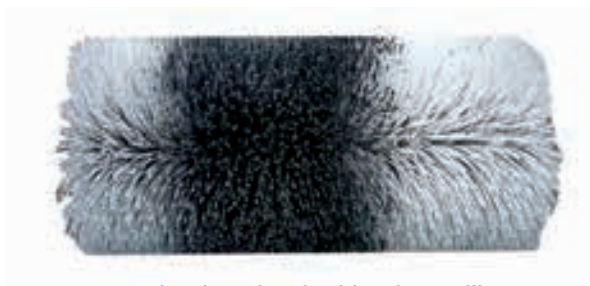


Cleaning a plate heat exchanger



# powerful & low-waste

By using nozzles with a jet width of up to 160 mm it is also possible to clean or decoat large surfaces rapidly and cost-efficiently.



Jet cleaning a brush with colour soiling



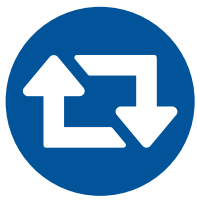
Fire damage restoration in an underground garage

Decoating a hall door

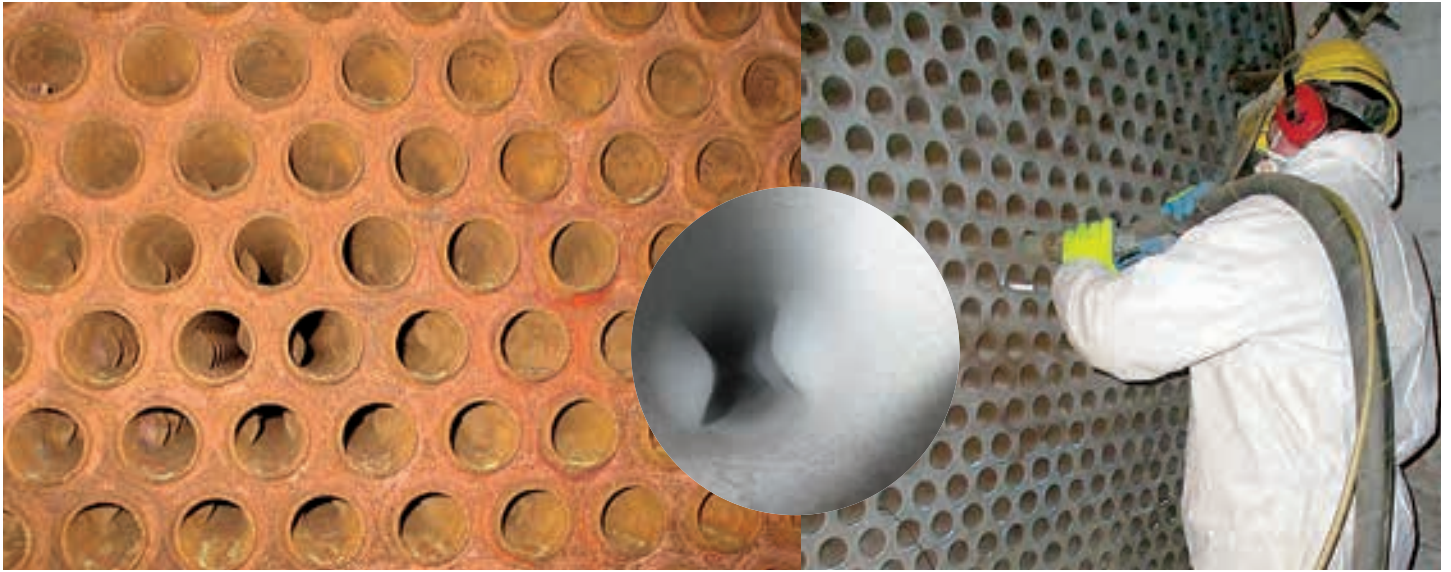


Fire damage restoration of a clinker facade



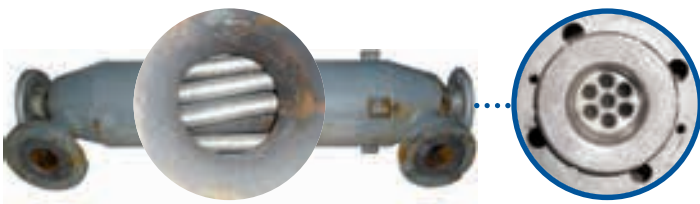


# Cleaning of the heat exchanger TubeMaster



Tube bundle heat exchanger (weight 90t)  
Tube length 6000 mm, hereof 4000 mm designed as formwork spacer

Cleaning and polishing of the inner tube surfaces



Cleaning of an exchanger with spirally designed tubes by using TubeMaster with chemical addition

## For tubes of 4 to 150 mm in diameter

TubeMaster cleans with dry ice or granulate and can therefore also be used when the use of high pressurized water would result in damages, e.g. when cleaning sulphur condensers. By using water, sulphuric acid would form and then remain in the tubes during the later process which results in destruction of the tubes. Also the dry cleaning with brushes or scrapers is not always successful. TubeMaster also removes persistent incrustations from the tubes in this area easily.



