Can smart science drive design innovation?

Silicone options for vehicle powertrain systems
Help increase performance reliability with silicone powertrain solutions

Breakthrough technologies are driving notable innovation in advanced vehicle powertrain systems. In addition to potential increased electrification, key design trends include targeted improvements in fuel or energy efficiency, component durability, driving experience, and optimized reliability, as well as addressing increasing under-the-hood temperatures. Dow Performance Silicones can help you meet these challenges with a wide range of successful, effective materials to help drive powertrain design.

Range of high-performance silicone materials

Silicones are remarkably versatile materials that can be produced in different forms for many uses. These materials can be formulated to meet specific process and performance requirements. For current and emerging vehicle powertrain systems, Dow offers:

- Engineered elastomers for fabricated components, seals and gaskets
- Adhesives and sealants for assembly bonding and component sealing

With excellent resistance to extreme heat, cold and aggressive fluids, these silicones from Dow have shown to be effective design solutions in a wide range of powertrain applications.

Potential applications: Silicones for powertrain reliability

Advanced silicone materials from Dow can help drive design innovation for increasing component durability and improving powertrain reliability. Potential applications include:

- Cooling and climate-control component seals
- Coolant and heater hoses
- Fabricated CVJ boots, engine mounts and exhaust hangers
- Transmission, gearbox and differential cover seals
- Engine seals and gaskets for manifolds, oil pans and rocker covers
- Flexible diaphragms for EGR valves and fuel systems
- Molded fuel line quick-connectors
- Turbocharger hoses and intercooler hoses
<table>
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</thead>
</table>
| Cooling, climate control: Fan clutch seals | • Seal in torque transfer fluid  
• Easily dispense seal material  
• Provide adhesive/gap-sealing performance | DOWSIL™ 3-0100 Automotive Sealant  
DOWSIL™ 3-0105 Automotive Sealant  
DOWSIL™ 3-0115 Automotive Sealant | NA  
LA  
EMEA  
APAC | • Process ease for formed-in-place gasketing  
• Noncorrosive, self-priming with room temperature cure  
• Excellent adhesion to different substrates |
| Cooling, climate control: Thermostat housing seals | • Provide reliable sealing on plastics and metals  
• Withstand pressures up to 20 psi and temperatures from -55 to 185°C  
• Low compression set | Compression seal (2 part):  
SILASTIC™ RBL-9694-30P A&B Liquid Silicone Rubber  
SILASTIC™ RBL-9694-45M A&B Liquid Silicone Rubber  
Adhesive seal (1 part):  
DOWSIL™ 3-0100 Automotive Sealant  
DOWSIL™ 3-0105 Automotive Sealant  
DOWSIL™ 3-0115 Automotive Sealant | NA  
LA  
EMEA  
APAC | • Choose one-part RTV or two-part heat-cured materials  
• Meet specific process and performance requirements  
• Speed production with automatic (robotic) dispensing |
| Cooling, climate control: Low-pressure heater hoses | • Good chemical/solvent resistance  
• Durable high-temperature performance  
• Easy processing for calendering or extrusion | SILASTIC™ 27788-Z BLU Silicone Rubber Blue  
SILASTIC™ 27788-Z RED Silicone Rubber Red  
SILASTIC™ 27790-Z GRN Silicone Rubber Green | NA  
LA  
EMEA  
APAC | • Choice of colors  
• Processing options for calendering or extrusion  
• Application-matched performance properties |
| Cooling, climate control: Radiator seals | • Seal in coolant  
• Maintain sealing performance from -50 to 200°C and at pressures up to 20 psi  
• Provide compression gasket for engineered groove | Cure-in-place compression gasketing for end caps:  
SILASTIC™ RBL-9694-30P A&B Liquid Silicone Rubber  
SILASTIC™ RBL-9694-45M A&B Liquid Silicone Rubber  
XIAMETER™ RBL-2004-70 Liquid Silicone Rubber | NA  
LA  
EMEA  
APAC | • Meet compression set requirements  
• Easy processing with 1:1 mix ratio of two-part heat-cured materials  
• Extrusion rate options |
| Cooling, climate control: Radiator and coolant hoses | • Good chemical/solvent resistance  
• Durable high-temperature performance  
• Easy processing for calendering or extrusion | SILASTIC™ HCE-65-1029-NP HCR Silicone Rubber  
SILASTIC™ HCE-65-1030-NP HCR Silicone Rubber  
SILASTIC™ HCE-65-4815 V4 Black  
SILASTIC™ HCE-70-1026-NP HCR Silicone Rubber  
SILASTIC™ 20031-D BLU Silicone Rubber (Blue)  
SILASTIC™ 20032-D RED Silicone Rubber (Red)  
SILASTIC™ 20039-D GRN Silicone Rubber (Green)  
SILASTIC™ 20063-L BLK Silicone Rubber (Black)  
SILASTIC™ 20093-T RED Silicone Rubber  
XIAMETER™ RBB-2100-60 Base  
XIAMETER™ RBB-2100-70 Base  
XIAMETER™ RBC-7022-70 Compound E-Blue Coil  
XIAMETER™ RBC-7023-70 Compound E-Green Coil  
XIAMETER™ RBC-7024-70 Compound E-Red Coil | NA  
LA  
EMEA  
APAC | • Silicone rubber bases for custom compounding to meet specialized needs  
• Fully formulated custom high-consistency rubber compounds to meet performance and processing requirements  
• Choice of colors and performance properties to meet application specifications  
• Efficient processing with range of cure times and temperatures  
• Enhanced elongation and tear strength |

