

AME4: Induction mixing of nanoparticle aluminum MMC's

Sponsor: Eck Industries



Project Description: Eck Industries in Manitowoc, WI delivers aluminum castings to customers in the military, hybrid vehicles, commercial trucking, aerospace, medical, industrial and energy markets. It is a privately-owned family business with over 64 years of experience in the aluminum foundry industry. The addition of nano-scale ceramic particles to aluminum, magnesium, and zinc alloys can enhanced inoculation, grain refinement, and hot tearing resistance, as well as improve yield and tensile strength while maintaining or enhancing ductility. A major challenge with metal matrix nano-composites MMNC's is the ability to effectively mix and distribute the nano-scale ceramic particles homogeneously into commercial scale batches of molten aluminum and maintain a homogeneous distribution through casting and solidification. There is a need for production of nano-particle master alloys containing well-dispersed nano-particle that will be subsequently diluted, ultrasonically dispersed, and cast. This project will utilize induction melting methods to disperse nanoparticles into molten aluminum.

