THERMAL SPRAY PROCESSES

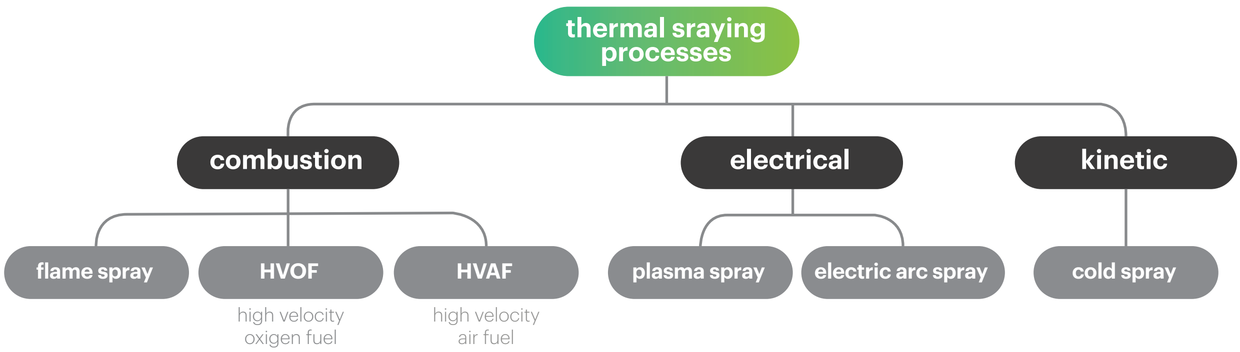
Equipment, parts, and rollers often face significant challenges due to abrasive, corrosive, and erosive wear. In many cases, these worn components can be effectively restored or better protected through thermal spraying. Thermal spray is a process that applies a coating to a surface by projecting fine particles in a molten or semi-molten state at high velocity.

At Hannecard, we offer a wide range of advanced thermal spray techniques such as **HVOF**, **HVAF**, **flame spray**, **electric arc spray**, **plasma spray**, and **cold spray**. This enables us to deliver custom solutions to meet the unique requirements of various applications across multiple industries.

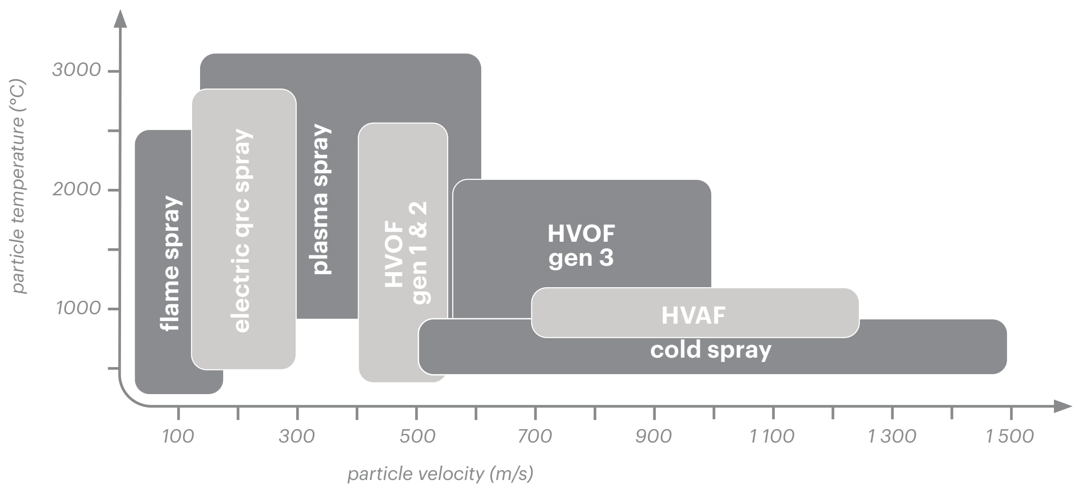
With over 100 different thermal spray materials available, including metals, alloys, carbides, and ceramics, our coatings do more than just repair damaged parts, they also provide wear protection, reducing maintenance and extending component lifespan. Used rollers and parts can be restored to their original design, or even surpass their previous performance.

Our thermal spray solutions address all wear-related challenges, from fretting and erosion to abrasion, impact, adhesion, and cavitation, ensuring long-lasting protection for your industrial components.

