



FLAMINGO

Fabrication of Lightweight Aluminium Metal matrix composites and validation In Green vehicles

Deliverable D 5.2
Report on sand casting of Al-MMCs parts

Lead Beneficiary

ÖGI

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Publishable Executive Summary

Deliverable D 5.2 is a report on sand casting of Al-MMnCs (Aluminum-Metal Matrix Nano Composites) parts. The objective of the task is to characterize the specimens and parts obtained through sand casting, evaluate the casting process, processing time, and costs of a casting procedure to ensure homogeneous distribution of nanoparticles. The report covers alternative mixing methods and the first castings in sand casting, comparing different combinations of mixing methods in terms of mechanical properties and castability. The results show that the "induction furnace + ultrasound" variant provides the best mechanical properties with a further small improvement when using the Tesla valve. The flowability and mold filling capacity are evaluated using a casting spiral, and it is found that the combination of inductive stirring and ultrasound has the best mixing effect and castability. The activities include initial trials for characterizing component homogeneity and surface quality, optimizing the casting system, and conducting casting trials with nanoparticles. Inspection of the castings is performed using visual testing, thermography testing, and computed tomography. The results show the presence of porosities and defects in the surface and internal areas of the components. The report also discusses the costs associated with sand casting and suggests possible improvements to reduce costs and improve efficiency in the melting process.

