
THERMAL SPRAY
TECHNOLOGIES L.L.C
THE INDUSTRY LEADERS IN CORROSION WEAR AND TEAR

- **Wear Resistant Coatings**

Thermal Spray Technologies offers an almost endless variety of coating solutions to provide Wear Resistance. Wear mechanisms including erosion, abrasion, adhesion, cavitations, fretting, and corrosion can all be addressed using Thermal Spray Technologies Engineered coatings.

- **Corrosion Protection**

Thermal Spray Technologies has the ability of producing coatings that Resist Corrosion in several industrial environments. Materials such as oxide ceramics and metal alloys containing nickel and chromium are commonly used.

- **Corrosion Resistant / Corrosion Protection Coatings**

When working with Thermal Spray Technologies technical staff on a corrosion prevention solution it is very important to understand the environment in which the component is working in. Our materials engineers will use that information to engineer a corrosion protection coating solution specific to that components needs. Our expertise in understanding materials properties and the thermal spray processes will be used to select the proper coating material, the correct thermal spray process, and optimum process parameters.

- **Galvanic Corrosion Prevention Coatings**

Galvanic corrosion resistant coatings are made from materials such as iron and steel alloys. These coatings are considered sacrificial coatings as they will preferentially slowly corrode while minimizing the corrosion occurring to the steel. This technology has been used on many components including very large ones such as bridges found in coastal areas and wind energy windmills. The technology has been proven to be far more effective than paints for providing longer term protection.

- **Corrosion Resistant Coatings**

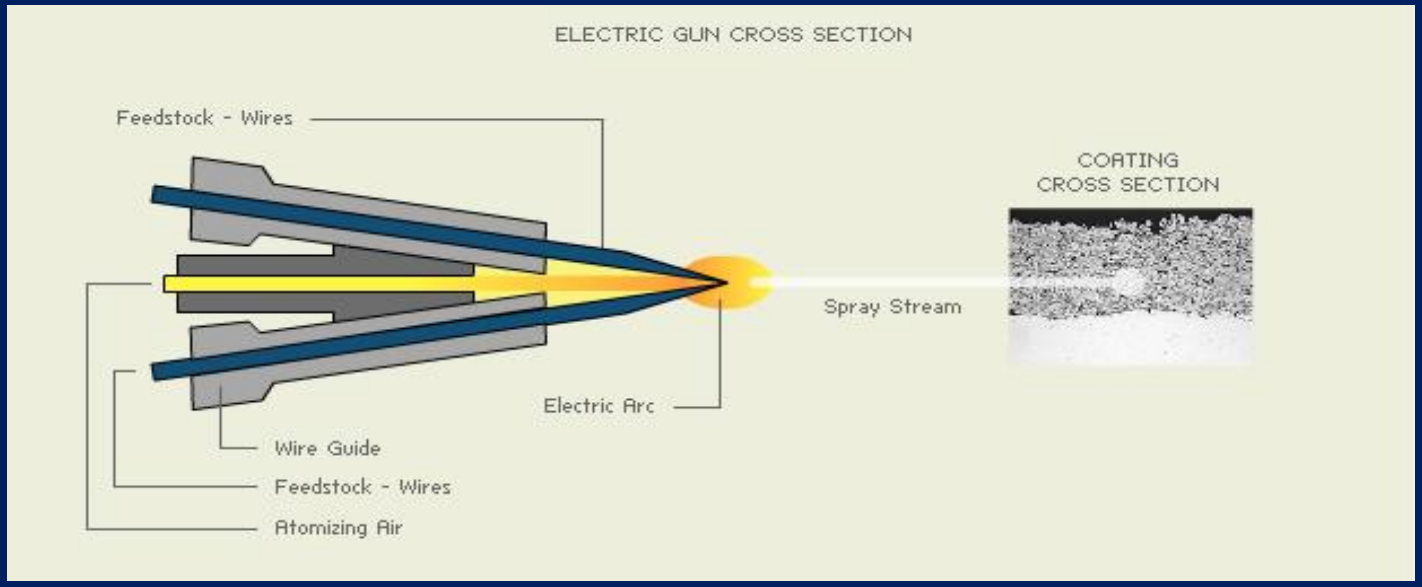
There are several corrosion resistant coatings that can be engineered to provide a corrosion resistant barrier for many substrate materials in many corrosive environments. Nickel-chromium and cobalt-chromium alloys produce very good corrosion resistant coatings. These materials can be deposited with very low porosity levels (less than 1%) to prevent corrosive attack through porous connections. Oxide ceramics are also very corrosion resistant materials and can be applied to most metal substrates to provide corrosion resistant coatings.

- **Wear and Corrosion Resistant Coatings**

Corrosion and wear are combined in many applications. Fortunately several different materials can be engineered to provide both wear and corrosion resistance coatings. Cermet materials, (ceramic and metal) such as carbides with corrosion resistant metal binders are examples of coatings that provide protection to both corrosion and wear. Oxide ceramics are very hard and corrosion resistant which also make them good candidates as coating solutions for these applications.

Electric-Arc Spray

Like flame spray, electric-arc spray was invented in the early 20th century. Even though the technology has been around for a long time, it still remains a very powerful thermal spray technology. Electric-arc spray uses a simple, low power arc drawn between two electrically charged wires. Arc spray equipment resembles GMAW (MIG) welding equipment, in the power source and wire feeding units. Common arc spray units are capable of spraying iron and copper alloys at rates up to 40 lbs. /hr. (18 Kg/hr.) using only 12 kW (42 MJ) of electricity. Electric-arc spraying produces the fastest coating rates of any technology. Electric-arc spray devices are thermally efficient and because there is no flame or plasma, little heat is transferred to the part being coated.



- **Materials**

Electric-arc spray is limited to materials that are electrically conductive and can be made into wire form. It is possible to spray some materials that cannot be made into wire, by incorporating them into the core of hollow conductive wires. Materials such as carbides have been successfully deposited with electric-arc spraying using cored wire technology. The carbide materials are then deposited with the metal wire housing to provide improved wear resistance as a Cermet, (ceramic/ metal composite) coating.

