

HIGH-DEFINITION PLASMA SPRAYING WITH WIRE FEEDSTOCK

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The use of wire feedstock rather than traditional particulate materials in plasma spraying is attractive because material costs are lower and handling is easier. The limitation on the use of wire feedstock has traditionally been the low energy output of conventional plasma guns which limits the rate at which wire can be melted and material deposited. The use of wire feedstock in producing coatings with small, well defined dimensions is not limited by feed rate. This paper experimentally examines melting and particle formation phenomena in sonic and supersonic spray guns which produce well defined spray patterns. The rate of wire melting and the size and velocity distribution of particles formed is examined as a function of gas enthalpy, gas velocity and gas mixture. An analysis of heat transfer and melting phenomena is developed and a simple model describing molten droplet formation is presented.