

International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

Balapur P.O., Hyderabad – 500005, Telangana, India



Cold Gas Dynamic Spray Technology

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. Dense coatings with porosity less than 0.1% can be achieved. Metallic, Alloy, Composites, Nanostructured and Amorphous powders can be deposited. This technology has huge potential for repair and refurbishment, electrical and thermal applications.

Key Features

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



Portable Cold Spray Technology

Potential Applications

- Repair and Refurbishment Applications (Aerospace components such as Compressor Fan casing etc.,)
- Coatings for Electrical contacts, lugs, EMI shielding, heat sinks
- Coatings for High Temp Corrosion resistance, Bio medical, Sputter Target
- Sacrificial coatings or Cathodic Protection (Zinc coating on Steel Structures)
- Anodic Protection coatings (Aluminium coatings on Active Magnesium aerospace and automotive components)
- Wear resistant coatings (MMCs, Alloy coatings)
- Nanostructured / amorphous/ BMG coatings
- High Entropy Alloy Coatings as Bondcoats for High Temperature Gas Turbine Applications



Typical Applications Developed

Intellectual Property Development Indices (IPDI)

- Technology Ready for Adaptation
- Application Development Activities in progress

Status	1	2	3	4	5	6	7	8	9	10
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Major Patents / Publications

1. Naveen M Chavan, SP Phani, M Ramakrishna, DS Rao and G Sundararajan, Surface & Coatings Technology 205 (2011), P4798–4807
2. G Sundararajan, Naveen M Chavan and S Kumar, Journal of Thermal Spray Technology, 1348—Volume 22(8) December 2013
3. S Kumar, A.Jyothirmayi, Nitin Wasekar and SV Joshi, Surface and Coatings Technology, 296(2016), 124-135

Centre for Engineered Coatings (CEC)

ARCI, Balapur PO., Hyderabad 500005, Telangana, India
Tel : +91 40 24452374 / 24457106; Fax : +91 40 24442699

Email: naveen[at]arci[dot]res[dot]in/skumar[at]arci[dot]res[dot]in/raods[at]arci[dot]res[dot]in/gparci[dot]res[dot]in