



Stay cool – become more productive

The new KNOLL AerosolMaster™ 4000 ATS is very easy and intuitive to operate. Among other things, this is ensured by the new SmartConnect control concept.

For three years, the AerosolMaster™ system has been part of the KNOLL product range. Based on aerosol dry lubrication (ATS), it minimizes heat generation in the cutting edge contact zone during machining processes. At AMB 2022, KNOLL is now presenting a new version of the AerosolMaster™ 4000 ATS, which is even easier to operate and ensures maximum productivity.

The cooling/lubrication situation at the cutting edge of the tool can be decisive for economical machining. The specialists at KNOLL Maschinenbau, a leading supplier of conveying and filtering systems for chips and cooling lubricants in metalworking, know this very well. For umpteen years, they have been dealing with the flooding cooling by cooling lubricants (KSS) that dominates metal cutting.

But they also have alternatives to KSS in mind – and in their product range. Managing Director Matthias Knoll is certain of it: "There are production areas where minimum quantity lubrication and, even more so, our aerosol dry lubrication are clearly superior."

The ATS system has been on the market under the name AerosolMaster™ since 2009, and under the roof of KNOLL Maschinenbau GmbH since 2019. Its inventor Reiner Rother, responsible since then for the advanced development of ATS and the AerosolMaster™ as MQL Development Engineer at KNOLL, explains as follows: "We have given a lot of thought in recent years as to how we can further improve the AerosolMaster™. With the new version now presented, we have succeeded in greatly simplifying the operation of the system, which will

help to open up new fields of application more easily."

Proven principle, simplified operation

He points out that the underlying technical principle (see box) has remained the same. The focus of the advanced development is to make operation easier. On the one hand, this is helped by the functional new design that supports fully automated refilling, for example. On the other hand, the new KNOLL SmartConnect control concept promises significant advantages.

Based on a small industrial PC that can communicate with the system PLC, the developers implemented very intuitive operation. The user can use it – depending on the desired application – to configure the aerosol generation and the transport of the medium. Reiner Rother clarifies this as follows: "If the user attaches importance to his tools achieving their longest possible service life, he can employ the AerosolMaster™ as a 'tool saver', so to speak. The same applies if he would like to produce the best surfaces or use a maximized feed rate." The parameter settings required in each case are already preconfigured.

In addition, a SmartConnect app is available that runs on smartphones and tablets. This means that the AerosolMaster™ can also be set, controlled – and monitored – using mobile devices. This app provides the user with maximum transparency over the entire process, all the way through the recorded operating data and its evaluation. It is suitable for monitoring, predictive maintenance, etc.

How the KNOLL AerosolMaster™ works

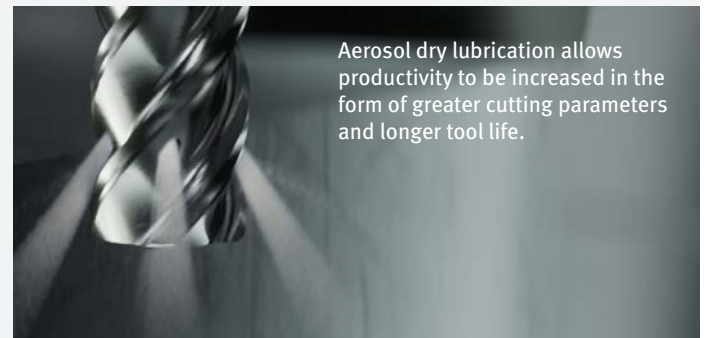
The heart of the AerosolMaster™ system is a pressure vessel containing an MQL oil, such as the lubricating oil ATS Lubricant, which is transformed into a fine aerosol with a droplet size of 0.1 µm to 0.4 µm (average size 0.25 µm) with the carrier medium air via a special Venturi nozzle. Patented control and regulation technology ensures that aerosol generation and transport can be adjusted according to the particular application. This also ensures that the aerosol flow remains constant and is fed to the cutting edge of the tool without loss. Because only optimum lubricant particle application effectively reduces the generation of heat due to friction. Even at high speeds and over long distances, demixing of the aerosol is hardly to be expected because of the extremely fine

particles. Nor is there any risk of film breakage. In addition, the ATS medium blows the dry chips immediately out of the machining zone.

When pure aerosol dry lubrication reaches its limits, for example in the heavy-duty machining of titanium and other materials with hardly any thermal conductivity, KNOLL combines ATS with cryogenic cooling technology. This means that, in addition to aerosol dry lubrication, liquid CO₂ is fed into a second channel to the machining contact zone, which can thus be cooled to a temperature as low as -78 degrees Celsius.



The KNOLL AerosolMaster™ system is based on aerosol dry lubrication. It avoids the heat generated by friction by guiding the finest lubrication particles directly to the tool cutting edge and wetting the contact point evenly.



Aerosol dry lubrication allows productivity to be increased in the form of greater cutting parameters and longer tool life.

Sustainable and cost saving

With the new AerosolMaster™ 4000 ATS and its simple operation, Reiner Rother expects increased interest from new customers who want to use the advantages of dry lubrication: "For example, metal cutters from the e-mobility sector. They usually only generate a small amount of chips, which is why a large cooling lubrication system is unlikely to be worthwhile for them."

For such applications, the AerosolMaster™ 4000 ATS offers a variety of advantages, also compared to conventional MQL systems.

With the ATS – compared to these – there are significantly fewer restrictions due to demixing or with regard to metering, control, line length and the use of small tools with cooling channel diameters of less than 0.2 mm. Instead, the user achieves significantly better productivity and process reliability with the AerosolMaster™ 4000 ATS. "Due to the significantly reduced heat generation in the impact zone, the ser-

vice life of the mill that is used increases by up to 30 percent compared to other MQL systems. Alternatively – with the same tool life specification – the cutting data can be increased," explains Reiner Rother.

Additional cost advantages result from the dry chips and workpieces that are produced. Against the background of the low lubricant consumption (about 3 to 25 ml/h), the provision and disposal costs of cooling lubricants are reduced to almost zero. Machine cleaning, which is always necessary with flood cooling, also becomes almost superfluous with ATS. And, as far as energy efficiency is concerned, the AerosolMaster™ systems show great potential: energy consumption per machine is up to 60 percent lower compared to central KSS systems.