



# Molykote® Lubricants for Electrical Applications

Starter motor

Alternator

Ignition system

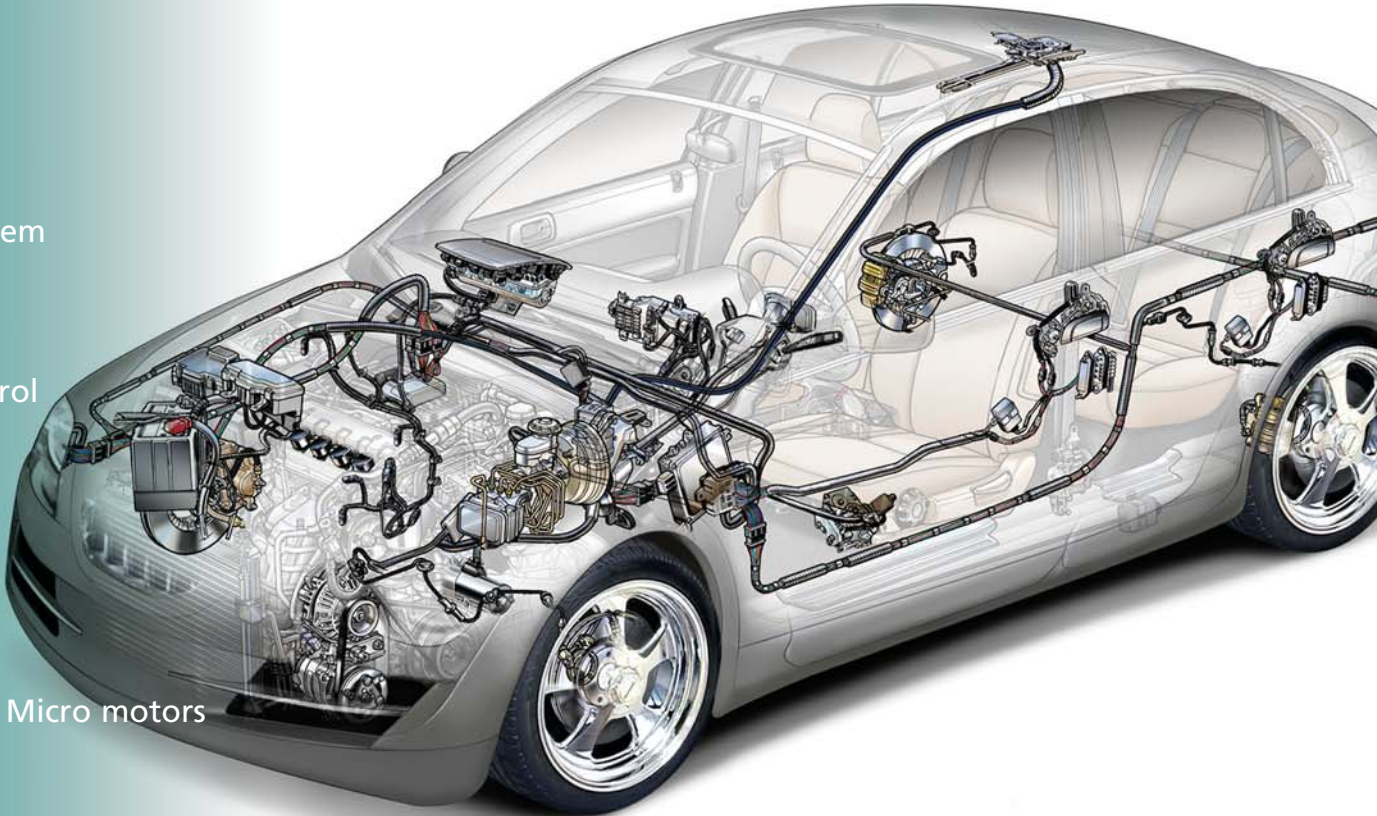
Engine control

Switches

Actuators & Micro motors

Wiring & harness

Electrical fan



Automotive  
Solutions





# Molykote® Lubricants for Electrical Applications

When it comes to providing high performance, reliability, flexibility of design and value in increasingly sophisticated automobile electrical components, designers and engineers around the world turn to Dow Corning for Molykote® lubrication solutions.

For trouble-free performance under changing conditions, you can trust Molykote engineers to provide lubrication solutions early in your design process for smooth operation and to minimize costly, time-consuming changes. We can even customize products, eliminating the guesswork that can run up costs and delay production.

