

LSR Top Coat

matte coating

Product Description

LSR Top Coat, Momentive Performance Materials offer, is a two-component low friction, protective translucent matte coating for consideration in applications such as respiratory face masks or orthopaedic devices, industrial seals or keypads. This material can be applied by spraying, brushing or dipping on surfaces that are dust and grease free but otherwise untreated. The LSR Top Coat can be cured very quickly at high temperatures (100°C to 180°C) in a ventilated hot-air oven.

The ability for the LSR Top Coat to reduce the surface friction of elastomeric silicone parts enables LIM* liquid silicone rubber, Silopren* LSR, HCR, and RTV materials to be utilized in areas that were previously closed to silicones due to their high inherent coefficient of friction.

Typical applications for consideration are cell phone covers, consumer and health-care grips and handles, connector seals, automotive interior applications, and any other area where the bulk properties of silicone are desired coupled with a surface exhibiting a lower coefficient of friction.

Momentive Performance Materials provides versatile materials as the starting point for our creative approach to ideas that help enable new developments across hundreds of industrial and consumer applications. We are helping customers

solve product, process, and performance problems; our silanes, fluids, elastomers, sealants, resins, adhesives, urethane additives, and other specialty products are delivering innovation in everything from car engines to biomedical devices.

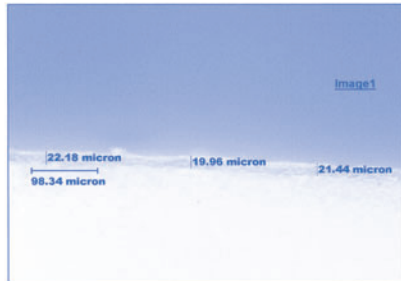
From helping to develop safer tires and keeping electronics cooler, to improving the feel of lipstick and ensuring the reliability of adhesives, our technologies and enabling solutions are at the frontline of innovation.



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Key Features and Typical Benefits

- Provides translucent matte finish coating
- Good adhesion to Momentive Performance Materials elastomer substrates
- Reduces the surface coefficient of friction (COF) of silicone elastomer substrates
- Reduces surface tackiness of RTV substrates
- Reduces surface dust pick up
- VOC (Volatile Organic Compound) free
- Biocompatible (USP Class VI requirements)
- Can be colored by using silicone compatible pigments
- Elastic properties may reduce the risk of microcracking on elastomeric surfaces under mechanical stress



Single spray on LIM6071 substrate and cured properly, LSR Top Coat forms a uniform thin layer @ ~20 μm

Typical Properties of LSR Top Coat (TP 3719)

Properties	Typical Data		
Color	Translucent matte finish coating		
Brookfield Viscosity 1 cP	~1600 cP-sec.		
Specific Gravity @ 25°C, gms / cc	1.03		
Pot Life of 1:1 Ratio Mixture @ 25°C ⁽¹⁾	~ 4-6 hours		
Refractive Index	1.41		
Flow-cup Viscosity	DIN EN ISO 2431 at 20°C	30-40 sec.	ca. 33
Abrasion Resistance	Norman Tool Tester, 175 g, paper, continuous mode, at 80 μ dry film thickness	cycles	80 - 100

(1) The pot life of the mixture can be increased to 2-3 days if the mixture is kept well below room temperature
Apply the coating immediately after mixing to avoid viscosity build up and ingredient settlement over time

The pot-life of the mixture of the two components (mixing ratio 1:1) at 20°C is three days. Increased temperature reduces the pot-life.

Coefficient of Friction and Adhesion

LSR Topcoat is designed to reduce the coefficient of friction (COF) of silicone elastomer surfaces. The COF and the adhesion appear to be dependant on the method of application. The dip method had the lowest reduction in COF (32% reduction), the highest minimum COF (0.47), and the lowest adhesion value to the silicone substrate (4B - minimal flaking). The un-coated LIM6071 sheets had an average COF of 0.65. Although a reduction from 0.65 to 0.47 is significant, the spray application method proved to be the most valuable: in reducing the coefficient of friction (43% reduction), having the lowest COF value (0.39) and bonding the best to the LIM6071 substrate (5B - no flaking).