- **Industries**

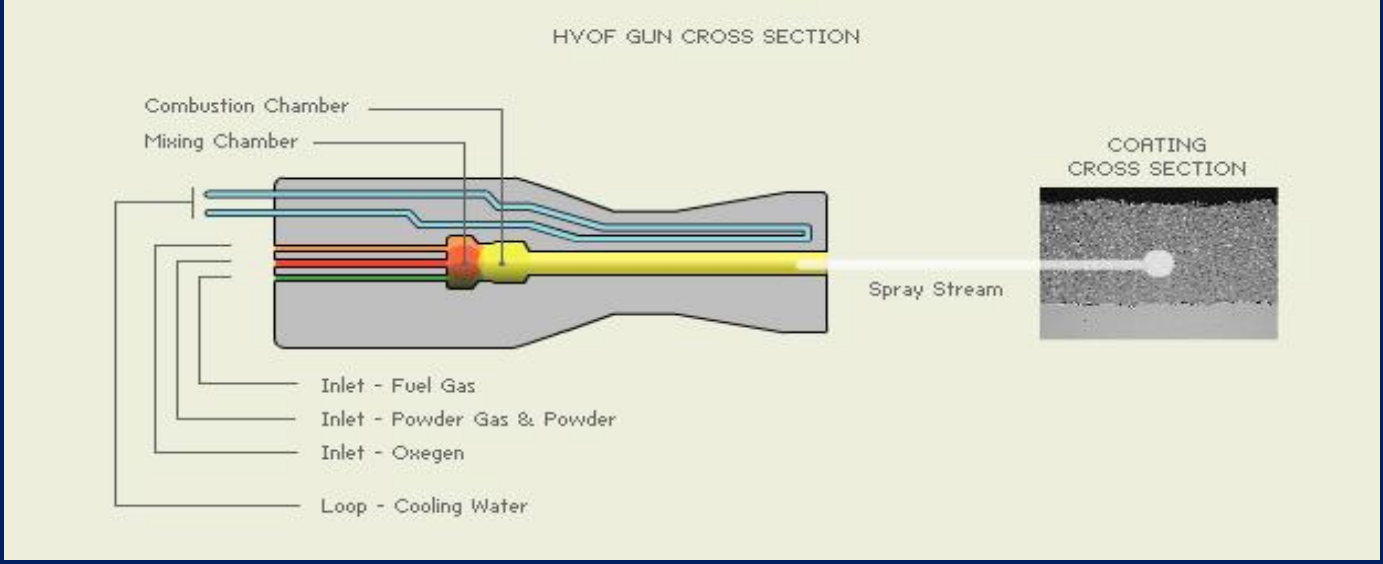
Like most of the thermal spray processes electric-arc spray can be found in many diverse industries. It is commonly used in Automotive, Aerospace, Defense, Infrastructure, Engineering, Oil and Gas, Mining and even in the industry of art.

- **Applications**

A common application for electric-arc spray is in the automotive industry. The technology is used to replace lead to hide seems between body panels, by filling the gap with metal and then finishing coating smooth to hide the seam. The technology has been used to coat large objects such as bridges, where aluminum and zinc are deposited to provide corrosion resistance.

HVOF (High Velocity Oxy-Fuel) & Carbide Coatings

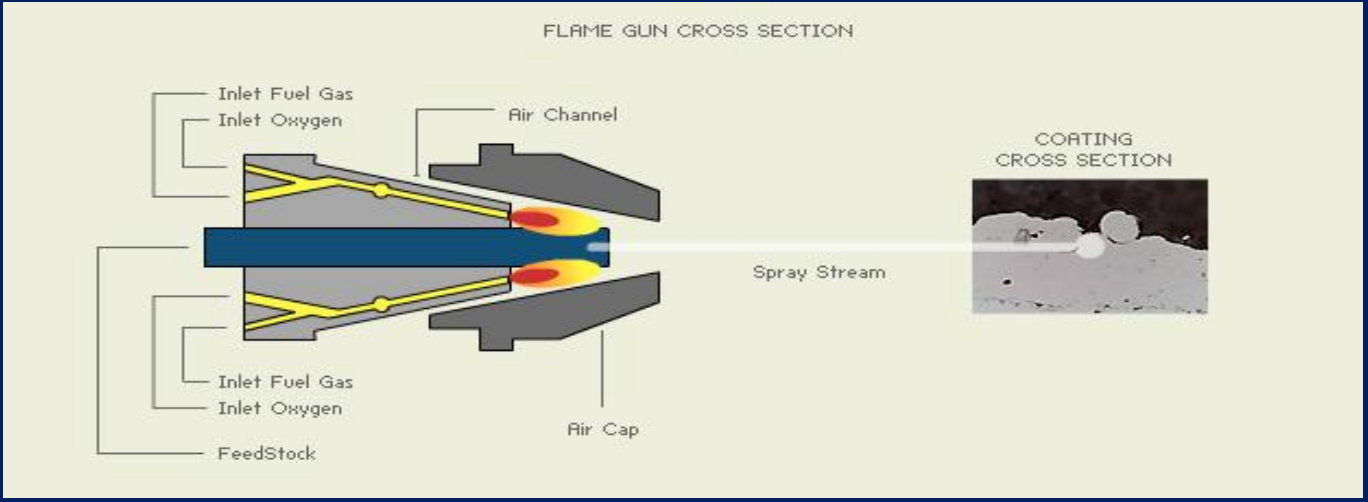
High-velocity, oxy-fuel, (HVOF) devices are a subset of flame spray. There are two distinct differences between conventional flame spray and HVOF. HVOF utilizes confined combustion and an extended nozzle to heat and accelerate the powdered coating material. Typical HVOF devices operate at hypersonic gas velocities, i.e. greater than MACH 5. The extreme velocities provide kinetic energy which help produce coatings that are very dense and very well adhered in the as-sprayed condition.