Below is an overview of our spraying processes:



Below is a diagram of our thermal spray processes, related to their particle velocities and temperatures:



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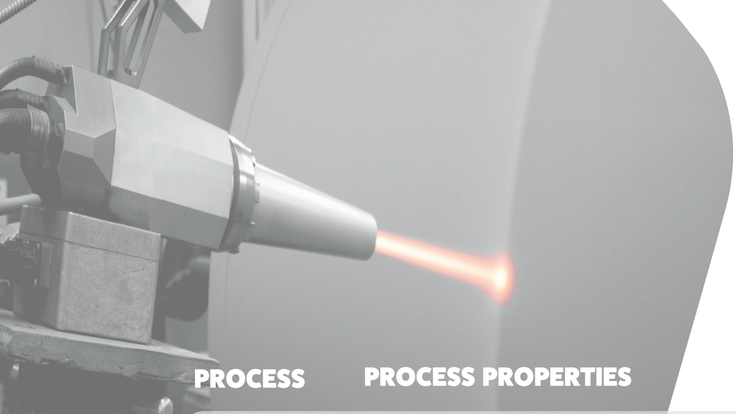
YOUR ROLLER EXPERT



PROCESS	PROCESS PROPERTIES	KEY CHARACTERISTICS	COATINGS
Flame spray	• **Feed material**: powder an wire form • **Energy source**: combustion of fuel and oxygen • **Process gases**: propane, propylene, acetylene • **Process temperature**: < 2 500°C • **Particle velocity**: < 200 m/s	• Microporus • Very dense and low-porosity layers • Medium bond strength • Smooth after machining • Optimal microhardness • Good corrosion resistance	• Metals • Superalloys based on iron, nickel, and cobalt (Stellite, Triballoy, Inconel, etc.) • Bond coats for corrosion protection
Electric arc spray	• **Feed material**: electrically conductive wires or cored wires • **Energy source**: electric gas discharge (arc) • **Process temperature**: 4 000°C • **Particle velocity**: < 300 m/s	• Microporous lamellar structure • High oxidation rate in the coating • Good adhesion and layer density • Simple and easy-to-execute process • Versatile and reliable • High production capacity • Cost-effective thermal spray process	• Various stainless steel alloys • Nickel-based alloys • Aluminum • Zinc • Copper and copper alloys
Plasma spray	• **Feed material**: powder form • **Energy source**: arc discharge between anode and electrode • **Process gases**: argon, hydrogen, nitrogen, helium • **Process temperature**: up to approximately 15 000°C • **Particle velocity**: up to approximately 600 m/s	• Fine microstructure • Low porosity • Good corrosion resistance • High process flexibility • Good tensile strength • Versatile with a wide range of material options • High production capacity	• Ceramic materials (oxides) • Cermets, carbides (hard metals) • Metals and metal alloys
HVOF	• **Feed material**: powder form • **Energy source**: combustion of fuel and oxygen • **Process gases**: propane, propylene, hydrogen, natural gas, kerosene, etc. • **Process temperature**: < 3 000°C • **Particle velocity**: < 1 000 m/s	• Fine microstructure • Very dense and low-porosity layers • High bond strength • Extremely smooth after machining • Optimal microhardness • Very good corrosion resistance • Excellent suitability for carbide coatings • Low oxidation degree	• Cermets, carbides (tungsten carbide, chrome carbide) • Metal (super) alloys based on iron, nickel, and cobalt (Stellite, Triballoy, Inconel, etc.) • Hard chrome replacements (HCR) • Bond coats for corrosion protection
HVAF	• **Feed material**: powder form • **Energy source**: combustion of fuel and oxygen • **Process gases**: propane, propylene, hydrogen, natural gas, kerosene, etc. • **Process temperature**: < 1 300°C • **Particle velocity**: < 1 200 m/s	• Fine microstructure • Very dense and very low-porosity layers • High bond strength • Extremely smooth after machining • Optimal microhardness • Very good corrosion resistance • Excellent suitability for carbide coatings • Low oxidation degree	• Cermets, Carbides (tungsten carbide, chrome carbide) • Metal (super) alloys based on iron, nickel, and cobalt (Stellite, Triballoy, Inconel, etc.) • Hard chrome replacements (HCR) • Bond coats for corrosion protection
Cold spray	• **Feed material**: powder form • **Energy source**: expanded gas up to 60 bar and 1 200°C • **Process gases**: nitrogen, compressed air, or helium • **Process temperature**: < 1 200°C • **Particle velocity**: < 1 500 m/s	• Fine microstructure • Extremely dense layers • Nearly zero porosity • High bond strength • Ideal for ductile and reactive materials • Extremely smooth after machining • Very low oxidation rate	• Ductile materials: zinc, aluminum, tin, nickel, copper, silver, titanium, etc.) • Ductile alloys: NiCr, Cu-Al, nickel alloys, MCrAlY's, etc. • High-end materials: niobium, tantalum