PREMIUM CARE LINE

NuSil™ | avantor™

PRODUCT GUIDE

PREMIUM CARE
A CLASS OF ITS OWN

Our Premium Care line is specifically designed for general healthcare applications requiring something beyond the standard offering, such as customization, specialized packaging and/or a higher level of regulatory support.

NuSil™ Care
High-risk industries demand a higher level of customer support. Over decades, we've refined our support systems to meet the high-touch needs of our customers. We call this premium level of support NuSil™ Care, and it's our standard across all industries.

Liquid Injection Molding
Our liquid silicone rubbers, or LSRs, are designed for liquid injection molding (LIM) including overmolding. NuSil™ LSRs are used to create precision molded components such as o-rings, gaskets, valves, seals, and other parts.

LIQUID SILICONE RUBBERS

PRODUCT NUMBER	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	STRESS @ STRAIN psi (MPa) @ %	CURE RATE T90 m @ 138°C	CURE RATE SCORCH m @ 138°C	SPECIFIC GRAVITY	COMMENTS
MED-4901	40 (00)	285 (2.0)	1,135	55 (9.7)	15 (0.1) @ 300	1.20	0.90	1.10	Key Features of NuSil™ LSRs: • Designed for High-throughput Manufacturing • Platinum Cure System—No Post-Cure Required • Able to Cure Rapidly at Elevated Temperatures • Easily Pigmented Using NuSil™ Color Masterbatches • Formulated as 1:1 Mix Ratio
MED-4905	7	350 (2.4)	1,000	70 (12.3)	40 (0.3) @ 200	1.90	0.65	1.08	
MED-4910	10	450 (3.1)	1,000	65 (11.5)	35 (0.2) @ 200	1.95	1.40	1.07	
MED-4920	20	750 (5.2)	700	125 (22.0)	65 (0.4) @ 200	2.10	1.50	1.14	
MED-4930	30	800 (5.5)	450	140 (24.7)	175 (1.2) @ 200	2.15	1.30	1.13	
MED-4940	40	850 (5.9)	350	246 (43.4)	425 (2.9) @ 200	2.30	1.50	1.13	
MED-4950	50	1,000 (6.9)	400	243 (42.9)	400 (2.8) @ 200	2.35	1.40	1.14	
MED-4960	60	1,300 (9.0)	525	250 (44.1)	600 (4.1) @ 200	2.10	1.05	1.15	
MED-4970	65	1,325 (9.1)	465	240 (42.3)	825 (5.1) @ 200	2.20	1.00	1.24	
MED-4980	80	1,000 (6.9)	250	90 (15.9)	650 (4.5) @ 100	2.05	0.95	1.17	

SELF-LUBRICATING

PRODUCT NUMBER	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	STRESS @ STRAIN psi (MPa) @ %	CURE RATE T90 m @ 138°C	CURE RATE SCORCH m @ 138°C	SPECIFIC GRAVITY	COMMENTS
MED30-4940-1	35	970 (6.7)	570	210 (37.0)	350 (2.4) @ 200	2.50	1.00	1.12	Moderate lubrication
MED1-4955	55	1,165 (8.0)	490	250 (44.1)	525 (3.6) @ 200	2.20	0.90	1.14	High lubrication
MED2-4955	60	1,200 (8.3)	490	250 (44.1)	525 (3.6) @ 200	1.80	1.10	1.14	Moderate lubrication

PROCESS VERSATILITY

Extrusion & Molding
NuSil™ high consistency rubbers, or HCRs, are designed for extrusion, calendaring and compression or transfer molding. Our HCRs are used to create medical tubing, rod, ribbon, sheeting for die-cutting, and molded parts such as balloons, gaskets or o-rings.

Platinum vs. Peroxide Cure Systems
Our HCRs are available in two cure systems, platinum and peroxide.

Platinum cure:
- Typically Two-Part Systems
- No Byproducts
- Post Cure Optional

Peroxide cure:
- Indefinite Work Time
- Peroxide Byproducts
- Post Cure Typically Required

HIGH CONSISTENCY RUBBER (PLATINUM CURE)

