

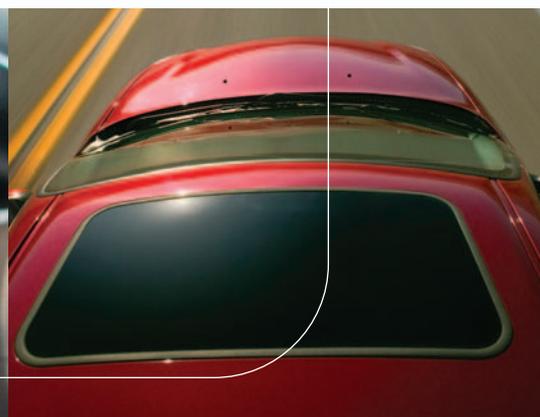
Window regulators

Door and trunk locks

Exterior rear view mirror

Wipers

Sun roof



Molykote® Lubricants for Body & Interior Applications

Seat systems

Head and arm rest

Combination switches

Door trim

Dashboard

Consol box

Seat belt system

Air bag

Interior switches

Steering adjustment

Navigation

Entertainment



Automotive
Solutions

DOW CORNING

Molykote® Lubricants for Body & Interior Applications

When it comes to providing safety, dependability, comfort and value in increasingly sophisticated automobile body and interior components, designers and engineers around the world turn to Molykote® for lubrication solutions from Dow Corning®.

For trouble-free performance under changing conditions, you can trust Dow Corning engineers to provide Molykote® brand lubrication solutions early in your design process for smooth operation and to minimize costly, time-consuming changes. Dow Corning 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, extend service temperature range and increase warranty life. In addition, they are non-toxic, environmentally friendly, and fulfill all international regulatory requirements. Furthermore, many Molykote lubricants are transparent or light in color to meet the aesthetic requirements of visible components.

Designed to work under extremes of load, speed and temperature, Molykote lubricants have excellent thermal stability, mechanical corrosive resistance, and good compatibility with elastomers and plastics widely used in automotive body and interior components.

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

- **Tailored approach** – Dow Corning 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.
- **Total solution** – In addition to specialty lubricants, Dow Corning has the know-how to help make vehicles safe, reliable, comfortable, and more fuel efficient. Visit www.dowcorning.com/automotive to learn more about our proven integrated approach to total solutions.



AV10071



AV10076



AV10074



AV06961

Molykote® Body Component Solutions

Molykote technical service experts can help you improve customer satisfaction by identifying the right solution for any of your body component application needs. Our materials quiet noise, reduce friction and wear, prevent corrosion, improve appearance, reliability, comfort and more.

Window regulators

Rail and slides – Synthetic greases are recommended for lubricating plastic slides and metal rails. Proper lubrication provides resistance to water washout and helps prevent noise caused by contamination of dust. Anti-friction coatings offer good lubrication and corrosion protection for rails and can reduce noise.

Micro motor – Synthetic greases have good plastic and rubber compatibility and are appropriate for lubricating reduction gear boxes at wide temperature ranges. The right grease can help lower electricity consumption.

Balancing spring – A “dry” anti-friction coating lubricant with heavy load carrying capacity and corrosion protection is appropriate for springs. Proper lubrication helps to eliminate stick slips, which generate noise.

Door and trunk locks

Locks – Heavy load-carrying synthetic greases are appropriate for lubricating locks and latches. Anti-friction coatings prevent corrosion of parts and reduce risk of soiling passengers.

Actuators – Synthetic greases are recommended for lubricating plastic and metal gear parts in actuators.

Key cylinder – Synthetic greases offer good water resistance and corrosion protection for key cylinders. For aesthetics, light colored greases are recommended for this application.

Exterior rear view mirror

Mirror actuator – Synthetic greases, compatible with plastics are applied to plastic gears to reduce noise and friction.

Power folding – Synthetic greases provide good lubrication for pivots, gears and slides, which consist of various plastic and metal components.

Wipers

Motor – Synthetic greases, compatible with plastics are applied to plastic gears to reduce operating noise and friction. These greases are safe for materials in contact with electrical components.

Blades – Anti-friction coatings can be applied on the wiper blade rubber to reduce friction that causes squeaks and other noises.

Sun roof

Slide, guide and cable – Good adhesive, synthetic and silicone greases are recommended. These lubricants are often visible, so color selection is important.

Micro motors – Synthetic greases have good plastic and rubber compatibility and are appropriate for lubricating reduction gear boxes at wide temperature ranges. The right grease can help lower electricity consumption.

Molykote® Interior Component Solutions

Safety and comfort are the major considerations for new automobile interiors. Dow Corning offers a number of solutions that increase the safety and comfort of automotive interiors as well as help with noise, vibration and harshness (NVH) applications.

Seat

Quiet operation is a must. Seat systems often use power modules and components, so proper lubrication is key to noise reduction.

Slides – Light colored greases and pastes with heavy load carrying capacity and plastics compatibly are appropriate to lubricate slides and related parts.

Recline gear – Light colored, heavy load carrying greases and pastes are appropriate to lubricate metal gears and actuators

Actuators & Micro motors – Greases can be used to lubricate plastic gears and metal components. Rubber compatibility is required for some applications.

Springs – Anti-friction coatings are applied to reduce noise generated from metal contact.

Head rest and Arm rest – Semi-dry lubricants and semi-transparent anti-friction coatings are used for assembly aid and lubrication. These films do not soil clothes and hands.

Door trim, dashboard and consol box

Clear anti-friction coatings eliminate noise and improve productivity compared with traditional non-woven tapes.

Seat belt system

Lubrication is critical for this “safety” component. Anti-friction coatings release and lock the components accurately under any conditions.

