



Deliverable Report

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1

Executive Summary

In the context of the D1.2 Part B “Pilot run of flame-retardant polymer materials including mechanical property testing for large 120 cell module” the main research focus was on the further investigation of the classification of the ignition resistance of long-fiber-reinforced thermoplastic materials (LFTs). These investigations are based on the work already done in the field of material development, which were described in the Deliverable report D1.2 Part A “Pilot run of flame-retardant polymer materials including mechanical property testing”.

In the context of 2 trial series, 17 material combinations (2 commercial PP-based flame-retardant masterbatches and 15 PP-based flame-retardant development masterbatches + PP-based long-glass fiber pellets) were processed by injection molding and then characterized. The characterization included the determination of the flame-retardant properties and tensile properties for all material combinations. Furthermore, partly the impact properties were examined and the combustion gases were analyzed. In addition, based on previous results the influence of a color masterbatch on the flame-retardant properties was investigated in an edge investigation.

A comparison of the results of the mechanical tests with the results of the flammability tests showed that several material combinations meet the specified requirements (sufficient mechanical properties and “V-0” classification according to UL94). Taking into account all basic conditions and results, one material combination with a PP-based flame-retardant development masterbatch was selected as final material which should be used for the first pilot run (D1.6 Part B) and the serial production (D4.2 Part B) of the thermoplastic parts (beams) of the support structure of the large 120 cell module .

Of course, for a commercially viable product, further adaptations such as UV-stabilization would be necessary to fulfill all the requirements. Nevertheless, in the context of the overall material characterization a solid base was created for the production of first prototype parts.

2

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