

OPTOELECTRONICS & ELECTRONICS



PRODUCT GUIDE

SHARPER, BRIGHTER & PURE

In response to market demands for smaller, thinner, brighter displays and more portable personal devices, we offer a unique line of high-purity silicones for the electronics and optoelectronics industries.

Optical Clarity

The NuSil™ brand delivers the most comprehensive line of refractive index matching silicones available. These materials are optimized for LEDs, LCDs and other applications that demand greater light output and optical stability while also improving both shock and heat resistance.

Purity and Low Volatility

We use technology perfected from our space-grade silicones to meet the ever increasing purity demands of the electronics industry. NuSil™ silicones can be refined to virtually eliminate common impurities -- such as ions and low molecular weight species associated with silicone contamination -- leading to greater reliability and longer operating life of the device.



POTTING & ENCAPSULATING GELS

PRODUCT NUMBER	REFRACTIVE INDEX / COLOR	VISCOSITY cP (mPa-sec)	DUROMETER / PENETRATION* (mm)	WORK TIME / TACK FREE TIME*	COMMENTS
OPTICALLY CLEAR					
LS-3238	1.38	1,500	15 (TYPE oo)	6 h	Index matches Magnesium Fluoride. Resistant to hydrocarbon solvents.
LS-3441	1.40	14,500	0.4 mm	24 h	Low volatility. Optically robust.
LS-3140	1.40	15,000	0.4 mm	24 h	Tough gel. Optically robust.
LS1-3443	1.43	650	6.0 mm	--	Optically robust. Increases brightness.
LS-3246	1.46	1,000	10 (TYPE oo)	8 h	Index matches glass.
LS-3249	1.49	400	60 (TYPE ooo)	~ 5 h	Index matches acrylates such as PMMA.
LS-3252	1.52	400	10 (TYPE oo)	~ 6 h	Index matches BK7 glass.
LSX-3354 Series	1.54	5,000	55 - 65 (TYPE ooo)	~ 2 h	Low permeability. Excellent for phosphor coatings.

GENERAL PURPOSE

PRODUCT NUMBER	TRANSLUCENT / TRANSPARENT	VISCOSITY cP	DUROMETER / PENETRATION* (mm)	WORK TIME / TACK FREE TIME*	COMMENTS
GEL-8136	TRANSLUCENT	460	9.0 mm	2 h	High tack gel.
GEL8-8150	TRANSPARENT	500	4.0 mm	1.5 h	RTV in 48 hours.
GEL-8170	TRANSLUCENT	600	9.0 mm	--	--
GEL-8250	TRANSLUCENT	650	5.0 mm	2 h	RTV cure. Broad operating temperature.
GEL-8107	TRANSLUCENT	910	50 (TYPE oo)	<1 h	Tough gel with low dissipation factor.
EPM-2482	TRANSPARENT	1,800	3.0 mm	--	Low volatility. For applications requiring a broader operating temperature range. Optimized for power electronics.
EPM-2480	TRANSPARENT	2,500	4.0 mm	> 30 h	Low volatility.

All materials are Platinum cure
*See Data Sheets for test parameter details

h = hours

FOAMS

PRODUCT NUMBER	FOAM DENSITY lbs/ft³ (g/cm³)	VISCOSITY cP (mPa-sec)	COLOR	CURE SYSTEM	COMMENTS
R-2360	12 (0.2)	40,000	WHITE	PLATINUM	Tough.
SFM5-2350	25 (0.4)	52,500	GRAY	PLATINUM	Flame resistant.

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PRIMERS

PRODUCT NUMBER	PERCENT SOLIDS %	COMMENTS
SP-120	4.0	Increased adhesion to polyphthalamide (PPA). Use with platinum or moisture cure silicones. Available in Red (SP-121).
CF1-135	4.5	Increased adhesion to aluminum. Use with platinum cure silicones.
CF6-135	9.0	Increased adhesion to titanium, polysulfone (PSU), polycarbonate (PC). Recommended where platinum inhibition is of concern.
SP-142	15	Increased adhesion to polyurethane (PU). Recommended where platinum inhibition is of concern.
SP-270	15	Improved adhesion to polyurethane (PU), polyvinyl chloride (PVC) and silver. Recommended where platinum inhibition is of concern.
SP-271	20	Improved adhesion to gold. Recommended where platinum inhibition is of concern.