- **Materials**
  - HVOF is most commonly used to produce very wear resistant coatings such as cermet's (ceramic and metal mixes) like tungsten-carbide cobalt, see figure above. Coatings of this type have wear resistance similar to sintered carbide materials. Because HVOF produces very dense coatings (porosity levels typically less than 0.5%), it can be used to produce very good corrosion coatings made from materials such as Inconel®, Stellite®, stainless steel, and ceramics. Some unique coatings produced by TST using HVOF technology are ultra-high density ceramics that provide excellent dielectric strength.
- **Industries**
  - Like most of the thermal spray processes HVOF coatings can be found in several diverse industries. Industries needing wear resistance such as agricultural and construction equipment, food processing, aerospace, etc., HVOF coatings are common. TST also uses the technology for highly sophisticated electronic devices and medical instruments that require high performance dielectric properties.
- **Applications**
  - HVOF coatings can be incorporated into the design of complex components such as high-tech medical devices used for performing complex surgeries, to simple components such as bolts used in agricultural combines. Combines process incredible amounts of crops during harvesting. The wear created by the crop going through the machine can be extreme and in those cases the bolts that are used to attach critical internal components are coated with carbide materials to greatly extend the life of the bolt. The improved bolt assures the component that the bolt is holding remains attached.

Flame Spray

Flame spray is divided into three subcategories, based on the form of the feedstock material, either powder, wire-or rod-flame spray. Flame spray utilizes combustible gasses to create the energy necessary to melt the coating material. Combustion is essentially unconfined, in that there is no extension nozzle in which acceleration can occur. Common fuel gases include hydrogen, acetylene, propane, natural gas, etc. The lower temperatures and velocities associated with conventional flame spraying typically result in higher oxides, porosity, and inclusions in coatings.



INDUSTRIES SERVED

- PAPER
- STEEL
- OIL & GAS
- REFINERIES
- MARINE APPLICATIONS
- CHEMICALS & FERTILIZER
- HYDRO POWER
- THERMAL POWER
- STEAM POWER
- PRINTING & PACKAGING
- METAL SURFACE WEAR SOLUTION
- METAL & ALLOY COATING
- IN-SITU GRINDING
- FABRICATION
- IN-SITU REPAIRS & RESTORATIONS

- **Quality**

"It is the quality policy of Thermal Spray Technologies to be dedicated to fully satisfying the needs of its customers in an economical and timely manner by engineering, improving and continuously providing high quality application specific coatings and coated components."

Successful companies are those driven by quality, from the way they operate, to the customer service standards they set and the products they deliver. Focusing on quality makes Thermal Spray Technologies a leaner, fitter organization, and one that is better equipped to win new opportunities in an increasingly competitive global marketplace.

- **THERMAL SPRAY COATINGS ON DEWATERING PUMPS AND PARTS**

Dewatering pump parts with severe Corrosion, Erosion and Wear and Tear problems. Parts that are commonly affected are the Volute, T-Piece, impeller, Reflux Body, Couplings, shafts…etc.

- **PARTS BEFORE SURFACE ENGINEERING AND THERMAL COATING APPLIED.**

Our Scope of Work:

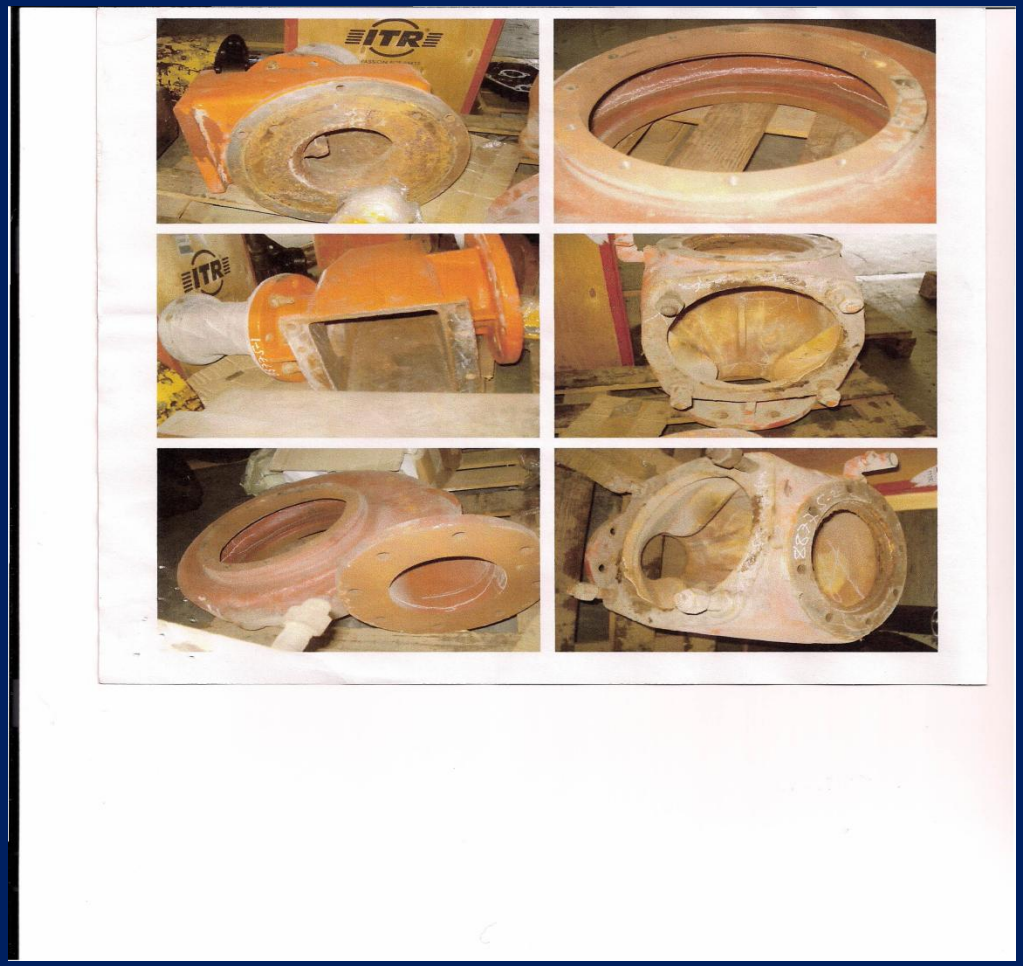
Initial Visual Inspection, Dismantling of Existing Spools, Surface Preparation by Grid Blasting, Masking of areas where coating is not required, Perform Thermal Spray process of Bond Coats and Top Coats, Apply Micro Sealant over sprayed surfaces and then complete our Final Inspection.

