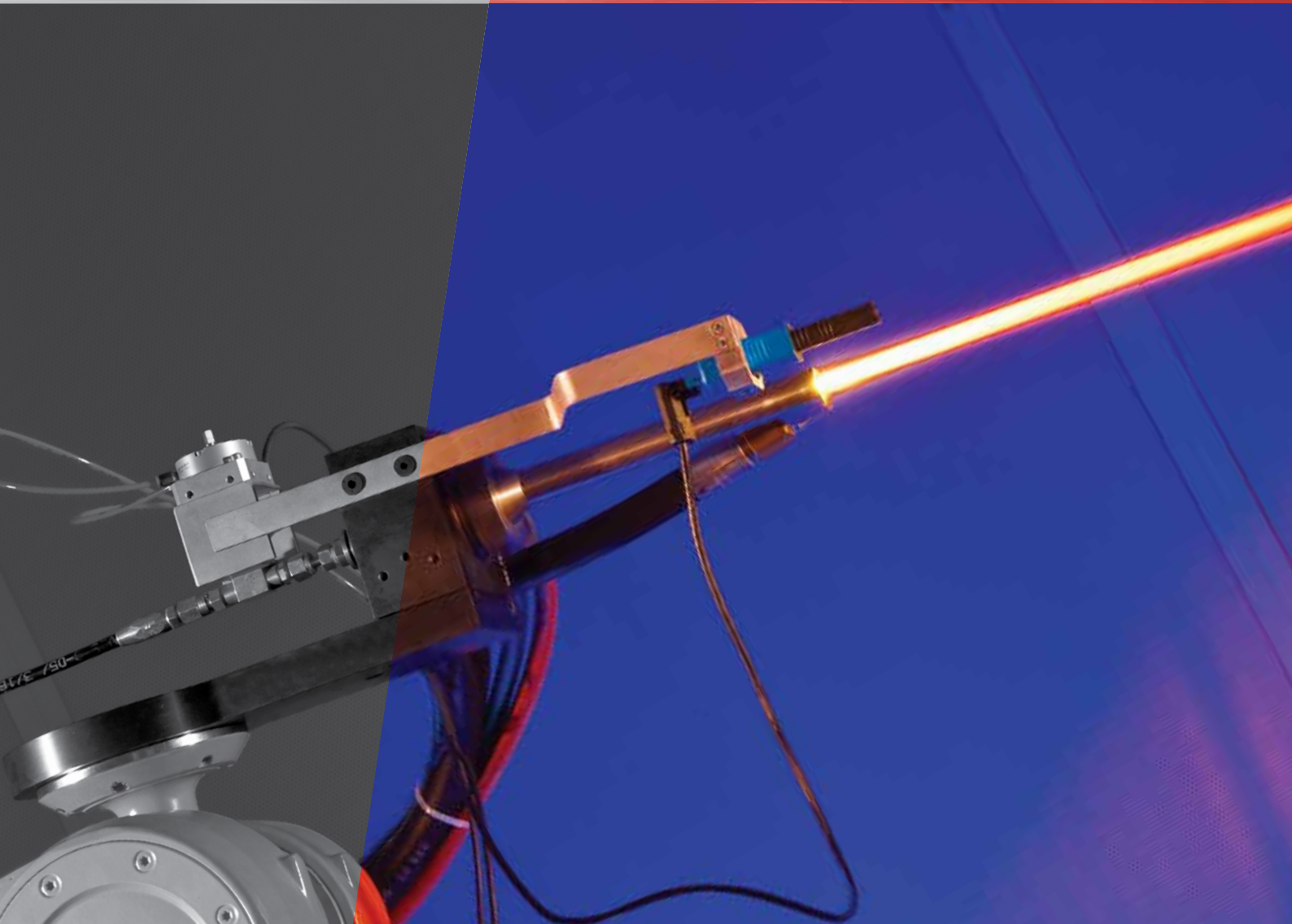


MIC Services

INNOVATORS IN TECHNOLOGY

**CURTISS
WRIGHT**
Surface Technologies

Thermal Spray



**Metal Improvement
Company**

A business unit of Curtiss-Wright Surface Technologies

Enhancing the performance
of critical components

www.cwst.co.uk

Thermal Spray Coatings Technology



Metal Improvement Company, a business unit of Curtiss-Wright Surface Technologies (CWST), provides engineered surface processes used by high technology industries to enhance performance and extend the life of critical components including world-class controlled shot peening, laser peening, engineered coatings and analytical services.

Through our technical experience, engineering excellence and global network of facilities we are able to work in partnership with our customers to enable them to meet and exceed their design requirements.

Our industry approvals include AS9100 Rev C, NADCAP, ISO 9001:2008, ISO 13485 and FAA as well as specific OEM, company and industry approvals as required.

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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

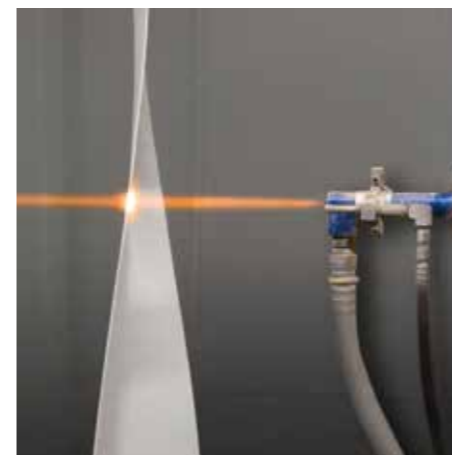
Thermal spray coatings can be applied using a range of different processes but essentially the application method for each procedure is very similar. The feedstock, in either powder or wire form, is reduced to a semi molten or molten form by the use of controlled combustion energy (HVOF, HVOF, Combustion 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, further details relating to the most commonly utilized - HVOF and Plasma spray, are detailed below.

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 (up to 20,000 degrees Kelvin) 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, 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 coating or 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.

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 48 booths internationally. Our new thermal spray facility in the UK has 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 facility has also been designed for applications 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 shock peening
- Engineered coatings
- Thermal Spray
- C.A.S.E.™ Super finishing
- Analytical 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.



Curtiss-Wright Surface Technologies is an operating group of the Curtiss-Wright Corporation, a diversified international provider of highly engineered flow control and motion control products and surface treatment services for aerospace, defense, energy and commercial/industrial markets.

www.curtisswright.com

**CURTISS
WRIGHT**
Surface Technologies

INNOVATORS IN TECHNOLOGY

MARKETS INCLUDE:

- Aerospace
- Architectural
- Automotive
- Chemical & food processing
- General & structural engineering
- Marine
- Medical
- Military
- Off-road & earth moving equipment
- Oil, gas & petrochemical
- Power generation
- Railways

SERVICES INCLUDE:

- **Controlled shot peening**
induces engineered residual compressive stresses
- **Shot peen forming**
creates curvature and corrects distortion
- **Laser peening**
induces deeper residual compressive stresses
- **Engineered coatings**
improves performance, prevents corrosion and aids lubricity
- **C.A.S.E.™ (isotropic finishing)**
removes surface asperities reducing friction
- **On-site processing**
provides services on customers' own premises
- **Peentex (architectural finishing)**
creates decorative and aesthetic texturing
- **Surface texturing**
applies a textured engineered finish
- **Peenflex mouldings**
protects against processing and handling damage



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Business units of Curtiss-Wright Surface Technologies include:



Everlube® Products

