



ScandMist
Industrial
air cleaners

MANN+
HUMMEL

ScandMist

ScandMist

For clean and safe workshop environments

THE PROBLEM

Industrial processes that combine lubricant with high-speed machine tools generate air pollution. The exact make-up of this pollution will vary significantly depending on the process, but is likely to consist of a complex mix of toxic contaminants – including oil, water, additives, metal slivers, bacteria and more.

Unsurprisingly, exposure to this cocktail of pollutants is detrimental to both human health and the wider environment. Contact between metalworking fluids and the skin can result in dermatitis. And more severely, inhaling lubricant mist or smoke can lead to a range of respiratory illnesses, including industrial asthma and extrinsic allergic alveolitis. So, it's vital to capture industrial pollution at source, the moment it is generated, to mitigate the risk to workers and other stakeholders.

The difficulty is that as machine tools spin faster to improve productivity, coolant delivery rates and pressures also increase. And as this happens, the risk of problems from oil mist and smoke grows too, which makes the job of removing such contaminant all the more important.

THE ANSWER

ScandMist is a range of industrial air cleaners that use a modular filter system to eliminate oil smoke, oil mist and emulsion mists for a clean and safe workshop environment.

ScandMist removes fumes, emissions and other harmful by-products of metalworking processes at source with a three-stage filtration process.

The clean air is returned directly to the workshop and exceeds international health and safety standards for exposure limits to metalworking fluids.

In fact, ScandMist exhaust air is a similar quality to that used in clinical applications, such as operating theaters. And with pre-filter efficiencies of greater than 95 %, final filter life is measured in years rather than months. And that's why ScandMist is best-in-class for filtration performance



ScandMist is available as standard, off-the-shelf products with extraction capacity up to 6,000 m³/h for oil mist applications and 4,000 m³/h for oil smoke, or as customized high-capacity systems for air flows from 8,000 m³/h to over 100,000 m³/h.





Inhaling oil mist has been linked to a host of respiratory problems and new health implications are still emerging.

STAY COMPLIANT - BOTH NOW AND IN THE FUTURE

There is currently no international or EU standards for acceptable oil mist emission levels. But a marked increase in awareness of the impact to human health of ingesting sub-micron particles has led many countries to set their own limits.

In the UK, for example, guidance levels have been removed following two cases of industrial disease that impacted over a hundred workers. The UK government is now seeking new methods of monitoring oil mist levels using particle counters to monitor particle distribution rather than particle concentration. Until that time, the UK government has stipulated that there is no safe level of oil mist, and companies must ensure that workers are adequately protected through good industrial ventilation systems.

This is indicative of the changing picture across the rest of the world. As new evidence on the health impact of exposure to metalworking fluids emerges, responsible employers are taking steps to protect workers from industrial air pollution.

ScandMist can help you stay compliant, both now and in the future. ScandMist exceeds all prescribed limits for exposure to metalworking fluids. And to make compliance easy, MANN+HUMMEL or our ScandMist Expert partners can survey your facility and provide a documented report of air quality at your site — recommending an optimized filter solution for even the most challenging environments.



Oil mist exposure limits are based on the maximum permissible particle concentration levels in mg/m^3 . Levels set in Europe range between $0.2 \text{ mg}/\text{m}^3$ in Switzerland, $1 \text{ mg}/\text{m}^3$ in France and from 0.5 to $10 \text{ mg}/\text{m}^3$ in Germany depending on the coolant.

Industrial air pollution

The threat is microscopic

PARTICULATE MATTER — HARMFUL TO EVERY BODY

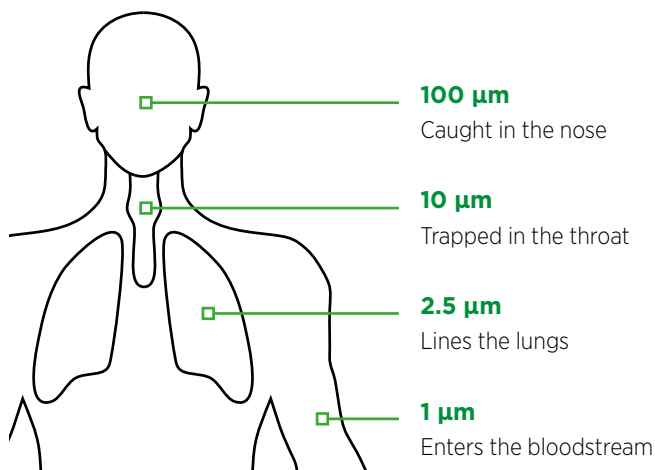
Particulate matter (PM) is microscopic solid or liquid airborne matter. It can be man-made or natural, but PM concentrations are typically greatest in areas of high industrial activity. And that's why it's important to understand the effect that PM can have on your workers' health.

