

Conceptual Design Framework for Setting Up Aluminum Alloy Powder Production System for Selective Laser Melting (SLM) Process

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Abstract

Documentation on the correct process and component requirements for setting up efficient aluminum powder production systems capable of manufacturing powder that meets the requirements for the selective laser melting (SLM) process is not available due to its proprietary nature. This hinders powder metallurgy (PM) trainees in acquiring knowledge and skills needed in setting up such metal powder production systems. To address this challenge, powder requirements for the SLM process and powder production techniques for manufacturing powder that meets SLM requirements were identified and defined via literature review. User-value analysis and cost–benefit analysis techniques were applied as evaluation tools to identify the best components and process parameters for an aluminum powder production system. A conceptual design framework for setting up an aluminum powder gas atomizing system which meets SLM requirements is developed. This review improves the delivery of PM education in developing countries as trainees gain knowledge and skills for setting up powder production systems.