(1)Products may not be available in all countries within a region. Visit dow.com to see specific buying options, or contact your local representative for more information. The graphic representations are presented here for illustrative purposes only and should not be construed as product specifications.
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<thead>
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<th>Powertrain application need</th>
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<th>Regional availability[1]</th>
<th>Selection criteria</th>
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</thead>
<tbody>
<tr>
<td><strong>Driveline: CVJ boots</strong></td>
<td>• High flex-fatigue life</td>
<td>SILASTIC™ HC M 60-1225 Gray</td>
<td>● ● ● ● ●</td>
<td>• High-consistency rubber; fully compounded for application needs</td>
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<td></td>
<td>• Durable flexibility over a wide temperature range</td>
<td>SILASTIC™ HCM 1102 Coil Black</td>
<td>●</td>
<td>• Range of durometer hardness</td>
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<td></td>
<td>• Good resistance to lubricants and road contaminants</td>
<td>SILASTIC™ WS 178-60-03 Black</td>
<td>● ● ● ● ●</td>
<td>• Economical processing</td>
</tr>
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<td></td>
<td></td>
<td>SILASTIC™ WS 190-60-01 Silicone Rubber Black</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td><strong>Driveline: Transmission seals</strong></td>
<td>Compression sealing (2 part):</td>
<td>SILASTIC™ RBL-9694-30P A&amp;B Liquid Silicone Rubber</td>
<td>● ● ● ● ●</td>
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<td></td>
<td></td>
<td>SILASTIC™ RBL-9694-45M A&amp;B Liquid Silicone Rubber</td>
<td>● ● ● ● ●</td>
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<td></td>
<td>Adhesive seal (1 part):</td>
<td>DOWSIL™ Q3-1566 Heat-Resistant Adhesive/Sealant</td>
<td>● ● ● ● ●</td>
<td>• Choose one- or two-part RTV or heat-cure materials</td>
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<td></td>
<td></td>
<td>DOWSIL™ 3-0100 Automotive Sealant</td>
<td>● ● ● ● ●</td>
<td>• Achieve very thin bond line thicknesses, potential cost savings with low-density options</td>
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<td></td>
<td></td>
<td>DOWSIL™ 3-0105 Automotive Sealant</td>
<td>● ● ● ● ●</td>
<td>• Speed production with automatic (robotic) dispensing</td>
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<td></td>
<td></td>
<td>DOWSIL™ 3-0115 Automotive Sealant</td>
<td>● ● ● ● ●</td>
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<tr>
<td></td>
<td></td>
<td>DOWSIL™ 7091 Adhesive Sealant</td>
<td>● ● ● ● ●</td>
<td></td>
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<tr>
<td></td>
<td>Inspection cover exposed to fluid splash only:</td>
<td>SILASTIC™ RBL-9694-20P A&amp;B Liquid Silicone Rubber</td>
<td>● ● ● ● ●</td>
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<tr>
<td></td>
<td></td>
<td>SILASTIC™ RBL-9694-30P A&amp;B Liquid Silicone Rubber</td>
<td>● ● ● ● ●</td>
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<tr>
<td></td>
<td></td>
<td>SILASTIC™ 3-8186 Thixotropic Foam</td>
<td>● ● ● ● ●</td>
<td></td>
</tr>
<tr>
<td><strong>Driveline: Differential, axle cover seals</strong></td>
<td>Compression seal (2 part):</td>
<td>SILASTIC™ RBL-9694-45M A&amp;B Liquid Silicone Rubber</td>
<td>● ● ● ● ●</td>
<td>• Select one- or two-part materials</td>
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<tr>
<td></td>
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<td>Adhesive seal (1 part):</td>
<td>● ● ● ● ●</td>
<td>• Meet processing requirements with different cure profiles</td>
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<tr>
<td></td>
<td></td>
<td>DOWSIL™ 3-0100 Automotive Sealant</td>
<td>● ● ● ● ●</td>
<td>• Match application needs with specific performance properties</td>
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<tr>
<td></td>
<td></td>
<td>DOWSIL™ 3-0105 Automotive Sealant</td>
<td>● ● ● ● ●</td>
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<tr>
<td></td>
<td></td>
<td>DOWSIL™ 3-0115 Automotive Sealant</td>
<td>● ● ● ● ●</td>
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<tr>
<td></td>
<td></td>
<td>DOWSIL™ 732 Multi-Purpose Sealant</td>
<td>● ● ● ● ●</td>
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<td></td>
<td></td>
<td>DOWSIL™ 737 Neutral-Cure Sealant</td>
<td>● ● ● ● ●</td>
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<tr>
<td></td>
<td></td>
<td>DOWSIL™ 7091 Adhesive Sealant</td>
<td>● ● ● ● ●</td>
<td></td>
</tr>
<tr>
<td><strong>Engine: Air intake manifold gasket</strong></td>
<td>Cured-in-place gasketing (CIPG):</td>
<td>SILASTIC™ RBL-9694-30P A&amp;B Liquid Silicone Rubber</td>
<td>● ● ● ● ●</td>
