

# SPACE GRADE LINE



PRODUCT GUIDE

## SPACE GRADE SILICONES – THE LOWEST IN OUTGASSING

NuSil™ space grade silicones remain elastic at low temperatures and resist breakdown at high temperatures, offering excellent utility in space where materials are repeatedly exposed to extreme temperatures.

### Low Outgassing (Controlled Volatility)

To mitigate volatile materials condensing on important surrounding devices, NuSil™ Low Outgassing and Ultra Low Outgassing™ silicones are used by leading space programs to provide the resilient protection they require to prevent contamination and material degradation. NASA and ESA require materials to be tested per ASTM E595 prior to use in space and must meet specifications outlined in NASA SP-R-0022A and ESA PSS-014-702, with a Total Mass Loss (TML) of ≤ 1.00% and Collected Volatile Condensable Material (CVCM) of ≤ 0.10%.

NuSil™ Low Outgassing materials meet or exceed these requirements, and our Ultra Low Outgassing™ materials exceed these standards by an order of magnitude, ≤ 0.10% TMLs and ≤ 0.010% CVCM.



## ADHESIVES & SEALANTS - TWO PART

NUSIL™ PRODUCT NUMBER	CURE SYSTEM	VISCOSITY (cP/mPa-sec) EXTRUSION (g/minute)	LAP SHEAR psi (MPa)	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME (TACK FREE TIME)	COLOR	BROAD OPERATING TEMPERATURE	SPECIAL FEATURES
<b>ULTRA LOW OUTGASSING™</b>										
SCV1-2590	PLATINUM	3,300	175 (1.2)	50	925 (6.4)	90	4 h	OPTICALLY CLEAR		Formulated to minimize UV degradation
SCV2-2590	PLATINUM	6,100	250 (1.7)	45	475 (3.3)	85	-	OPTICALLY CLEAR	•	High refractive index
SCV-2590	PLATINUM	8,800	375 (2.6)	45	950 (6.6)	125	-	OPTICALLY CLEAR		-
SCV-2590-2	PLATINUM	9,500	400 (2.8)	50	950 (6.6)	150	4.5 h	BLACK		-
SCV-2585	PLATINUM	49,500	475 (3.3)	35	700 (4.8)	300	1 h	TRANSLUCENT	•	-
SCV-2586	PLATINUM	325,000	175 (1.2)	45	225 (1.6)	150	4 h	RED	•	Low density

## LOW OUTGASSING

CV-2510	ALKOXY	45,000	-	45	600 (4.1)	200	4 h	WHITE	•	-
CV1-2566	ALKOXY	45,000	650 (4.5)	50	900 (6.2)	160	3 h	RED	•	-
CV-2566	ALKOXY	55,000	500 (3.4)	55	950 (6.6)	150	3 h	RED	•	-
CV-2568	ALKOXY	125,000	100 (0.69)	50	175 (1.2)	60	4 h	RED		Low density
CV2-2566	ALKOXY	THIXOTROPIC	625 (4.3)	55	900 (6.2)	140	2 h	RED	•	-
CV4-2500	PLATINUM	1,500	-	25	-	-	2 h	OPTICALLY CLEAR		-
CV14-2500	PLATINUM	2,600	50 (0.3)	30	425 (2.9)	150	-	OPTICALLY CLEAR		Improved primerless adhesion
CV16-2500	PLATINUM	5,300	200 (1.4)	40	650 (4.5)	100	2 h	OPTICALLY CLEAR	•	High refractive index
CV15-2500	PLATINUM	3,200	225 (0.39)	50	850 (5.9)	90	3 h	OPTICALLY CLEAR		Formulated to minimize UV degradation
CV-2500	PLATINUM	8,300	400 (2.8)	50	1,000 (6.9)	125	2 h	OPTICALLY CLEAR		-
CV-2500-2	PLATINUM	8,500	-	50	950 (6.6)	150	3 h	BLACK		Opaque
CV2-2289-1	PLATINUM	12,300	300 (2.1)	30	450 (3.1)	250	(20 h)	WHITE	•	-
CV3-2289-1	PLATINUM	14,900	200 (1.4)	35	175 (1.2)	125	(12 h)	WHITE	•	Includes micro-balloons for bond line control
CV-2289	PLATINUM	60,800	400 (2.8)	30	750 (5.2)	350	-	TRANSLUCENT	•	Available in white and black
CV10-2568	PLATINUM	125,000	175 (1.2)	40	235 (1.62)	170	3 h	RED	•	Low density
CV7-2289-1	PLATINUM	230,000	350 (2.4)	30	700 (4.8)	375	-	WHITE	•	Improved primerless adhesion
CV4-2289-1	PLATINUM	1,300,000	325 (2.2)	30	650 (4.5)	400	30 m	WHITE	•	Thixotropic

