Cost-effective manufacturing of metal powders through continuous process by SMS group

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ABSTRACT

SMS group supplies plant technology for the production of high-quality metal powder for additive manufacturing (AM) and other technologies. Cost-effective and high-quality powders will be one of the main drivers for the development of metal AM towards a sustainable industrial technology. By operating a gas atomization plant (VIGA - vacuum induction gas atomization) integrated in the SMS 3D-Test Center, the SMS group has optimized the classical powder production for the requirements in AM over the last years.
In addition to conventional gas atomization plants, the SMS group, together with a customer, has developed another innovative powder production process. The conventional batch-wise process is transformed into a continuous process. The continuous powder production plant enables cost-effective and large-scale production of up to 4,000 tons per year. Compared to the traditional gas atomization process the capacity is increased by a multiple. Production costs for spherical, high-quality metal powders are significantly reduced. The increase in capacity results in enormous economies of scale. Set-up times, melting and cooling times are reduced. In the new process developed by SMS group, two vacuum induction melting (VIM) furnaces continuously hold liquid melt, which is atomized successively through the nozzle. The nozzle can be exchanged during operation. Melting is done under vacuum to guarantee highest quality levels like in the conventional process.

INTRODUCTION

The demand for metal powder has grown significantly in recent years, particularly due to the ongoing industrialization of additive manufacturing (AM). In order to meet the high quality requirements in the field of AM, powders are atomized under inert gas during the gas atomization process. With some alloys, melting is additionally performed in a vacuum induction gas atomization (VIGA) process, as it is known. The requirements for metal powder used for AM are manifold and complex. In order to achieve high quality additive manufactured components while at the same time meeting the economic and ecological