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BioBagFil – Sustainable bag filter

Objective

Project aim was the development of sustainable pocket filters that perform as well as today's models. These filters are made from biobased plastics and therefore represent a closed material cycle. The project's focus was set on bioplastics that are both biobased and biodegradable, such as polylactide (PLA), polybutylene succinate (PBS) or polyhydroxyalkanoates (PHA). The most common biomaterial among this group is PLA, which can already be used to produce nonwovens, spunbond and meltblown nonwovens and therefore also industrial pocket filters. PLA as raw material is already widely used in production and processing into industrial products, but has some disadvantages in terms of its properties due to high brittleness, increased shrinkage and low elasticity. When combined with other biobased plastics, such as polybutylene succinate (PBS) or bio-PE, these disadvantages can be effectively compensated.

Approach and results

This research project focused on the modification and improvement of properties of biogenic carded and extruded nonwovens in relation to operating conditions of filter media for air filtration. Main focus was set on reducing hydrolysis sensitivity and optimising thermal and mechanical properties. A key task of the planned work in this context was to investigate long-term stability of filter nonwovens under typical operating conditions with corresponding lifetime prediction. The filter class, pressure differentials and other filter-related data were determined in order to evaluate filter performance. Field tests of filter components were carried out to verify service requirements and durability in terms of humidity, temperature and ageing behaviour. After production, surface weld seams and durability and resilience of the material composite made from biogenic nonwoven layers were continuously improved.

Sustainable bag filter (© EURO-Filter)

Unfortunately, not all deficits regarding mechanical stress and long-term stability of developed pocket filters could be overcome by the end of the project. Filter performance could still be improved. Further development of biogenic base polymers such as PLA, PBS or PHA is therefore essential if these materials are to be used as durable, sustainable filter media in the future. The results of this research project have laid the foundations for this.

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