



COLD GAS DYNAMIC SPRAY COATING TECHNOLOGY

Centre for Engineered Coatings

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Overview

Cold gas dynamic spray (also called Cold Spray or Kinetic Spray) involves accelerating micron sized powder particles to supersonic velocities resulting in the formation of dense, thick and pure coatings with high deposition rates. Cold spray is a low temperature high velocity variant of thermal spray family. This technique has very high deposition rates and deposition efficiencies. Since there is no heating of powders, retention of powder properties in the coating is possible.

Technology Highlights

- Indigenously developed state of the art PLC based automated portable control panel
- Different set of nozzles
 - For Low melting materials (polymer based)
 - High deposition rate or coverage area
 - Low deposition rate or coverage area
 - For Ni based materials, Steels (Optional)
- Compressed air as process and carrier gas
- Max Pressure-20 bar; Max Temperature-600°C
- Cu, Al, Ag, Zn, Sn, Ni, SS, Ta, Nb, Ti and alloys and composites



Cold Spray Gun



Power Supply and Control Panel for Cold Spray Coating System

Material	Application
Copper	Electrical contacts, lugs, EMI shielding
Silver	Electrical conductivity, corrosion, oxidation resistance/Cu lugs, high current contacts and decorative
Zinc	Galvanic protection/cathodic protection of steels
Tantalum and Niobium	High temperature corrosion resistance, biomedical, sputter target
Titanium	Corrosion resistance, biomedical applications
Tin	Electrical contacts
Steel	Structural and corrosion resistance applications
Nickel, Ni-Cr, Inconel	Hot oxidation
Tungsten/Copper	Heat sink applications
Aluminium	Repair and refurbishment, corrosion resistance
High entropy alloys	High temperature applications



Electric Lug



Ag Coating on Steel



Al Coating on Aircraft Part



Zn Coated Fuel Filler Tube



Al Alloy Specimens After Repair

Technology Status

- Application development activities are in progress
- The technology is ready for transfer and in progress

*Intellectual Property Development Indices

IPDI	1	2	3	4	5	6	7	8	9	10
Activities	Basic concepts and understanding of underlying scientific principles	Shortlisting possible applications	Research to prove technical feasibility for targeted application	Coupon level testing in stimulated conditions	Check repeatability/consistency at coupon level	Prototype testing in real-life conditions	Check repeatability/consistency at prototype level	Reassessing feasibility (IP, competition technology, commercial)	Initiate technology transfer	Support in stabilizing production
Status										