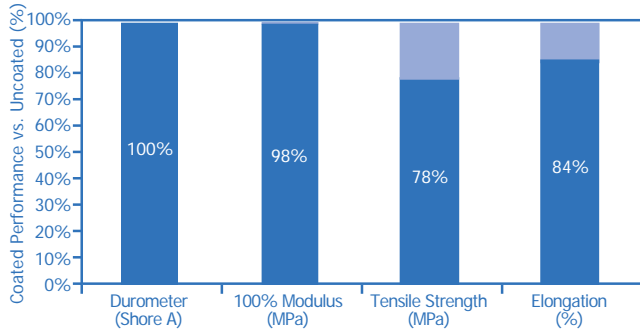
Preparation	COF (% of Reduction)	COF (Magnitude)	Cross-Cut Adhesion
Sprayed	43%	0.39	5B – No Flaking
Dipped	32%	0.47	4B – Minimal Flaking
Sponge Brushed	35%	0.40	4B – Minimal Flaking

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Mechanical Properties

LSR Top Coat does not significantly deteriorate the mechanical properties of the silicone elastomer substrate. The chart below shows that there is minimal effect on Durometer, 100% Modulus, Tensile strength, and Elongation.

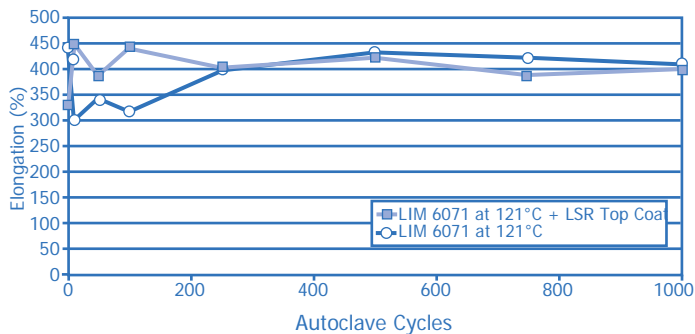
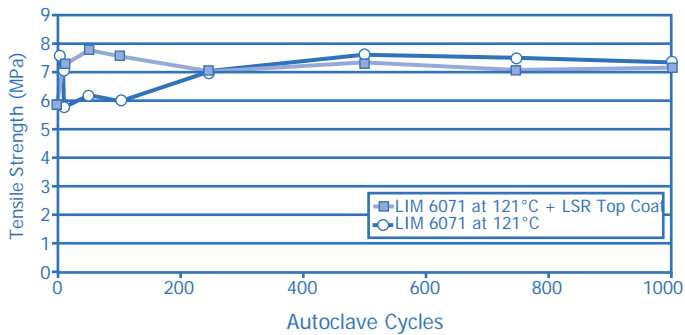
Average⁽¹⁾ Performance of Uncoated vs. Coated LSR



(1) Calculated average performance of LIM 6030, LIM 6050 and LIM 6071. All test specimens were post cured for 30 minutes at 350°F (177°C) and single spray coated.

Autoclave Resistance

LSR Top Coat provides heat and chemical resistance comparable to a normal LSR. The tensile strength of Top Coated cured LSR was unchanged over 1000 autoclaving cycles, as shown below. This is very important for consideration in Healthcare applications requiring repeat sterilization performance.



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Biocompatibility and Food Contact

LSR Top Coat is VOC free and is an excellent candidate for applications where food contact and biocompatibility are required. LSR Top Coat is compositionally compliant with the FDA requirements under 21 CFR 177.2600.⁽¹⁾ Samples of cured LSR Coated with Top Coat have met extractive requirements under 21 CFR 177.2600.⁽²⁾ After proper curing, LSR Top Coat is also compliant with the BfR Section XV food contact regulations. LSR Top Coated samples of LIM6040-D1 and Silopren* LSR 2005, as cured ASTM "slabs", have passed USP Class VI biocompatibility testing.

(1) USP Class VI equivalent tests were tested according to USP VI close methods: intramuscular implantation, intracutaneous injection, and systemic injection.

(2) Compliance testing conducted with LSR Top Coat on LIM 6040-D1 substrate cured into ASTM "slabs".

