

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

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



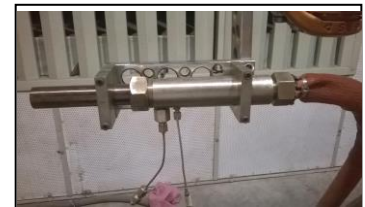
High Pressure Cold Spray Technology

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. The uniqueness is to target dense coatings that need very high particle velocities to get deposited using cold spray and to deposit dense coatings of Refractory Metals, Molybdenum, Cobalt based materials, superalloys, metal-metal carbide composites without having to resort for a post treatment procedure.

Key Features

- Indigenously developed state of the art PLC based automated Portable control panel (Max Pressure – 100 bar)
- High Mach Number Nozzles (>3)
- Maximum Pressure-50 bar; Maximum Temperature-600°C
- Steels, Super Alloys, Molybdenum, HEAs, Refractory coatings
- Indigenously designed and fabricated High Pressure Heater
- Indigenously designed and fabricated High Pressure Gun and Powder Feeder
- Indigenously designed and fabricated high mach number nozzles



High Pressure Gun

Potential Applications

- Repair and Refurbishment Applications
- Coatings for Electrical contacts, lugs, EMI shielding, heat sinks
- Coatings for High Temp Corrosion resistance, Bio medical, Sputter Target
- Super Alloy coatings for high temperature wear and corrosion applications
- Wear resistant coatings (Metal-Metal Carbides)
- Nanostructured / amorphous/ BMG coatings
- High Entropy Alloy Coatings for Bondcoats for High Temperature Gas Turbine Applications



High Pressure Heater

Intellectual Property Development Indices (IPDI)

- Preliminary Process Development Level

Status	1	2	3	4	5	6	7	8	9	10

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