One in nine deaths globally are now associated with air pollution¹ and PM is a major contributor to that number.

In fact, when public bodies, such as the World Health Organization, discuss air pollution they typically talk in terms of PM₁₀, PM_{2.5} and PM₁ — that is, particulate matter smaller than 10 µm, 2.5 µm and 1 µm respectively. And there's good reason for this. Humans are adept at stopping particles larger than 10 µm from entering our bodies, but particulate smaller than this gets past our defences — and how far it travels depends on its size.

PM₁, for example, passes through the walls of the lungs and enters the bloodstream; causing damage to our vital organs — including heart disease and various cancers.

PENETRATION OF DIFFERENT PARTICLE SIZES

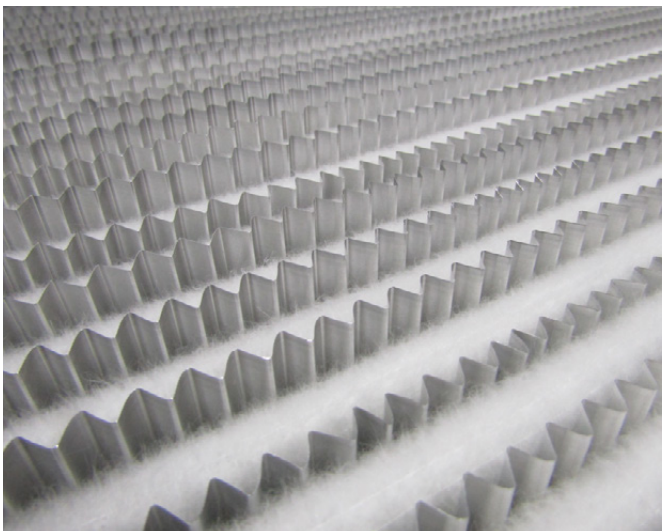


¹) World Health Organization, WHO releases country estimates on air pollution exposure and health impact, September 2016.

The size of particulate generated by different processes and coolants may vary, but PM1 is by far the most common contaminant.

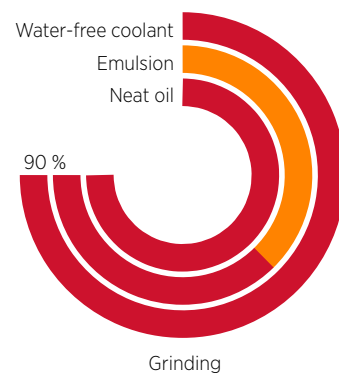
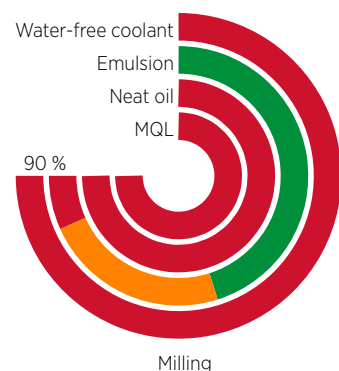
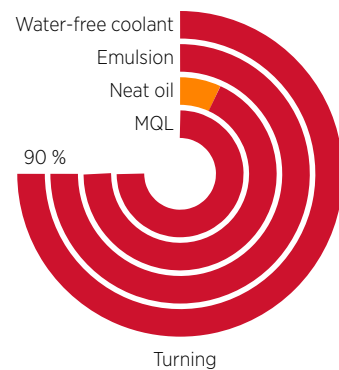
PM1 – THE GREATEST THREAT IN MACHINING

High rotational speeds, increased process heat and high-pressure coolants mean machining processes are creating finer and finer aerosols. In 2006, a study by the German Social Accident Insurance Institute examined the pollution generated by a wide variety of machining processes using different coolants. It found that the most dominant particulate created across all processes was PM1 (right).



