



MOMENTIVE
performance materials

Materials & Applications
**Silicone RTVs in
Aviation and Aerospace**



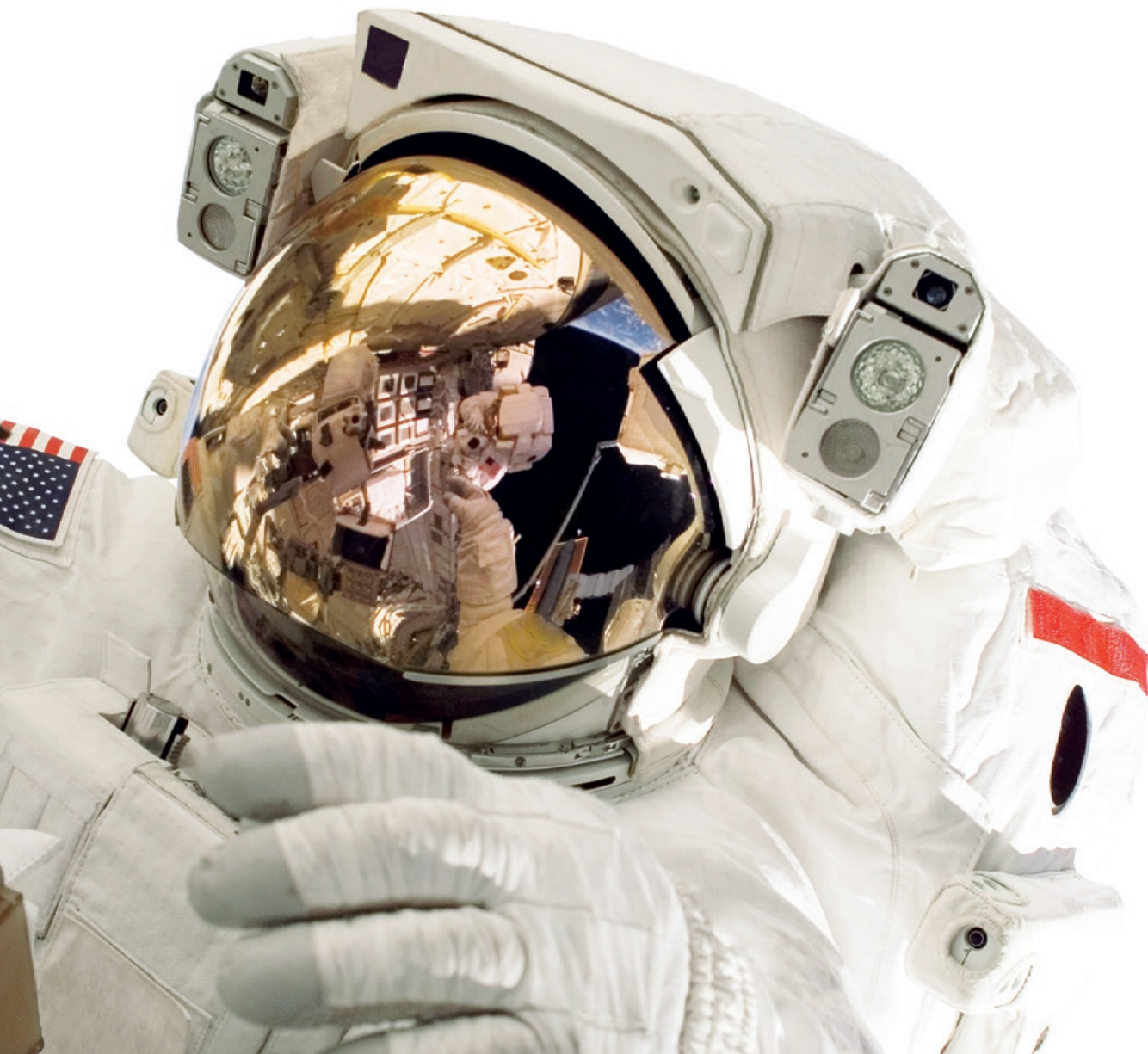
A Global Leader in Silicones

The strength of Momentive is deeply rooted in the long and prestigious history of GE technology, innovation, technical service, and application engineering. Milestones include the discovery of new chemistries and the birth of breakthrough products. It's also a story about commitment to successful business relationships, about global reach, and about value-added process innovations that can help our customers reduce costs, improve quality, and realize their business objectives.

