

SURFACE TREATMENT**CERAMIC COATING****DSF 1.1.5****Definition:**

Most ceramic coatings are electrically nonconductive (making them excellent insulators), and have significantly higher level of abrasion resistance than most metals, they are capable of maintaining their integrity under severely elevated temperatures.

Ceramic coatings are robust and have a high level of lubricity & are often used as barrier materials to enhance the interaction between moving metal parts. Wear-resistant ceramics, such as titanium nitride and chromium carbide, can be applied to work steels and air –hardening tool steels.

Thermal barrier ceramics, such as magnesium zirconate and zirconia, exhibit a high level of hardness, thermal resistance, and elevated melting points are also being employed for industrial applications.

Treatment Information:

The Engineering Drawing must define the areas that require treatment. A ground finish is recommended to ensure that the surface roughness is less than the coating thickness.

Note: Before applying a coating, it is important to ensure compatibility between the ceramic material and the metal surface. Much of this compatibility depends on thermal expansion properties, as having expansion rates that differ too greatly can cause a coating to crack when it cools after application.

Popular standard processing methods include:-

- **Plasma Spray:** Strong adhering & high density coating. Expensive.
- **Detonation Gun:** High density tungsten carbide coatings on metal.
- **Oxygen Acetylene Rod:** Strong adhering coating.

Appearance:

The finished article shall be free from visible treatment defects such as blisters, pits or un-plated areas.

The coating will be smooth typically 6.3 Ra μm and adherent, clean and free from damage.

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Plasma spray coating is recognised as being the most versatile of all the Thermal Spray processes. During operation, a gas (argon or hydrogen) heated to such a high temperature (typically greater than 15,000°C) that it becomes ionised & electrically conductive. This plasma is created by an electric arc within the torch where the gas is formed into a plasma jet as it exits the nozzle. Ceramic powder particles are injected into this gas stream where they soften and strike the substrate at high velocity as droplets to form a strong adhering & high density coating (typically 80µm - 100µm thick). Controls for cooling or regulating the spray rate are used to maintain substrate temperatures of 105 to 160°C.

This process can be very expensive.

Properties:

- Ceramic is a non- metallic material, unaffected by acids & alkalis.
- Wear- resistant hard coating
- Electrical & thermal insulation properties.
- Heat & oxidation resistant.

ASM (DEK) Applications:

Ceramic coatings (aluminium oxide) are sturdy and have a high level of lubricity; offering an abrasive resistant barrier between moving parts. Almost any metal, ceramic or plastic can be thermal sprayed.

- OTS Snugger Plate – To reduce Substrate wear on Snugger

Note: Avoid tension (elongation) & ensure thermal expansion compatibility with substrate.

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