

Summary

The thesis has a typical structure. It was divided into three main parts. First part contains overview of the literature used to write the two chapters. The first chapter contains the information about the processing methods of polymeric materials. The basic parameters of processing methods have been indicated. What is more, one can find the description of the machines and tools used for materials processing. The polymeric materials used in machining have been characterized. The chapter provides the information about their properties, use and modification methods. The first chapter has been closed with the description of the influence that processing parameters has on material's properties after machining. The second chapter corresponds to the mechanical gears, giving the basic knowledge on how they operate and how they are being used. One can find the information about the types of gears and materials used for their production. In the third chapter the process of polymeric material processing with a multipassing method has been characterized. There is a description of the process taking into consideration the design of the outline of the teeth. There have been also attached the pictures taken during the gear's processing with a multipassing method.

In the second part of this work the purpose and the thesis are presented. There has also been indicated the range of the work. The test results and the research methodology have been included in the third part which contains seven subsections. The basic properties of the materials chosen for test have been presented. The description of the manufacturing method and heat treatment of the gear has been included. The method of testing the structure and properties of the material has been characterized. The fourth chapter includes the preliminary study which has been conducted in order to prove the legitimacy of further testing. The structure of the surface tested with the profilometer and microscope has been included in the fifth chapter. Thermal performance of the manufactured products has been tested using differential scanning calorimetry DSC, the results of the testing have been presented in the sixth chapter. In the next chapter the testing results of the thermomechanical properties determined by the DMTA method. Chapter eight includes numerical modeling by milling in Ansys program. In the following chapter of this work

the process of gear manufacturing has been presented. This process consisted of developing machining code based on the analytical calculations of the gear wheel outline, consequently writing a program and its analysis in machine environment only to end with manufacturing the gear on CNC lathe.

Chapter tenth is followed by a short analysis of the research results along with a summary and conclusions. At the end of dissertation there is a list of literature used during the thesis.