

„Research analysis and potential use of recycled waste as fillers for polymer composites intended for machining”

### Summary

The work has a standard structure, divided into three main part. The first part consists of a literature review, which includes chapters on both the theory of polymer composites and the methods for their processing. It describes the basic parameters of machining processes, methods of manufacturing polymer composites, as well as the tools and machines used in this technology. A detailed characterization of the polymer materials used in machining is provided, including their properties, applications, and modification methods. The literature review also covers the recycling of plastics and non-ferrous metals, particularly aluminum and brass, and their potential use as fillers in polymer composites. This review concludes with a discussion of how processing parameters affect the properties of composites after machining.

The second part of the work presents the research objectives and theses. The main research goal was to investigate the impact of aluminum and brass chips on the mechanical, thermal properties, and machining process of polymer composites.

The scope of the work, which includes studies on improving the properties of composites and their potential applications in industry, is also provided.

The third part of the work is dedicated to presenting the research results and methodology. It begins by detailing the materials selected for the study, describing the methods for producing the composites and their machining process as well as the techniques used for structural and material property analysis. Chapter four describes the composite manufacturing process. Chapter five presents the results of thermal property tests conducted using differential scanning calorimetry (DSC) and the thermomechanical properties determined using the DMTA method.

Complementing the research are hardness and impact strength tests of the composite samples. Chapter six presents the surface topography analysis of the

composites before and after machining, as well as tomographic studies of the composite structure.

The final chapters of the work focus on summarizing and analyzing the results. The impact of aluminum and brass chips on the properties of the composites is discussed, particularly regarding the improvement in mechanical strength.

Conclusions regarding the optimization of the machining process, especially concerning tool wear and process parameters that are critical for the final quality of the machined materials, are also included.

The work concludes with an analysis of the research results and final conclusions, along with a bibliography of the literature referenced in this dissertation.