PRODUCT NUMBER	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	STRESS @ STRAIN psi (MPa) @ %	WORK TIME @ 25°C	CURE RATE T90 m @ 116°C	CURE RATE SCORCH m @ 116°C	SPECIFIC GRAVITY	COMMENTS
MED-4014	15	700 (4.8)	1,330	155 (27.3)	40 (0.3) @ 200	> 72 h	2.50	1.25	1.08	Low modulus
MED-4020	25	1,400 (9.7)	1,245	190 (33.5)	75 (0.5) @ 200	> 72 h	2.30	0.95	1.10	Low modulus with high tear
MED-4025	30	1,285 (8.9)	890	130 (22.9)	105 (0.7) @ 200	1.5 h	2.80	0.75	1.11	Low tension set
MED-4035	35	1,565 (10.8)	1,055	195 (34.4)	195 (1.3) @ 200	3.5 h	2.70	1.00	1.11	--
MED-2045	40	1,490 (10.3)	790	195 (34.4)	195 (1.3) @ 200	--	2.35	0.70	1.16	Designed for dissolving in solvents, 3 part system
MED-4050	50	1,500 (10.3)	985	265 (46.7)	305 (2.1) @ 200	3.5 h	2.60	1.10	1.16	--
MED-4065	65	1,250 (8.6)	1,000	265 (46.7)	355 (2.4) @ 200	6 h	2.65	0.85	1.20	--
MED-4080	80	1,150 (7.9)	735	225 (39.7)	450 (3.1) @ 200	8 h	2.75	0.80	1.20	--
ULTRA HIGH PERFORMANCE										
MED-4027	30	2,300 (15.9)	1,050	235 (41.2)	100 (0.7) @ 200	2.5 h	4.30	2.00	1.11	Ultra-high tensile strength
MED-4055	55	1,655 (11.4)	880	315 (55.6)	490 (3.4) @ 200	2.5 h	2.85	1.00	1.14	Ultra-high tear strength
MED-4070	70	1,325 (9.1)	760	300 (52.9)	605 (4.2) @ 200	2 h	2.70	0.90	1.19	Abrasion / fatigue-resistant

h = hours

HIGH CONSISTENCY RUBBER (PEROXIDE CURE)

PRODUCT NUMBER	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	STRESS @ STRAIN psi (MPa) @ %	CURE RATE T90 m @ 116°C	CURE RATE SCORCH m @ 116°C	SPECIFIC GRAVITY	COMMENTS
MED-4128	25	1,010 (6.9)	800	70 (12.3)	90 (0.6) @ 200	1.65	0.55	1.11	Uncatalyzed, low-tension set
MED-4120	30	1,300 (9.0)	980	135 (23.8)	100 (0.7) @ 200	2.10	0.55	1.10	Uncatalyzed
MED-4135	35	1,350 (9.3)	800	130 (22.9)	190 (1.3) @ 200	2.10	0.55	1.10	Uncatalyzed
MED-4174	50	1,200 (8.3)	775	225 (39.7)	325 (2.2) @ 200	1.70	0.55	1.15	Uncatalyzed
MED-4150	50	1,450 (10.0)	750	190 (33.5)	250 (1.7) @ 200	1.90	0.50	1.16	Uncatalyzed
MED4-4115	50	1,600 (11.3)	500	100 (17.6)	400 (2.8) @ 200	2.20	0.65	1.15	Pre-catalyzed with non-vinyl specific peroxide
MED-4165	65	1,200 (8.3)	700	225 (39.7)	400 (2.8) @ 200	1.70	0.50	1.21	Uncatalyzed
MED4-4116	70	1,300 (9.0)	450	125 (22.0)	550 (3.8) @ 200	2.05	0.50	1.21	Pre-catalyzed with non-vinyl specific peroxide

HIGH CONSISTENCY RUBBER (PLATINUM OR PEROXIDE CURE)

PRODUCT NUMBER	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	STRESS @ STRAIN psi (MPa) @ %	WORK TIME* @ 25°C	CURE RATE T90 m @ 116°C	CURE RATE SCORCH m @ 116°C	SPECIFIC GRAVITY	COMMENTS
MED-4032	30	1,200 (8.3)	1,100	160 (28.2)	150 (1.0) @ 200	8 h	3.05	1.00	1.10	Platinum cure variations require CAT-40 and CAT-55 to cure. Peroxide cure variations require the use of various peroxide catalysts.
MED-4042	40	1,475 (10.2)	1,000	160 (28.2)	230 (1.6) @ 200	2 h	2.45	0.80	1.11	
MED-4052	50	1,400 (9.7)	1,100	230 (40.5)	280 (1.9) @ 200	9 h	2.25	0.70	1.16	
MED-4062	60	1,400 (9.7)	1,000	250 (44.0)	300 (2.1) @ 200	11 h	2.30	0.70	1.16	
MED-4072	70	1,100 (7.6)	875	240 (42.2)	450 (3.1) @ 200	4 h	1.90	0.55	1.22	
MED-4082	80	1,150 (7.9)	900	200 (35.5)	400 (2.8) @ 200	16 h	2.20	0.60	1.22	

h = hours
*Based on a Platinum cure system

ADHESION DEGREES OF FREEDOM

Bonding
NuSil™ adhesives offers excellent bonding to substrates including silicones, metals, and a variety of plastics.