For over 50 years, Momentive has pioneered developments in silicone technology for the world's most prominent industries, including chemical manufacturing and processing, automotive, personal care, building and construction, consumer hardware, food processing, electronics and business equipment, appliances, and OEM assembly and maintenance.

It is Momentive's history and flight time in Aviation and Aerospace that separates its product offerings from others in the industry. Momentive is proud of its long-standing relationship and contributions to the successes of the world's venture into outer space. Momentive has had silicone materials on every US manned flight since the early Mercury Program in the Sixties to the latest vehicles flying today.

Our products have been used in numerous mechanical, electrical and sealing applications. But the application that we take special pleasure in is a Momentive RTV product made the footprints on the moon as the soles of the astronauts' boots. We at Momentive look forward to making a lot more footprints in the future!



Commercial Aircraft Solutions at Work

These reliable aviation products find application in a multitude of aspects of aircraft assembly and maintenance, from adhesives for wings and fuel tanks to electrical wire and everything in between.



Silicone RTVs in an Aircraft*

Cockpit

1. Black Box Encapsulant
2. Cockpit Instrument Seal
3. Electrical Box Sealant
4. Radome Sealant
5. Sealant, Potting and Encapsulant for Computer Units
6. Weatherstrip Adhesive

Cabin

7. In-flight Entertainment System Sealant
8. Lighting Sealant
9. Overhead Bin Sealant
10. Vent Duct Sealant
11. Window Assembly Sealant

Cargo Area

12. Cargo Door Seal
13. Electrical Wire Sealant
14. Firewall Penetration Sealant

Engine

15. Engine Gasket
16. Engine Molded Seals
17. Engine Electronics Potting
18. Engine/Thermal Shield
19. Filleting Hardware Heads
20. Gas Turbine Bracket Adhesive
21. Joint Fill Compound

Galley

22. Door Gasket Seal
23. Formed Gaskets
24. Galley Sealant
25. Lavatory Sealant

Landing Gear

26. Light Lens Sealant
27. Potting Landing Gear Electrical Devices

Tail

28. General Maintenance Sealant
29. Hydraulic Switch/Control Sealant

Wing

30. Fuel Cell Coating
31. Fuel Tank Electrical Device Sealant
32. Fuel Tank Sealant
33. Hydraulic Gear Box Sealant
34. Lighting Sealant
35. Wind Edge Sealant

* Contact us for other silicone or quartz applications

Product/Application Selector Guide

		One-component								
Potential Products ⁽¹⁾	RTV 100 series	RTV 106	RTV 116	RTV 133	RTV 142	RTV 157 RTV 159	RTV 160 or TSE 390 series	FRV 1106 Fluoro-silicone	SilCool* thermal management materials	
Features	High performance adhesive	High temperature, paste adhesive	High temperature, flowable adhesive	UL V-0 component recognized, neutral cure adhesive	Low volatile adhesive	High strength adhesive	Neutral cure adhesive	Adhesive with excellent chemical resistance	Thermally Conductive adhesives and greases. Cure options available	
Substrate Adhesion	Primerless adhesion to many substrates	Primerless adhesion to many substrates	Primerless adhesion to many substrates	Primerless adhesion to many substrates	Primerless adhesion to many substrates	Primerless adhesion to many substrates	Primerless adhesion to many substrates	Primerless adhesion to many substrates	Primerless adhesion to many substrates	
Potential Applications										
Exterior	Cargo Door Seals					•				
	Door Gasket Sealant					•				
	Lighting Sealant					•				
	Filletting Hardware Heads					•				
	Joint Fill Compound	•	•				•			
	Potting Landing Gear Electrical Devices									
	Sealant for Smooth Exterior Edge of Aircraft Wing						•			
	Weather Strip Adhesive						•			
Electronics	Radome Sealing				•		•			
	Circuit and Terminal Protection					•	•		•	
	Cockpit Instrument Sealant					•	•			
	Electrical Wire Sealant		•	•			•			
	Sealing, Potting and Encapsulating Computer Units					•	•		•	
	Electronics Power Equipment Encapsulant						•		•	
	Sensors and Components								•	
Engine	Interlayers/Displays/LEDs									
	Gasketing		•	•	•	•	•	•		
	Heat Insulator/Thermal Blanket		•	•	•	•	•			
	Heat Shielding		•	•	•	•	•			
	Molded Seals		•	•	•	•	•			
	Electronics Potting		•	•	•	•	•			
General	Gas Turbine Bracket Adhesive		•					•		
	Extreme High Temperature Potting and Encapsulating								•	
	Firewall Penetration Sealant				•					
	Light Lens Sealant and Adherent						•			
	Shock Absorber Between Metal Aircraft Parts									
Wings/Fuel	General Aircraft Maintenance Sealant	•					•			
	Electrical Devices Within Fuel Tank							•		
	Fuel Cell Coating							•		
	Fuel Tank Sealant							•		
	Sealing Hydraulic Gear Boxes							•		
	Sealing Hydraulic Switches and Controls							•		
Interior	Electrical Box Sealant						•			
	Pre-Formed Gaskets	•					•			
	Galley Sealant	•								
	In-Flight Entertainment Systems Sealant	•								
	Lavatory Sealant	•								
	Lighting Sealant			•						
	Ventilation Duct Sealant	•	•		•					
Miscellaneous	Window Assembly Sealant	•		•	•	•				
	Battery Sealant						•			
	Black Box Gel Encapsulant						•			
	Charger Sealant						•			
	Heating and Cooling Tube Sealant							•		
	Landing Gear Sealant							•		
	Thrust Reversers Heat Shielding									
Thrust Reversers Insulator					•					
Thrust Reversers Vibration Dampening					•					