Tube bundle exchanger installed in a steam turbine of a paper mill

The main use of TubeMaster is in the field of tubes of all materials and tube bundle heat exchangers. There are experiences in cleaning and polishing inner tube surfaces with the following tube materials:

**Aluminium, bronze, graphite, cast iron, stainless steel, plastic material, copper brass steel, titanium and special materials**



Cleaning of a sulphur condenser in the gas extraction

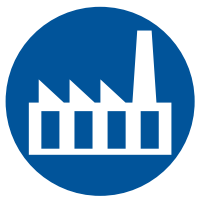


PressMaster is a practical partial automation for the TubeMaster system



Heat exchanger of a biogas plant





# Industrial cleaning IceMaster

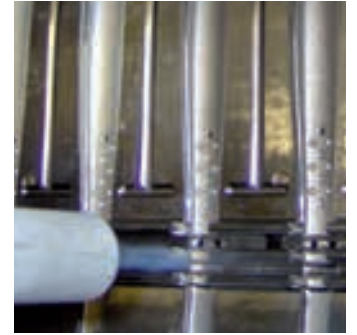
## Effective, cost efficient and fully automatable

Dry ice or dry snow, which is generated from liquid CO<sub>2</sub> directly in the blasting gun, will be entered in a compressed air stream and blasted at high speed on the surface to be cleaned. IceMaster procedure allows cost-efficient, fully controlled and automated cleaning.

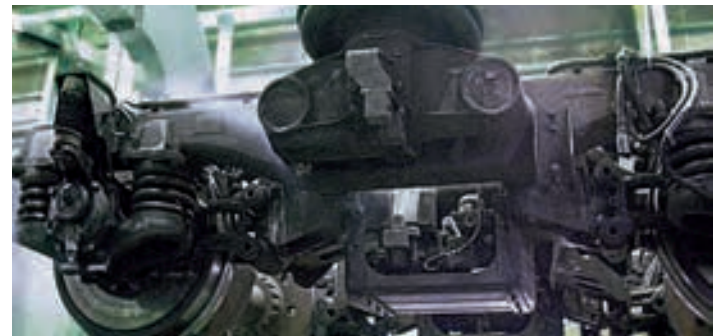
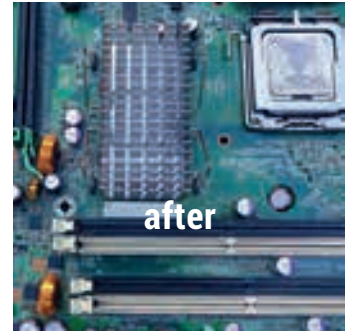
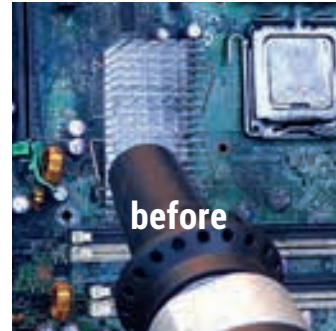