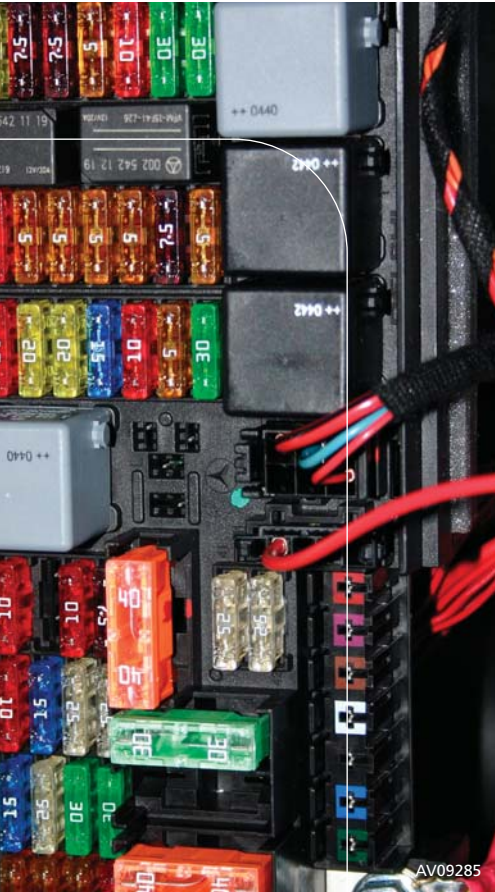
Every Molykote automotive product and service is backed by the Dow Corning commitment to provide the design and processing answers you need to ensure your customer's satisfaction.

Molykote state-of-the-art lubricants offer good lubricity, manage friction, and extend service temperature range and warranty life. In addition, they are non-toxic, environmentally friendly, and fulfill all international regulatory requirements.

Designed to work under extremes of load, speed and temperature, as well as in exposure to fuel and corrosive exhaust gas, Molykote lubricants have excellent thermal stability, mechanical and corrosive resistance, and good compatibility with elastomers and plastics widely used in automotive electrical components.

Our product range and engineering expertise make us the ideal partner for cooperation and development projects for improvement or new products.

- **Tailored approach** – Molykote has global capabilities but can tailor a solution that can satisfy local needs.
- **Simple and exact** – We offer a wide selection of specialty lubricants for all applications to help you make the right choice the first time.
- **Environmentally friendly** – Our lubricants and silicone-based products do not contain heavy metals or unwanted chemicals to comply with our customer's increasing requirements in terms of environmentally friendly products.
- **Total solution** – Specialty lubricants are the core portion of our electrical components solutions, but Dow Corning also offers selected silicone compounds, sealants, adhesives and protective coating for a complete product range.



AV09285



AV07390



AV10057

## Starter motor

Starter motor components require the use of a variety of lubricants to maintain low friction and control the coefficient of friction. Synthetic oil base grease can extend the life of lubrication over wide temperature ranges.

**Overrunning clutch** – Silicone greases are recommended to control friction between the metal roller and housing to keep right “hold and release” on this mechanism, where high coefficient of friction, anti-wear property and wide temperature range are needed. Durability is also important to meet warranty life of the components.

**Planetary reduction gear** – Synthetic greases with EP additives are appropriate for their good lubricity and wide temperature range. These greases can lubricate gears and small bearings.

**Spline** – A “dry” anti-friction coating lubricant with heavy load carrying capacity and corrosion protection is necessary for the steel spline.

**Bearings** – Good load carrying greases meet the long life lubrication need of bushing and slide bearings.

## Alternator

High temperature long life bearing grease are appropriate to optimize component life.

## Ignition system

**Spark plug boots** – Silicone greases or fluorinated greases have good heat stability and rubber compatibility that are required to prevent boots from sticking.

## Engine control

Engine systems need precise mechanical control at each component. This requires lubricants that have high temperature, anti-fuel, gas property and electrical stability.

**Electronic throttle** – Fluorinated greases are applied to lubricate valve control gears and bearings to extend the life of gears running at high temperatures.

**Idle control valve** – Fluorinated greases are applied to miniature bearings and valve control screws to reduce friction and accurate control of the stepping motors. High temperature and fuel resistance are required because of exposure to fuel/air mixtures.

