

Vacuum Plasma Spray Forming of NARloy-Z

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Vacuum Plasma Spray (VPS) forming is being developed for producing near net shape liners of combustion chambers for the Space Shuttle Main Engine, National Launch System, and Advanced Main Combustion Chamber programs. In this development work, the microstructural characteristics and mechanical properties of VPS NARloy-Z are being investigated. NARloy-Z, a high conductivity copper base alloy, is used as the liner in the Space Shuttle Main Engines' (SSME) Main Combustion Chamber (MCC). The VPS forming of NARloy-Z has been shown to produce dense, fine recrystalline grain and homogeneous microstructures. Currently, NARloy-Z is being sprayed on the inside surface of 28 cm (11 inch) diameter structures. These test articles are being used to evaluate the effects of inside diameter spraying on the quality of deposited material. Good strength, ductility, conductivity, and bond strength have been found and are discussed herein.