

ELECTRONICS AND ADVANCED ASSEMBLY

Imagine **the frontiers of tomorrow**

Aerospace, defense & avionics

DOW

®

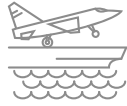




**Exploration &
imagination
inspired by the
will to perform.**



Aircrafts, helicopters & drones



Defense



Avionics, displays & lighting



Spaceships & satellites



New frontiers

Why Dow

We've had our eyes to the skies for decades, developing the first silicones for aviation in 1943. We haven't looked back. Instead, we look up. We work together to develop silicone solutions and services for aerospace, defense, and avionics that optimize safety, comfort, and efficiency under extreme conditions.

What's changed since those early days of silicone development for aviation? We've put a man on the moon. Planes circle the globe. Drone technology exists. The possibilities are endless, and we are determined to remain at the forefront of the future. Though times have changed, products that we introduced back then are now recognized as industry standards.

Why silicones

Silicone properties are ozone resistant and naturally stable under a wide range of temperatures, moisture, and other environmental conditions. Dow silicones are unique materials with a useful temperature range from -115°C to 260°C, and these materials are highly stress relieving, with a modulus

that commonly ranges from 0.01 to 10 MPa. Further, our in-depth knowledge of silicone chemistry allows us to create and adjust desired material and performance properties.

Furthering our reach – together.

Product family	Features and benefits
Adhesives, sealants, and foams	<ul style="list-style-type: none"> • Outperform and outlast organics under demanding conditions • Remain flexible over a wide temperature range • Reliable adhesion to a variety of substrates • Light-weighting and perfect sealing
Coatings, gels, and encapsulants	<ul style="list-style-type: none"> • Protect against moisture, dirt, shock, and vibration and heat fluxes • Are stress-relieving and dimensionally stable • Have minimal shrinkage
Liquid silicone rubbers (LSRs)	<ul style="list-style-type: none"> • Ease of processing • Good mechanical properties • Excellent resistance to extreme temperatures and aging
Optically clear materials	<ul style="list-style-type: none"> • Offer high performance even in harsh environments • Range from dispensable to moldable solutions • Allow design flexibility for lighting, electronics, and displays
Thermal interface, and electrically-conductive materials	<ul style="list-style-type: none"> • Provide wide-range solutions for effective thermal management of sensitive electronics • Offer broad choice of thermal conductivity • Fill oddly-shaped gaps • High EMI-shielding effectiveness with electrically conductives



Aircrafts, helicopters & drones

Proven solutions

Piloted aircraft and unmanned aerial vehicles (UAVs), or drones, need environmental sealing, adhesive bonding, thermal management, and protection against electromagnetic interference (EMI). Fixed wing and rotary wing aircraft also



demand proven performance, especially for critical electronic components. Whether an aircraft is fuel-powered or battery-driven, engineers expect materials to help solve design challenges. The aircraft industry needs to meet strict safety standards, too.

Multi-purpose and solvent-resistant fluorosilicone sealants from Dow deliver required performance. DOWSIL™ adhesives, sealants, and foams are not only used for exterior and interior applications, but also as the gaskets for compressors, gearboxes, and pumps. Solvent resistant sealants support the assembly and repair of fuel systems and tanks. These advanced silicones are also used for bonding substrates to heat sinks in transmission, power, and conversion modules as well as bonding integrated circuit substrates, attaching heat sinks, and adhering lids, housings, and base plates.

More electric aircrafts benefit from DOWSIL™ thermal-management solutions for the battery and battery systems.



Defense

Mission-critical performance

Whether by air, land, or sea, military missions demand proven solutions to some of engineering's toughest challenges. Military operations also need materials that deliver optimal performance in challenging conditions such as desert heat, arctic cold, and jungle rains. With their unique balance of properties, Dow silicones combine high levels of stress relief with reliable environmental resistance.

DOWSIL™ coatings, gels, and encapsulants resist shock and stress, while dampening vibrations, and providing good flame resistance. Many of these products are MIL-SPEC tested and Underwriter Laboratories (UL) approved.





Avionics, displays & lighting

Electronics, sensors, and illumination

Whether they're flying us home or across the globe, aviation pilots need to see in order to keep us safe. They need to see fuel levels. They need to see air traffic. They need to see flight control avionics, displays and lighting support communications, navigation and monitoring in the cockpit and beyond. As our skies get busier, flight recorders and collision avoidance systems are becoming more important, too.

From flight displays to cockpit, from instrument and cabin lighting to navigation light, engineers need rugged, reliable solutions. DOWSIL™ optically clear materials resist temperature, humidity, and other environmental extremes. Even the miniature lamps or displays in cabin interiors require the right protection and performance.

For dissipating heat, Dow's thermally-conductive materials provide reliable cooling solutions for electronics, modules, and assemblies. DOWSIL™ electrically-conductive materials ensure high-shielding effectiveness from electromagnetic interference in the wide range of frequencies.