- **PARTS AFTER SURFACE ENGINEERING AND THERMAL COATING APPLIED**

Our Scope of Work:

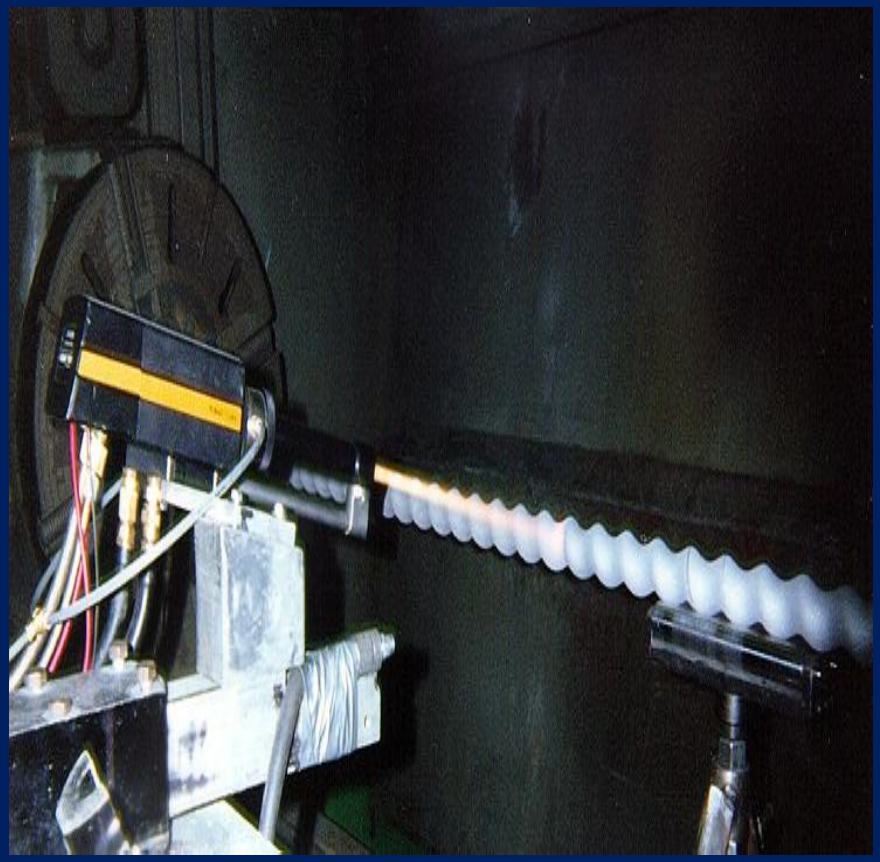
All parts and areas are Thermal Coated, Final Inspection is completed and parts are ready for Delivery/Shipment to the customer.

PUMPS AND PARTS BEFORE THERMAL SPRAY COATING HAS BEEN APPLIED.



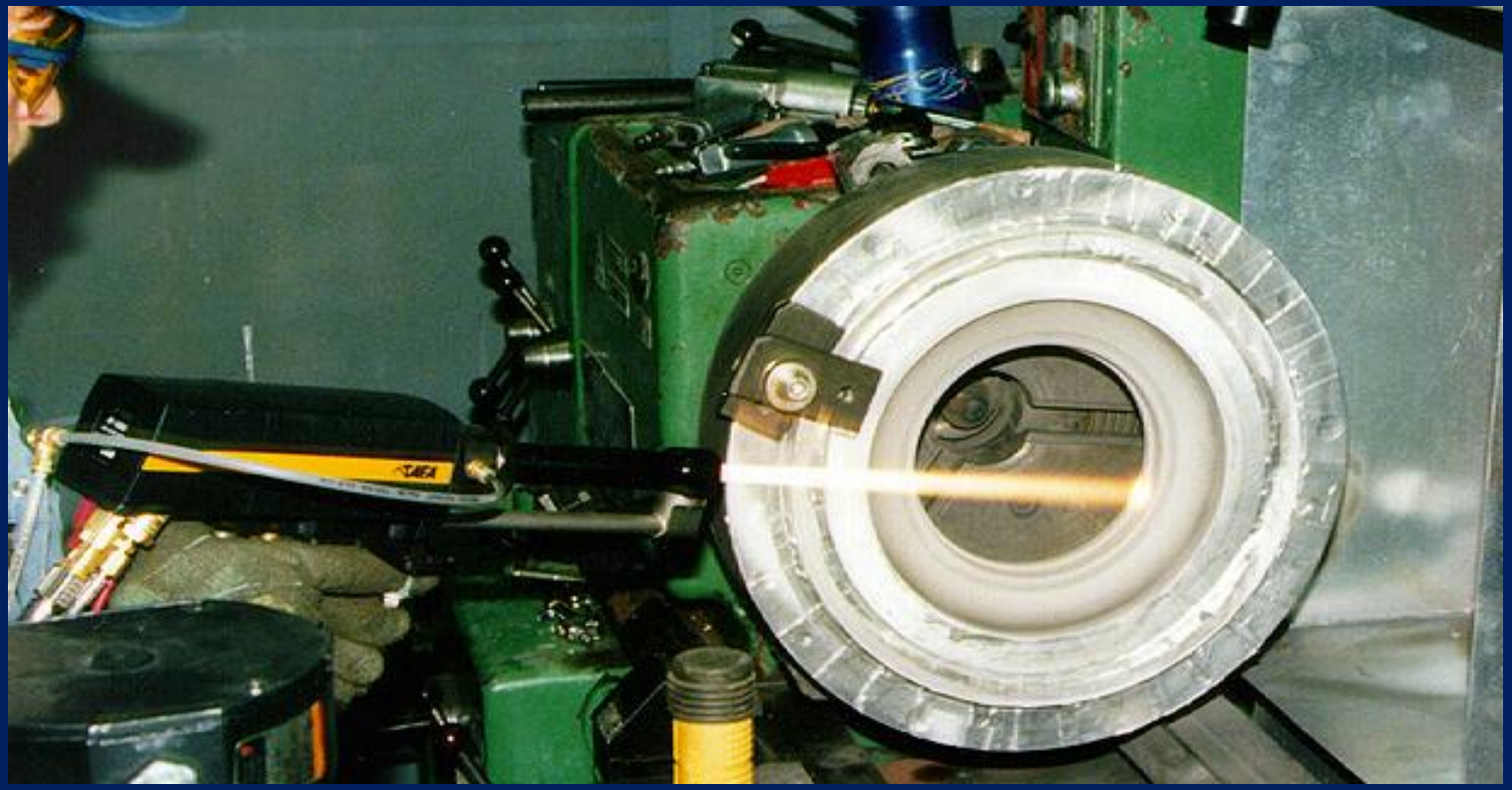
PUMPS AND PARTS AFTER THERMAL SPRAY COATING HAS BEEN APPLIED.

