

Capacity Area A3 Topic 1.1 Milestone 3

Competitiveness identified

The aim of the project is to evaluate the effects of a spacer integrated to a fabric lay-up, on the impregnation kinetics by a melt thermoplastic, the impregnation quality and the mechanical performances.

For the time period September 2019 to August 2020, the following objectives have been addressed: optimization of the process parameters and evaluation of their impacts on the impregnation quality and mechanical performances of the part. Creation of a model for cost comparisons of different impregnation strategies, process parameters, production volumes as well as identification of the main item(s) of expenditure.

The experiments and the microstructural analyses show that increasing the saturation time (second impregnation phase following the first injection through the spacer length) and maintaining a “feeding” of the sandwich by the matrix during the heating and cooling phases, improve the impregnation quality and the mechanical performance. The experiments also reveal the importance of a gradual increase in pressure (rather than a single increment directly up to the final pressure) during the saturation phase, however without exceeding 15 bar for the studied part, to obtain a better impregnation. Finally, the tests conducted at a higher temperature (260°C vs. 240°C) have not shown any significant improvement or degradation in the impregnation quality and mechanical performance.

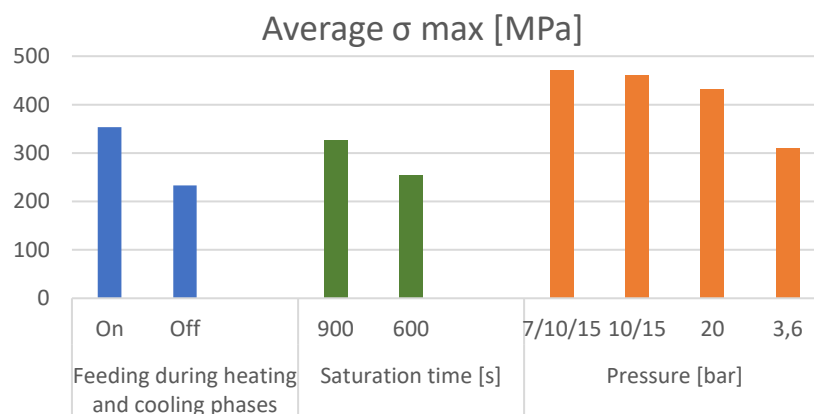


Table 1. Stress comparison as a function of the process parameters



Figure 1. Micrographs of two plates after impregnation with different process parameters (porosities are circled in red).