Cost-Effective Additive Method Repairs/Enhances Metal Parts, Reduces Lead Times and Extends Service

Cold Spray

Cold spray is a solid-state spray process that deposits metal powder with temperatures below the material melting point through the use of a supersonic nozzle and pressurized/heated inert gas. Concurrent Technologies Corporation uses cold spray for the application of metals, metal alloys and metal blends to create new parts, repair existing parts, and/or enhance base material properties (e.g., improved corrosion or wear protection).

Benefits of Cold Spray

- Low heat input with no "heat-affected zone"
- Work-hardened and near-wrought properties can be achieved
- No limit on deposition thickness
- High deposit efficiency typically > 80%
- Deposition density > 99%
- Powder microstructure and properties are preserved
- No oxide formation, alloy decomposition, combustion product entrapment
- A diversity of materials that can be applied from aluminum to refractory metals

The Gen III system is compact and portable providing easy mobility for use in production, repair facilities or in the field.

Specialized Equipment

Concurrent Technologies Corporation utilizes a VRC Metal Systems Gen III Max system, which uses three 15kW heaters mounted within a single mobile unit.

The Gen III Max only takes up a small three-foot by five-foot area and is on wheels, enabling easy mobility for production, repair or in-the-field applications. It can be manually or robotically operated, providing a versatile feature that makes it the system of choice for many repair and obsolescence applications.

Specifications

- Portable, Self-contained system~ (8' x 3' x 6')
- Handheld operations or integrate with robotic spray booth
- Materials: Aluminum, Copper, Nickel, Titanium, Inconel, Tantalum, and more..
- Applications: parts repair, near-net part production, performance coatings

The cold spray process utilizes metal-based powders, which are accelerated at supersonic velocities onto the surface of a part that has been worn or damaged. Upon impact, the powder is consolidated into a dense solid material only requiring finish machining to restore the part back to its original dimensions. The resulting deposition can range from ~0.01 inch up to any desirable thickness.

(continued)

Applications

Parts Repairs

Cold spray provides a cost effective means to reset parts and address long lead times or part obsolescence. Cold spray is being used globally to repair expensive and/or hard-to-acquire components on a wide range of applications from aircraft, ground and water (both above-water and under-water) vehicles as well as non-vehicle component repairs. Applications also range from commercial to military assets and provide the opportunity to reclaim damaged components that would otherwise be scrapped and replaced.

Performance Coatings

Cold spray enables the opportunity to apply a coating material to a base material in order to improve performance of the intended application without degrading the base properties of the parent material. Such applications consist of applying coatings to improve corrosion resistance and wear resistance of the base component. The ability to do this improves the life-cycle of the base components to reduce maintenance and repair costs as well as improve readiness capabilities.

Near-net Part Production

With the ability to deposit a wide range for materials using the cold spray process, near-net shaped parts can be produced in an additive environment as opposed to more costly subtractive operations (i.e., traditional machining). The use of cold spray reduces waste in part fabrication and has the ability to create layered parts with different materials to induce unique performance capabilities that would not be achievable using a single material basis.

Why Concurrent Technologies Corporation?

Concurrent Technologies Corporation is an all-encompassing service provider for Additive Manufacturing solutions. We offer complete process execution including reverse engineering, development of process parameters, powder and substrate characterization, surface profile preparation, material application, finish machining and inspection. We also provide services to evaluate, validate and qualify deposited materials through metallurgical, mechanical and physical property characterization as well as services to perform cold spray repair, coating and production both in-house and on-location. All processes are controlled and documented to ensure quality results.

CTC's quality management systems are certified to the ISO 9001:2015 (Quality) and 14001:2015 (Environmental) standards, and to AS9100D:2016 (Quality-Aerospace-Related Products).

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