Superior Products for Aviation and Aerospace

One-Component, Room Temperature Cure Adhesive / Sealants

- The **RTV 100** series product family is Momentive's premier line of high strength acetoxy-cure adhesives with FDA, UL, NSF, and USDA recognition, and meets MIL-A-46106 specifications. This high performance line, in both paste and flowable grades, offers primerless adhesion to many substrates. Both **RTV 106** and **RTV 116** adhesives offer high temperature performance.
- **RTV 133** is a black, one-component adhesive that is suggested where resistance to burning of the finished product is a design consideration. It offers high strength, primerless adhesion to many substrates and a non-corrosive (alkoxy) cure. It has UL V-0 component recognition.
- **RTV 142** is a non-corrosive, low-volatile paste adhesive ideal for electronic gasketing or vertical/overhead applications.
- **RTV 157** and **RTV 159** are high strength, paste adhesives with an acetoxy cure. They offer high temperature and high strength performance.
- The **RTV 160** series of adhesives are non-corrosive to sensitive metals found in electronics. This series offers products of varying viscosities and UL component recognition. **RTV 162** and **RTV 167** comply with MIL-A-46146. **RTV 167** is a high strength paste.
- The **TSE 390** series of adhesives offer fast tack free time and are non-corrosive to metallic substrates. They are excellent choices for electrical/electronics applications. This series offers products of differing viscosities and meet the corrosion resistant requirement of MIL-A-46146A.
- The adhesive sealant **FRV 1106** is a paste consistency, fluid resistant product for use in fuel, solvent and chemical environments. This acetoxy-cure sealant offers primerless adhesion, room temperature cure, and weathering resistance.
- **SilCool*** thermally conductive **TSE 3000** series of adhesives are available in both room temperature and heat cure, as well as one and two component options. This series of materials has a variety of viscosities from flowable to paste-like. **SilCool*** thermally conductive **TIG series** of greases are also available for applications needing removability/reworkability.



Two-Component, Room Temperature Potting Compounds/Encapsulants

- **Snapsil*** fast cure **RTV 200** series of adhesives are a new line of fast room temperature curing, two component high strength adhesives ideal for applications on assembly lines to quick turn around maintenance and repair. Available in a convenient single caulker, it is easy to use with a standard caulking gun. The RTV 200 series adheres to most substrates with no primer necessary.
- **RTV 11**, **RTV 21** and **RTV 41** are three of Momentives' general-purpose two-part silicone encapsulants that are an excellent choice for the aviation environment. They cure at room temperature and offer superior adhesion with primers.
- **RTV 60** and **RTV 88**, part of Momentives' high temperature two-part silicone materials, differ primarily in viscosity in the uncured state. RTV 60 is excellent for potting and encapsulating applications, while RTV 88 is ideal for vertical or overhead surfaces.

