Product Information

DOW CORNING

High Performance Lubricants

Molykote® 321 Dry Film Lubricant and *Molykote*® 321 Dry Film Lubricant Spray

Dry film lubricant for components used intermittently or those exposed to unusual environments

FEATURES

- Lubricates over a wide temperature range of -290 to 840°F (-178 to 450°C)
- Has an exceptionally low coefficient of friction
- Air dries in 20 to 30 minutes; completely cures in 4 hours
- Reduces wear normally associated with running-in new or rebuilt equipment
- Remains stable in many extreme environments such as vacuum and radiation due to its dry form
- Lubricates effectively even after long periods of non-use and will not wash out or attract and hold dust or dirt
- Adheres to most clean metal surfaces
- Resists chemicals and fuels

COMPOSITION

- Solvent dispersion of MoS_2, graphite and inorganic binder
- Supplied as pourable liquid and aerosol; cures to dry lubricating film

USES

Molykote® 321 Dry Film Lubricant is designed for use on parts that are inaccessible for lubrication after assembly; require a dry, thin lubricating film; or normally experience high initial wear on running-in new or rebuilt equipment. It has also been successfully used in a variety of metal-working applications. *Molykote* 321 Dry Film Lubricant can be used on:

- Cutting tools – broaches, gear cutters, milling cutters, taps, drills, reamers, chasers, punches, etc.
- Railroad pins – brake pins and levers, roll stabilizer pins, trip pivots, eccentric bolts
- Splines, threaded connections, disconnects
- Aircraft engines for air foil lubrication
- Instruments operating in unusual environments, such as in a vacuum, near radiation or in extreme low or high temperatures
- Metal forming
- Aluminum to aluminum and aluminum to steel surfaces

TYPICAL PROPERTIES

These values are not intended for use in preparing specifications.

Method	Test	Unit	Result
As Supplied			
	Specific Gravity at 77°F (25°C)		0.97
	Viscosity at 77°F (25°C), Zahn #1	sec	32
	Density	lb / gal	8.3
	Approximate Coverage (0.0007-in thick)	sq ft / gal	780
	Flash Point, closed cup	°F (°C)	102 (39)
As Cured			
	Color		Gray-black
	Binder Type		Inorganic
CTM 0409[1]	Endurance Life[2], 1000 lb	minutes	71
CTM 0389	Load-Carrying Capacity[3]	N	11,250
CTM 0394	Coefficient of Friction[4]		0.07
	Adhesion, on metals and glass		Good
	Fluid Resistance	Ethanol, methyl isobutyl ketone, acetone, silicone fluid, water, methanol, acetone, benzene, naphtha, hydrazine (product is, however, attacked by N_2O_4)	

[1]Corporate Test Methods (CTMs) correspond to standard ASTM tests in most instances. Copies of CTMs are available upon request.

[2]Federal test method 791a-3807, falex pin and vee block.

[3]Federal test method 791-3812, falex pin and vee block.

[4]LFW-4 press fit test.

Specification Writers: Please obtain a copy of the Dow Corning Sales Specification for this product and use it as a basis for your specifications. It may be obtained from any Dow Corning Sales Office, or from Dow Corning Customer Service in Midland, MI. Call (989) 496-6000.

Table I: Recommended Pretreatments For Metal Surfaces

Pretreatment	Steel	Plated Cr or Ni	Metals Cd or Ni	Al Alloys	Cu Alloys	Mg Alloys	Ti Alloys
Degrease	X	X	X	X	X	X	X
Removes Oxides							
Bright Dip					X		
Sandblast	X	X					X
Anodize				X			
Dichromate						X	
Phosphate	X		X				

DESCRIPTION

Molykote 321 Dry Film Lubricant is a selected blend of solid lubricants of controlled particle size dispersed with an inorganic binder in a solvent system. *Molykote* 321 Dry Film Lubricant Spray is an aerosol package using bulk material solvent and propellant. After the solvent evaporates, the coating cures at room temperature to form a solid lubricant.

