

Thermal spray

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COMPANY PROFILE

Curtiss-Wright Surface Technologies (CWST) offers a single source solution and point of contact for all your surface treatments. We can reduce your turnaround times and costs through our network of over 75 worldwide facilities.

Our proven surface treatments meet industry demands for lighter materials, improved performance and life extension in key markets such as Aerospace, Automotive, Energy and Medical. We can prevent premature failures due to fatigue, corrosion, wear, galling and fretting.



Surface Technologies is a Division of Curtiss-Wright (NYSE:CW) a global innovative company that delivers highly engineered, critical function products and services to the commercial, industrial, defense and energy markets. Building on the heritage of Glenn Curtiss and the Wright brothers, Curtiss-Wright has a long tradition of providing reliable solutions through trusted customer relationships.

**CURTISS -
WRIGHT**

Thermal spray technology is an effective and trusted coating solution for the thermal management, protection and enhanced performance of critical components operating across a broad range of industries including aerospace, automotive, power generation and oil and gas.

Essentially, the technology heats and accelerates a powder or wire feedstock onto a component's substrate to produce coatings with specifically optimized properties. The resulting coating protects components from exposure to high temperatures, wear, corrosion and oxidation and can also restore the damaged or worn surface of a component's substrate to its original dimensions.

Thermal spray technology

Thermal spray coatings can be applied using a range of different processes but essentially the application method for each procedure is very similar. The feedstock, in either powder or wire form, is reduced to a semi molten or molten form by the use of controlled combustion energy (HVOF, HVAF, Combustion wire or Powder spraying) or electrical energy (Plasma or Arc Wire spraying). The heated material stream is then propelled onto the surface of the component using the kinetic energy formed from a gas stream. Upon impact with the surface, the molten or semi molten coating material forms a splat which then contracts as it cools forming an intimate bond with the substrate. Each process has its own specific characteristics and the most commonly utilized are HVOF and Plasma spray.

HVOF Coatings

The high velocity oxy fuel (HVOF) technique combines hydrocarbon fuel (in gas or liquid form) and oxygen which is then fed into the combustion system of the gun. This combination is then ignited, forming a high pressure flame which is accelerated in a similar way to a rocket engine, to propel the semi molten coating material onto the component. This process is a preferred method for applying carbide based coating systems, based on Tungsten or Chromium Carbide, and also metallic materials.

As the thermal energy is limited by the combustion temperature, and the supersonic flame means very short dwell times for the material in the spray stream, materials with high melting points or where controlled levels of increased porosity are required are more suited to the plasma spray technique.

Plasma coatings

The plasma spray technique utilises the extremely high temperatures of a plasma plume which is generated by electrically ionizing a controlled gas stream. This allows materials such as refractory metals and ceramics with high melting points to be applied routinely, in addition to lower melting point materials such as abrasives containing polymers, metallic materials,

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along with carbides. Plasma spray coatings can be optimized for controlled levels of porosity making this process the ideal choice as a thermal barrier coating for critical applications operating in severe service environments.

The unique characteristics of each thermal spray process are taken into account during the design or optimization phase of a new application. Understanding the combination of kinetic and thermal energy, and its interaction with the material to be sprayed, allows for tailoring and optimization of the coating to provide the best possible property set from a given material.



Repair and overhaul

As well as new manufacture, we also offer both component repair and refurbishment of gas and steam turbine components. These services range from 'tip repair' of compressor blades and vanes, repairs to combustion/ flame tubes, replacement honeycomb seals, specialised welding, fabrication and strip, inspection (including laboratory reports), braze/welds repair and re-coating of turbine blades, vanes and NGVs.'

Desirable features of Thermal spray:

- Controlled porosity and oxide content
- Low residual stress
- Stable phases
- Perfect interface

Thermal spray experience

Curtiss-Wright Surface Technologies has a wealth of expertise in thermal spray technology and currently operates in excess of 55 booths internationally. Our new thermal spray facilities in the UK have been installed with the latest equipment and technology including multi-axis robotic equipment which enables the transferability of tooling designs and remote programming. This allows best practices to be shared easily within the group and also offers commercial benefits to customers by reducing development and validation times.

In addition, our new facilities have also been designed for application development, parameter studies, coatings qualification and prototype work. Our coatings experts work directly with customers to diagnose problems and devise solutions.

One stop shop

Alongside our thermal spray coating capabilities we also provide a wide range of highly engineered surface treatments, enabling us to offer our customers the full advantages of a one stop surface engineering shop improving logistics and turnaround times.

Our full range of services includes:

- Controlled shot peening
- Shot peen forming
- Laser peening
- Engineered coatings
- Thermal spray
- C.A.S.E.™ super finishing
- Material testing services

We believe in working in partnership with our customers to solve their complex challenges and improve the life and performance of their products.

KEY BENEFITS

- Protect critical components against wear, corrosion, fatigue, oxidation and high temperatures.
- The bond strength can withstand severe wear, thermal shock and fatigue conditions.
- Coating thickness of the coating is highly controlled allowing restoration of worn parts.
- Temperature of the bulk substrate can be maintained at 150°C or less.
- Versatility in the choice of coating materials – metals, ceramics, alloys, polymers and carbides.
- The use of robotics means that even complex shapes achieve a uniform coating.

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