Project title:	Increase of the efficiency of oil-separating gas filters by the experimental and simulative development of a novel filter medium made of bicomponent fibers
Partner:	Junker-Filter GmbH, Math2Market GmbH, Ahlstrom-Munksjö Oyj, Fakultät für Technische Prozesse Hochschule Heilbronn, Fraunhofer-Institut für Techno- und Wirtschaftsmathematik (ITWM), Institut für Textiltechnik der RWTH Aachen University (ITA)
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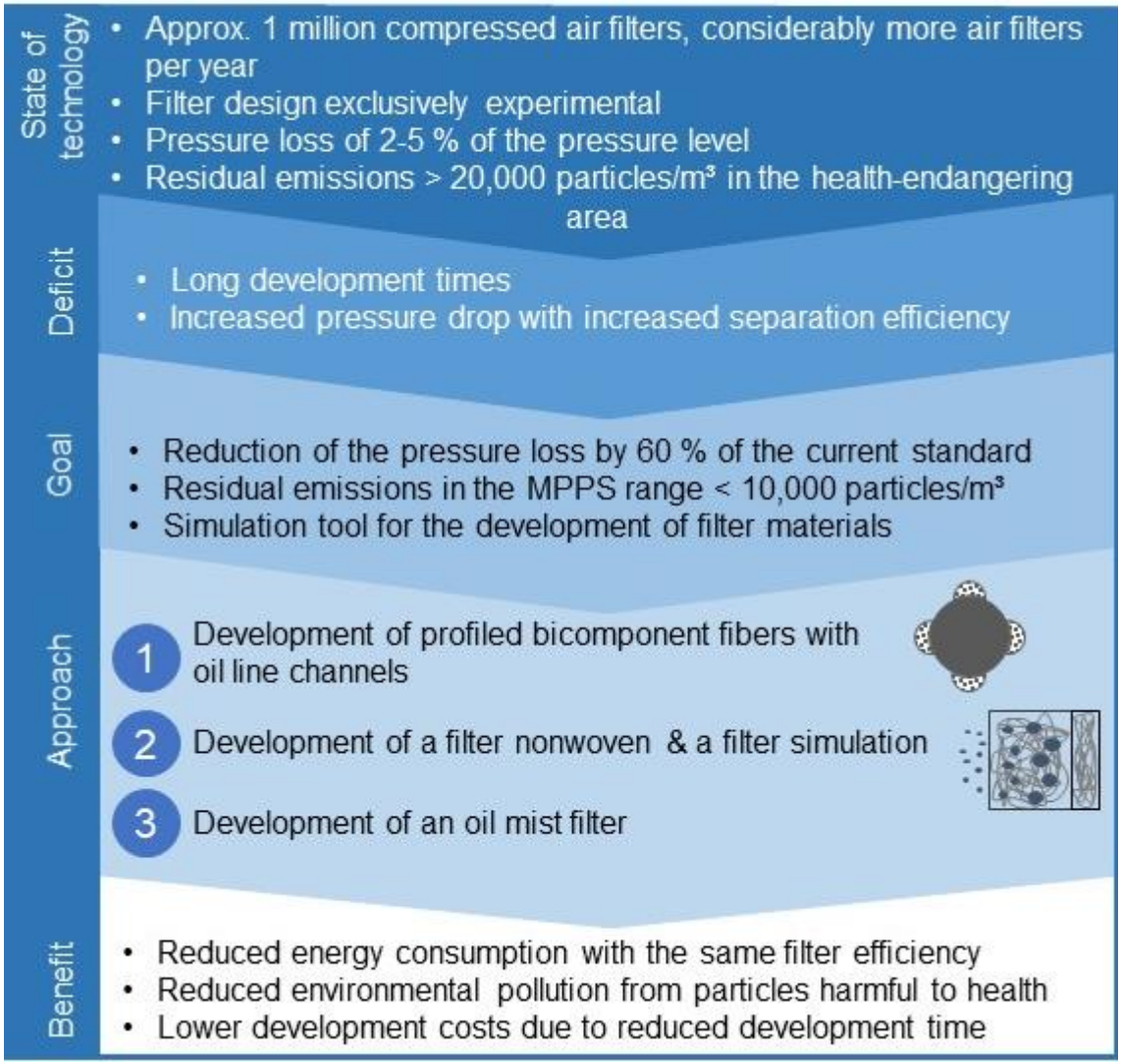

Figure 1: Overview of the "BiGOFil" project

Mission Statement

In order to ensure the long-term health of employees and functional safety at the workplace, finely dispersed oil must be separated from gases, usually from the air, at many workplaces. Special oil filters, so-called coalescence filters, are used for this purpose. There are two main application scenarios: On the one hand, the separation of oil mist and oil-containing emulsion mist from air or other gases at ambient pressure, on the other hand the treatment of compressed air. Currently, 1 million filters are used in the compressed air sector in Germany. The number of general air filters is considerably higher. The filters cause a pressure loss of 2 - 5 % of the prevailing pressure level in the plants, with residual emissions of > 20,000 particles/m³ in the health-damaging range. In addition, the filter design is currently only experimental.

Approach

The deficits of the long development times and the increased pressure loss with higher separation efficiency are dealt with in the BiGOFil project. The aim is to reduce the pressure loss by 60 % compared to the current standard, to keep the residual emissions in the area of Most Penetrating Particles (MPPS) at < 10,000 particles/m³ and to set up a simulation tool for the development of filter materials. For this purpose, profiled bicomponent fibers with oil line channels are first being developed at ITA. In parallel, the simulative spinneret and process design will be carried out at the ITWM. Based on the novel fibers, a filter nonwoven will be developed and produced at Ahlstrom-Munksjö. In addition, a model for the description of the processes at the filter is being developed at Math2Market, whereby the structure simulation is realized. Based on the filter nonwoven Junker-Filter develops and produces prototypes of the novel filters. These are tested by the Heilbronn University in the final application. The new filter allows a high filter efficiency with low energy consumption. Furthermore, the environment is less polluted by harmful oil droplets, which are removed from the air by the filter. The filter simulation tool reduces development times and thus the development costs for filter manufacturers.

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