<td>• Versatile two-part, heat-cure LSR kits especially suitable for FIPG seals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SILASTIC™ RBL-9694-45M A&amp;B Liquid Silicone Rubber</td>
<td>● ● ● ● ●</td>
<td>• Successful, effective performance</td>
</tr>
<tr>
<td><strong>Engine: Air intake, induction system seals</strong></td>
<td>Compression seal:</td>
<td>SILASTIC™ RBL-9694-20P A&amp;B Liquid Silicone Rubber</td>
<td>● ● ● ● ●</td>
<td>• Silicone rubber foam especially suited for low-force seals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SILASTIC™ 3-8186 Thixotropic Foam</td>
<td>● ● ● ● ●</td>
<td>• Two-part LSR with heat cure</td>
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<td></td>
<td>Adhesive seal:</td>
<td>DOWSIL™ 736 Heat-Resistant Sealant</td>
<td>● ● ● ● ●</td>
<td>• One-part, ready-to-use sealant with room temperature cure</td>
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</tbody>
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| Engine: Anti-drainback oil filter valve | • Stable mechanical properties  
• Resistance to engine oils, including synthetics  
• Resistance to hardening or softening over a wide range of service temperatures | SILASTIC™ LSR 9390-70 Liquid Silicone Rubber  
XIAMETER™ 21068-V Silicone Rubber Red | NA  
LA  
EMEA  
APAC | • Application-matched, proven sealing materials  
• Resistance to compression set, cracking and leaking  
• Easy processing/fabricating |
| Engine: Engine mounts, exhaust hangers | • High tear strength  
• Stable mechanical properties  
• Long-term resistance to extreme heat and cold | Rubber compounds for fabricated parts:  
SILASTIC™ EH55MHS11 Grey 7035  
SILASTIC™ HCM 65-5047 HS Green  
SILASTIC™ 21058-V Red Silicone Rubber Red  
XIAMETER™ HCM 75-4731 HCR Silicone Rubber  
XIAMETER™ 24104-V Silicone Rubber Brown  
XIAMETER™ 24140-V Silicone Rubber Brown  
XIAMETER™ 24142-V HCR Silicone Rubber | NA  
LA  
EMEA  
APAC | • High-consistency silicone rubber compounds to meet specific application requirements  
• Range of engineered elastomers with successful, effective performance |
| Engine: EGR valve diaphragms | • Good fuel resistance  
• Durable flexibility in high service temperatures | Fluoro-liquid silicone rubber (F-LSR):  
SILASTIC™ FL 30-9201 Fluoro Liquid Silicone Rubber  
SILASTIC™ FL 40-9201 Fluoro Liquid Silicone Rubber  
SILASTIC™ FL 60-9201 Fluoro Liquid Silicone Rubber  
Fluorosilicone rubber compounds (FSR):  
SILASTIC™ EFX70MLC00 Fluorosilicone Rubber  
SILASTIC™ 28075HD-V Fluorosilicone Rubber | NA  
LA  
EMEA  
APAC | • Meet application requirements with excellent fuel/exhaust resistance  
• Range of hardness, tear strength and elongation levels available  
• Choice of fluoro-liquid silicone rubber for injection molding or FSR compounds for other process options |
| Engine: Fuel delivery diaphragms | • Long-term fuel resistance  
• Good flexibility over a wide range of service temperatures | Fluoro-liquid silicone rubber (F-LSR):  
SILASTIC™ FL 30-9201 Fluoro Liquid Silicone Rubber  
SILASTIC™ FL 40-9201 Fluoro Liquid Silicone Rubber  
SILASTIC™ FL 60-9201 Fluoro Liquid Silicone Rubber  
Fluorosilicone rubber compounds (FSR):  
SILASTIC™ EFX20MHS00 Fluorosilicone Rubber  
SILASTIC™ EFX30MHS00 Fluorosilicone Rubber  
SILASTIC™ EFX60MHS00 Fluorosilicone Rubber  
SILASTIC™ EFX60MLC00 Fluorosilicone Rubber  
SILASTIC™ FCM 55-1241-FX Fluorosilicone Rubber-Red  
SILASTIC™ FCM 60-1278 FX FSR Rubber Red  
SILASTIC™ 28075HD-V Fluorosilicone Rubber  
SILASTIC™ 28819-V Fluorosilicone Compound  
SILASTIC™ 38640-V Fluorosilicone Rubber | NA  
LA  
EMEA  
APAC | • F-LSR compounds for high-volume injection molding processes  
• FSR compounds customized to meet range of application requirements |
| Engine: Fuel delivery quick-connector seals | • Fuel resistance  
• Good flexibility in heat/cold  
• Good permeation resistance  
• Good compression set resistance and stress relaxation properties  
• Low swell  
• High tear strength | Fluoro-liquid silicone rubber (F-LSR):  
SILASTIC™ FL 30-9201 Fluoro Liquid Silicone Rubber  
SILASTIC™ FL 40-9201 Fluoro Liquid Silicone Rubber  
SILASTIC™ FL 60-9201 Fluoro Liquid Silicone Rubber  
Fluorosilicone rubber compounds (FSR):  
SILASTIC™ EFX70MLC00 Fluorosilicone Rubber  
SILASTIC™ EFX75MLC10 Fluorosilicone Rubber  
SILASTIC™ FCM 75-4955 LC Yellow  
SILASTIC™ FCM 75-4955 Fluorosilicone Rubber  
SILASTIC™ 28075HD-V Fluorosilicone Rubber | NA  
LA  
EMEA  
APAC | • Customized compounds for fabricated parts  
• Options in viscosity, cure rates and hardness  
• Match performance properties to application requirements |
| Engine: Fuel system bonding and sealing | • Seal in fuel over a wide range of temperatures and pressures  
• Minimal acceptable flange widths | Adhesive seal:  
DOWSIL™ 730 FS Solvent-Resistant Sealant | NA  
LA  
EMEA  
APAC | • One-part fluorosilicone with excellent heat stability  
• Fast extrusion rate and tack-free time  
• Good mechanical and dielectric strength |

