

# One filter system for all oil and emulsion mist.

Kappa **AIRDRY**™

Multi-functional. Innovative. Flexible.

THE  
FUTURE  
HAS ZERO  
EMISSIONS

 kappa



# NOT TWO

## cooling lubricant applications are the same

Cooling lubricants play a key role in industrial production. They are absolutely indispensable in the use of modern machine tools. On the one hand they ensure that friction between the workpiece and tool is reduced, and on the other hand they remove frictional heat.

As varied as the requirements are for cooling lubricants, so is their composition. Cooling lubricants are multi-component mixtures with synthetic or mineral oil-based main components and a multitude of additives that provide the desired properties. The recipes used are a guarded secret of the manufacturers.





# Oil and emulsion mist

What applies for the composition of cooling lubricants also applies for the airborne emissions released. They present a cocktail of the most varied of components, whose effect on the human organism depends mainly on the corresponding substance properties and the fineness of the particles. The particle size varies from rough droplets right down to the finest aerosols in the nano range. In addition, usually a considerable proportion of total emissions is in the form of gaseous emissions (vapours). The proportion of gaseous emissions can make up a multiple, sometimes up to 100 times the aerosol portion.

The vapour proportion of cooling lubricants emissions cannot be economically separated. This leads to continuous concentration in the case of single-user extraction systems (top-mounted units) in the hall and to condensation (especially on cold surfaces). Instead of single workplace extraction systems, group extraction systems, in which the filtered exhaust air is fed outside, are the right choice. The discharged air volume must be balanced by supplying fresh air.



The following example best illustrates how important compliance with the limit values is:

If you fill a 20 ml liquor glass to the top with cooling lubricant and distribute the contents in a room with a volume of 1000 m<sup>3</sup> (L x W x H = 12.5 x 10 x 8 m), you have already reached the maximum room air concentration in Austria and exceeded the German limit by more than 100% (as of 2019). The present example shows very clearly how quickly an exceedance occurs. Especially when you consider how often open processes (insertion and removal of workpieces, draining, drying, open lubricant circuits etc.) can be found in production.



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# Kappa Airdry™ represents the only filter system that can be individually configured for all cooling lubricants.

## Multi-functional. Innovative. Flexible.

### **One filter system for oil and emulsion mists.**

Whatever combination of oil and emulsion exhaust air occurs, the Kappa Airdry filter system offers the suitable configuration. Unlike any other filter system, it allows for different tasks to be handled uniquely in that individual filter stages can be individually configured and changed – one filter system for all oil and emulsion mists.

### **Future-proof technology.**

Kappa Airdry filter systems are equipped with the best available technologies for efficient and economical filtration of oil and emulsion mist. The design of the unit and the filter elements are the result of years of research and our practical experience. The individual, new high-performance filter stages ensure maximum filtration performance, high service life and a low resistance.

### **Optimum flexibility.**

Even during changeover to another cooling lubricant, the Kappa Airdry can be easily adjusted to the changing framework conditions. The Kappa Airdry makes it possible to deal with the changed composition of the cooling lubricant emissions and the resulting different properties of the substance mixtures. This ensures long-term stable and above all safe operation.

# Perfect technology, ready for use.

The Kappa Airdry is prefabricated in the factory ready for connection, including the high-performance fan as well as the electrical and control technology. This ensures quick and simple installation. The modular system enables the realisation of system sizes up to an air capacity of 25,000 m<sup>3</sup>/h in one unit. For larger air volumes, several units can be easily combined to form a large system.

2,000 to 25,000 m<sup>3</sup>  
per hour  
in one unit







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# Kappa Selective Separation (KSS)

innovative  
and unique  
filtration technology

The Kappa Airdry consistently separates according to the Kappa Selective Separation (KSS) filtration principle. In this process, emissions occurring at each stage are selectively separated until finally the finest mist droplets and aerosols are very effectively separated at the main filter level. This principle of selective filtration leads to a significantly higher separation rate with simultaneous lower energy consumption compared to conventional systems. The construction and equipment are the result of years of research and our practical experience.