Moisture cure silicones: alkoxy, oxime, acetoxy.
For more information, reference "Choosing a silicone primer/adhesive system." www.nusil.com/PrimerAdhesive

ALTERNATIVE ADHESIVES

LIQUID PRESSURE SENSITIVE ADHESIVES

PRODUCT NUMBER	PEEL STRENGTH ppi (kN/m)	VISCOSITY cP (mPa-sec)	CURE SYSTEM	COMMENTS
PSA-1270	3.0 (0.5)	2,100	NON-CURING	1.43 refractive index.

FILM ADHESIVES

PRODUCT NUMBER	LAP SHEAR* psi (MPa)	THICKNESS	CURE SYSTEM	COMMENTS
R-2682-12	100 (0.7)	0.014 in (0.356 mm)	PLATINUM	For applications requiring shorter processing times, easy clean-up, and consistent bond thickness. Adheres to silicone, and some metals or plastics. Custom thicknesses are available upon request.

*See Data Sheets for test parameter details

LOW VOLATILITY CURE IN-PLACE GASKETS

PRODUCT NUMBER	WORK TIME	DUROMETER TYPE A	NOMINAL BEAD ASPECT RATIO	COMMENTS
EPM-2412 Series	20 m	30	0.9	Low volatility. Designed to be removable for rework. Available in black. Adhesive version available where a permanent seal is required (EPM1-2412).

m = minutes

HOT OR COLD, IT'S COVERED

Potting & Encapsulating

Our potting and encapsulating silicones provide excellent protection for delicate components against thermal cycling, shock and outside contaminants such as moisture and particulates. For more complex geometries, NuSil™ low modulus gels offer flexibility to keep wire bonds from shearing and components from warping. While our elastomers offer a tougher, more rigid material for stability and surface protection.

Broad Operating Temperature

Building on decades of flight heritage in space, the NuSil™ brand of broad operating temperature silicones have been optimized to increase reliability by remaining flexible at very low temperatures and to resist breakdown at extreme heat. And if customer demands go beyond standard specifications, we can tailor our silicones to perform at even more extreme temperatures.



POTTING & ENCAPSULATING ELASTOMERS

PRODUCT NUMBER	REFRACTIVE INDEX / COLOR	VISCOSITY cP (mPa-sec)	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME / TACK FREE TIME*	MIX RATIO	COMMENTS
OPTICALLY CLEAR								
LS2-6941	1.41	1,100	30	120 (0.8)	100	5.5 h	1:1	Able to RTV.
LS-6140	1.41	3,125	50	850 (5.9)	90	3 h	1:1	Low volatility. Able to RTV.
LS1-6140	1.41	3,200	50	900 (6.2)	90	> 8 h	1:1	Low volatility and requires heat to cure. Designed for dispensing.
GENERAL PURPOSE								
R-2613	TRANSPARENT	4,400	50	1,240 (8.5)	115	2 h	10:1	Pourable. RTV. 1.41 R.I.
R-2615	TRANSPARENT	5,300	50	1,300 (9.0)	100	4 h	10:1	Self leveling. Able to RTV. 1.41 R.I.
R21-2615	TRANSPARENT	25,000	75	1,200 (8.3)	65	2 h	1:1	LTV cure. 1.41 R.I.
R-2188	TRANSLUCENT	11,300	20	475 (3.3)	350	> 8 h	1:1	Excellent dielectric properties for medium- and low-power electronics. Flexible cure. Tested per UL 94 and passed V1.
CF19-2186	TRANSLUCENT	75,000	25	1,100 (7.6)	600	15 m	1:1	Excellent dielectric properties for actuators.
R-2560	RED	31,000	55	700 (4.8)	125	1 h	100:0.5	Resists breakdown at high temperatures. Not recommended for deep section cures.
R-2160	RED	227,300	20	750 (5.2)	625	50 m	10:1	Flowable, high performance elastomer at elevated temperatures.
R-2175	BLACK	2,000	50	525 (3.5)	130	1 h	1:1	Flowable. RTV. 0.4 W/m-K. Fast cure version available.
R-2165	GRAY	4,400	60	500 (3.4)	100	10 m	1:1	Flowable. RTV. 0.6 W/m-K. Fast cure and white version available.
EPM-2496	GRAY	4,500	65	700 (4.8)	115	25 m	1:1	Low volatility. Flowable. RTV. 0.5 W/m-K