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<tr>
<td><strong>Engine:</strong> Oil pan gasket</td>
<td>• Good resistance to engine oils, including synthetics</td>
<td>XIAMETER™ Q4-2918 Black Silicone Rubber Compound</td>
<td>NA</td>
<td>• Successful, effective performance</td>
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<td></td>
<td>• Resist compression set and retain flexibility across service temperature range</td>
<td>XIAMETER™ Q4-2918LV Dark Black Silicone Rubber Compound</td>
<td>LA EMEA APAC</td>
<td>• Easy-to-use compounds to meet process requirements</td>
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<td>Rubber compounds for fabricated parts:</td>
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<tr>
<td></td>
<td>XIAMETER™ MX 4108 HCR Silicone Rubber</td>
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<tr>
<td></td>
<td>XIAMETER™ Q4-2918 Black Silicone Rubber Compound</td>
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<tr>
<td></td>
<td>XIAMETER™ Q4-2918LV Dark Black Silicone Rubber Compound</td>
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<td></td>
<td>XIAMETER™ 24048-V HCR Silicone Rubber</td>
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<td></td>
<td>XIAMETER™ 24057-V DBLK Silicone Rubber Black</td>
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<td></td>
<td>XIAMETER™ 24096-V Silicone Rubber Gray</td>
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<td></td>
<td>XIAMETER™ 24097-V HCR Silicone Rubber</td>
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<td></td>
<td>Cured-in-place gasketing (CIPG):</td>
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<td></td>
<td>SILASTIC™ RBL-9694-30P A&amp;B Liquid Silicone Rubber</td>
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<tr>
<td></td>
<td>SILASTIC™ RBL-9694-45M A&amp;B Liquid Silicone Rubber</td>
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<tr>
<td><strong>Engine:</strong> Rocker cover gasket</td>
<td>• Good oil resistance</td>
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<td></td>
<td>• Good compression set resistance and compression stress relaxation</td>
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<td></td>
<td>Compression gasket (2 part):</td>
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<td></td>
<td>SILASTIC™ RBL-9694-30P A&amp;B Liquid Silicone Rubber</td>
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<td></td>
<td>SILASTIC™ RBL-9694-45M A&amp;B Liquid Silicone Rubber</td>
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<td></td>
<td>Adhesive seal with on-line pressure check (1 part):</td>
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<td></td>
<td>DOWSIL™ 3-0105 Automotive Sealant</td>
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<td></td>
<td>DOWSIL™ 3-0115 Automotive Sealant</td>
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<td></td>
<td>Adhesive seal without on-line pressure check (1 part):</td>
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<td></td>
<td>DOWSIL™ 3-0100 Automotive Sealant</td>
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<td>DOWSIL™ 737 Neutral Cure Sealant</td>
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<td>DOWSIL™ 1080 Oxime Sealant</td>
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<td></td>
<td>DOWSIL™ 7091 Adhesive Sealant</td>
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<td></td>
<td>DOWSIL™ Q3-1566 Heat-Resistant Adhesive/Sealant</td>
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<tr>
<td><strong>Engine:</strong> Static engine seals</td>
<td>• Seal in oil or coolant</td>
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<td></td>
<td>• Withstand temperatures from 50 to 200°C and pressures under 10 psi</td>
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<td></td>
<td>• Serve as compression gasket or adhesive seal</td>
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<td></td>
<td>Silicone rubber compounds for outer layers:</td>
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<tr>
<td></td>
<td>SILASTIC™ HCC 55-1002-NP Silicone Rubber Black</td>
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<td></td>
<td>SILASTIC™ HCC 65-1027-NP HCR Silicone Rubber Black</td>
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<td></td>
<td>SILASTIC™ HCC 70-1012-GP Silicone Rubber Black</td>
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<td></td>
<td>SILASTIC™ HCC 70-1031-NP HCR Silicone Rubber Black</td>
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<td>SILASTIC™ HCE 65-1299 Black</td>
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<td>SILASTIC™ HCE 65-4815 Black</td>
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<td></td>
<td>Self-adhesive rubber compounds:</td>
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<td></td>
<td>Intermediate layer</td>
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<tr>
<td></td>
<td>SILASTIC™ HCE 70-4770 SA HCR Silicone Rubber</td>
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<td>Fluorosilicone rubber compound for hose liners:</td>
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<td>SILASTIC™ FCC 40-4725</td>
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<td>SILASTIC™ FCC 55-1047-FX Fluorosilicone Rubber</td>
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<td>SILASTIC™ FCE 50-4948 SA RED Fluorosilicone Rubber</td>
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</table>

