Markers and Methods for the Identification of Recycled Polymeric Materials

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The Analysis of polymeric materials is amongst the most diverse pallet of methodoglogies and tools due to the polymeric and non soluble substance matter. Material Characeristation vary from Physical and Thermodynamic testing to surface analysis. Recently, a comprehensive literature review looking at the application of recycled plastics in safety-related components was reported [1]. When recycling such parts, it is critical to assess both mechanical properties and chemical properties of the finished product to ensure that performance is not affected. However, due to the uncertainties of the material properties in mechanical recycling, there are limited studies on the use of regranulates in safety-relevant components. As a result, the literature recommends that no more than 25% recyclate should be used, especially for technical parts. A proportion of less than 5%, on the other hand, is considered tolerable and can be done without further testing of the properties. This case study describes a combined analytical approach to test the structure and properties of polyamide gears processed by extrusion/injection molding of virgin or recycled (regrind) pellets. The workflow described is aimed at analyzing the potential differences of the virgin and recycled pellets and gears.

1. Rethmann, C., 2022. Evaluation of polymer recycling for safety-relevant components in the automotive industry, Masterthesis, University of Applied Sciences/Hochschule Osnabrück.