The entire make-up of the filter elements of the individual filter stages have been perfected and developed further over many years by the Kappa R&D department. Resulting in high-quality filtration of lubricant emissions. In addition, all filter elements as well as the overall filter construction have been resistance optimised. This leads to a low overall system resistance; even for the toughest uses. This significantly reduces resistance compared to a conventional fibrous filter. The modules are individually assembled depending on the application and requirement. If a module is not required, it can simply be dispensed with.

### 1st stage: Kappa metal filter cells

Foreign bodies,  
chips are retained.  
First filtration of droplets.



### 2nd stage: Kappa expansion chamber

Filtration of droplets  
due to velocity deceleration  
and expansion.



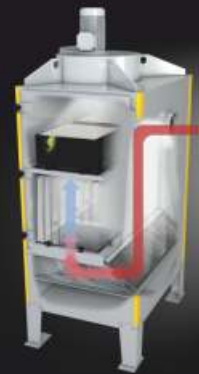
### 3rd stage: Kappa stainless steel fibre, combination fibre filter cells

Efficient filtration of droplets  
and aerosols by agglomeration  
and drainage.



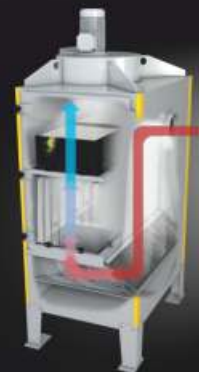
### 4th Stage: Kappa plastic fabric filter cells

Highly efficient filtration of fine  
aerosols and micro particles.  
The separated emissions coagulate  
and run off downwards.



### 5th stage: Kappa microfibre, multichamber filter cells

Optional filter cell, especially for  
recirculated air-operation.  
Highly efficient  
filtration of nano particles.



## KSS – pure gauge

Air contaminated with oil and emulsion mist enters the filter system from the side or from above and forms a downflow towards the filter bottom. Foreign bodies and coarse loads are captured on the transition of the pre-separation chamber to the filter chamber in the Kappa metal filter cell (first stage), without contaminating already separated cooling lubricant or clogging the drain. In cases of drier lubricant emissions and materials that are less inclined to agglomerate, this stage can optionally be used humidified.

Then the emission-loaded air enters the filter chamber, where, due to expansion and speed delay in the expansion chamber (second stage), droplets can be separated, which collect in the large area collecting tray on the floor of the filter system.

Above the collecting tray, depending on design, is the Kappa high-grade steel fibre filter cell or the Kappa combined fibre cell (third stage). Both filter cells are built from microfibres (high-grade steel/plastic microfibres) in  $\mu$  range to separate fine droplets and aerosols. The fine fibres of the filter cells ensure an optimum agglomeration and drainage effect alongside filtration. Optionally, the filter cell can be cleaned automatically. The stable and high-quality design as well as the excellent cleaning properties of the fibre cells ensure a long service life and numerous usage possibilities.

Filtration of the aerosol fraction  $< 2.5 \mu\text{m}$  is performed in the new style glass fibre-free Kappa oil mist filter cell (fourth stage) made from a polypropylene fibre mix. It is characterised by oleophobic, hydrophobic and antibacterial properties. The fibres are so fine that mist droplets as well as fine aerosols and microparticles can be effectively separated. The droplets and aerosols that are filtered out coagulate in the individual filtration layers into strands of liquid and run off downwards.

Especially when used in recirculated air operation, the filtration of the remaining residual fraction is carried out depending on the cooling lubricant in the optional Kappa microfiber filter cells or the Kappa multi-chamber filter cells made from plastic fleece fiber with special surface treatment. They ensure a highly effective filtration of nano particles.

The filter stages are arranged vertically, so that gravity can assist in the drainage process. Condensate runs into the condensate tray and is drained via the condensate nozzle.





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