*See Data Sheets for test parameter details

h = hours
m = minutes

COATINGS

PRODUCT NUMBER	CURE SYSTEM	VISCOSITY cP (mPa-sec)	DUROMETER TYPE A	PERCENT SOLIDS %	TENSILE psi (MPa)	ELONGATION %	COMMENTS
R-2180	PLATINUM	3,075	40	20	1,700 (11.7)	1,050	High strength coating. Requires heat to cure.
R-1082	ACETOXY	700	25	29	1,425 (9.8)	950	Great adhesion to a variety of substrates. RTV.
R-1009	OXIME	6,150	45	32	1,150 (7.9)	650	High strength coating recommend for coating PCBs and other electronic assemblies. RTV.
EPM-2850	OXIME	7,300	15	100	--	150	Low volatility. Solventless coating. For applications requiring a broader operating temperature range. RTV.

OPTICALLY CLEAR MOLDING ELASTOMERS (1.41 R.I.)

PRODUCT NUMBER	DUROMETER TYPE A	VISCOSITY cP (mPa-sec)	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	COMMENTS
LS1-6941	50	62,500	750 (5.2)	305	80 (14.1)	For liquid-injection molding and casting. Flexible. Requires heat to cure.
LS-8941	80	21,500	1,250 (8.6)	65	55 (9.7)	For liquid-injection molding, compression molding and casting. Requires heat to cure.

All materials are Platinum cure

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BOND IT YOUR WAY

Adhesives & Sealants

NuSil™ adhesives and sealants offer excellent bonding for a wide variety of substrates including glass, ceramics, metals and plastics. Our silicones are specifically designed to increase manufacturing throughput for increased speed to market. Many of these materials cure at room temperature (RTV) faster than traditional RTV adhesives or with heat to accommodate your processing procedures.

Alternative Adhesives

Our silicone curable film adhesives are alternate solutions to traditional liquid adhesives. They offer bond line control and ease of use with no mixing required and minimal cleanup with excellent adhesion. NuSil™ liquid PSAs offer the ability to make peel-and-stick films and tapes for instant adhesion and can be removed for rework.



ADHESIVES & SEALANTS - TWO PART

PRODUCT NUMBER	REFRACTIVE INDEX / COLOR	CURE SYSTEM	VISCOSITY cP (mPa·sec) EXTRUSION RATE* g/min	LAP SHEAR* psi (MPa)	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME / TACK FREE TIME*	COMMENTS
OPTICALLY CLEAR									
LS2-6140	1.41	PLATINUM	2,740 cP	477 (3.2)	50	1,130 (7.7)	150	> 8 h	Low Volatility. Requires heat to cure. Optically robust. Primerless adhesion to ceramic, plastics and metals. Tested per UL94 and passes Vo.
LS-6943	1.43	PLATINUM	5,400 cP	--	40	900 (6.2)	120	~ 2 h	For applications requiring a broader operating temperature range. Optically robust.
LS-6143	1.43	PLATINUM	5,500 cP	180 (1.2)	40	600 (4.1)	125	2 h	Low Volatility. For applications requiring a broader operating temperature range. Optically robust.
LS-6946	1.46	PLATINUM	37,500 cP	510 (3.5)	30	675 (4.7)	275	2 h	Index matches glass.

GENERAL PURPOSE

R1-2145	DARK GRAY	PLATINUM	140 g/min	625 (4.3)	45	1,000 (6.9)	400	1 h	Tough. Able to RTV.
R-2145	DARK GRAY	PLATINUM	140 g/min	600 (4.1)	45	1,050 (7.2)	400	15 m	Tough. Quick pot life and fast cure. Able to RTV.
R34-2186	TRANSLUCENT	PLATINUM	9.0 g/min	--	48	830 (5.7)	340	18 h	Requires heat to cure.
R-2141	TRANSLUCENT	PLATINUM	90,000 cP	350 (2.4)	40	650 (4.5)	250	1.5 h	RTV. Excellent primerless adhesion to metals and glass.
R33-2186	TRANSLUCENT	PLATINUM	124,350 cP	--	20	1,000 (6.9)	725	2 h	RTV.
R31-2186	TRANSLUCENT	PLATINUM	142,500 cP	110 (0.8)	20	1,000 (6.9)	775	15 m	RTV. Quick pot life and fast cure.
R32-2186	TRANSLUCENT	PLATINUM	170,000 cP	150 (1.0)	15	975 (6.7)	850	15 h	Requires heat to cure.