Pump Rotor and Auger Screws
WC - Ni for Wear and Corrosion



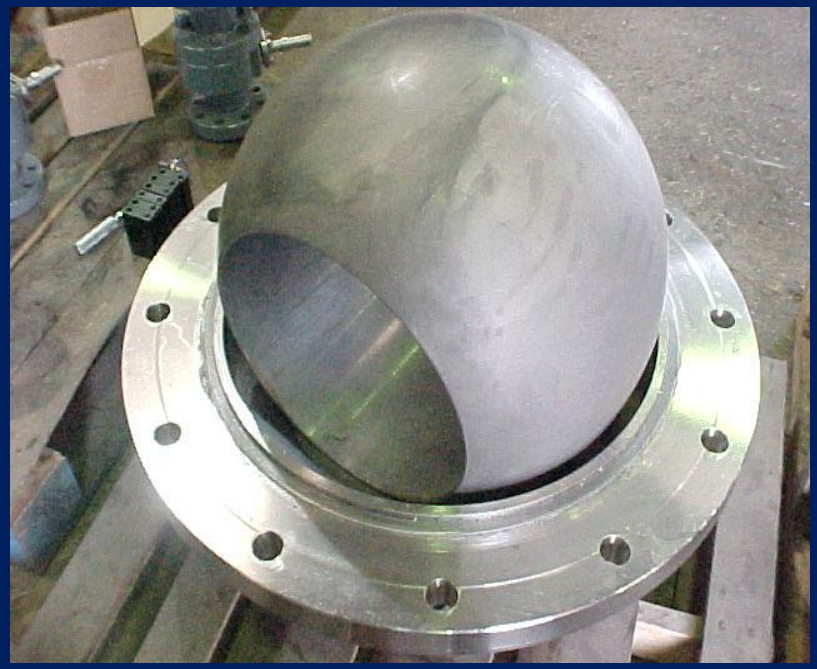
Compressor Shafts and Rods WC - Co - Cr for Wear and Corrosion

