



FACT SHEET

California Environmental Protection Agency



Air Resources Board

THERMAL SPRAYING

What Is Thermal Spraying?

Thermal spraying is a process in which metals are melted and sprayed on a surface to form a coating. Other names for thermal spraying include flame spraying, metallizing, and hardfacing. The metals that are sprayed are pure metals or alloys that are generally in the form of powders, wires, or rods. The energy that is used to melt the metal is provided by a combustion source or an electric arc. After the metal is melted, compressed air or another gas propels the droplets to the surface being coated. In many cases, thermal spraying surfaces are machined to provide the desired surface finish. For more severe service, the metal coating may be sealed with a thin coating of paint or a silicone product.

What Types Of Thermal Spraying Are Performed In California?

Process	Material Used	Energy Source	Fuels Include
Flame Spraying	Powder, Wire, Rod	Combustion	Oxygen-Fuel (e.g., Acetylene, Hydrogen, and Propane)
Plasma Arc Spraying	Powder	Electric Arc to produce plasma	Hydrogen, Nitrogen, Argon, and Helium
Twin-Wire Electric Arc	Wire	Electric Arc	None
High Velocity Oxy/Fuel (HVOF)	Powder	Combustion	Oxygen-Fuel (e.g., Hydrogen, Methane, Propylene, Propane) and Kerosene
Detonation Gun	Powder	Spark Ignition of Gas Mixture	Oxygen-Fuel (e.g., Acetylene, Propane, and Methane)

What Applications Use Thermal Spraying?

- Repair or build up worn or damaged surfaces
- Undercoat for paint
- Electrical Conductance
- Wear Resistance
- Corrosion Resistance
- Temperature Resistance/Insulation

What Are The Benefits Of Thermal Spraying?

- May last longer than conventional paint, which can result in a lower life cycle cost.
- Can reduce costs by providing a high-quality surface on parts that are formed from inexpensive metal.
- May be a suitable replacement for hard chromium electroplating.
- No VOCs are contained in the metal coating materials.
- No cure time is needed, unlike many conventional paints.

What Industries Use Thermal Spraying?

- Aerospace
- Agriculture
- Automotive
- Computers
- Electronics
- Machine shops
- Medical
- Marine
- Military
- Oil/Gas exploration and refining
- Power plants
- Pulp and paper
- Steel Mills
- Textile
- Transportation

What Is The California Air Resources Board (ARB) Staff Doing About Thermal Spraying?

The ARB is investigating the extent to which the materials used in thermal spraying produce toxic air emissions (i.e., hexavalent chromium or nickel) that could harm public health. As part of the investigation, ARB is working with material manufacturers, equipment suppliers, thermal spraying shops, air district personnel, and other interested stakeholders to gather data and assess the potential health risks. If ARB determines that additional controls are needed to protect public health, we will develop an Airborne Toxic Control Measure for thermal spraying operations.