LFT (XENCOR)

In order to predict the mechanical behavior our the long glass fiber reinforced grades (XENCOR family) at part level and to take into account their specificities compared to more traditional short fiber reinforced compounds, a dedicated **MOLDFLOW-DIGIMAT-ABAQUS methodology has been defined and implemented from the DIGIMAT material calibration to the application on final application parts** .

The work accomplished regarding this topic is summarized in the following documents:

- Document 1: for in-depth understanding of the key aspects to be considered during the DIGIMAT material calibration with an insight about MOLDFLOW capabilities in terms of fiber orientation prediction;
- Document 2: for the application and validation on a structural demonstrator part

Moreover, for some specific customer requests involving impact/crash tests, an **approached method has been implemented to mimic the higher resistance to failure propagation observed with the XENCOR grades** compared to short fiber reinforced polymers. The related information can be found here.

In addition to these studies, it is also relevant to assess the influence of a part and feeding system (sprue, runners and gate design/size ...) on the residual fiber length that we should expect in the final application. Therefore, a procedure to include the **fiber breakage (inside the mold cavity) during our injection molding simulation (MOLDFLOW)** has been written and is available here.

Finally, a full study has been completed to evaluate the capabilities of MOLDEX 3D to predict the fiber breakage in the injection molding barrel (screw). This analysis is described in this report and includes:

- Model validation at purge and part level;
- Sensitivity study to material model parameters and processing conditions;
- Analysis of the impact of the screw design on the predicted residual fiber length;
- Combination with our DIGIMAT model for Xencor Xtreme LGF-1045 ECHO in order to couple the influence of the process on the residual fiber length and hence, on the final part performances (stiffness ...).

Note that during the calibration of the DIGIMAT material card for the Xencor Xtreme LGF-1045 ECHO grade, we have been able to demonstrate how the **fiber-flow coupling model developed in MOLDEX 3D** could help to better predict the mechanical anisotropy of the material in some specific cases. See related document here.