Pump Stationary Ring - High Pressure WC - Ni for Wear and Corrosion

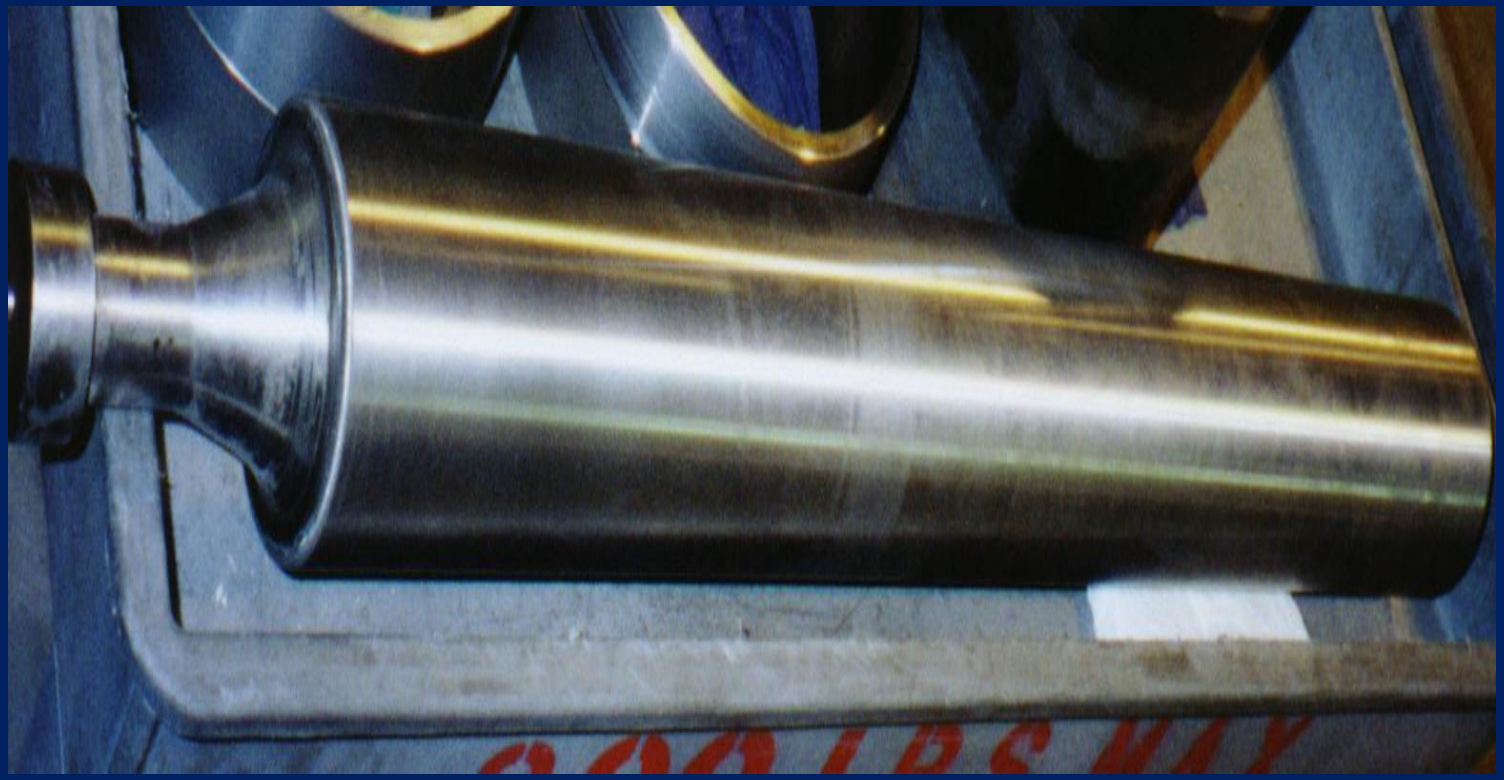


Thermal Coatings are applied on Industrial Rolls by HVOF or Wire Arc Process

Ball Valve
WC - Co - Cr for Wear and Corrosion



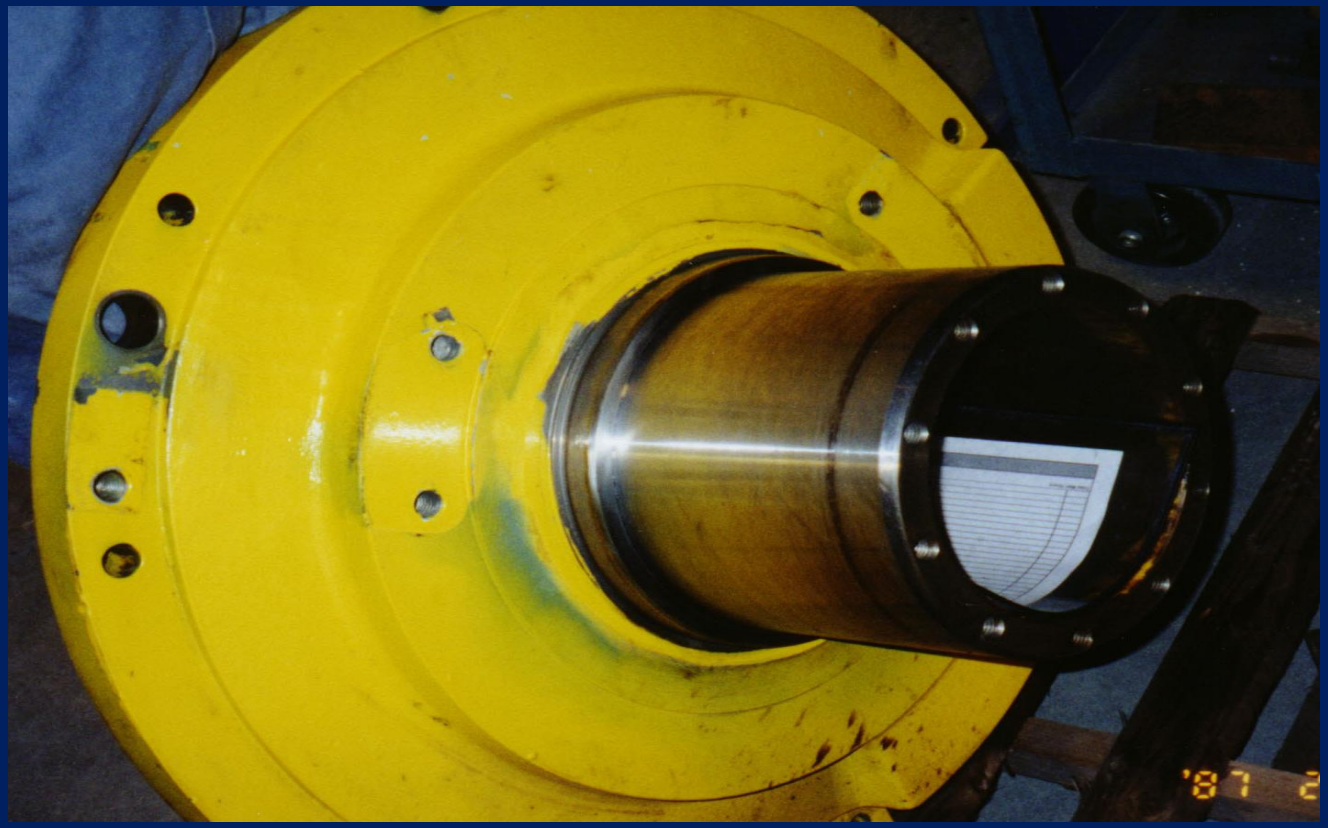
Plunger Rod
WC-Ni for Wear and Corrosion



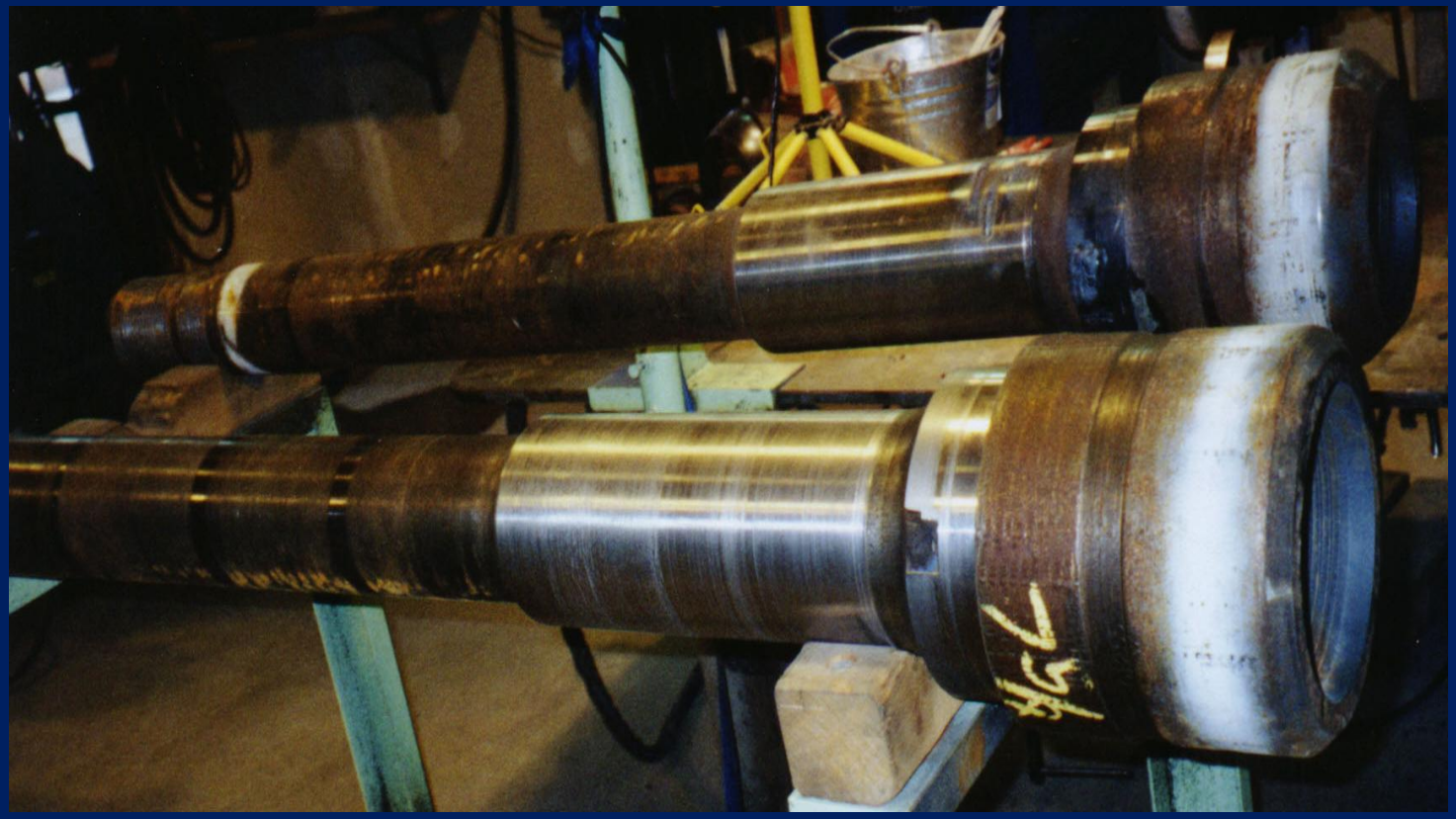
Heavy Industrial Rolls For Wear and Corrosion

