CERAMIC AND METAL COATINGS

FOR THERMOWELLS, PROTECTION TUBES, AND BARE SENSORS

Increasing numbers of industrial firms are specifying reliable, high quality thermal coating for repair, restoration and enhancement of mechanical or process equipment. Knowledgeable operations personnel regularly take advantage of the many cost savings and performance improvements now available from these processes and materials; some of which were previously used only for aerospace applications.

BACKGROUND AND USES

Thermal spraying is a process which uses combustion, electric arc or gas plasma, combined with an inert feeder gas, to apply a wide variety of molten metals, ceramics, oxides, and carbides to a target substrate. Combining various substrates with particular coatings allows engineers to choose from using a coated component instead of a solid one.

Some of the major use categories for thermal spray coatings are to increase wear resistance, prevent corrosion, provide thermal barriers or electrical insulation, and restore parts to their original dimensions. In concert with each of these categories, advanced finishing techniques provide a broad spectrum of surface finishes ranging from 1 RMS to over 300 RMS to meet virtually any requirement.

Plasma Arc Spray

Plasma arc spraying is the workhorse of the thermal spray processes. The material to be sprayed is introduced in powder form in the plasma gas stream either in the torch nozzle or just outside the nozzle. The velocity of the plasma stream that exits the nozzle is about the velocity of sound in air. The velocity of spray is usually increased by constricting the torch nozzle. Argon and helium are popular plasma gases, and if these are properly used, the spray deposit will contain very little oxide. This is a process advantage over thermal spray processes that use air as gas to produce the consumable spray. The intense heat of the plasma does not produce substantial substrate heating. Most of the heat to the substrate comes from the heat from the impinging consumable droplets and substrate temperatures usually do not get over 250 degrees F. When substrate heating becomes a consideration, on for example thin wall tubes, auxiliary jets of inert gas are used for substrate cooling. Hundreds of powder consumables are available. They fall into four different categories: metals, ceramics (primarily oxides and carbides), cermets and composites. The most popular ceramic coatings are aluminum oxide and chromium oxide. They are used mostly for wear applications. Ceramics such as yttria-stabilized zirconia and magnesium zirconate are used for thermal barrier applications. The most popular cermet consumable used in plasma spraying is tungsten carbide/cobalt. The mechanical, physical, and chemical properties of a thermal spray deposit may be different from the properties of the same material in bulk. Plasma spraying has been so extensively used in critical components that there is significant data on the properties of many deposits. In general, the differences between spray and bulk properties are inconsequential.

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Thermal Combustion Spray

Thermal combustion jet spraying was first offered on a commercial basis in 1981. The consumable to be sprayed is introduced into the center of the jet stream from a powder feeder using a carrier that is compatible with the fuel gas mixture. Bond strength is the product of the particle velocity and temperature. The deposit densities are about 95% or better and porosity of the coating can be as little as 0.5%.

Thermal Combustion Wire Process

The materials that can be sprayed with the wire flame spray process include any material that can be made into flexible wire that will melt in the oxyacetylene flame. Many consumables are available, but the commonly sprayed materials are zinc and aluminum, and are used primarily for corrosion protection. The bronzes and hard steels are used for wear protection, and the soft steels and molybdenum are used as rebuilding material for repair jobs. There is no thickness limit to this process, and deposits as thick as 0.25: have been made. A common thickness for wire spray deposits is 0.030" to 0.050" for wear applications and rebuilding. For corrosion applications, deposits can be as thin as 0.001".

QUALITY ASSURANCE PROGRAM

JMS Southeast, Inc. employs one of the most rigorous Quality Assurance programs in the industry. Our specially formulated powders can be traced from the location where they are mined, through each refining process, to the finished product ready for use at our plant. Each coating application undergoes analysis by either the metallographic or petrographic laboratory prior to release. This assures our customers of receiving consistently reproducible coatings of the highest quality.

CUSTOMER SERVICE

Because we use state-of-the-art coating systems, waste is virtually eliminated and high coating speeds are attained. These factors allow us to offer the highest quality coatings at the most competitive prices available today.

INDUSTRIAL PRODUCTS

Almost any industry can benefit from JMS Southeast's coating experience and service. We have wells and other coated parts for the Textile Industry, Power Industry, Petrochemical Industry, Pulp and Paper, Steel Industry, Aluminum Plants, Glass Plants and Wire Drawing Industry just to name a few.

JMS also has the capabilities to teflon coat any thermowells, protection tubes or sensors as needed. Teflon coating will prolong the life of the sensor by protecting it from many forms of chemical attack.

Pleas contact JMS for prices on our many coatings services.