Most oil mist eliminators are only effective against larger particulate, around 10 µm in diameter. But ScandMist is effective where it really counts – with particulate under one micron in diameter (PM1).

ScandMist combines oil coalescing filters with a final HEPA filter stage (class H13 to EN 1822) that provides 99.95 % efficiency against particulate 0.3 µm in diameter. With this level of filtration, the output air from ScandMist is clinically clean and likely to be of a much higher standard than that found outside your facility. That means safe air quality for your workers, and health and safety resolution for you.



■ PM10 ■ PM2.5 ■ PM1

Multi-stage filtration

Best-in-class efficiency

THE SCANDMIST PROCESS

ScandMist uses a three-stage filtration process to progressively clean the air flow. The first two stages remove the oil or emulsion, and the final filter cleans the air so that it can be returned directly to the local environment.

This approach prolongs filter life, reduces overall energy consumption and enables the captured coolant to be drained for recycling.

A high performance fan driven by an EC motor draws the contaminated air through the series of filters.



Stages one and two remove 95 % of emulsion and 98.5 % of neat oil @ 0.4 μm .

1 COALESCING FILTER STAGE 1

In the first ScandMist stage, multiple layers of pleated media collect the oil or coolant, allowing it to drain to the base of the unit. The filter media does not absorb the oil, but rather coalesces the ever-increasing droplets until they are heavy enough to drain.

Contaminated air passes through the filter media where oil particles are attracted to the oleophobic fibres. The oil droplets continue to collide with the fibre and grow in mass. As the oil drop becomes bigger, it becomes heavy enough to fall against the air flow to the base of the ScandMist unit. Here, it can be collected or drained straight back to the machine tool sump.

2 COALESCING FILTER STAGE 2

The scrubbed air is then passed through a second coalescer at stage two, where the process is repeated. This second coalescer has a higher filtration efficiency than the initial stage, and captures the smaller oil particles that were not caught in stage one.

After this second filtration stage, the air is on average between 95 – 98 % free from oil mist.

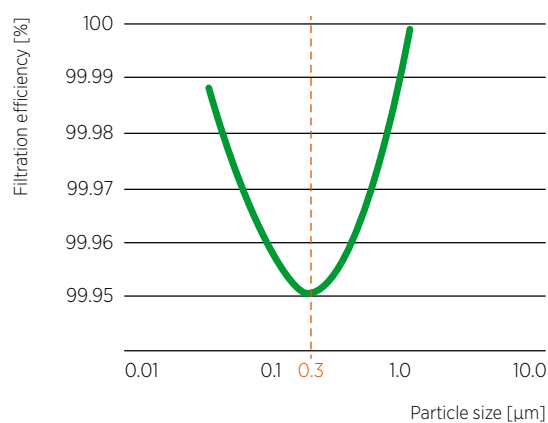
3 HEPA FILTER STAGE 3

The third filtration stage is designed to completely clean the remaining air to a standard far higher than the surrounding ambient air.

Using a HEPA filter, this final stage ensures that fine, sub-micron particles – trace oil, smoke, bacteria, pollen and spores – are trapped and not allowed to return to the workshop.

ScandMist employs an H13 (to EN 1822) HEPA filter that provides 99.95 % efficiency at 0.3 μm . This means that in a workshop environment, effectively all hazardous particles are trapped and only clinically clean air is returned to the workshop.

STAGE 3 HEPA FILTRATION EFFICIENCY



Why choose ScandMist? Consistent, high performance and comfort

SCANDMIST VS. THE COMPETITION

There are a range of different technologies for combating oil and emulsion mists available on the market across a range of different price points. But it is important to remember that in CNC machining applications, the most common and harmful contaminant is PM1. While electrostatic precipitators and centrifugal techniques can work well for relatively large PM10 – and even occasionally PM2.5 – particles, their performance against smaller particulate is poor. Sub-micron PM1 particles are simply too small for these techniques to capture and pass through unfiltered.