Key Features of NuSil™ Adhesives:
- Variable Cure Times for Faster Throughput
- Low Modulus Prevents Warping, Delamination and Substrate Failure

Wound Care
NuSil™ high-purity soft silicone adhesives provide permeability, protection and atraumatic removal from the skin making them the preferred choice for wound and scar care applications.

Key Features of NuSil™ Soft Silicone Adhesives:
- Solvent-Free
- Variable Tack
- Range of Viscosities Available for Ease of Processing

ADHESIVES

PRODUCT NUMBER	WORK TIME	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TEAR PPI (kN/m)	STRESS @ STRAIN psi (MPa) @ %	PEEL STRENGTH lbf/in	COMMENTS
1 PART								
MED-1037	< 8 m	30	730 (5.0)	565	--	170 (1.2) @ 200	--	Non-self-leveling
MED-1011	< 10 m	25	1,400 (9.7)	725	100 (17.6)	115 (0.8) @ 200	--	Self-leveling
MED-1000	< 10 m	25	1,400 (9.7)	795	75 (13.2)	110 (0.8) @ 200	--	Self-leveling
MED-1040	10 m	23	265 (1.8)	340	17 (3.0)	130 (0.9) @ 200	--	Self-leveling, high flow
MED-1031	< 25 m	35	850 (5.9)	310	40 (7.1)	415 (2.9) @ 200	--	No acidic leaving group
2 PART								
MED1-4013	15 m	20	1,000 (6.9)	800	130 (23.0)	120 (0.8) @ 200	17	RTV or cures rapidly with heat
MED3-4013	2 h	20	1,000 (6.9)	800	130 (23.0)	125 (0.9) @ 200	23	RTV or cures rapidly with heat
MED2-4013	15 h	15	1,000 (6.9)	800	130 (23.0)	80 (0.6) @ 200	26	HTV and cures rapidly with heat

m = minutes
h = hours

SOFT SILICONE ADHESIVES

PRODUCT NUMBER	VISCOSITY cP (mPa·sec)	WORK TIME @ 25°C	TACK psi (MPa)	PENETRATION mm (in) (Shaft weight / ft diameter / time)
MED-6360	450	60 m	12.0 (0.08)	14.0 (0.55) (19.5 g / 6.35 mm / 15 s)
MED-6342	10,000	10 h	10.0 (0.07)	1.1 (0.05) (19.5 g / 6.35 mm / 5 s)
MED-6345	15,300	30 m	5.8 (0.04)	5.3 (0.21) (19.5 g / 6.35 mm / 5 s)
MED-6350	25,000	2 h	6.0 (0.04)	2.2 (0.09) (19.5 g / 6.35 mm / 15 s)

PRESSURE SENSITIVE ADHESIVES

PRODUCT NUMBER	PEEL STRENGTH ppi (kN/m)	TACK lbs (kg)	VISCOSITY cP (mPa·sec)	SOLIDS CONTENT %	SOLVENT
MED1-1356	14.3 (2.5)	2.3 (1.0)	245	50	ETHYL ACETATE
MED-1356	14.3 (2.5)	2.3 (1.0)	1,200	65	ETHYL ACETATE

PRIMERS

PRODUCT NUMBERS	SOLIDS CONTENT %	COMMENTS
MED-160	4.0	Increased adhesion to polyphthalamide (PPA). Use with platinum or moisture cure silicones.
MED1-161	4.5	Increased adhesion to aluminum. Use with platinum cure silicones.
MED6-161	8.7	Increased adhesion to titanium, polysulfone (PSU), polycarbonate (PC), polyurethane (PU). Recommended where platinum inhibition is of concern.
MED-162	15.0	Increased adhesion to polycarbonate (PC) and polyurethane (PU)
MED-163	15.0	Improved adhesion to polyurethane (PU), polyvinyl chloride (PVC) and silver. Recommended where platinum inhibition is of concern.
MED-164	10.0	Increased adhesion to various substrates. Designed for use with moisture cure systems.
MED-165	4.8	Increased adhesion to various metals.
MED-166	6.5	Increased adhesion to, and is compatible with, acrylics.