Spaceships & satellites

Mission-critical systems

Spaceships and satellites operate in high-vacuum environments where outgassing can disrupt electronic systems, optical devices, and thermal radiators. Sealants and encapsulants that release high levels of volatiles can degrade the performance of electronics and sensors. Released gases from materials with high levels of volatiles can also condense on camera lenses. Space-grade silicones from Dow meet NASA requirements for low thermal vacuum outgassing. They also provide good physical and electrical stability over a wide temperature range. DOWSIL™ space-grade encapsulants are available in flowable and thixotropic versions, and used with modules, relays, power supplies, delay lines, cable connectors, and complete electronics assemblies. Low-outgassing silicones for spaceships and satellites include controlled-volatility sealants with low levels of collected volatile condensable materials (CVCs), and high elongation for stress relief (according to ASTM E595).



New frontiers

Constant innovation

Experts from around the world are evaluating asteroid mining, a return trip to the Moon, and a manned mission to Mars. Achieving these goals will require a growing number of launches, which is why engineers need the right material solutions for launch equipment protection.

The thermal energy from rocket plumes can cause ablation to flame trenches made of concrete, refractory brick, and steel. That's why Dow provides ablative materials for protecting launch platforms and rocket nozzles under extreme heat flux. Our technical experts in the United States will be happy to support you in solving extreme heat-flux challenges.

Dow has also developed thermally-conductive gels for encapsulating electronics, and instant green-strength adhesives for bonding substrates with different thermal-expansion rates that could be of help for current and future module designs.

Featured products

To start the conversation, we've included a key product list below – a preview of our complete lineup.

	Product	Cure system	Features and benefits	Agency listing
Adhesives, sealants, and foams	DOWSIL™ 3-6548 Silicone RTV Foam	Two-part addition	Reversion resistant, non-corrosive foam can be used for preparing fire-resistant penetration seals	ASTM E814
	DOWSIL™ 3-6265 HP Adhesive	One-part addition	Non-flowing • High tensile strength • Low void formation after cure for sensitive substrates	UL 94 V-0
	DOWSIL™ 6-1104 Controlled Volatility Sealant	One-part condensation	Extrudable, non-slump materials • NASA requirements for low outgassing • Easy repairability • Good physical and electrical stability over a range of frequencies, temperatures, and humidity • Ensure protection of components from temperature extremes, high humidity, radiation, thermal shock, atomic oxygen, and mechanical vibration	NASA requirements
	DOWSIL™ 6-1125 Controlled Volatility Sealant			
	DOWSIL™ 93-076 RF Aerospace Sealant	Two-part condensation	A high-temperature sealant/adhesive with high bond strength • Can be used as an effective high-temperature pressurization sealant, thermal barrier, or insulative coating, and as an adhesive for ablative coatings • Can be used for protecting cable breakouts and terminations • For fabricating formed-in-place seals	MIS-19888
	DOWSIL™ 730 FS Solvent Resistant Sealant	One-part condensation	Fluorosilicone adhesive/sealant • Non-sag acetoxy-cure system • Easy to apply • Good adhesion to many substrates • Stable and flexible from -65°C (-85°F) to 260°C (500°F) • Retains its properties under exposure to fuels, oils, and solvents	
	DOWSIL™ 732 Multi-Purpose Sealant	One-part condensation	Non-sag acetoxy-cure system • Easy to apply • Good adhesion to many substrates • Flexible from -60°C (-76°F) to 180°C (356°F) with short peaks to 205°C (401°F)	MIL-A-46106
	DOWSIL™ 3145 RTV Mil-A-46146 Adhesive/Sealant	One-part condensation	Non-flowing • High tensile strength • Fast in-line cure with optional heat acceleration	MIL-A-46146
	DOWSIL™ 7092 High Green Strength Adhesive and Sealant	One-part condensation	Instant green strength • Excellent adhesion to a wide range of substrates such as glass, metal, and plastics	UL 94 HB
	DOWSIL™ EA-6060 Adhesive	Two-part addition	Fast, low-temperature cure • UV indicator for inspection	UL 94 V-0
DOWSIL™ Q3-1566 Heat Resistant Adhesive/Sealant	One-part condensation	High temperature resistant • Broad adhesion to many substrates		
Coatings, gels, and encapsulants	DOWSIL™ 1-2577 Conformal Coating	One-part condensation	Elastoplastic • Cured to a tough, abrasion resistant surface	UL 94 V-0 • IPC-CC-830A • MIL-I-46058
	DOWSIL™ 1-4105 Conformal Coating	One-part addition	Elastomeric • No added solvents • Rapid, versatile-cure processing controlled by temperature	UL 94 V1 (f1)
	DOWSIL™ 3-1953 Conformal Coating	One-part condensation	Elastomeric • Cured to a soft coating - allowing reliability improvement against stress	UL 746 E • IPC-CC-830B • MIL-I-46058
	DOWSIL™ 93-500 Space Grade Encapsulant (Thixotropic)	Two-part addition	Silicone elastomer • Exceeds requirements of NASA for thermal vacuum low outgassing • Wide operating temperature range from -115°C to 200°C (-149°F to 392°F)	NASA SP-R-0022A
	DOWSIL™ 3140 RTV Coating	One-part condensation	Good flowability • High elongation value for vibration/mechanical shock dampening and low stress	MIL-I-46058C • IPC-CC-830 • UL 94 V1
	DOWSIL™ CC-3122 Conformal Coating	One-part condensation	Elastoplastic • High-performance • Solvent-free • Delivers long-term reliability in extreme environmental conditions	UL 94 V-0
	SYLGARD™ 160 Silicone Elastomer	Two-part addition	General purpose encapsulant with good flowability and flame resistance • Moderate thermal conductivity • Condensation-cure system that can be heat accelerated	UL 94 V-0
	SYLGARD™ 170 Fast Cure Silicone Elastomer	Two-part addition	Low viscosity • General purpose encapsulant	MIL-PRF-23586
SYLGARD™ 527 Silicone Dielectric Gel	Two-part addition	Condensation- or heat-accelerated cure dielectric gel • Suitable for protecting various electronic devices, especially those with delicate components	UL 94 HB	