## ADHESIVES & SEALANTS - ONE PART

CV-1142	OXIME	35 g/minute	375 (2.6)	45	700 (4.85)	300	(20 m)	TRANSLUCENT	•	Spot bonding, also available in black & white
CV1-1142	OXIME	13,000	-	30	400 (2.75)	200	-	TRANSLUCENT	•	Self-leveling, also available in black & white and with UV tracer
CV7-1142-1	OXIME	20 g/minute	350 (2.4)	40	700 (4.85)	300	(20 m)	WHITE	•	-
CV9-1142	OXIME	35 g/minute	265 (1.8)	55	400 (2.75)	85	(25 m)	TRANSLUCENT	•	Higher Durometer, low density

g/minute = grams per minute

h = hours  
m = minutes

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## FROM THERMAL MANAGEMENT TO PROCESS EFFICIENCIES

### Thermal Management

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

### Process Efficiencies

NuSil™ low outgassing silicone pressure sensitive adhesives (PSAs) and curable film adhesives are superior solutions to traditional liquid adhesives: they offer bond line control and ease of use with no mixing required and minimal cleanup. NuSil™ PSAs offer peel-and-stick application for instant adhesion, whereas our film adhesives offer more aggressive bonds. None of NuSil™ tapes and film adhesives require special storage conditions.



## THERMALLY CONDUCTIVE MATERIALS

NUSIL™ PRODUCT NUMBER	THERMAL CONDUCTIVITY W/(mK)	VISCOSITY (cP/mPa-sec) EXTRUSION (g/minute)	CURE SYSTEM	LAP SHEAR psi (MPa)	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME	BROAD OPERATING TEMPERATURE	SPECIAL FEATURES
<b>ULTRA LOW OUTGASSING™</b>										
SCV1-2599	1.6	THIXOTROPIC	PLATINUM	-	75	200 (1.4)	30	2 h		-
SCV2-2599	0.644	141 g/minute	PLATINUM	-	55	400 (2.75)	225	3 h		Syringe-dispensible
<b>LOW OUTGASSING</b>										
CV-2948	1.59	THIXOTROPIC	ALKOXY	150 (1.0)	80	250 (1.7)	30	2.5 h	•	-
CV-2946	1.49	THIXOTROPIC	PLATINUM	165 (1.0)	75	200 (1.38)	30	2 h		-
CV-2943	1.22	THIXOTROPIC	ALKOXY	475 (3.3)	90	750 (5.17)	35	2 h	•	Aggressive bonding, gray
CV-2942	0.999	THIXOTROPIC	PLATINUM	375 (2.6)	85	650 (4.5)	15	2.5 h		Aggressive bonding, gray
CV-2963	0.64	THIXOTROPIC	PLATINUM	275 (1.9)	60	425 (2.9)	250	2 h		-
CV1-2960	1.11	683,000	PLATINUM	-	75	250 (1.7)	60	2 h		Spreadable
CV1-2964	0.95	50,000	PLATINUM	120 (0.8)	65	180 (1.2)	50	-		-
CV-2960	0.828	124,000	PLATINUM	205 (1.4)	60	200 (1.38)	110	1.5 h		-
CV-2961	0.791	256,000	PLATINUM	205 (1.4)	75	275 (1.9)	40	2 h	•	-
CV4-2946	0.95	122 g/minute	PLATINUM	27 (1.1)	36 'o'	-	-	5.5 h		Reworkable gel
CV2-2946	0.644	140 g/minute	PLATINUM	-	55	400 (2.8)	225	3 h		Thin bond line
CV-2900	0.609	40 g/minute	OXIME	-	65	400 (2.8)	150	-	•	-

g/minute = grams per minute

## TAPES, FILM ADHESIVES & PSAs

NUSIL™ PRODUCT NUMBER	ADHESION LAP SHEAR psi (MPa) PEEL STRENGTH ppi (kN/m)	THICKNESS (INCHES)	CURE SYSTEM	SPECIAL FEATURES
<b>LIQUID PRESSURE SENSITIVE ADHESIVES</b>				
CV-1161	Peel: 7.5 (1.3)	-	NON-CURING	50% solids, ethyl acetate
CV3-1161	Peel: 1.5 (0.26)	-	PEROXIDE	Non-VOC solvent, tert butyl acetate, 37% solids
<b>ONE PART DOUBLE-SIDED TAPE</b>				
CV4-1161-5	Peel: 2.5 (0.44)	0.005	CURED	Double-sided tape, Kapton® center
CV5-1161-7	Peel: 2.1 (0.37)	0.007	CURED	One-sided tape, conductive Kapton® center
<b>TWO PART CURABLE FILM ADHESIVES</b>				
CV-2680-12	Lap Shear: 250 (1.7)	0.012	PLATINUM	Versatile bond over a variety of substrates
CV-2681-12	Lap Shear: 70 (0.48)	0.013	PLATINUM	Volume resistivity, 125 ohm-cm

