



MAGNAPLATE

COATINGS ENGINEERED **FOR YOUR SUCCESS**

BENEFITS

- Superior non-stick properties resist adhesion
- Prevent hydrogen “pick-up” (absorption)
- Wear resistance can be matched to application
- Offer superior heat transfer properties
- Superior resistance to friction, galling, and seizing
- Low coefficient of friction
- Will not scratch, chip, flake, or rub off
- Improve titanium’s inherent corrosion resistance
- Increase part performance
- Temp range: –200°F (–129°C) to +1200°F (+649°C)
- Nadcap, AS9100:D
- Meets AMS 2488, Type 2



Titanium Gland nuts used in aircraft are protected against freeze-up, abrasive wear and corrosion by a CANADIZE surface treatment. The dry-lubrication of the coating also permits faster maintenance procedures.

Canadize®

“Synergistic” Coatings for Titanium and Titanium Alloys Prevent Hydrogen Absorption

Recognizing that titanium is highly susceptible to hydrogen pickup or embrittlement, metallurgical engineers at General Magnaplate created a series of coating processes that would preclude any hydrogen absorption. Called CANADIZE, these “synergistic” coatings were used to prevent galling at the joints and in the drive shaft of titanium core-sample drill tubes used in NASA’s exploration of the moon. The coatings also prevented contamination of moon rock samples by titanium or other foreign materials.

CANADIZE coatings have been successfully employed to solve wear, friction, galling, seizing, moisture and corrosion problems in a broad spectrum of applications involving titanium and its alloys.

The CANADIZE process begins with a proprietary cleaning process. The part is then enhanced to the desired thickness in a proprietary solution.

Through predetermined time and current control, a hard ceramic surface is formed. In instances where permanent dry lubrication is desired, one or more carefully selected engineering materials are infused into the surface, i.e. fluorocarbons, polymers, molybdenum disulfides, graphites, or combinations of these well known dry lubricants.

APPLICATION SPOTLIGHT

A variety of metal parts used in the manufacture of sealed reagent kits for chemical testing were coated with CANADIZE to provide chemical resistance and increase the service life of the manufacturing equipment.

Galling and seizing compromised valves in pressure vessels and piping systems controlling the flow of LP gas and anhydrous ammonia. CANADIZE anti-galling/anti-seize coating solved the problem and eliminated a potentially dangerous situation.





TYPICAL APPLICATIONS

- Aerospace
- Aircraft components
- Manufacturing equipment
- Packaging equipment
- Desalinization tubing
- Food contact
- Valves
- Torpedoes
- Ordnance
- Rapid-fire weaponry
- Undersea crafts
- Construction
- Power tools



CANADIZE treatment on both the inside and outside of the Titanium core-sample drill tubes used in NASA's exploration of the moon's surface prevented galling at the joints and in the drive shaft. It also eliminated the danger of contamination of moon rocks samples by titanium particles or other foreign materials.

ENGINEERING DATA & PERFORMANCE CHARACTERISTICS

Versatility. With few exceptions, CANADIZE coatings can be applied to parts of any configuration, and virtually any size or thickness. Precise control of the coating thickness permits use on machine threads and similar close-tolerance parts.

Hardness/wear and abrasion resistance. Abrasion resistance and wear life are substantially improved. The CANADIZE process produces an augmented surface hardness (Rc 45) on the titanium part or assembly. Additional enhanced properties include high fatigue strength and fracture toughness superior to steel.

Permanent lubricity. The CANADIZE process provides an extremely hard, permanently dry-lubricated surface over the entire part, thus eliminating galling, binding and seizing.

Friction. CANADIZE exhibits a low coefficient of friction against most materials, but with an additional top layer of specially selected polymers or dry lubricants, the coefficient of friction can be further reduced. The CANADIZE process is also available with molybdenum disulfide which can be combined with various other engineering polymers to meet specific requirements. Its lubricity reduces surface friction significantly, allowing the free flow of liquids while resisting the adhesion of contaminants over a broad temperature range.

Temperature. Without top coating, the usable operating temperature range is -200°F (-129°C) to $+1200^{\circ}\text{F}$ ($+649^{\circ}$). With the addition of proprietary polymers and lubricants, the max can be as high as $+950^{\circ}\text{F}$ ($+510^{\circ}\text{C}$).

Chemical protection. Titanium is very susceptible to chemical attack from halides and particularly chlorides. Special engineering polymers are applied to the surface to offer complete corrosion protection against most chemicals, including washdown solutions.

Corrosion resistance. Titanium's natural resistance to corrosion is greatly augmented by the CANADIZE process. As a result of the enhanced ceramic film created on the metal part, the new surface becomes almost impervious to corrosion, making it especially useful wherever galvanic, seawater immersion or atmospheric corrosion is encountered.

Thickness. CANADIZE coating thickness range can be provided from 0.0001" to 0.0006". Titanium 6AL 4V produces the best ceramic coating – other alloys will not permit more than a thin film. General Magnaplate's engineers are available for consultation regarding optimum thickness recommendations.