Suspension Plasma Spray | Premium Dense and Columnar Coating Solutions

Finely structured coatings are increasingly requested for applications in aerospace, electronics, power generation, printing, and industrial markets due to their improved physical and mechanical properties. These coatings can range from extremely dense and crack free to porous and highly strain-tolerant columnar microstructures. The common factor being smaller crack, porosity, and structural features than typical Atmospheric Plasma Spraying (APS) coatings.

New Technology

Conventional plasma spray processes are limited to spraying powder sizes greater than about 10 microns. As a result, microstructural defects including porosity and cracking are of the same size scale. Suspension Plasma Spray (SPS) enables the plasma spraying of very fine powders (<5 microns) by suspending the powders in a solution to carry them into the plasma plume. The resultant coatings have much finer feature sizes that can be controlled to generate both extremely dense and columnar microstructures similar to Electron Beam Physical Vapor Deposition (EB-PVD).

Coating Characteristics

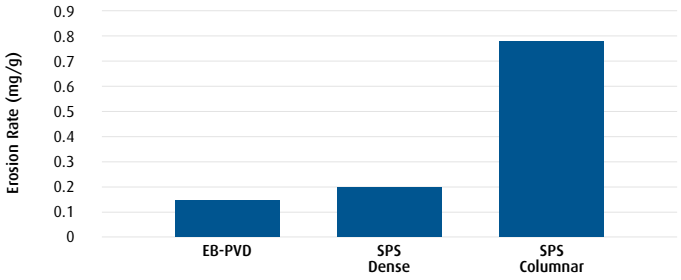
- Versatile columnal microstructure
- Crack-free splats
- Very smooth, dense, and thin

Versatility

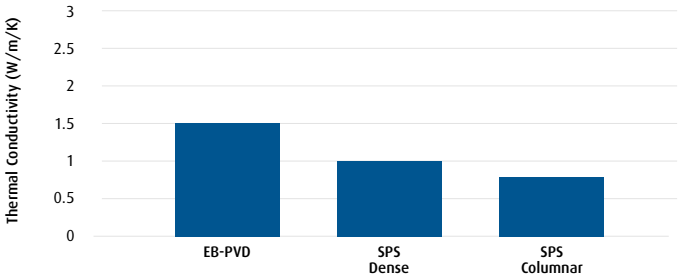
SPS can provide a wide range of microstructures from near 100% dense to highly porous columns. Additionally, it is possible to generate layered coatings of different chemistries to develop coatings with a combination of properties (e.g. 7 weight percent yttria stabilized zirconia (7YSZ) and gadolinium zirconate to generate high toughness coatings that are also Calcium-Magnesium-Aluminosilicate (CMAS) resistant).

SPS Benefits

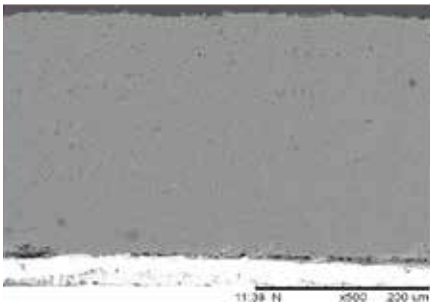
- Columnar coatings with improved strain tolerance compared to standard APS Dense Vertically Cracked (DVC) coatings
- Extremely dense coatings
- Can be applied on Platinum Aluminide (PtAl) bondcoats
- Cost effective application of EB-PVD replacement columnar coatings onto large components.
- Improved as-sprayed surface roughness compared to standard APS coatings



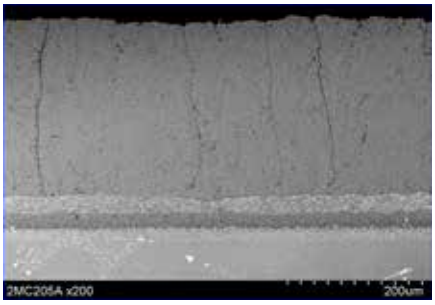
Erosion rate for 7YSZ SPS coatings compared to 7YSZ EB-PVD



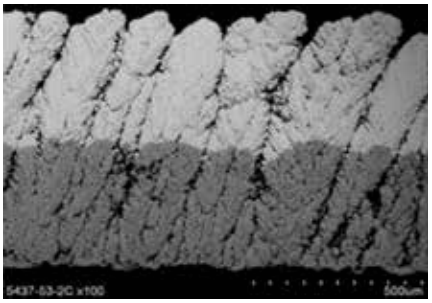
Thermal conductivity for 7YSZ, SPS and EB-PVD coatings



Dense Cr2O3 SPS Coating



SPS Dense vertically cracked (DVC)



Dual-layer porous columnar SPS coating

Contact us today!

Not only does Praxair Surface Technologies offer SPS coating services, we also develop the materials and powder feeder used in the process. We are constantly developing new technologies and coating application solutions, so contact us for additional information. psti-info@praxair.com

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Praxair Surface Technologies, a Linde company
1500 Polco Street, Indianapolis, IN 46222
Phone +1 317 240 2500, Fax +1 317 240 2255
www.praxairsurfacetechnologies.com, psti-info@praxair.com

P40-4783, 01-2021