



# Single Wire Arc Thermal Spray for Uniform Surface Coating and Rapid Prototyping

**IP Status:** Issued US Patent; **Application #:** 09/843,188

## Less Spray Divergence with Single Wire Arc Thermal Spray

The single-wire arc spray apparatus and methods yield a narrow beam spray and a controlled width spray pattern having highly defined edges. Current arc spray technologies can suffer from spray divergence of up to 20 degrees, leading to the spray coating having uneven thickness. The described method generates a narrow beam thermal spray of liquid droplets to overcome this problem and produce spray coatings with uniform thickness.

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## Uniform Surface Coating for Rapid Prototyping

Thermal spray processes have found wide use in applying coatings to various substrates such as plastics, metals and ceramics. Wire arc thermal coating methods have emerged as the technique of choice as the devices yield high quality coatings using inexpensive equipment and materials, low power requirements and relatively low thermal limits. The described technique retains these advantages while decreasing the spray divergence, leading to more uniform coating thickness. Arc thermal spray technologies are useful in the fabrication of freestanding, three dimensional structures by the building up of layers, as in 3D printing and rapid prototyping techniques.

### BENEFITS OF HIGH DEFINITION SINGLE WIRE ARC THERMAL SPRAY:

- High definition single wire thermal spray system produces spray coatings with even thickness, a great improvement on current state of the art techniques.
- Wire arc thermal spray technologies use low cost equipment and materials, are energy efficient and have relatively low thermal limits.
- Gas jet assists in detaching droplets from the molten end of the consumable wire, reducing nozzle clogging.
- The technique has potential for use in 3D printing techniques and rapid prototyping.

**Technology ID**

z00216

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