

Increasing the cost efficiency of hot isostatic pressing for near net-shape processing of titanium alloy components

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The advent and enthusiasm for additive manufacturing (AM) has increased significantly the use of titanium alloy powders. For most of the powder-based AM processing techniques, there is a requirement for the fine powders of narrow size range. Since most of the atomizing techniques produce a range of sizes, with a more or less Gaussian distribution, this means that after delivering powders for AM, there is a considerable quantity of powders left seeking application. In consequence, the price of this powder is often very much reduced, for example, the price of Ti alloy powder may be decreased several times. Hot Isostatic Pressing (HIP) does not place such a stringent requirement on powder size (provided the tap density is not strongly impacted), and there is, therefore, a tremendous potential cost advantage for HIP of these coarser powders were to be used. The research described here involves a study of the microstructure, response to heat-treatment, and mechanical properties of samples of Ti-6Al-4V produced by HIP'ing such coarser powders. These results are compared with those of conventionally wrought Ti 6-4, and the differences are analyzed and contrasted.

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Materials

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