Shafts for Vertical Down Hole Pumps WC-Ni for Wear and Corrosion

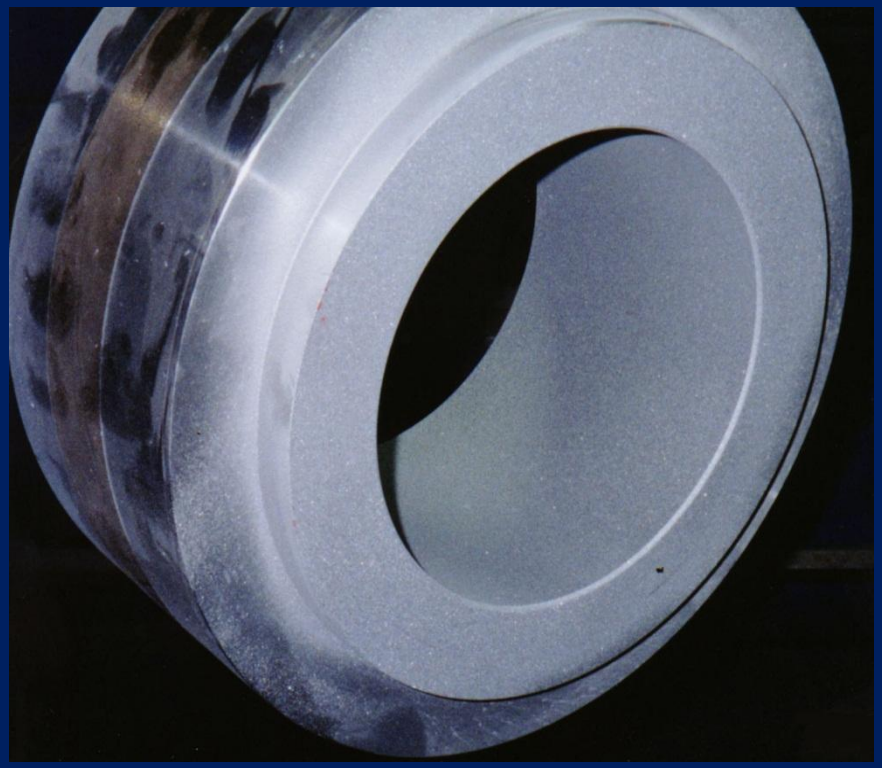
Swivel Head - Bearing Area
WC-Ni for Wear and Corrosion



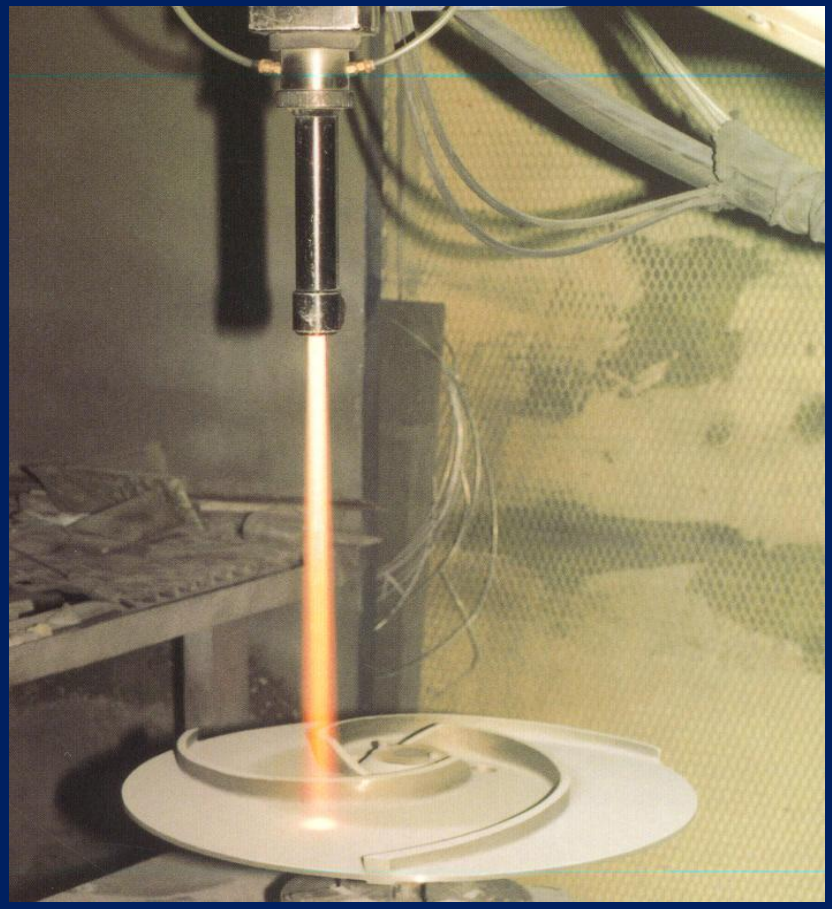
Drive Sub for Down-Hole Drilling NiCrSiB for restoration and WC-Ni for Wear & Corrosion