- **RTV 560/566** and **RTV 577** provide outstanding adhesion with a primer at low temperatures. All cure at room temperature and provide variable cure rates by adjusting the curing agent. RTV 560/566 offers the widest useful temperature range of all Momentive products (-115 °C to +260 °C). RTV 566 is an excellent choice for aviation/aerospace applications requiring low outgassing. RTV 577 is highly viscous and an outstanding choice for sealing and insulating on vertical and overhead surfaces.
- The **RTV 6100** series of silicone dielectric gels are liquid silicones, which cure to form soft, gel-like elastomers. They help preserve dielectric integrity, offer shock and vibration dampening, and provide outstanding protection to delicate electronic assemblies in harsh environments. They offer a variety of cure rates and primerless adhesion to most substrates. **RTV 6156** provides low temperature performance.
- The **RTV 8000** series are general purpose two-part silicone rubber compounds. They consist of pourable, non-corrosive grades with excellent adhesion and high temperature performance. It conforms to the physical and electrical requirements of MIL-PRF-23586F. (Supersedes MIL-S-23586E.)

Two-Component, Heat Cure Potting Compounds/Encapsulants

- **RTF 762** and **RTV 7000** are variable density foams that are supplied as two component liquids, that chemically react when mixed to generate foam.
- **FRV 138** is a two component soft, flexible rubber encapsulant with superior chemical resistance. This product is an excellent choice to consider for use in fuel, solvent and other chemical environments. It provides excellent adhesion to a variety of substrates without the use of primer. Potential applications for FRV138 include potting sensors and electronic devices that are subjected to harsh conditions.
- The **InvisiSil*** optically clear encapsulants **IVS 5000** series of products are two part optically clear, non-yellowing, heat curable gels and elastomers. This series of products have high light transmittance and a high refractive index. Typical applications for these products are LED encapsulants as well as inner layer materials for displays and coating on optical devices.

Superior Products for Avionics

Long-term, reliable protection of sensitive electronic components is essential to many electronic applications today. Increasingly small systems and rising circuit densities have resulted in hotter operating temperatures, and driven demand for high-performance solutions for heat dissipation. Designers confronting these challenges will find a range of solutions from Momentive Performance Materials, Silicones. Our SilCool* family of adhesives and compounds deliver the high-thermal conductivity, thin bond lines, and low thermal resistance required for high performance components. For applications requiring environmental or stress protection, Momentive offers a selection of silicone adhesives/sealants, encapsulants, and potting materials.

Thermally Conductive Silicone Grease Compounds

Momentive's thermally conductive SilCool grease compounds offer excellent thermal conductivity, as well as excellent stability, penetration, temperature resistance, and low bleed. These properties enable SilCool grease compounds to draw heat away from devices, contributing to improved reliability and operational efficiency of electronic components. The combination of processing performance and thermal conductivity that these grease compounds offer makes them good candidates for thermal interface applications in high-performance devices and packages, such as TIM2 applications in CPUs and MPUs.