## GELS

NUSIL™ PRODUCT NUMBER	VISCOSITY (cP/mPa-sec)	PENETRATION (mm)	WORK TIME	COLOR	SPECIAL FEATURES
CV-8251	1,800	3.0	24 h	OPTICALLY CLEAR	Broad operating temperature
CV-8151	2,500	4.0	30 h	OPTICALLY CLEAR	Self-leveling, flowable
CV1-8151	16,000	0.4	-	OPTICALLY CLEAR	Firm gel

All materials are Platinum cure

h = hours

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## MAINTAINING CONDUCTIVITY AT EXTREME TEMPERATURES

### Electrical Conductivity and Static Dissipation

Static accumulation and discharge can damage sensitive electronic components. We incorporate electrically conductive additives into our space grade silicones, allowing the material to carry a current. This enables static to dissipate continuously rather than allowing it to accumulate and discharge rapidly. The electrical conductivity is measured by volume resistivity ( $\Omega\cdot\text{cm}$ ) and is used to gauge the shielding effectiveness of the material.

### Broad Operating Temperature

NuSil™ broad operating temperature silicones are optimized to remain flexible at extremely low temperatures and to resist breakdown at elevated temperatures. Our silicones are proven in these environments through heritage in Low Earth Orbit (LEO) and Geosynchronous Orbit (GEO).



## ELECTRICALLY CONDUCTIVE / STATIC DISSIPATIVE

NUSIL™ PRODUCT NUMBER	VOLUME RESISTIVITY (ohm-cm)	VISCOSITY (cP/mPa-sec) EXTRUSION (g/minute) FLOW (Inches)	CURE SYSTEM	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	WORK TIME	BROAD OPERATING TEMPERATURE	THERMALLY CONDUCTIVE	SPECIAL FEATURES
ULTRA LOW OUTGASSING™										
SCV1-2596	0.005	THIXOTROPIC	PLATINUM	85	450 (3.1)	-	2.5 h		•	-
SCV-2596	2.5	-	PLATINUM	75	475 (3.3)	90	2 h	•		-
LOW OUTGASSING										
CV2-2646	0.003	4 inches	ALKOXY	75	300 (2.06)	70	2 h		•	Certified conductivity at 200° C
CV2-2644	0.004	THIXOTROPIC	PLATINUM	85	500 (3.4)	100	2.5 h			Conductive at elevated temperature
CV-2644	0.005	THIXOTROPIC	PLATINUM	85	525 (3.6)	-	2.75 h		•	-
CV1-2646	0.005	THIXOTROPIC	ALKOXY	90	-	-	3.5 h	•		-
CV-2646	0.007	THIXOTROPIC	ALKOXY	80	400 (2.8)	90	3.5 h	•	•	-
CV1-2640	25	280 g/minute	PLATINUM	40	525 (3.62)	225	-			Pumpable
CV-1500	3.0	THIXOTROPIC	OXIME	80	650 (4.5)	20	-	•		-
CV-2640	2.5	-	PLATINUM	75	475 (3.3)	90	2 h	•		-
CV2-2640	1.0 minimum	105,000	PLATINUM	30	500 (3.4)	350	60 m	•		Process-friendly packaging
CV3-2640	2.2 x 10 <sup>6</sup>	12,200	PLATINUM	25	70 (0.48)	120	-	•		-
CV1-1148	9 x 10 <sup>9</sup>	5,000	OXIME	-	-	-	-	•		Sprayable
CV2-1148	9 x 10 <sup>9</sup>	THIXOTROPIC	OXIME	-	-	-	-	•		Spot bonding

g/minute = grams per minute

h = hours  
m = minutes

## COATINGS\*

NUSIL™ PRODUCT NUMBER	VISCOSITY (cP/mPa-sec)	% SOLIDS	COLOR	TACK FREE TIME	SPECIAL FEATURES
CV-1144-0	240	60	TRANSLUCENT	50 m	-
CV3-1144-1	900	60	WHITE	-	-
CV-1146-2	2,400	72	BLACK	-	-
CV2-1147	2,000	60	TRANSLUCENT	2 h	Non-blocking overcoat
CV-1152	7,300	100	TRANSLUCENT	50 m	-

h = hours  
m = minutes

\* VM&P Naptha Solvent  
All products serve as an atomic oxygen protective overcoat

## PRIMERS\*

NUSIL™ PRODUCT NUMBER	% SOLIDS	SPECIAL FEATURES
SP-120	4	-
CF1-135	4.5	-
CF6-135	8.7	Platinum cure systems, difficult substrates
SP-270	15	Platinum cure systems, inhibiting substrates

\* VM&P Naptha Solvent  
All products available in red

## FOAM

NUSIL™ PRODUCT NUMBER	FOAM DENSITY lbs/ft <sup>3</sup> (g/mL)	VISCOSITY (cP/mPa-sec)	APPLICATION LIFE (MINUTES)	COLOR	CURE SYSTEM
CV-2391	20 (0.320)	7,000	6	WHITE	PLATINUM

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