Air bag

Air bag sensors consist of many components. Synthetic lubricants and fluorinated greases are appropriate to lubricate the inside of this module, which eliminates noise.

Interior switches and combination switches

Light colored, synthetic greases and fluorinated greases are appropriate to lubricate plastic components and electrical contacts. Greases provide better operation as well as good electrical contact.



MOLYKOTE
FROM DOW CORNING

Smart Lubrication™

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Steering adjustment

Synthetic grease is appropriate to lubricate telescopic steering columns and title steering systems. Lubricants should be applied to slides, guides and links.

Actuator – Synthetic greases have plastics compatibility and are appropriate for plastic gears and slides in the actuators.

Navigation and entertainment

Synthetic greases, semi-dry lubricants and fluorinated greases are appropriate to lubricate mechanical parts. Plastics compatibility and safe electrical contacts are required.

Molykote® Long-life Specialty Lubricants

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

The *Molykote*® line of specialty lubricants for body and interior components include:

- **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.

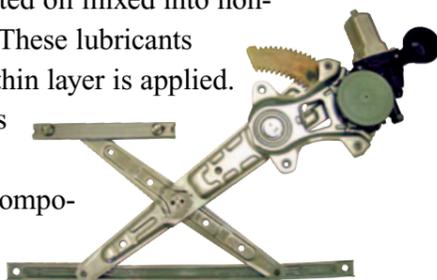
- **Pastes** – High concentrations of solid lubricants dispersed in oil for convenient application. These lubricants have high concentrations of solid lubricants blended in various bases. They are used where a high concentration of solid lubricant is required, such as initial run-in and areas exposed to high loads.

Emerging Technologies

Dow Corning engineers are also working closely with OEMs to provide lubricant solutions to reduce friction, wear and NVH, while fulfilling the comfort and safety requirements for the latest designs for automotive body and interiors. Dow Corning has been at the forefront of new technological advances and will continue to provide solutions for future development.

- **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.

- **Semi-dry lubricant** – Clear color dispersions that contain fluorinated solid lubricants and slight amounts of fluorinated oil mixed into non-flammable solvent. These lubricants dry quickly after a thin layer is applied. A lubricating film is left which does not soil passengers or components. They are used for interior components, assembly-aid and preventing noise.



Specialty lubricants are the core portion of our body and interior 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 which demand a strong but flexible bond, such as when bonding materials with differing thermal expansion rates.



Testing Capabilities

Dow Corning automotive centers in Germany, Japan and the United States feature a wide range of equipment for designing, testing and validating our lubricants and other materials specifically for body and interior applications. To help you to select the right specialty lubricants for your application in the body and interior 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 | | |
| Corrosion | Emcor – SKF | X | X | | |
| Life time/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 | | |

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 |
| Corrosion | Copper corrosion | X | X | | |
| Thermal/oxidation stability | DSC | X | X | X | |

Check our website for up-to-date testing capabilities at 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, service solutions and more.



Product Recommendations

Body Segment

| Sub-segment | Part | Recommended Molykote® products | Function performed and product features |
|------------------|---------------------------|--|--|
| Window Regulator | Guide & slide | SK-623, AI-6159 | Lubrication of plastics slides & guide |
| | Guide & slide | D-708 | Lubrication of plastics slides & guide |
| | Micro motor | MI-60, YM-102, Gn paste | Lubrication of plastics gears |
| | Balancing spring | 6031, 106 | Lubrication of spring |
| Locks | Locks, latches & levers | BR2 Plus ,G-1016, 3400 Leadfree, D-708 | Lubrication of spline & corrosion protection of steel & Zinc diecast parts |
| | Actuators Key cylinder | MI-60, YM-102 Synthetic grease | Lubrication of plastics gears Lubrication of metal parts |
| Exterior Mirror | Mirror actuator | EM-30L, AG-633, EM-60L | Lubrication of plastics gears |
| | Power folder | YM-103, AG-633 | Lubrication of gears and shaft |
| Wiper | Wiper motor | MI-60, YM-102 | Lubrication of plastics gears |
| | Wiper blades | Anti-friction coating | Lubrication of wiper rubber |
| Sunroof | Slide guide & cable | G-1023, AS-812, PG 75, EM-50L | Lubrication of slides, guide & cable |
| | Micro motor | MI-60, YM-102 | Lubrication of plastics gears |

Interior segment

| | | | |
|---------------------|------------------|--------------------------------|---|
| Door Trim | Plastics contact | D-96, D-9610 | Lubrication of plastics parts; NVH |
| Dashboard | Plastics contact | D-96, D-9610 | Lubrication of plastics parts; NVH |
| Seat | Slide | AG-626, E paste | Lubrication of bearings |
| | Reclining gear | YM-103 | Lubrication of gear & latch |
| | Actuators | MI-60, YM-102 | Lubrication of plastics gears |
| | Head & arm rests | PD-900, PD-910 | Lubrication; Assembly aid |
| Seat Belt | Mechanical parts | D-708, D-3484 | Lubrication of gears, shafts & latches |
| Airbag | Module | HP-300, EM-50L | Lubrication of plastics & electrical contact |
| Interior Switches | Switch | EM-30L, EM-50L | Lubrication of plastics parts |
| Cup Holder | Slides | EM-50L,HP-300 | Lubrication of plastics parts |
| Sun Visor | Connectors | PD-910 | Lubrication of plastics & rubber connector |
| Steering Adjustment | Assembly | MI-60, YM-102, E paste, D-708 | Lubrication of plastics, rubber seal, & metal parts |
| Navigation | Mechanical parts | EM-30L, EM-50L, HP-300, PD-910 | Lubrication of plastics & electrical contact |

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 or 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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