



# MOLYKOTE® HP-300 Grease protects critical inverter electrical connections

Case study: With reliable rubber compatibility and thermal regulation, grease lubricates and seals O-rings

## The application

Electric vehicles depend on AC/DC power inverters to change the direct current (DC) electrical output from the vehicle's battery into alternating current (AC) to power the engine and other components. These batteries supply 500 volts of power and a maximum current of 500 amps, so reliable inverter operation is key to protecting battery life and the vehicle's motor.

## The challenge

Power cables with O-ring seals made from various rubbers – including EPDM or silicone rubber – are used to connect the inverter and battery. The O-rings are critical to helping prevent moisture from entering the inverter chamber. With working temperatures reaching up to 120°C, wide-temperature performance and proper rubber-compatible lubrication is required to protect the O-rings from damage.

A vehicle manufacturer in China approached the MOLYKOTE® team for a solution that would deliver needed O-ring protection and performance, along with dependable rubber compatibility.

## The solution

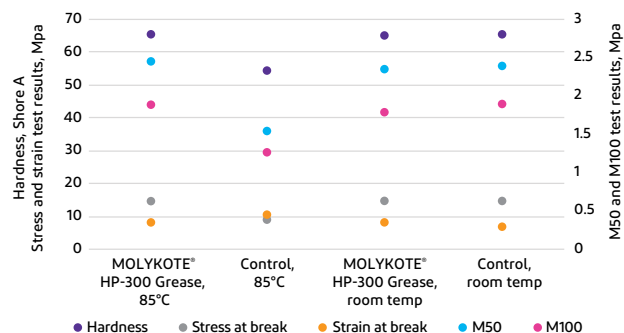
MOLYKOTE® HP-300 Grease can protect electrical connection O-rings in demanding environments, with minimal hardening or changes to mechanical properties. Delivering excellent rubber compatibility, performance and thermal stability, the grease is suitable for use with various rubbers, such as EPDM elastomers and silicone rubbers.

Using both EPDM elastomers and silicone rubbers, the MOLYKOTE® technical team subjected MOLYKOTE® HP-300 Grease to several tests to

observe how the lubricant performed under pressure, successfully demonstrating the grease's performance via lab comparisons with a traditional lubricant solution as a control. MOLYKOTE® HP-300 Grease did not negatively affect the mechanical properties of the rubber O-rings, and it showed excellent compatibility. The data convinced the automotive manufacturer that MOLYKOTE® HP-300 Grease was the right solution for its challenge.

## EPDM elastomer compatibility tests

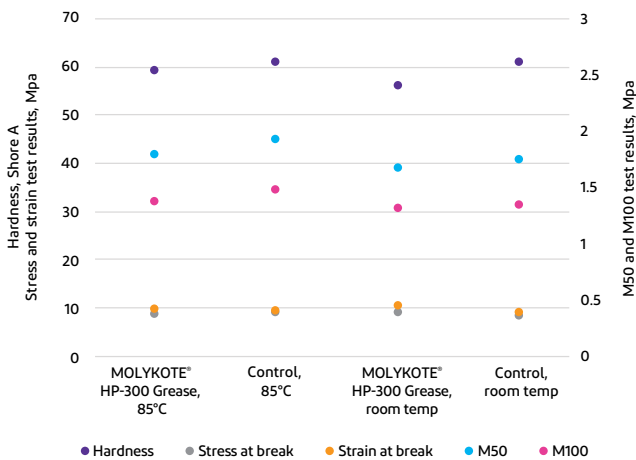
Specimens were prepared according to ISO 527 and were aged for 250 hours under 85°C and room temperature conditions.



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## Silicone rubber compatibility tests

Specimens were prepared according to ISO 527 and were aged for 250 hours under 85°C and room temperature conditions.



## Get extraordinary performance in extreme conditions

MOLYKOTE® HP-300 Grease can be used broadly under harsh conditions, such as at low or high temperatures; in corrosive environments; in the presence of solvents, liquefied natural gasses and high-vacuum conditions; and more.

It has been used in specialized applications where the volatilization of the lubricating material is undesirable, such as on cleanroom equipment and semiconductor manufacturing equipment.

MOLYKOTE® HP-300 Grease delivers:

- Good plastic and rubber compatibility
- Excellent stability at high temperatures
- Superior resistance to chemicals and solvents
- Minimal deterioration due to oxidation; appropriate for long-term lubrication
- Low vapor pressure (base oil)

## Typical properties of MOLYKOTE® HP-300 Grease

Specification writers: These values are not intended for use in preparing specifications. Please contact your local MOLYKOTE® sales representative prior to writing specifications on this product.

Standard <sup>(1)</sup>	Property	Result
	Appearance	White
JIS K 2220	Penetration (worked 60 times)	280 mm/10
	NLGI class	2
	Service temperature range	-65 to 250°C
	Density	2.0 g/cm <sup>3</sup>
MIL-S-8660	Bleed (200°C, 24 hr)	8.0%
MIL-S-8660	Evaporation (200°C, 24 hr)	0.2%
MIL-S-8660	Evaporation (200°C, 1,000 hr)	1.0%
ASTM D2596	Four-ball weld load (1,500 rpm/1 min)	3,300 N
ASTM D2266	Four-ball wear scar (1,200 rpm, 392 N, 1 hr)	1.1 mm
JIS K 2220	Low-temperature torque test (-20°C)	
	Starting torque	4.1 Ncm
	Running torque	1.8 Ncm
JIS K 2220	Low-temperature torque test (-40°C)	
	Starting torque	11 Ncm
	Running torque	3.6 Ncm
	Base oil vapor pressure (20°C)	4x10 <sup>-10</sup> Pa

<sup>(1)</sup>JIS: Japanese Industrial Standard. MIL: Military Specification and Standards. ASTM: American Society for Testing and Materials.

## About MOLYKOTE® Specialty Lubricants

For more than 70 years, customers around the world have trusted the MOLYKOTE® brand for performance and expertise to solve or prevent virtually any lubrication problem and to save energy. Available through a global network of more than 3,000 channel partners, MOLYKOTE® brand lubricants – which include well over 500 anti-friction coatings, compounds, dispersions, greases, oils and fluids, and pastes – serve the automotive market and industrial/maintenance, repair and overhaul (MRO) markets. To learn more about our extensive product and service offering or to locate a distributor, visit [molykote.com](http://molykote.com).



## Contact us

MOLYKOTE® has Contact Centers around the globe. Find the phone number for the center nearest you at [www.dupont.com/molykotecontact](http://www.dupont.com/molykotecontact).



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