A HEPA filtration stage is sometimes employed after an electrostatic or centrifugal process. But because the

initial stage is unable to remove significant quantities of PM1, this particulate quickly clogs the fine media of the HEPA filters – resulting in frequent and costly changes.

ScandMist is different. It employs coalescers in the first two filtration stages. These gather and coalesce sub-micron particles into larger droplets, which then drain to the bottom of the machine or a separate oil sump for reuse.

This delivers high efficiency, protects the final HEPA filters, and prevents all stages from becoming clogged with particulate – increasing filter life and prolonging performance.

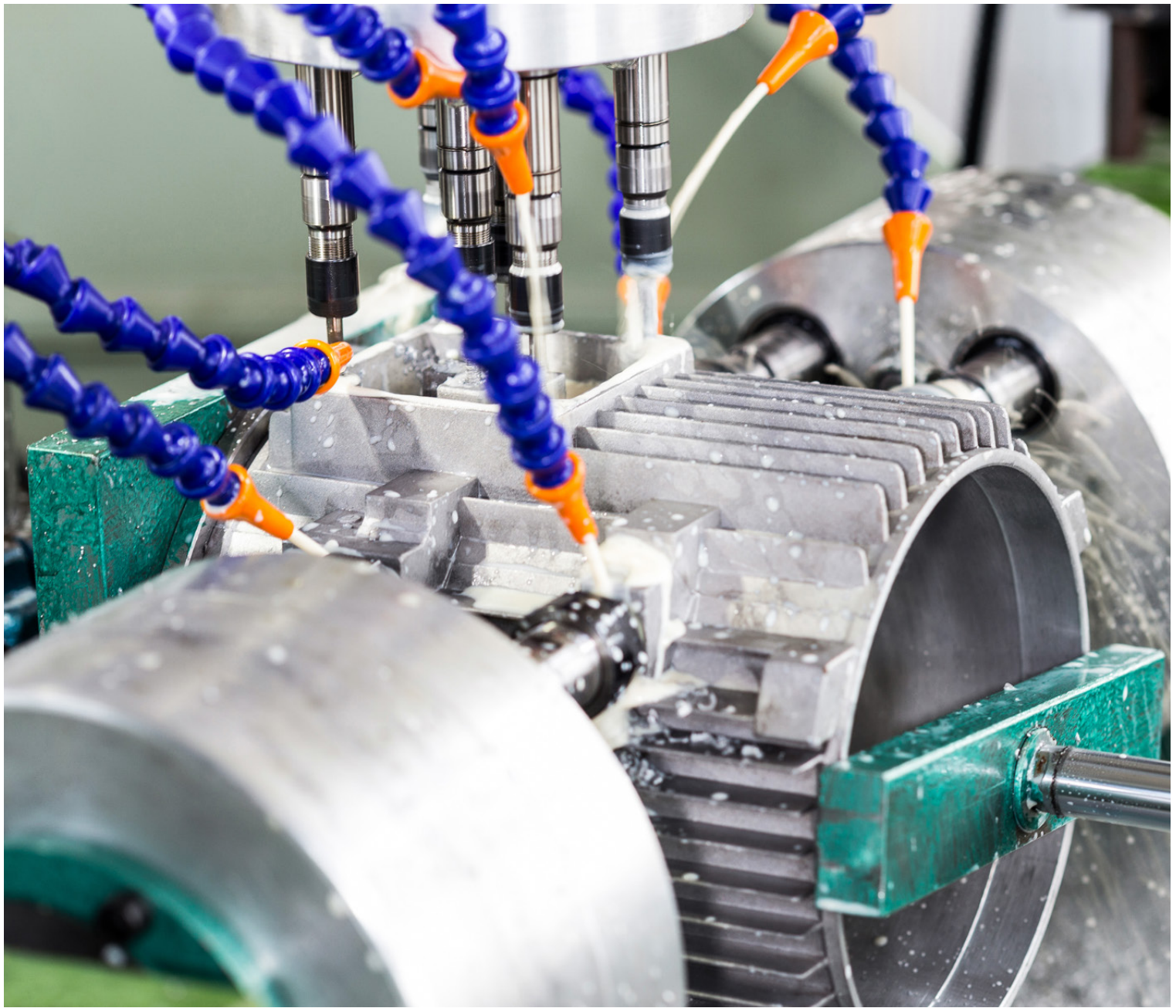
PLUG & PLAY INSTALLATION

Getting started with ScandMist is easy. Standard industrial connectors mean that electrical installation of ScandMist separators is a simple case of plug and play. PIN configurations are listed in each product's corresponding datasheet.