(1) Products may not be available in all countries within a region. Visit dow.com to see specific buying options, or contact your local representative for more information.
<table>
<thead>
<tr>
<th>Powertrain application need</th>
<th>Design needs</th>
<th>Potential solutions</th>
<th>Regional availability(1)</th>
<th>Selection criteria</th>
</tr>
</thead>
</table>
| Ignition: Coil plug         | • Electrical insulation for high voltages  
• High service temperatures | XIAMETER™ 25065-V Blk Silicone Rubber Black  
XIAMETER™ 25065-V Wht Silicone Rubber White | NA  
LA  
EMEA  
APAC | • High-consistency silicone rubber compounds to meet specific application requirements  
• Available in black and white colors |
| Ignition: Coil wire         | • Weatherability  
• Wide range of service temperatures | XIAMETER™ 39020-T Wht Silicone Rubber White | NA  
LA  
EMEA  
APAC | • High-consistency silicone rubber compounds to meet specific application requirements |

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Silicone solutions from Dow for other vehicle systems

In addition to driving innovation for added component durability and improved powertrain systems reliability, advanced silicone materials from Dow are proven, effective solutions for a diverse range of applications in other vehicle systems. Our smart science in silicone elastomers, adhesives and sealants can help you meet challenging design needs in these other automotive systems.

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