**Exhaust gas recirculation** – Fluorinated greases are appropriate to lubricate valve control stepping motors and diaphragms of exhaust gas recirculation systems. High temperature and exhaust gas resistance are required because of contact with re-circulated gas.

## Wiring and Harness

Synthetic greases or semi-dry lubricants, which have better plastics and rubber compatibility, can improve seals and make secure connections with connectors. Semi-dry lubricants are a good choice to reduce friction with the seal and harness at assembly.

## Switches, Actuators & Micro motors

**Switches** – Synthetic or fluorinated greases are widely used for their plastics and metal compatibility.

**Actuators & Micro motors** – Greases can be used for many materials are appropriate to lubricate plastics gears and metal movements. Also rubber compatibility is required for some applications.

## Electrical fan

High temperature bearing greases can extend the life of the components. A high degree of durability is required.

## Emerging Technologies

Molykote engineers are also working closely with OEMs to provide lubricant solutions to reduce and control friction and wear, while fulfilling the reliability requirements for next-generation electrical and electronics systems

As powertrain technology improves, so will their electrical components. Molykote has been at the forefront of new technology and will continue to provide solutions for future development.

# Testing Capabilities

Dow Corning automotive centers in Germany, Japan and the United States feature a wide range of equipment for designing, right specialty lubricants for your application in the electrical segment, we can perform the following tests:

## Mechanical/Dynamical Tests

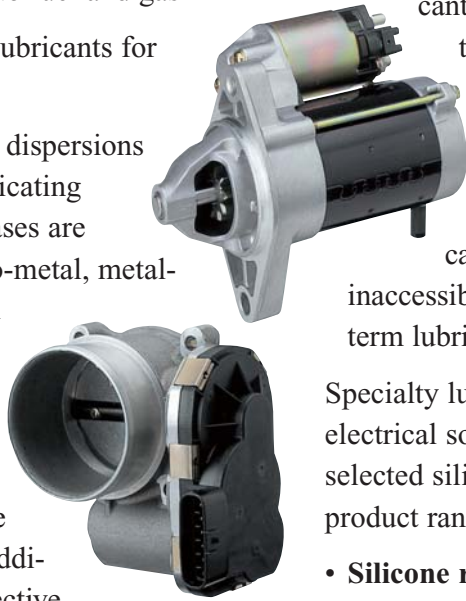
Feature	Test	Grease	Paste	Powder	AFC
Lubricity/plastic compatibility	Ball Plate	X	X		X
Plastic compatibility	Plastics plate	X	X		
Lifetime/high temperature	FE 9 bearing – FAG	X			
Corrosion	Emcor – SKF	X	X		
Lifetime/wear/load	LFW 1 – Oscillating and Rotating	X	X	X	X
Low temperature	Low temperature torque	X			
Lubricity/stick slip	Press fit	X	X		X
Lifetime/lubricity/wear	SRV	X	X	X	X
Load carry capacity/wear	VKA – Four Ball	X	X		
Water compatibility	Water Wash Out	X	X		

# Molykote® Long-life Specialty Lubricants

Ordinary lubricants often cannot meet the increased technical demands of today's sophisticated electrical components. In many applications, specialty lubricants are required to perform under extreme conditions such as low and high temperatures, variable speeds and loads, and exposure to fuel and gas

The Molykote line of specialty lubricants for electrical components includes:

- **Greases** – Thick or semi-fluid dispersions of a thickening agent in a lubricating liquid. High-performance greases are designed for dynamic metal-to-metal, metal-to-rubber, metal-to-plastic and plastic-to-plastic applications. Most greases are based on synthetic formulations that have excellent resistance to thermal degradation. Many are fortified with solid lubricant additive technology to provide effective lubrication under extreme load conditions. High-performance fluorinated greases are designed for extended service at higher temperatures and higher loads, and in harsh chemical environments.
- **Pastes** – High concentrations of solid lubricants dispersed in oil for convenient application. These lubricants have high concentrations of solid lubricants



blended in various bases. They are used where a high concentration of solid lubricant is required, such as initial run-in and areas exposed to high loads.

- **Anti-friction coatings (AFC)** – Paint-like products that contain submicron sized particles of solid lubricants instead of coloring pigment, dispersed through carefully selected resin blends and solvents. After curing, the coating forms a dry lubricating film that can help prevent corrosion and is aesthetically pleasing. Anti-friction coatings are ideal for applications involving dusty environments or for inaccessible areas containing parts that need long-term lubrication.