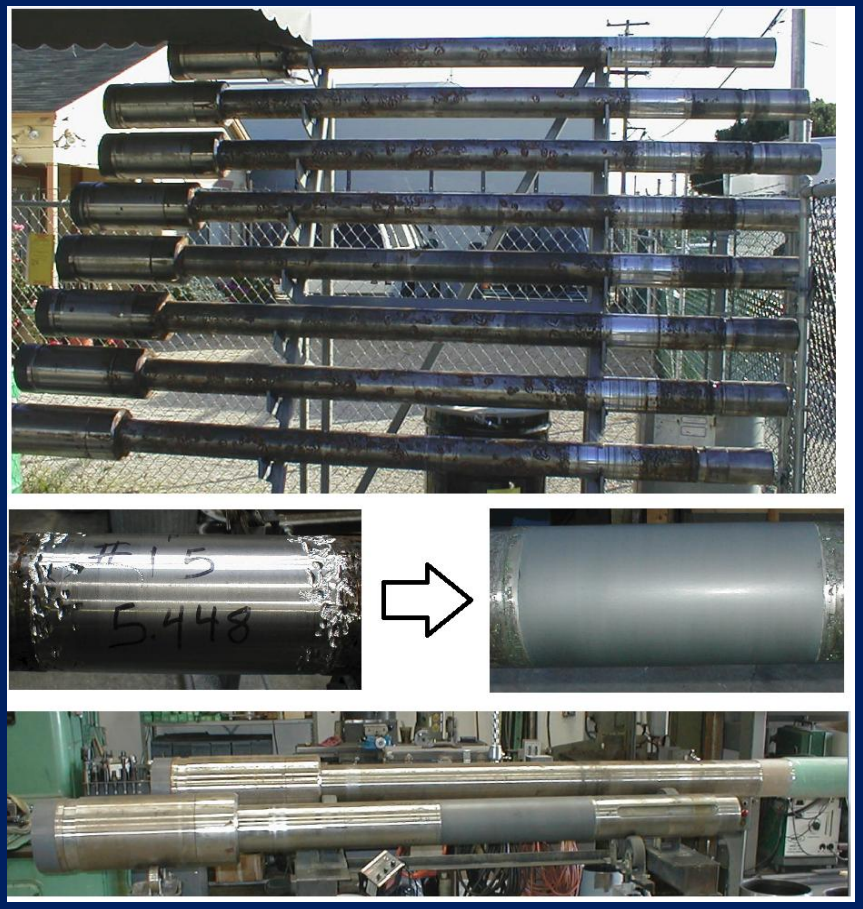


Balance Piece for Bearing NiWCrSiB to Rebuild



Shafts and Pump Impellers
WC-Co for Wear and Erosion





Vessel and Tank Inner/Outer Wall Coatings for Wear and Corrosion

General Applications

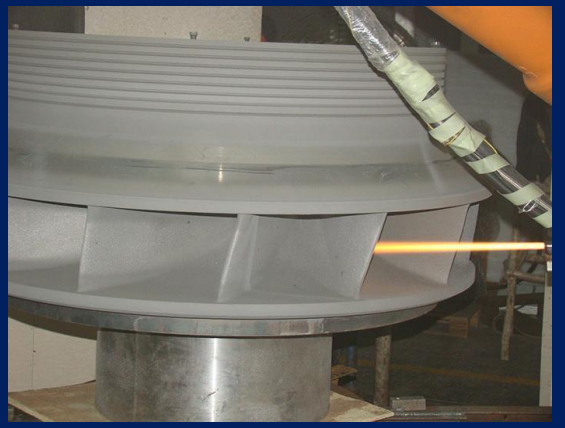
HVOF – ARC SPRAY – FLAME SPRAY – TSA - PLASMA





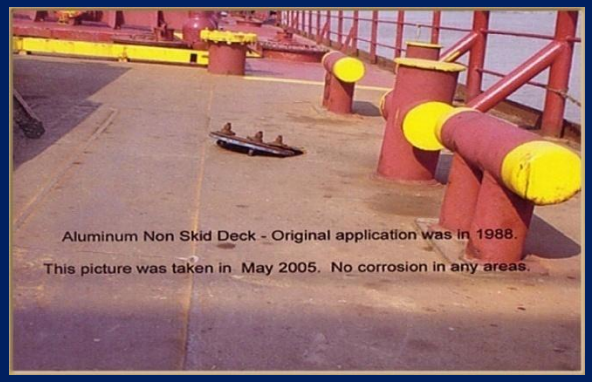


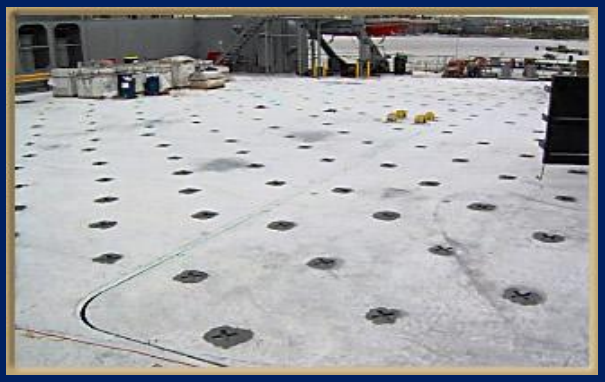




Marine Applications

TANK LININGS, ANTI FOULING, ANTI-CORROSION, EXHAUST STACKS, STEAM PIPES, NON SKID DECKING, HIGH ABRASION AREAS, CHAIN LOCKERS, PROCESS EQUIPMENT, BALLAST AREAS, PORTABLE WATER TANKS, FUEL TANKS, SUPER STRUCTURES OF ANY VESSEL, ANCHOR CHAIN AREA, BOW THRUSTER, SHIP DECKS, BALLAST TANKS, HEAT EXCHANGERS.





THERMAL SPRAY TECHNOLOGIES L.L.C

Al Quoz Industrial Area, Dubai,

United Arab Emirates

Tel: 00971 56 343 8772

Tel: 00971 50 544 2979

Email: **thermalspray@mail.com**

HVOF – ARC SPRAY – FLAME SPRAY – PLASMA - TSA