USE LIMITATIONS

Molykote 321 Dry Film Lubricant may affect certain plastics, rubbers and paints. Test thoroughly before use.

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

HOW TO USE

Surface Preparation

Parts to be coated should be clean and dust-free. *Molykote* 321 Dry Film Lubricant may be applied directly to ground or to highly machined surfaces. **The best performance has been found on metal surfaces that have been abrasive-blasted so that the surface has a random orientation of 20 to 30 rms finish.** Certain surface pretreatments can further enhance the performance and endurance life of the coating (see Table I).

Application Methods

Molykote 321 Dry Film Lubricant may be applied by spraying, dipping or brushing. Spraying usually produces the most uniform and precisely controlled film thickness. Dipping is also good if a high degree of uniformity is not essential.

Because solids tend to settle rapidly, keep material agitated continuously and keep container covered to prevent resin hydrolysis and solvent loss.

Molykote 321 Dry Film Lubricant requires no dilution before use unless solvent has been lost by evaporation. If so, add naphtha solvent to restore the original viscosity. Some addition of solvent may also be desirable for dipping or brushing.

When spraying, use a commercial spray gun of 1-quart capacity or less. A spray booth is desirable. Make sure the working area is adequately ventilated and observe the usual precautions for spray painting. **Keep the product well mixed both in the reservoir and when circulating to and from the spray nozzle.** Check to see that all elastomers in the spray system can be used with a naphtha solvent.

To obtain the best adhesion and wear life, apply a coating no more than 0.001-inch thick. A single wet pass of spray usually deposits a film of about 0.0005- to 0.0008-inch thick. Where uniformity is especially important, place parts on a screen during spraying to minimize excessive coating buildup due to “flashback.” Fitting parts on a jig and rotating while spraying also helps.

When dipping, required equipment includes a pan or bath and an easily removable rack or basket. Place parts in the basket and dip briefly. **A motor-driven agitator is useful to keep solids in suspension.**

Brushing is recommended only when spraying or dipping is impractical or where uniformity is not required. Use any ordinary paint brush.

Molykote 321 Dry Film Lubricant Spray in aerosol cans may be used for small volume production runs or for final touchups.

Curing

Molykote 321 Dry Film Lubricant is dry to the touch within 30 minutes after application. However, for maximum performance, the coating must be cured by hydrolysis from contact with atmospheric moisture. In a normal room environment of 50 percent relative humidity, the film will cure in approximately four hours.

Removal of Cured Film

Ethyl acetate, toluene or xylene can be used to scrub off *Molykote* 321 Dry Film Lubricant after soaking.

STORAGE AND SHELF LIFE

When stored under normal warehouse conditions below 90°F (32°C), *Molykote* 321 Dry Film Lubricant has a useable life of 24 months from date of manufacture. *Molykote* 321 Dry Film Lubricant Spray has a useable life of 60 months from date of manufacture.

SHIPPING LIMITATIONS

Molykote 321 Dry Film Lubricant is a combustible liquid. *Molykote* 321 Dry Film Lubricant Spray is an extremely flammable gas.

PACKAGING

Molykote 321 Dry Film Lubricant is available in 1-gal and 5-gal pails.

Molykote 321 Dry Film Lubricant Spray is available in 16-oz aerosol cans containing 11 oz (312 g), net weight.

SAFE HANDLING INFORMATION

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED. BEFORE HANDLING, READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET IS AVAILABLE FROM YOUR DOW CORNING REPRESENTATIVE, OR DISTRIBUTOR, OR BY WRITING TO DOW CORNING CUSTOMER SERVICES, OR BY CALLING (989) 496-6000.

WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that Dow Corning's products are safe, effective, and fully satisfactory for the intended end use.

Dow Corning's sole warranty is that the product will meet the Dow Corning sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. Dow Corning specifically disclaims any other express or implied warranty of fitness for a particular purpose or merchantability. Unless Dow Corning provides you with a specific, duly signed endorsement of fitness for use, Dow Corning disclaims liability for any incidental or consequential damages. Suggestions of use shall not be taken as inducements to infringe any patent.

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