MACHINE-TO-MACHINE COMMUNICATION

ScandMist separators come fitted with input and output signal ports as standard to enable a range of machine-to-machine applications. For example, ScandMist can communicate directly with the machining center so that the separator is powered on (via the input signal) at the same time as the processing center.

ScandMist's two output ports can also be programmed for various uses, such as indicating upcoming filter changes to enable predictive maintenance.



REDUCE YOUR ENERGY CONSUMPTION

Some industrial filtration systems are essentially just extractors that take oil mist from the vicinity of the machine and vent it directly outside the facility. Not only is this bad for the environment, it is also bad for your wallet.

Venting scrubbed air from your workshop to the outside is the equivalent of driving with the heaters on full blast and the windows down. Your heating system is working hard to warm air that your filtration system then vents outside.

Because ScandMist's exhaust air is so clean, it can be returned directly to the workshop. That means you can break the cycle of continually heating and expelling air outside. And that can have a dramatic impact on your heating costs.

And ScandMist is energy efficient in its operation too, employing EC motors that deliver maximum performance from a low energy demand – with closed-loop motor and fan speed control fitted as standard.



The output air from ScandMist is so clean it can be exhausted directly into the workshop environment.

ScandMist standard units

Off-the-shelf solutions

70R OEM/70D OEM



100R OEM MD/
200D OEM MD



100R/200D



ScandMist R series

Oil smoke filtration systems

	70R OEM	100R OEM MD	100R	100R OEM	200R	350R
Nominal flow	700 m ³ /h	1,000 m ³ /h	1,000 m ³ /h	1,000 m ³ /h	2,000 m ³ /h	4,000 m ³ /h
Number of coalescing stages	1 + Demister	1 + Demister	2	2	2	2
Input/output signal	✓	✓	✓	✓	✓	✓
Fan/EC motor power	1.18 kW	3.7 kW	3.7 kW	3.7 kW	3.7 kW x 2	5.5 kW (IE3)
Built-in pump option	x	x	✓	x	✓	✓

100R OEM/200D OEM

200R/400D

350R/350D



ScandMist D series Oil mist filtration systems

	70D OEM	200D OEM MD	200D	200D OEM	400D	350D
Nominal flow	700 m ³ /h	2,000 m ³ /h	2,000 m ³ /h	2,000 m ³ /h	4,000 m ³ /h	6,000 m ³ /h
Number of coalescing stages	1 + Demister	1 + Demister	2	2	2	2
Input/output signal	✓	✓	✓	✓	✓	✓
Fan/EC motor power	1.18 kW	3.7 kW	3.7 kW	3.7 kW	3.7 kW x 2	11 kW (IE3)
Built-in pump option	x	x	✓	x	✓	✓

ScandMist standard units

Off-the-shelf solutions

200P OEM/200M OEM

200P/200M

400P/400M



ScandMist P series Oil fume and VOC filtration systems

ScandMist M series MQL filtration

	200P OEM	200P	400P	200M OEM	200M	400M
Nominal flow	2,000 m ³ /h	2,000 m ³ /h	4,000 m ³ /h	2,000 m ³ /h	2,000 m ³ /h	4,000 m ³ /h
Number of coalescing stages	1 + Demister	1 + Demister	1 + Demister	1 + Demister	1 + Demister	1 + Demister
Input/output signal	✓	✓	✓	✓	✓	✓
Fan/EC motor power	3.7 kW	3.7 kW	3.7 kW x 2	3.7 kW	3.7 kW	3.7 kW x 2
Built-in pump option	x	x	x	x	x	x