PURE PROTECTION

Potting & Encapsulating
Our potting and encapsulating silicones provide excellent protection for delicate components against thermal cycling shock and outside contaminates such as moisture and particulates. These elastomers offer a tough, rigid material for stability and surface protection.

Molding
NuSil™ low viscosity elastomers are also useful alternatives to LSR and HCR for prototyping molded parts.
Key Features of NuSil™ Low Viscosity Elastomers:

- Self-Leveling and Flowable
- Low Temperature Cure
- Platinum Cure

Dip Molding & Spraying
NuSil™ dispersions are silicone elastomer systems that are dispersed in a solvent carrier. They are ideal for applications where a thin film coating is needed, or for dipping and spraying processes.

LOW VISCOSITY ELASTOMERS

PRODUCT NUMBER	VISCOSITY cP (mPa·sec)	WORK TIME @ 25°C	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	STRESS @ STRAIN psi (MPa) @ %	MIX RATIO	COMMENTS
MED-6015	5,000	5.5 h	50	1,200 (8.2)	100	--	--	10:1	Clear
MED-4086	6,450	18 h	55 (000)	40 (0.28)	475	--	8 (0.06) @ 200	1:1	Ultra-low durometer
MED-4917	11,750	31 h	20	500 (3.4)	375	--	120 (0.8) @ 200	1:1	--
MED-6010	16,000	4 h	45	950 (6.5)	140	30 (5.3)	--	1:1	Clear
MED2-4220	19,500	3 m	20	585 (4.4)	500	--	100 (0.7) @ 200	1:1	Rapid RTV
MED4-4220	20,500	25 m	17	645 (4.4)	570	35 (6.2)	90 (0.6) @ 200	1:1	RTV
MED-6019	25,500	2.5 h	75	1,300 (9.0)	65	35 (6.2)	--	1:1	--
MED-6020	65,000	4 h	40	680 (4.7)	215	40 (7.5)	--	1:1	Clear
MED-6033	72,000	50 h	50	730 (5.2)	390	80 (14.1)	540 (3.2) @ 200	1:1	Clear
MED-4011	103,750	2 h	25	670 (4.6)	530	--	120 (0.8) @ 200	10:1	--
MED-4044	118,000	5 h	40	825 (6.0)	360	150 (26.5)	480 (3.3) @ 200	10:1	--

m = minutes
h = hours

DISPERSIONS

PRODUCT NUMBER	DUROMETER TYPE A	TENSILE psi (MPa)	ELONGATION %	TEAR ppi (kN/m)	STRESS @ STRAIN psi (MPa) @ %	VISCOSITY cP (mPa·sec)	SOLIDS CONTENT %	SOLVENT	COMMENTS
1 PART									
MED11-6604	15	75 (0.5)	375	15 (2.6)	--	250	50	THF	RTV
MED16-6606	20	1,200 (8.2)	800	120 (21.2)	50 (0.3) @ 100	95	30	HEPTANE	RTV Adhesive
MED10-6605	25	1,500 (10.3)	950	125 (22.1)	160 (1.1) @ 300	700	29	XYLENE	RTV
MED-2014	35	1,700 (11.7)	900	160 (28.3)	250 (1.7) @ 300	1,800	35	XYLENE	Requires heat to cure
2 PART									
MED10-6600	25	1,200 (8.2)	750	145 (25.6)	325 (2.2) @ 300	400	35	XYLENE	1.46 R.I.
MED10-6400	30	1,500 (10.3)	800	150 (26.5)	350 (2.4) @ 300	800	35	XYLENE	1.43 R.I.
MED10-6640	40	1,700 (11.7)	1,000	300 (53.0)	150 (1.0) @ 100	2,500	20	XYLENE	Ultra-high tear
INKS									
MED-6608-X	--	--	--	--	--	1,150	72	--	RTV Ink available in white and black
MED-6613-X	--	--	--	--	--	2,000	60	--	Heat curable ink in various colors

LUBRICATION TOOLBOX

Siliconization & Lubrication
NuSil™ lubricious coatings provide a durable and long-lasting thin silicone layer to hypodermic or suture needles, syringe barrels, cutting edges and other medical instruments.

We have a variety of options for lubricious coatings. Our specialty dispersions offer a virtually non-migrating coating while our fluids provide a high degree of lubrication. Our dimethyl fluids are used for lubricating thermoplastic parts and our fluoro fluids are used to lubricate silicone parts. A blend of our dispersions and fluids can be created to increase lubricity.