	Product	Cure system	Features and benefits	Agency listing
Optically clear materials	DOWSIL™ EG-1200 Gel	Two-part addition	High transparency • Rapid versatile-cure flowable gel • High tackiness for coupling variety of surfaces • Can be used as liquid optically clear coupling agent for displays and lighting applications	
	DOWSIL™ MS-1002 Moldable Silicone	Two-part addition	Optically clear moldable silicone • Suitable for producing fine detail optical parts • Good resistance to environmental aging	UL 94 (f1)
	DOWSIL™ VE-XXXX	UV	Transparent • Low modulus • Low shrinkage • UV-curable resin for liquid-based bonding technology • Designed to bond display cover glass/plastic and touch panel to LCD/OLED display modules	
	SYLGARD™ 184 Silicone Elastomer	Two-part addition	Transparent, two-part encapsulant • Good flame resistance	UL 94 V1 (f1)
Liquid silicone rubbers (LSRs)	SILASTIC™ RTV-3120 Mould-Making Base	Two-part condensation	General purpose silicone mold-making rubber • Recommended for high-temperature applications	
	SILASTIC™ RTV-4130-J Base and Curing Agent	Two-part addition	High durometer silicone rubber • Simplified handling • Room-temperature cure within 24 hours, or heat accelerable	
	SILASTIC™ RTV-4230-E Base and Curing Agent	Two-part addition	High strength • Tear resistant • Creates flexible molds to reproduce intricate detail • Easy release • High elongation	
	SILASTIC™ FL 60-9201 Fluoro Liquid Silicone Rubber (F-LSR)	Two-part addition	Solvent resistant • Chemically resistant • For gasketing and membranes	
Electrically- and thermally-conductive materials	DOWSIL™ 1-4173 Thermally Conductive Adhesive	One-part addition	1.8 W/m*K flowable adhesive • High tensile strength • No added solvent	UL 94 V-0
	DOWSIL™ TC-2035 Adhesive	Two-part addition	3.3 W/m*K heat-cure adhesive • Low bond-line thickness • Stable performance at high temperatures up to 200°C (392°F)	UL 94 V-0
	DOWSIL™ EC-6601 Electrically Conductive Adhesive	One-part condensation	Sealant for EMI shielding in a wide range of frequencies • Can be used as an adhesive or formed-in-place gasket • Adheres to variety of substrates • High elongation provides flexibility of joints	
	DOWSIL™ TC-4515 Thermal Gap Filler	Two-part addition	1.8 W/m*K condensation- or heat-accelerated cure gap filler • Holds vertical position in cured and uncured state • Soft and compressible once cured	UL 94 V-0
	DOWSIL™ TC-4535 CV Thermally Conductive Gap Filler	Two-part addition	3.5 W/m*K controlled volatility gap filler	UL 94

When surface preparation is required, we recommend starting with one of the following primers.

Primers	DOWSIL™ 1200 OS Primer	One-part condensation	Enhances bonding/adhesion of RTV- and heat-cure silicones to metals, ceramics, glass, wood, masonry, and structural plastics.
	DOWSIL™ 92-023 Primer	One-part condensation	Specially formulated for use with addition-cure silicones to mitigate surface poisoning. Recommended for use with FR4, most metals, and ceramics.
	DOWSIL™ 1204 Primer	One-part condensation	Enhance adhesion to most metals, ceramics, and plastic for all silicones, especially with RTV cure.



Seek Together™

Discover more

We bring more than just an industry-leading portfolio of advanced silicone-based materials. As your dedicated innovation leader, we bring proven process and application expertise, a network of technical experts, a reliable global supply base, and world-class customer service.

To find out how we can support your applications, visit [dow.com/electronics](https://www.dow.com/electronics).

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