

Light-weighting using Advance Simulation and Tooling free Investment Casting AM (Additive Manufacturing) Process

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Abstract

Casting process simulation and ICME tools are very matured and allow accurate predictions of the residual stress & distortion; hot tear & shrinkage type defects and micro-structure & properties in most of the alloys. Tooling free castings using AM (printed wax, PMMA, PLA and SLA) offers tremendous design freedom with feature placement, orientation, and drafting. Part and feature consolidation after carefully understanding current casting higher order sub-assembly; it's form-fit and functionality can lead to a more complex one piece casting configuration, improving the final product performance at reducing cost and lead times. Author will present case studies from various research projects working with member investment foundries and manufacturing innovations institutes - America Makes and LIFT / ALMMII, demonstrating light-weighting with the application of advance simulation and AM processes.