MOLYKOTE®

ILLUSTRATIVE DOCUMENT ON THE CHARACTERISTICS OF POST-PHOSPHATE CONVERSION COATINGS

CHARACTERISTICS

Molykote® lacquers are dispersions of solid lubricating substances—such as molybdenum disulfide—and finely distributed organic or inorganic binding resins in solvents.

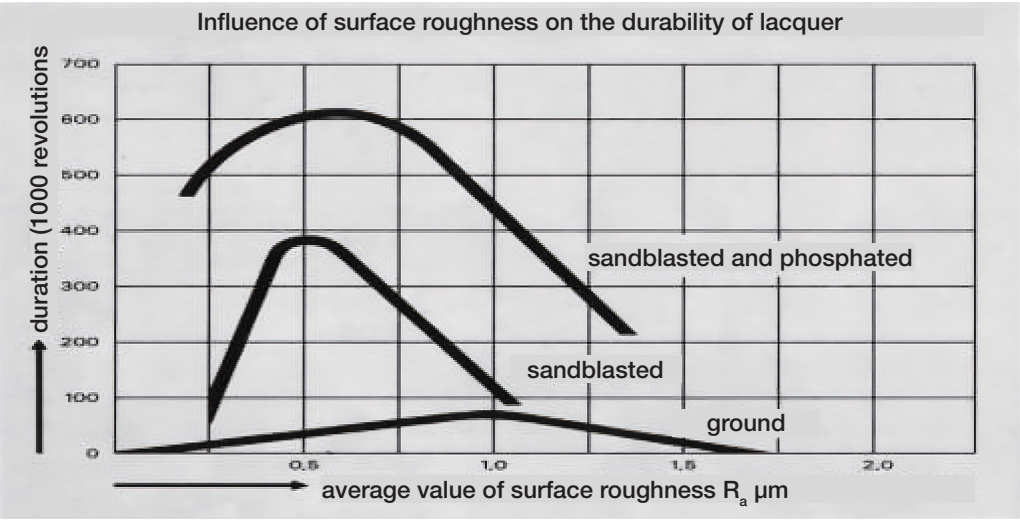
As high-performance lubricants, they ensure permanent lubrication and meet extreme requirements that conventional lubricants cannot fulfill, such as for small parts under heavy loads, with minimal sliding speeds, oscillating movements only, or exposure to extreme temperatures.

As corrosion protectants, Molykote® lacquers offer excellent results combined with reduced wear, resistance to high pressures, and protection against chemical and environmental agents.

The lubricating film they form demonstrates pressure resistance values that often exceed the yield strength of most metals.

SURFACE PREPARATION

The durability of the lubricating film is significantly influenced by the surface pretreatment.



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SURFACE PREPARATION (CONTINUED)

Phosphating is recommended for iron and steel parts (excluding stainless steel), and for galvanized or cadmium-coated iron parts. Phosphating baths that form very thin, crystalline layers are preferable.

Depending on the type of bath used, phosphating can alter the dimensions of the parts by a few microns, with a weight increase of approximately 40 g/m².

Phosphating is controlled visually: the phosphate layer must be uniform and consistent, with a color ranging from grey to black. Parts must not be stained, and above all, should show no white spots.

PURPOSE

This is a post-phosphating treatment obtained through the application of a heat-curing lubricating lacquer that provides long-lasting, dry lubrication under heavy loads and at low sliding speeds, especially during start-stop conditions in intermittently operating devices. Even after long idle periods, the coating provides excellent lubrication at startup, as the applied film remains unaltered over time.

Molykote® reduces wear, eliminates maintenance, and ensures operation even after prolonged inactivity. In many cases, it even enables lifetime lubrication, resulting in greater cost-effectiveness.

Molykote® is especially used where lubrication with oils or greases is not possible due to design constraints (inaccessible lubrication points, exposure to dust, dirt, etc.), while long-lasting, maintenance-free lubrication throughout the lifetime of the components is desired.

DESCRIPTION

The treatment consists of a manganese phosphate coating according to **UNI ISO 9717**, forming a microcrystalline layer with a thickness ranging from 3 to 6 microns.

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DESCRIPTION

When designing the part, it must be taken into account that the phosphate deposit forms partially at the expense of the base metal, and that between 1/2 and 2/3 of the layer thickness protrudes beyond the original dimensions of the component.

After phosphating, a molybdenum disulfide-based polymerizing lacquer is applied (by spraying, dipping, or brushing) to the significant surface, which must be indicated in the technical drawing. If no such indication is provided, the entire surface of the component is to be considered significant.

Once the coating has dried, it is cured for at least 2 hours at 150°C. The parts must be cooled in still air at room temperature.

TESTS AND INSPECTIONS

THICKNESS

Thickness is measured using the magnetic method according to **UNI ISO 2178**. The coating thickness (including the phosphate layer) must be ≥ 10 microns across all points of the significant surface.

VISUAL INSPECTION

The coating must appear uniform across the entire significant surface and have a matte smoke-grey color. Drips, cracks, or flaking are not allowed.

CORROSION TESTS

The test consists of exposing the parts to salt spray in accordance with **UNI ISO 9227**.

Rust spots visible to the naked eye at normal reading distance must not appear before 48 hours of exposure.

REFERENCE STANDARDS: UNI ISO 9717
UNI ISO 2178
UNI ISO 9227

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TECHNICAL INFORMATION

The main technical characteristics of the two most commonly used types of **Molykote®** are listed below:

MOLYKOTE® 106

Heat-curing polymerizing lubricant lacquer

Color	Dark gray
Flash point (method used) °C	23
Binder	Organic
Operating temperature range	-70°C to approximately +250°C
Curing time	60 minutes at 150°C
Resistance to mineral oils	Resistant
Recommended film thickness	Approximately 10 µm*
Resistance to degradation	Even after a long stop, the lubricating action remains perfect
Coefficient of friction	About 0.15 with light loads, decreasing to 0.03 for heavier loads
Coverage with film thickness of approximately 10 μm	Approximately 15 m²/kg
Compliance with standards:	
meets the following USA specifications	MIL-L8937A
Thinner	Special thinner for Molykote 106

* Regarding the bearing clearance, it is necessary to calculate any additional thickness of the base layer, such as phosphate.

DOW CORNING® 3400A
Lubricant lacquer

(Formerly Dow Corning® 1-3940 bonded lubricant)

Type	Dispersion of solid lubricants and anticorrosives
Physical form:	
- Supplied	as a low-viscosity liquid
- Polymerized	solid lubricant film
Typical characteristics	good solvent resistance; complies with Mil-L-46010A standard; excellent lubrication and corrosion protection
Main use	corrosion protection and lubrication of ferrous metal parts

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