Decoating of colours in air conditioning and aeration ducts in the tramway

Pre-treatment of parts before coating

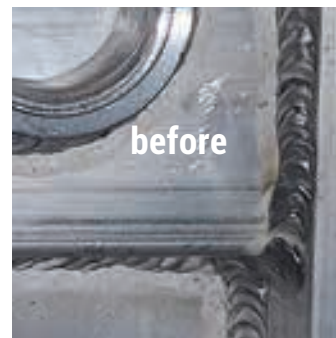


Cleaning electronics using IceMaster without electrostatic charges ▼



▲ Cleaning of welding seams for inspection

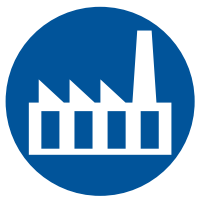
▼ Cleaning of welding seams on aluminium pieces



Removal of asbestos plaster







# Removal of viscous grease layers **SpeedMaster**

## JetMaster process gets support: **SpeedMaster**

Kipp Umwelttechnik, the sister company of mycon, developed the SpeedMaster together with the University of Paderborn for cleaning and coating of tubes (inner and outer surfaces), rods, strips, profiles and wires. The development of the cleaning process SpeedMaster takes place as part of a project funded by the Federal Ministry of Economics within the framework of the Central Innovation Program (also called ZIM).

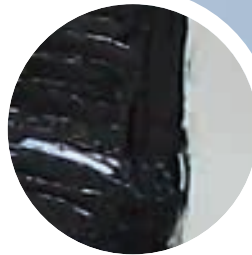
Apart from the application for SpeedMaster that cleans and coats tubes (inner and outer surfaces), rods, strips, profiles and wires with high-speed, SpeedMaster can also be used for cleaning/degreasing other surfaces. Applications are for example the cleaning of bogies and the internal cleaning of tanks. The cleaning agent for SpeedMaster can be reused.

Cleaning the buffers  
of a locomotive





SpeedMaster SR is working with other special liquids than SpeedMaster does. Also the footprint of the nozzle is, with a width up to 300 mm in diameter, much bigger. The resources for SpeedMaster SR are separable. SpeedMaster SR can be used for cleaning nearly all surfaces, e.g. bogies, wheelsets, insulators or train bodies.



Removal of viscous grease layers from painted surface using SpeedMaster SR without damaging the surface

#### Cleaning of bogies using SpeedMaster





# Cleaning exhaust particulate filters **FilterMaster** by mycon GmbH

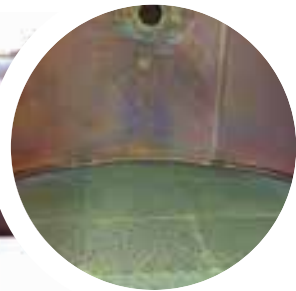
## FilterMaster for cars and more – reliable cleaning without dismantling

The patented FilterMaster for cars and more cleaning system is used to clean exhaust particulate filters whose filter surfaces are not completely accessible through housings. For cleaning with this system, no separation of the filter housing is necessary. Even difficult-to-access filters of any size, also with upstream baffles or similar flow deflections can be cleaned easily using FilterMaster for cars and more. Thus, a weakening of the housing by welds or corrosion resulting from welding can be excluded from the outset.