Built to perform

Built to last



SCANDMIST SYSTEM ARCHITECTURE

1. Air inlet module – right, left or rear
2. Integrated for pump for oil recycling
3. Stage 1 – coalescing filter
4. Stage 2 – coalescing filter
5. One piece service door with integrated seal
6. Stage 3 – HEPA filter
7. Power distribution panel and Plug & Play connections
8. Closed-loop feedback motor and fan controller
9. Electrically-commutating motor
10. Pressure manometers – one for each filter stage
11. Outlet grille – exhaust transition available as an option

ScandMist high capacity Fully-customized systems

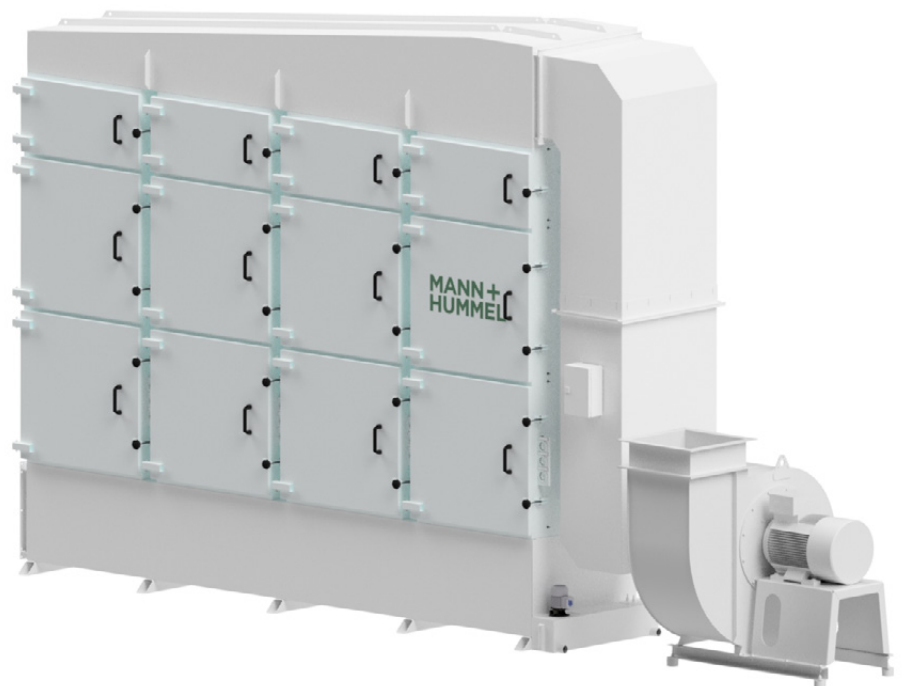
SCANDMIST HIGH CAPACITY PLATFORMS

ScandMist high capacity platforms manage the oil mist emissions from a number of CNC machines, and are particularly popular in high-volume manufacturing environments that require filtration systems for entire production lines. These high capacity systems are designed to operate as part of a local ventilation system and can handle air flows from 6,000 m³/h to over 100,000 m³/h.

The real beauty of a ScandMist high capacity system lies in its simplicity; each is a completely custom design but consists of a selection of standard ScandMist units integrated together — with one common inlet and one common outlet. This modular approach allows us to quickly design a system that is a one off and tailored for your exact requirements, while using technology that's well proven in the field.

Each ScandMist high capacity system is an integrated unit, with all the necessary components to plug in to your new or existing ventilation system. This can be configured to your requirements, but the typical ScandMist high capacity system will include:

- > ScandMist multi-stage filtration stacks
- > System control cabinet
- > Frequency inverter
- > High capacity fan & motor
- > Silencing system





MANN+HUMMEL has been a filtration specialist for more than 75 years. ScandMist is a product of this experience and expertise.

INDUSTRY KNOW-HOW

Not only is ScandMist well-proven in the field, so are we. Our experts have helped hundreds of customers address the problems caused by oil mist, oil smoke and VOCs in the workplace.

Much of our expertise comes from our experience across all fields of filtration. And as a major manufacturer with more than 80 locations around the world, we understand your aims and challenges.

> Detailed knowledge of machining processes

> In-depth understanding of associated contaminants

> Air filtration research and development

> Oil mist and oil smoke filtration

> HEPA filtration

> Hydrophobic coalescing filters

> Activated carbon filtration

> Thermodynamics, fluid mechanics & AHU design



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