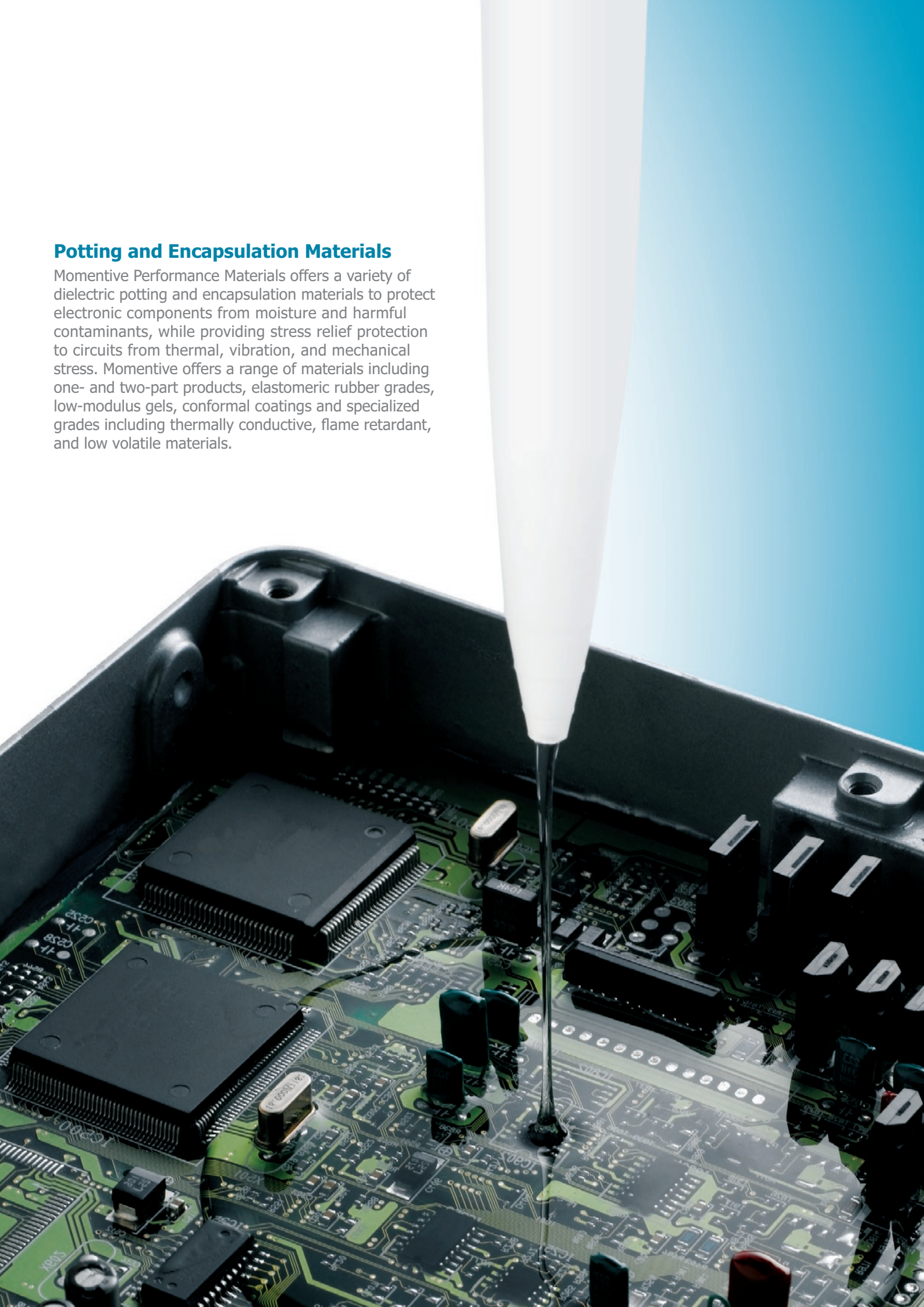
Thermally Conductive Silicone Adhesives

Momentive Performance Materials developed its family of SilCool thermally conductive adhesives to help deliver thin bond lines, which contribute to low thermal resistance while providing excellent adhesion and reliability. This series of heat-cured, 1-Part adhesives excel in thermal interface applications that demand good structural adhesion. Examples include spreaders and heat generators, and thermal interfaces to heat sinks in TIM2 applications. Additional thermal adhesives from Momentive offer the process convenience of 1-Part condensation cure with moderate heat dissipation. Target applications include board assemblies and sealants in power modules and sensors.



Potting and Encapsulation Materials

Momentive Performance Materials offers a variety of dielectric potting and encapsulation materials to protect electronic components from moisture and harmful contaminants, while providing stress relief protection to circuits from thermal, vibration, and mechanical stress. Momentive offers a range of materials including one- and two-part products, elastomeric rubber grades, low-modulus gels, conformal coatings and specialized grades including thermally conductive, flame retardant, and low volatile materials.



Frequently Asked Questions



Why RTV silicone?

RTV silicones consist of rubber and gel products developed for adhesion, sealing, coating and encapsulation/potting applications. The Si-O backbone of silicones provides inherent excellent temperature performance, both high temperature stability and low temperature flexibility, excellent dielectric properties, and outstanding weatherability resistance. With our long history in Aviation and Aerospace, Momentive's RTV silicones are an excellent choice for many applications.

What is Momentive's quality assurance?

Momentive has outstanding lot traceability. We conduct quality tests on every batch of silicone and can provide a Certificate of Analysis to our customers upon request. This helps our customers reduce cost by avoiding redundant testing. Additionally, Momentive is an ISO certified facility.

Does cured silicone rubber outgas?