ADHESIVES & SEALANTS - ONE PART

GENERAL PURPOSE

R-1130	TRANSLUCENT	OXIME	THIXOTROPIC	485 (3.3)	35	850 (5.9)	325	25 m	Recommended for polycarbonate (PC) substrates.
R-1140	TRANSLUCENT	ACETOXY	THIXOTROPIC	625 (4.3)	30	700 (4.8)	350	7 m	Recommended for copper substrates. Available in black.
R-1600	TRANSPARENT	OXIME	THIXOTROPIC	205 (1.4)	45	650 (4.5)	300	30 m	For applications requiring a broader operating temperature range.
EPM-2840	TRANSLUCENT	OXIME	45 g/min	375 (2.6)	45	700 (4.8)	300	20 m	Low volatility. Available in black and white.
EPM-2411-2	BLACK	PLATINUM	0.9 g/min	--	20	750 (5.2)	700	~ 8 h	Low volatility, glob top. Requires heat to cure.

*See Data Sheets for test parameter details

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m = minutes

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CONDUCT IT

Electrical Conductivity and Static Dissipation

Static accumulation and discharge can damage sensitive electronic components. We incorporate electrically conductive additives into our silicones, allowing the material to carry a current. This enables static to dissipate continuously rather than allowing it to accumulate and discharge rapidly. Our silicones are available in volume resistivity (ohm-cm) ranges from <0.010 ohm-cm for EMI shielding and >1 ohm-cm for static dissipative applications.

Thermal Management

Our thermally conductive, electrically insulating, silicones aid in the movement of heat from electronic devices without adding stress to the systems. Unlike thermal pads, our thermally conductive silicones conform to complex geometries, making them ideal for use in a wide array of electronics and optoelectronics assemblies.



ELECTRICALLY CONDUCTIVE / STATIC DISSIPATIVE

PRODUCT NUMBER	VOLUME RESISTIVITY ohm-cm	VISCOSITY cP (mPa-sec) EXTRUSION RATE g/min	CURE SYSTEM	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME / TACK FREE TIME*	COLOR	COMMENTS
R-2634	0.001	160 g/min	ALKOXY	80	250 (1.7)	90	3 h	GRAY GREEN	Conductive at elevated temperatures in unconfined configurations.
R-2637	0.006	THIXOTROPIC	PLATINUM	60	210 (2.1)	275	4 h	TAN	--
R-2630	6	11,700 cP	PLATINUM	60	690 (4.7)	95	15 h	BLACK	--
R-2631	70	100 g/min	PLATINUM	45	615 (4.2)	275	--	BLACK	--
EPM-2462	0.005	186,200 cP	PLATINUM	85	525 (3.6)	70	2.75 h	TAN	Low volatility.
EPM-2461	535	675,000 cP	PLATINUM	30	500 (3.4)	350	1 h	BLACK	Low volatility.

*See Data Sheets for test parameter details

h = hours
m = minutes

THERMALLY CONDUCTIVE

PRODUCT NUMBER	THERMAL CONDUCTIVITY W/m-K	VISCOSITY cP (mPa-sec) EXTRUSION RATE g/min	CURE SYSTEM	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME / TACK FREE TIME*	COLOR	COMMENTS
R-2930	1.46	THIXOTROPIC	PLATINUM	80	260 (1.7)	20	3 h	WHITE	--
R-2940	0.84	THIXOTROPIC	PLATINUM	90	700 (4.8)	35	5 h	GRAY	--
R-2949	0.75	75,000 cP	PLATINUM	75	275 (4.8)	50	3.5 h	WHITE	For applications requiring a broader operating temperature range.
R-2939	0.75	70,000 cP	PLATINUM	70	300 (2.1)	70	4 h	WHITE	--
EPM-2490	1.49	3,700,000 cP	PLATINUM	75	200 (1.4)	30	2 h	WHITE	Low volatility.
EPM1-2493	0.95	36,000 cP	PLATINUM	65	180 (1.2)	50	13 h	WHITE	Low volatility. Recommended for bondlines 5 micron or greater. Tested per UL 94 and passed Vo.
EPM-2495	0.64	140 g/min	PLATINUM	55	400 (2.8)	225	3 h	WHITE	Low volatility. Recommended for bondlines 50 micron or greater.
EPM-2890	0.61	40 g/min	OXIME	65	400 (2.8)	150	40 m	WHITE	Low volatility. Recommended for bondlines of 0.4 micron or greater.