Application Examples

LSR Top Coat enables or improves silicone elastomer applications where high surface friction is undesired. The first applications were seen in the area of orthopaedics (e.g. shoe inlays and orthopaedic liners), but its versatility makes it an excellent candidate for consideration in a much broader range of opportunities in a number of different industries such as:

Market	Potential Applications
Healthcare	<ul style="list-style-type: none">• Tubing, catheters• Respiratory care devices• Stoppers, valves• Prosthetic sleeves, knee pads• Surgical instrument grips and handles
Consumer Electronics	<ul style="list-style-type: none">• Keypads• Cell phone covers
Consumer Goods	<ul style="list-style-type: none">• Sporting goods• Footware, shoe insoles• Masks
Automotive	<ul style="list-style-type: none">• Connector seals• Window wiper blades• Interior surfaces
Industrial Purpose	<ul style="list-style-type: none">• Wire and cable• Gaskets and seals

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How to Use

LSR Top Coat is a two-component system which requires mixing of the A and B components prior to application to a substrate. Because of the tendency of settling of the matting agent and resin, the B component must first be mixed by itself for 5 - 10 minutes using a drum or pail tumbler with moderate shear rates. Subsequently, the A and B components should be mixed together in a 1:1 ratio using suitable agitation to maintain suspension of the matting agent.

LSR Top Coat can be applied by a number of different methods, such as spraying, dipping and brushing. Spray application has been shown to offer optimum performance, however, part design and manufacturing requirements may also have significant impact.

The coating should be cured immediately after spraying, using a hot air oven for 5 to 30 minutes @ 100°C to 180°C. The cured coating provides best results such as coefficient of friction when coated samples are thoroughly cured. Reference curing condition table, in next column, for performance results under different curing conditions.

Curing Condition	COF (% of Reduction)	COF (Magnitude)	Cross-Cut Adhesion
Sprayed (10 min @ 100°C)	52%	0.32	5B – No Flaking
Sprayed (30 min @ 100°C)	50%	0.34	5B – No Flaking
Sprayed (20 min @ 140°C)	55%	0.33	5B – No Flaking
Sprayed (10 min @ 180°C)	50%	0.36	5B – No Flaking
Sprayed (30 min @ 180°C)	41%	0.37	5B – No Flaking

The coating contains compounds that are flammable, and care should be taken to remove them during the curing process using good ventilation and fresh air flow in the oven.

Packaging

LSR Top Coat comes in:

US: 2 x 1kg kits & 2 x 15kg kits

EU: 2 x 5kg kits & 2 x 25kg kits

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Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

Product Safety, Handling and Storage

Customers considering the use of this product should review the latest Material Safety Data Sheet and label for product safety information, handling instructions, personal protective equipment if necessary, and any special storage conditions required. Material Safety Data Sheets are available at www.momentive.com or, upon request, from any Momentive Performance Materials representative. Use of other materials in conjunction with Momentive Performance Materials products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

Limitations

Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

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Emergency Service

Momentive Performance Materials maintains an around-the-clock emergency service for its products. The American Chemistry Council (CHEMTREC), Transport Canada (CANUTEC), and the Chemical Emergency Agency Service also maintain an around-the-clock emergency service for all chemical products:

Location	Momentive Performance Materials Products	All Chemical Products
Mainland U.S., Puerto Rico	518.233.2500	CHEMTREC: 800.424.9300
Alaska, Hawaii	518.233.2500	CHEMTREC: 800.424.9300
Canada	518.233.2500	CANUTEC: 613.996.6666 (collect) or CHEMTREC: 800.424.9300
Europe, Middle East, Africa	+32.(0)14.58.45.45 (Belgium)	CHEMTREC: +1-703.527.3887 (collect)
Latin America, Asia/Pacific, all other locations worldwide	+518.233.2500	CHEMTREC: +1-703.527.3887 (collect)
At sea	Radio U.S. Coast Guard, which can directly contact Momentive Performance Materials at 518.233.2500 or CHEMTREC at 800.424.9300.	

DO NOT WAIT. Phone if in doubt. You will be referred to a specialist for advice.

Principal Locations

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Europe, Middle East, Africa and India		
Leverkusen Germany	00.800.4321.1000 + 31.164.293.276	+ 31.164.241750
Pacific		
Akasaka Park Building 5-2-20 Akasaka Minato-ku, Tokyo 107-6112 Japan	+ 81.3.5544.3100	+ 81.3.5544.3101
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	UA, Silanes, Resins, and Specialties 800.334.4674	304.746.1623
	RTV Products-Elastomers 800.332.3390	304.746.1623
	Sealants and Adhesives and Construction 877.943.7325	304.746.1654
Latin America		
Argentina and Chile	+ 54.11.4862.9544	+ 54.11.4862.9544
Brazil	+ 55.11.4534.9650	+ 55.11.4534.9660
Mexico and Central America	+ 52.55.5899.5135	+ 52.55.5899.5138
Venezuela, Ecuador, Peru, Colombia, and Caribbean	+ 58.212.285.2149	+ 58.212.285.2149
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