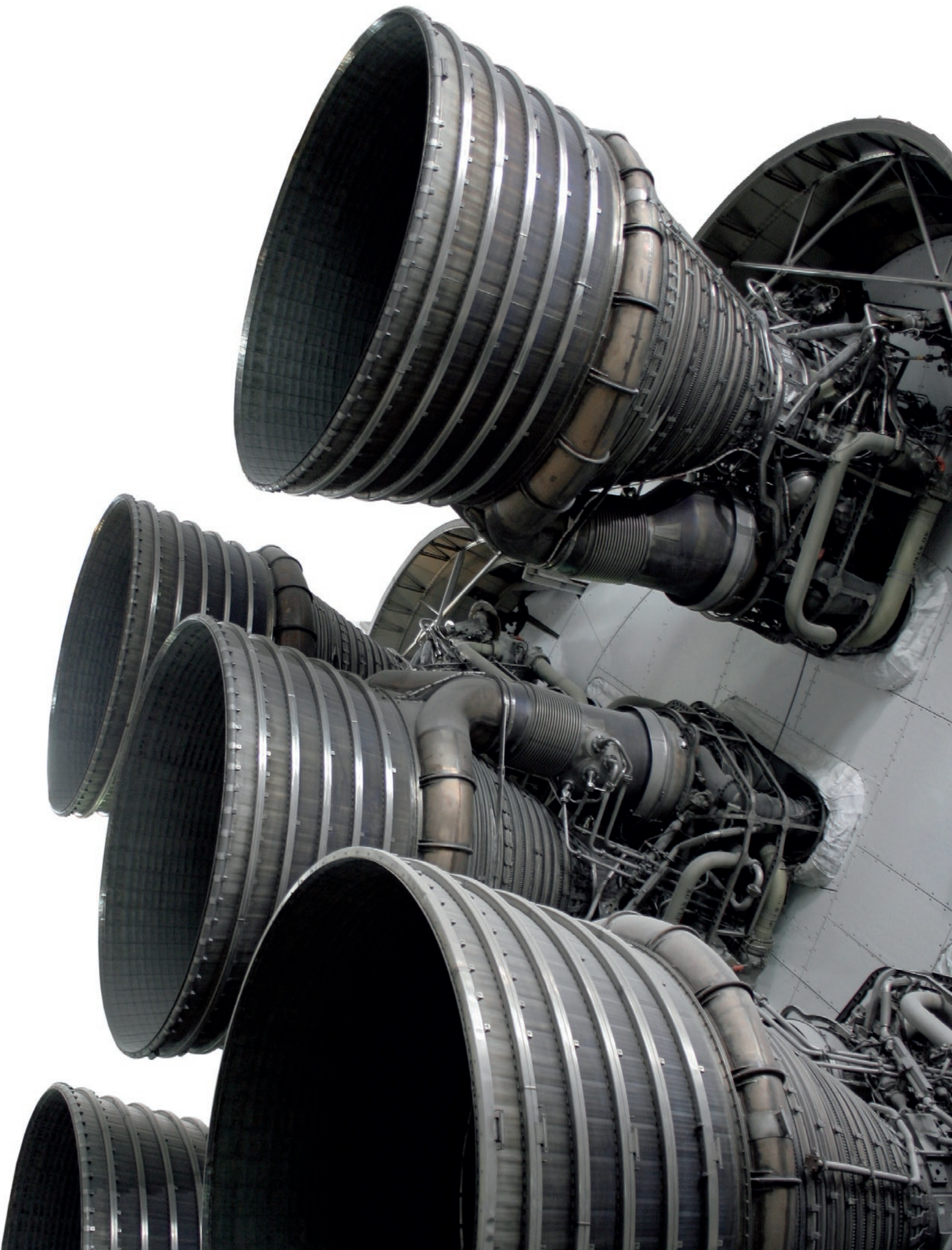
Momentive has formulated specialty RTV grades to reduce outgassing substantially when used under extreme conditions, e.g., high temperature and vacuum. General purpose silicones can outgas under these types of conditions. Please contact Momentive Technical assistance for more information.

Do I need to use a primer?

It depends on your application requirements and product choice. For example, one-component RTV products offer primerless adhesion to most substrates, while most two-components do not. Momentive recommends that you test the product in your application before using it.

How can I get Technical Product Data Sheets, samples and MSDS for Momentive materials?

Product Data Sheets and MSDS are available on our web site, www.momentive.com
Sample requests are available by contacting a Momentive authorized distributor or contact our service center. See back page for phone numbers.