Key Features of NuSil™ Lubricious Coatings:
- Reducing the Coefficient of Friction and Insertion Force
- Minimizing Break-Loose and Extrusion Forces
- Hydrophobic Coatings

LUBRICIOUS COATINGS

PRODUCT NUMBER	VISCOSITY cSt (mPa·sec)	SOLIDS CONTENT %	SOLVENT	COMMENTS
SPECIALTY DISPERSIONS				
MED10-4161	150 (129)	33	XYLENE	Amino functional silicone coating
MED-4159	185 (159)	53	STODDARD SOLVENT / IPA	Amino functional silicone coating
MED10-6670	20 cP	25	XYLENE	Dry permanent coating
MED-4162	30,000 cP	31	XYLENE	Wax-like coating

PRODUCT NUMBER	VISCOSITY cP (mPa·sec)	VOLATILE CONTENT %	COMMENTS
FLUIDS			
MED-361	100 - 100,000	< 0.5	Dimethyl polymer
MED-460	350 - 12,500	< 0.5	Methyl fluoro copolymer (high fluoro)
MED-420	350 - 100,000	< 0.5	Methyl fluoro copolymer (low fluoro)
MED-400	350 - 100,000	< 0.5	Fluorosilicone polymer
GREASES			
MED-9011	95,000	< 1	Low consistency grease
MED-9021	300,000	< 1	Medium consistency grease
MED-9031	900,000	< 1	High consistency grease
MED-6731	2,000,000	< 1	High consistency methyl fluoro grease

REGULATORY SUPPORT

For over 35 years, we have been assisting medical device and pharmaceutical companies in obtaining regulatory clearance for their products. That commitment extends well beyond the sale of our silicones. We provide the technical and regulatory expertise needed for approval and are willing to communicate directly with regulatory authorities on behalf of our customers.

We have submitted over 700 device Master Files (MAFs) to the United States Food & Drug Administration (FDA) and international authorities in support of our medical grade silicones. A critical element of our MAFs is the biological testing conducted on the products found in this guide. Our materials meet the test requirements listed below.

BIOLOGICAL EFFECT	TEST	STANDARD
CYTOTOXICITY	Cytotoxicity testing using the ISO Elution Method	ISO 10993-5
HEMOLYSIS	In Vitro Hemolysis Study (Extract)	ISO 10993-4
SYSTEMIC TOXICITY	USP Systemic Toxicity Study (Extracts)	ISO 10993-11
INTRACUTANEOUS EXTRACTS	Acute Intracutaneous Reactivity Study (Extracts)	ISO 10993-10
IMPLANTATION (ONE WEEK)	USP Muscle Implantation	ISO 10993-6
GENOTOXICITY	Bacterial Reverse Mutation Study	ISO 10993-3
RABBIT PYROGEN	Pyrogen Study – Material Mediated	ISO 10993-11
SENSITIZATION	ISO Maximization Sensitization (GPMT)	ISO 10993-10

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**

Headquarters
Avantor Performance Materials, LLC
3477 Corporate Parkway
Center Valley, PA 18034 USA
Toll Free: +1 855-AVANTOR (1-855-282-6867)
Outside of US Tel: +1 610-573-2600
www.avantorinc.com

North & South America
1050 Cindy Lane
Carpinteria, CA 93013 USA
+1 805-684-8780
silicone@nusil.com
www.nusil.com

Europe
Parc d'Activités de Sophia Antipolis
Le Natura Bt2
1198, avenue Maurice Donat
06250 MOUGINS France
+33 (0) 4 92 96 93 31
nusil.sophia@nusil.com
www.nusil.com

Asia
10 Anson Road
#32-15 International Plaza
Singapore 079903
+65 64306694
nusilasia@nusil.com
www.nusil.com

NUSIL™ MEDICAL GRADE SILICONES

All of our medical grade silicones are specifically designed, manufactured and purified to meet the strictest requirements of the healthcare industry. These products are made under applicable cGMP standards in facilities indirectly or directly regulated by US FDA and are typically supported with master files.

Choose from our three lines of medical grade silicones:

	IMPLANT	PREMIUM CARE	CLASS VI
USE	IMPLANTABLE	IMPLANTABLE (≤ 29 DAYS)	NOT IMPLANTABLE
SPECIFICATIONS/ PACKAGING	CUSTOMIZABLE	CUSTOMIZABLE	STANDARD
REGULATORY SUPPORT/ TESTING	IMPLANT	PREMIUM	CLASS VI
CUSTOMER SERVICE	NUSIL™ CARE		

Please contact NuSil Technology LLC for assistance and recommendations in choosing a particular product line.