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FLURO-POWER

Fluorosilicones

Fuels and solvents often found in aircraft, automotive, and oil and gas applications, can degrade the protection of delicate electronics provided by standard silicones. Fluorosilicones resist that degradation and offer the added benefit of a broad operating temperature range. From decades of optimizing materials for the most demanding aircraft applications, we provide one of the most diverse standard lines of fluorosilicones in the industry.

Additional Products

If you don't find what you are looking for, we have many additional products in our formulation library and can customize infinitely more based on your unique requirements. For the complete range of products, please visit:

www.nusil.com/productsearch



FLUROSILICONES

ADHESIVES & SEALANTS

PRODUCT NUMBER	COLOR	CURE SYSTEM	EXTRUSION RATE g/min	LAP SHEAR* psi/MPa	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TACK FREE TIME	COMMENTS
FS3-3730	TRANSLUCENT	ACETOXY	230 g/min	200 (1.4)	35	820 (5.7)	400	15 m	--
FS-3730	WHITE	ACETOXY	180 g/min	350 (2.4)	33	900 (6.2)	440	25 m	--

*See Data Sheets for test parameter details

m = minutes

THERMALLY CONDUCTIVE

PRODUCT NUMBER	THERMAL CONDUCTIVITY W/m-K	VISCOSITY cP (mPa-sec)	CURE SYSTEM	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME	COLOR	COMMENTS
CF1-3800	1.25	THIXOTROPIC	PLATINUM	50	125 (0.9)	50	90 m	WHITE	Recommended for intermittent exposure to fuels and solvents.

m = minutes

POTTING & ENCAPSULATING ELASTOMERS

PRODUCT NUMBER	CURE SYSTEM	VISCOSITY cP (mPa-sec)	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME	COLOR	COMMENTS
CF1-3510	PLATINUM	70,000	20	230 (1.5)	135	5 h	RED	--

h = hours

MOLDING ELASTOMERS

PRODUCT NUMBER	DUROMETER TYPE A	EXTRUSION RATE g/min	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	COLOR	COMMENTS
CF3-3521	30	120 g/min	700 (4.8)	360	--	TRANSLUCENT	Recommended for intermittent fuel or solvent exposure.
FS-3511	40	37.5 g/min	1,150 (7.9)	335	60	TRANSLUCENT	For liquid injection molding. Requires heat to cure.

All materials are Platinum cure

COATINGS

PRODUCT NUMBER	CURE SYSTEM	VISCOSITY cP (mPa-sec)	DUROMETER TYPE A	PERCENT SOLIDS %	TENSILE psi (MPa)	ELONGATION %	COMMENTS
R-3930	ACETOXY	735	30	60	750 (5.2)	400	High strength coating. RTV.
R-3975	ACETOXY	1,625	25	60	425 (2.9)	400	--

POTTING & ENCAPSULATING GELS

PRODUCT NUMBER	COLOR	VISCOSITY cP (mPa-sec)	DUROMETER TYPE oo	WORK TIME	COMMENTS
FS-3502-1	WHITE	1,200	10	~ 3 h	--
GEL-3500	TRANSPARENT	11,250	50	12 h	Recommended for intermittent exposure to fuels and solvents.

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CUSTOMIZATION MASTERED 3,000+ STANDARD PRODUCTS AND BEYOND

We know that standard solutions don't always fit. That's why we create customized products based on our customers' unique applications. And after three decades serving the most demanding industries, we've honed our processes and proprietary equipment to take customization to a mass scale.

Today, we have over 3,000 standard products that can easily be mass customized to your precise, unique specifications. Whether you require boutique creations or mass-market offerings, we are committed to creating your products, your way.

www.nusil.com/customization

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