PRINCIPAL LOCATIONS – Regional Information

North America	World Headquarters 22 Corporate Woods Boulevard Albany, NY 12211 USA	T 800.295.2392	F 607.754.7517
Latin America	Rodovia Eng. Constâncio Cintra, Km 78,5 Itatiba, SP – 13255-700, Brazil	T +55.11.4534.9650	F +55.11.4534.9660
Europe, Middle East, Africa and India	D-51368 Leverkusen Germany	T 00.800.4321.1000 T +31.164.225.350	F +31.164.241.750
Asia Pacific	Akasaka Park Building - 5-2-20 Akasaka Minato-ku, Tokyo 107-6112 Japan	T +81.3.5544.3100	F +81.3.5544.3101

CUSTOMER SERVICE CENTERS

North America	Charleston, WV 25314, USA E cs-na.silicones@momentive.com		
	<ul style="list-style-type: none"> Specialty Fluids UA, Silanes, Resins, and Specialties RTV Products-Elastomers Sealants and Adhesives & Construction 	T 800.523.5862 T 800.334.4674 T 800.332.3390 T 877.943.7325	F 304.746.1654 F 304.746.1623 F 304.746.1623 F 304.746.1654
Latin America	E cs-la.silicones@momentive.com		
	<ul style="list-style-type: none"> Argentina & Chile Brazil Mexico & Central America Venezuela, Ecuador, Peru, Colombia, & Caribbean 	T +54.11.4862.9544 T +55.11.4534.9650 T +52.55.5899.5135 T +58.212.285.2149	F +54.11.4862.9544 F +55.11.4534.9660 F +52.55.5899.5138 F +58.212.285.2149
Europe, Middle East, Africa and India	E cs-eur.silicones@momentive.com	T 00.800.4321.1000 T +31.164.225.350	F +31.164.241750
Asia Pacific	E cs-ap.silicones@momentive.com		
	<ul style="list-style-type: none"> Japan China Korea Singapore 	T +81.276.20.6182 T +86.21.5050.4666 (ext. 1523) T +82.2.6201.4600 T +65.6496.2121	
Worldwide Hotline	Worldwide Web www.momentive.com	T 800.295.2392 T +607.786.8131	F +607.786.8309

THE MATERIALS, PRODUCTS AND SERVICES OF MOMENTIVE PERFORMANCE MATERIALS INC., MOMENTIVE PERFORMANCE MATERIALS USA INC., MOMENTIVE PERFORMANCE MATERIALS ASIA PACIFIC PTE. LTD., MOMENTIVE PERFORMANCE MATERIALS WORLDWIDE INC., MOMENTIVE PERFORMANCE MATERIALS GmbH, THEIR SUBSIDIARIES AND AFFILIATES DOING BUSINESS IN LOCAL JURISDICTIONS (collectively "SUPPLIERS"), ARE SOLD BY THE RESPECTIVE LEGAL ENTITY OF THE SUPPLIER SUBJECT TO SUPPLIERS' STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, SUPPLIERS MAKE NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (i) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USE CONDITIONS, OR (ii) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING SUPPLIERS' PRODUCTS, MATERIALS, SERVICES, RECOMMENDATIONS OR ADVICE. AFOREMENTIONED EXCLUSIONS OR LIMITATION OF LIABILITY ARE NOT APPLICABLE TO THE EXTENT THAT THE END-USE CONDITIONS AND/OR INCORPORATION CONDITIONS CORRESPOND TO THE RECOMMENDED CONDITIONS OF USE AND/OR OF INCORPORATION AS DESCRIBED BY SUPPLIER IN ITS PRODUCT DATA SHEET AND/OR PRODUCT SPECIFICATIONS. EXCEPT AS PROVIDED IN SUPPLIERS' STANDARD CONDITIONS OF SALE, SUPPLIERS AND THEIR REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS, PRODUCTS OR SERVICES DESCRIBED HEREIN. Each user bears full responsibility for making its own determination as to the suitability of Suppliers' materials, services, recommendations, or advice for its own particular use. Each user must identify and perform all tests and analyses necessary to assure that its finished parts incorporating Suppliers' products, materials, or services will be safe and suitable for use under end-use conditions. Nothing in this or any other document, nor any oral recommendation or advice, shall be deemed to alter, vary, supersede, or waive any provision of Suppliers' Standard Conditions of Sale or this Disclaimer, unless any such modification is specifically agreed to in a writing signed by Suppliers. No statement contained herein concerning a possible or suggested use of any material, product, service or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Suppliers or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product, service or design in the infringement of any patent or other intellectual property right.