Exhaust particulate filter  
from a DAF XF 105 truck before cleaning

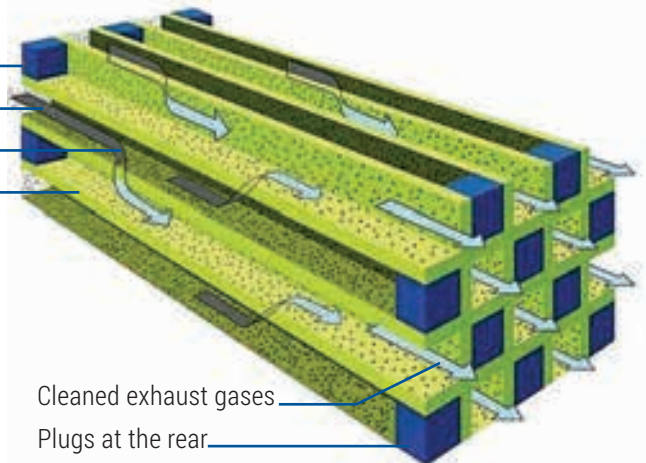


Locomotive exhaust particulate filter before and after  
cleaning with FilterMaster for cars and more



### Functionality of the diesel particulate filter

Plug at the front \_\_\_\_\_  
Exhaust gas from the engine \_\_\_\_\_  
Particulate and ash retention \_\_\_\_\_  
Filter walls \_\_\_\_\_



100 µm

▲ Ceramic particulate filter, view  
through the scanning electron microscope



◀ Exhaust particulate filter  
from MAN TGX EURO 6 truck

Exhaust particulate filter  
from a MAN truck after cleaning







## FilterMaster for trucks and more – fast and thorough cleaning of openly accessible filter surfaces

For cleaning filters which are openly accessible, specific type of carbon dioxide and compressed air mixtures as well as some other industrial gases are used. Specially designed jet nozzles are used to clean the sintered metal and ceramic filter surfaces.

Each type of filter can be controlled and processed precisely with exact repetitive accuracy. The system works in a closed circuit. Adaptive flange rings enable the intake of almost every type of filter. Even angular filters of older design can be cleaned easily. Depending on the type of filter, the entire filter surface is controlled automatically and the maximum quantity of soot and ash content is removed.

Catalyst from a truck before and after cleaning with FilterMaster for trucks and more



Sintered metal filter from truck before and after cleaning with FilterMaster for trucks and more.



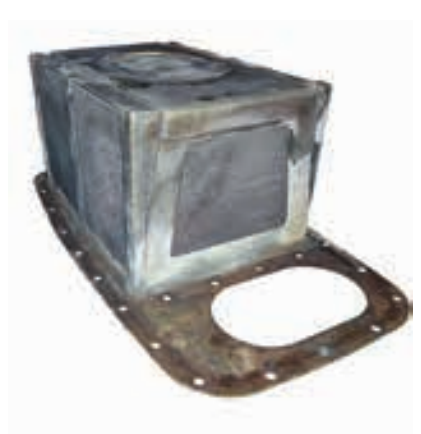
mycon filter test facility

The filter testing facility serves to measure the through-flow behavior of exhaust gas particulate filters. The measurement is carried out once before and then after the cleaning. After the cleaning, the through-flow behavior should be almost equal to that of new filters.

The test facility is suitable to accept exhaust gas filters of a weight up to about 500 kg.



EvoBus particulate filter before and after cleaning with FilterMaster for trucks and more



