

Axial III™ Spray System - Advanced Coating Solutions



The Axial III torch design gives the user a highly flexible, robust, field proven tool that can apply almost any coating. Axially fed powders or suspensions ensure consistent heat treatment of all particles which leads to superior coatings possible at the most economic results for:

- Wear (abrasion, adhesion, fretting, erosion)
- Thermal Barriers
- Clearance Control (abradables)
- Corrosion / Oxidation
- Electrical (resistance and conductivity)

Benefits

Efficiency and Productivity

- High deposition efficiencies, less powder waste
- High flow rates, reducing job time
- Can spray Ceramics, Cermets and Metals
- Can spray superfine powders
- Savings on powders and operating cost

Enhanced Coating Quality

- No separation of mixed powders in the flame
- No flame deflection from torch axis
- Increased process stability
- Highly stable plasma
- Denser coatings

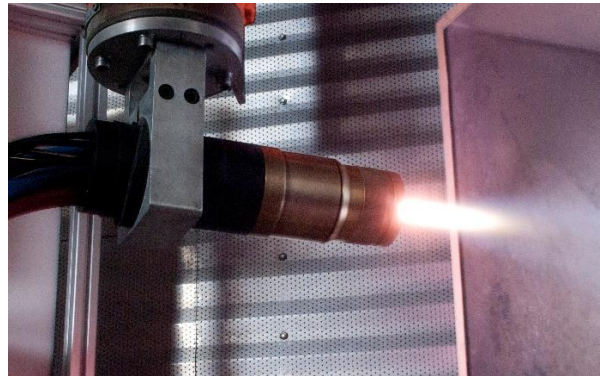
Capabilities

- Low angle (>15°) spraying
- Focused gas and supersonic nozzle designs
- Suspension or solution feed possible
- Reactive materials
- Nano materials

Axial III Saves You Money

Typical Analysis	Axial III System	Radial System
Deposition Efficiency	80%	50%
Feed Rate (g/min)	120	35
Powder costs / kg	\$75	\$75
Powder on part	10 kg	10kg
Powder sprayed	13 kg	20 kg
Powder wasted	3 kg	10 kg
Deposition time	120 min	600 min
Total Operating Cost	\$ 177	\$ 850
Total Powder costs	\$ 500	\$ 1150
Total Costs	\$ 1115	\$ 2350

Total Savings 50%
Total Time Reduction 80%



Axial III Operation

The Axial III is a 3-anode/3-cathode DC plasma torch with powder injection along the central axis. The plasma streams converge at the point where the powder or suspension is injected. At this point, the plasma/powder flow is accelerated through a specially designed nozzle. Particle velocities are significantly higher than those of other plasma torches and approach those attained with HVOF systems. The resultant coatings are very consistent, reproducible and of superior quality.

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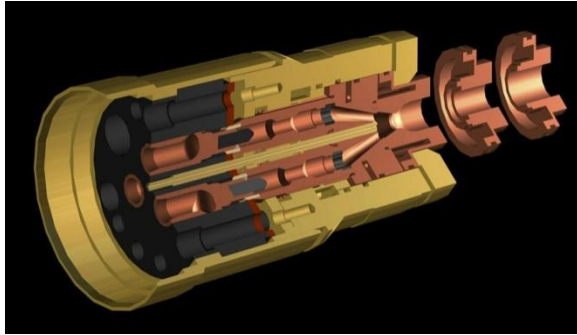
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Three-Gas Chemistry

The Axial III Plasma Spray Torch utilizes three gases: Argon (Ar), Nitrogen (N₂), and Hydrogen (H₂). Helium (He) can be substituted for H₂.

The Axial III™ can operate using either Argon or Nitrogen as the primary gas. Factory set maximum flow rates for the gases are:

Ar: 400 l/min
N₂: 200 l/min
H₂: 100 l/min or; He: 140 l/min



Axial III Specifications

- Powder Feeding: Axial, carbide-reinforced injector
- Electrical Power: 50 – 150 kW
- Number of Cathodes: three cathodes arranged at 120° angles
- Number of Anodes: three
- Plasma Nozzles: 8mm – 25mm
- Maximum Pressure Limit in Arc: 4 bars
- Mixture of Plasma Gas:
 - argon
 - argon/hydrogen
 - argon/nitrogen
 - argon/nitrogen/hydrogen
 - nitrogen/hydrogen
- Current Load: 3x30 to 250 amps
- Electrode Potential 60 – 200 volts
- Cooling: Water, 50 l/min, 14 bars
- Adaptor: straight 180°, right angled 90°
- Special Gun: Axial III internal spraying gun to 325 mm at 135 kW

Control Equipment

Touch screen control panel, with full display of process variables, data trending and recording, run parameter database, self-diagnostic tools, all bundled in an industrial grade computer.

Control cabinets with segregation between water/gas MFC's and electrical PCL's, CE marked, process feedback control, gas pressure transducers, water flow and temperature measurement for system heat balance.

Power Supplies: Proven Industrial design, built-in high voltage pulse, input voltage protection and "forced" air-cooled



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