Thermaspray is the exclusive supplier of Polymer Coatings from Plasma Coatings USA
PLASMA COATINGS USA

Thermaspray has undertaken a strategic partnership with Plasma Coatings in the USA to offer the South African market a new range of surface technologies and coatings to tackle the food, printing and packaging, tyre and rubber, paper and pulp, fempro/diaper and many more industries. These coatings are designed to solve many of the above industries’ problems resulting in decreased maintenance, higher outputs, and an increase in cost savings.

What are Plasma Coatings?
Plasma Coatings combines the benefits of conventional thermal spray coatings with polymer coatings. They utilise hardfacing techniques, dispersion spray and electrostatic methods to apply coatings. Each process deposits a coating onto a prepared base material forming a mechanical bond that enhances the properties of the surface.

What makes plasma coatings unique is the application of a double layer consisting of a metallic/ceramic thermally sprayed bond coat providing adequate roughness and excellent wear resistance and a polymer top coat providing a coating with superior adhesion strength and release and traction properties. This results in a coating with a combination of the best properties of ceramics, metals, and polymers.

Below is a schematic of a plasma coating:

<table>
<thead>
<tr>
<th>Component</th>
<th>Thickness</th>
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</thead>
<tbody>
<tr>
<td>Release Polymer Thickness</td>
<td>20% - 40% of total</td>
</tr>
<tr>
<td>Metal Matrix Thickness</td>
<td>60% - 80% of total</td>
</tr>
<tr>
<td>Base Material</td>
<td></td>
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</tbody>
</table>

Total Coating Thickness: ~ 0.1mm - 0.15mm
The double layer consist of:

1. Thermal Spray (Bond coat)

This is the method of applying materials onto a prepared base material by heating particles in the stream of a heat source, creating a semi-molten state. The particles are then propelled by high velocity onto a prepared substrate where they adhere to the base surface via a mechanical bond. Particles continue to build up until a specified thickness is attained. This technique is considered the "cold method of welding", whereas high temperatures can be achieved in the heated pocket, the temperature of the part itself usually remains under 100°C.

Typical physical specifications of bond coatings:
- Maximum hardness of 72 Rc (Tungsten Carbides).
- Surface texture as sprayed is rough, from Ra4 - 25µm
- Thickness range from 50µm to 4mm.
- Bond strength range: 17MPa -100MPa.

Advantages
- No degrading of parts due to heat warping and distortion.
- No degrading of part metallurgy or integrity.
- Surfaces are enhanced to provide improved performance.

2. Polymer System (Top Coat)

A wide range of polymers are also available, typically in the 20µm -80µm thickness range. Methods of application will vary, as will the curing methods.

Through dispersion or electrostatic systems we apply:
- Fluorocarbons.
- Fluoropolymers.
- Silicones.
- Epoxies.
- Teflon® industrial coating.
- The use of special polymers (PTFE, PFA, FEP etc.) provides surfaces that are both hydrophobic and oleophobic preventing various materials such as adhesives, rubber, synthetic materials or food ingredients from sticking. These non-stick properties can be further enhanced by increasing the substrate/coating roughness profiles and reducing surface contact area.
- As a result of an infusion process, polymers and fluoropolymer coatings have a very good mechanical bond to the substrate.
- Polymer and fluropolymer coatings can be applied to any substrate including aluminium, steel, stainless steel, tool steel, copper, and ceramics etc.
- Some of the coatings are temperature resistant up to approximately 280°C and many are FDA compliant for direct food contact.

Industries served
- Tyre and Rubber
- Paper and Pulp
- Food and Beverage
- Pharmaceutical
- Diaper / Fempro
- Tapes / Adhesives
- Printing & Packaging

Benefits of Wear, Traction, and Release Dual Coating Systems:
- Improved part performance - Improves surface properties
- Improved machine efficiency - Run with higher efficiency at faster production speeds
- Improved cleanability - Less downtime
- Improved quality - Fewer imperfections in the end product
- Improved safety - Noise reduction and elimination of static electricity
- Forgiveness / Versatility - Coatings are tough and withstand wear
- Contamination/ Machine hygiene issues
- Tension control / Web handling
- Low Coefficient of Friction (COF)
- Wear / Chemical resistance combined
As a market leader in the South African Thermal Spraying Industry, we offer a fully comprehensive range of products and services to OEM and end-user clients in a wide range of demanding industries. We pride ourselves on research and partnerships with the biggest names in the business. With our powerhouse of partners and capable well-trained staff, there is no job too big or small for us to handle. We have advanced and well-equipped quality managed facilities which will ensure that we have you covered no matter what type of application you are working with.

### Applications

#### Non Conductive & Conductive coatings
- Surface Traction coatings
- Wear and Abrasion resistance
- Low Friction coatings
- Corrosion protection

#### Release (non-stick) & Cleanability

#### Five core bond coat applications techniques

1. **Combustion Wire Metallizing:** In this process, various metal wires are fed into an oxygen-acetylene gas mixture. It is then in a molten state and sprayed onto the part being processed.

2. **Electric Arc:** This process also uses materials in wire form, but in this case, the heat source is the arcing of two electrically conductive wires. The material is melted and propelled onto the part at a greater velocity than seen in the metallizing process. Higher temperatures allow for an increased source of base materials, faster rates of deposition, and improved bond and coating density.

3. **Thermal Spray:** Like metallizing, our thermal spray is based on an oxygen-acetylene heat source. Unlike metallizing, however, the material begins in powdered form. This process provides a larger selection of base materials and better bonding and density.

4. **Plasma Spray:** In this process, we use various gases that are ignited by an electric arc. Temperatures can rise up to 12000° K while the part temperature remains at less than 100° C. One of the benefits of using this system is the high heat, which can process materials with high melting points (including ceramics).

5. **HVOF (High Velocity Oxygen Fuel):** In this process, particles actually travel faster than the speed of sound, generating the best bond strengths, density, and hardness of all our processes. HVOF does not reach temperatures that are attainable with plasma processes so materials such as ceramics cannot be processed with this technique at this time.

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