# Product Overview



CO2 Pressure boosting station



IceMaster automated version



IceMaster AL



IceMaster ACB



SnowMaster



IceMaster 1/2



IceMaster 3/4



IceMaster XLC + LC



IceMaster XLM + LM



IceMaster XSP + SP



AiR-Robot



SpeedMaster SR



JetMaster



PowerMaster



Mini-PowerMaster



TubeMaster



FilterMaster  
for trucks and more



Automated cleaning system for  
large filters



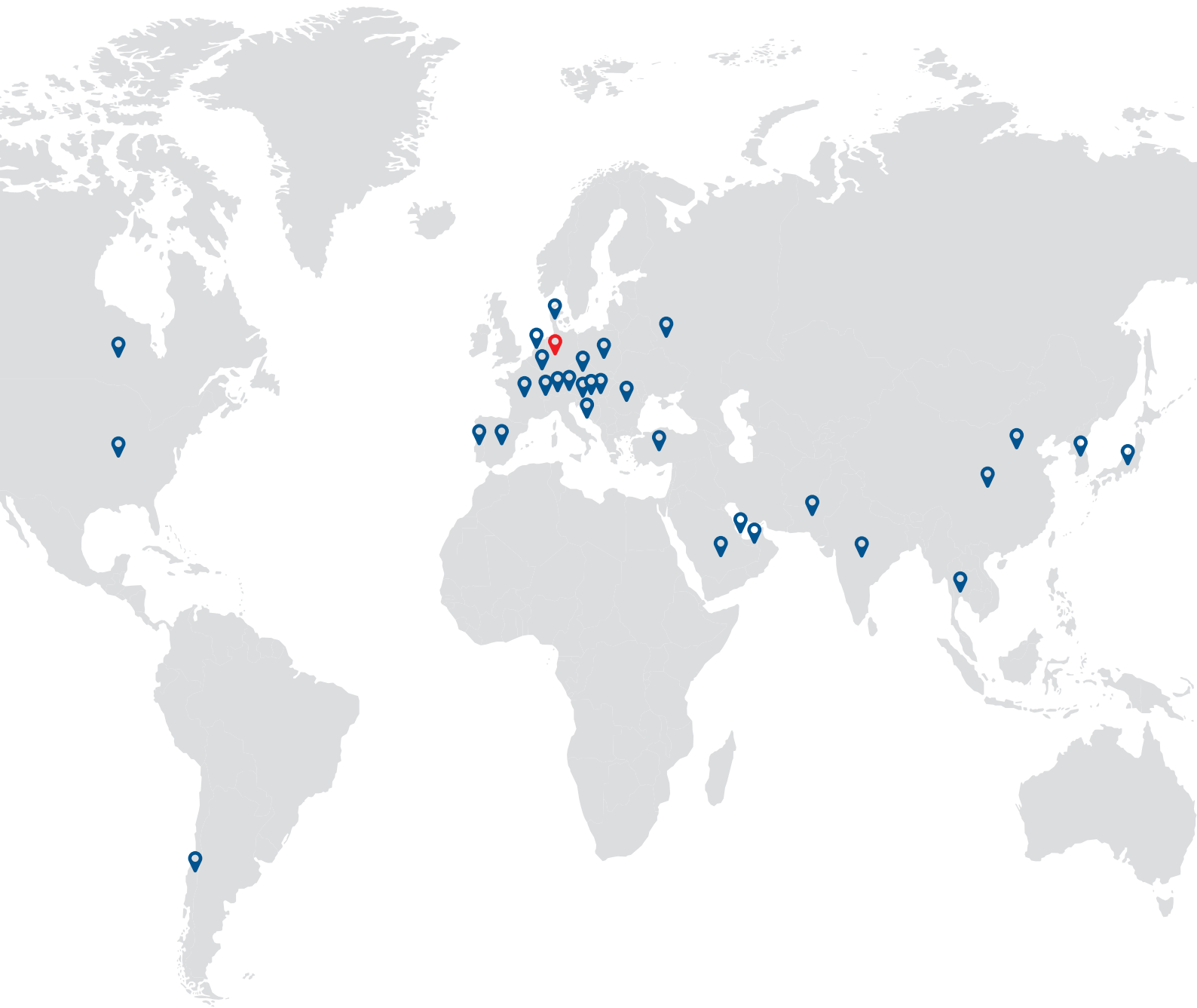
FilterMaster  
for cars and more



Blasting cubicle



Our devices, applications and processes are in action in various countries:



IDEAS  
IDEEEN

COMPETENCE  
KOMPETENZ

INNOVATION  
INNOVATION

QUALITY  
QUALITÄT

RELIABILITY  
ZUVERLÄSSIGKEIT

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