Specialty lubricants are the core portion of our electrical solutions, but Dow Corning also offers selected silicone rubber and sealants to complete the product range.

- **Silicone rubbers** – Widely used for connectors seals and diaphragms to seal moisture and dust. They feature high temperature stability and low temperature elasticity.
- **Silicone adhesives/sealants** – These products are designed for applications that demand a strong but flexible bond, such as when bonding materials with differing thermal expansion rates.

testing and validating our lubricants and other materials specifically for electrical applications. To help you to select the

## Chemical/Physical Tests

Feature	Test	Grease	Paste	Powder	AFC
Temperature stability	Dropping Point	X	X		
Low temperature usability	Flow Pressure	X	X		
IR spectra	Infrared analysis (IR)	X	X		
Oil Bleed and Evaporation	Oil Bleed and Evaporation	X	X		
Oxidation resistance	Norma Hoffmann	X	X		
Consistency	Penetration	X	X		
Viscosity	Rotational viscometer	X	X		
Corrosion	Salt spray	X	X		X
Thermal/oxidation stability	DSC	X	X	X	

Check our website for up-to-date testing capabilities at [www.dowcorning.com/automotive](http://www.dowcorning.com/automotive)



# Dow Corning: One Company, Many Automotive Solutions

As the global leader in silicon-based technology and with more than 60 years of experience as a leading automotive supplier, Dow Corning provides products, services and business solutions to meet your needs exactly. Whether you need to boost performance, lower costs, or increase customer satisfaction with your automotive systems, modules and components, we have experts who can help.

When you select Dow Corning as your business partner, you

get fully integrated application and engineering support along with high-quality products and materials. From parts manufacturing to consulting to critical components' design, our experts can customize solutions that provide comfort, reliability and safety for vehicles today and for the future.

In addition to lubrication and sealing expertise, we have a wide variety of options involving coatings, elastomers and service solutions.

## Product Recommendations

### Electrical components

Sub-segment	Part	Function to be performed	Recommended Molykote® products	Product feature
Starter motor	Spline	lubrication	3400A Lead free	Lubrication and corrosion protection
	Spline	lubrication	BR2 Plus	Lubrication of spline and gears
	Bearing	lubrication	BR2 Plus	Lubrication of bushing and bearing
	Planetary type reduction gear	lubrication	7514, AG-650	Lubrication of gears and bearings
	Over running clutch	lubrication	33, 7325, 33 Medium	Lubrication of roller and housing
Alternator	Bearing	lubrication	G-6000	Lubrication of bearings
Ignition system	Spark plug boots	lubrication and release	G-5008	Lubrication, seal and release
Engine control	Electronic throttle	lubrication	HP-300	Lubrication at high temperature and fuel vapor
	Idle control	lubrication	HP-300	Lubrication at high temperature and fuel vapor
	EGR	lubrication	HP-300	Lubrication at high temperature and fuel vapor
Wiring & Harness	Connectors	lubrication	PD-910	Lubrication of plastics and rubber connector
	Assembly	lubrication	PD-910	Lubrication of plastics and rubber seal
Switch, Actuators & Micro Motors	Switch	lubrication	EM-30L, EM-50L	Lubrication of plastics and electrical contact
	Actuators	lubrication	YM-102, YM103, EM-30L, E Paste	Lubrication at wide temperature and various materials
	Micro motors	lubrication	YM-102, YM103, EM-30L, E Paste	Lubrication at wide temperature and various materials
Electrical fan	Bearing	lubrication	HP-300, 3451	Lubrication at high and low temperature

Recommended products are Molykote® brand and for all areas, unless otherwise noted.

## How To Contact Us

Dow Corning has sales offices, manufacturing sites, as well as science and technology laboratories around the globe. For more information, visit [www.dowcorning.com/automotive](http://www.dowcorning.com/automotive) or [www.molykote.com](http://www.molykote.com), or call one of our primary locations listed here.

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## Global Presence. Local Support.

Dow Corning's global presence in the automotive market enables you to develop specifications centrally while providing consistent high-quality products and services locally. Through our global sales, application engineering, product development, and manufacturing and delivery capabilities, our quality is consistent around the globe. This also enables a more effective and efficient product customization process—no matter where you are located!

#### **LIMITED 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 use. Suggestions of uses should not be taken as inducements to infringe any particular patent.

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.

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**DOW CORNING DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

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