



Issue no.: 1/2012 – Meltblown microfibre fleece for more efficient filter elements

Filtration properties of meltblown microfibre

MAHLE uses a special technology—the meltblown method—in order to continuously improve filtration properties. Here, thin meltblown microfibrils are applied to the untreated side of the filter medium (in case of cabin air filters: as an intermediate layer). The microfibre can be treated with an electret charge, meaning a permanent electrostatic charge of the fibre surface. The adhesive forces can hold back smaller particles than purely mechanical pores are able to, and this improves the dirt-holding capacity.

The fibres are organised lengthwise by means of ultrasound welding and will not be swept along by the oncoming flow speed of the filtered medium.

What is a meltblown microfibre?

As the name suggests, it is a very fine fibre with diameters of 2–15 micrometres (Figure 1), which was blown out of the melt. They allow for a very large pore volume of the finished filter media and therefore a significantly longer service life. This composite material also features very low pressure differential and high separation efficiency.

The combination of one or several thin and highly efficient meltblown filter layers with a stable support results in an optimised filter media. This technology is applied in air filters, cabin air filters, and fuel filters (for diesel as well as gasoline engines)—including the aftermarket.

Flow-through direction

For fuel filters

MAHLE fuel filters are constructed as star filters. This means that the filter paper is inserted into the housing in the shape of a star. The fuel to be cleaned flows through the filter from the outside to the inside. This enables the meltblown coating on the untreated side (Figures 2 and 3) to work optimally and ensures at the same time that fibres cannot enter the injection system.

For air filters

For this filter as well, the meltblown microfibrils are on the untreated side. This enables the fibres to deliver full performance without entering the intake section.

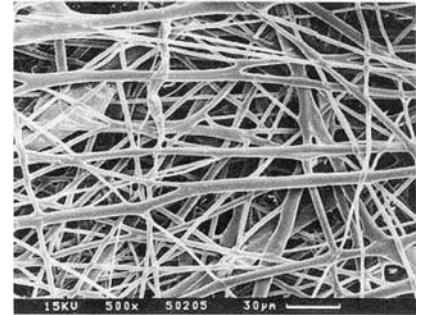


Figure 1

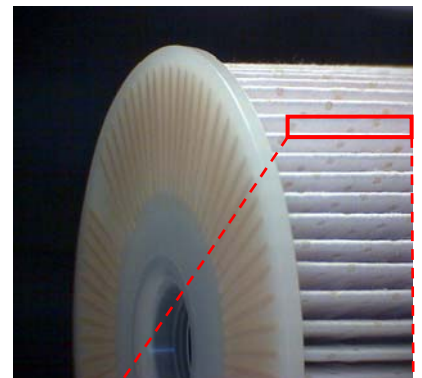


Figure 2

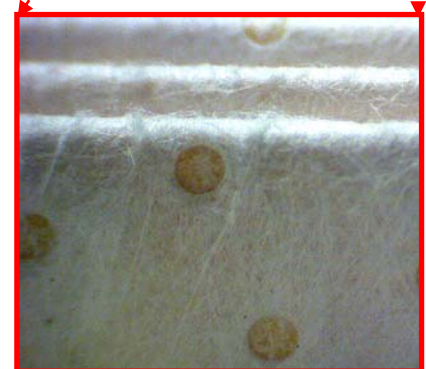


Figure 3



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For cabin air filters

For cabin air filters, the meltblown coating is applied to the treated side as an intermediate layer. Here the outer layers handle the removal of coarse particles and the stabilisation of the filter medium, while the meltblown intermediate layer is responsible for the removal of fine particles.

Figure 1: REM image of the meltblown filter material

Figure 2: Fuel filter with meltblown coating

Figure 3: Pleat surface of a fuel filter with meltblown coating