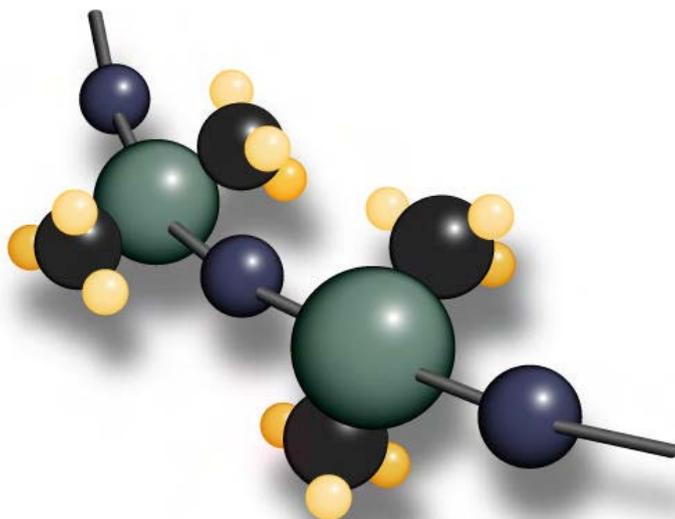


Polymer Systems Technology Limited

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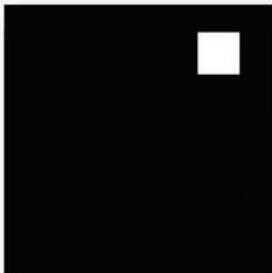
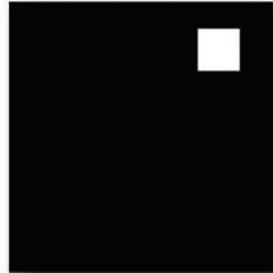
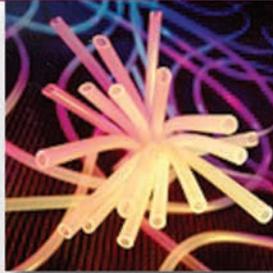
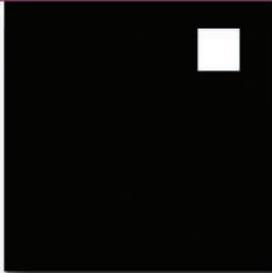
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Unit 2. Network 4. Cressex Business Park,
Lincoln Road, High Wycombe, Bucks. HP12 3RF
Phone +44 (0) 1494 446610
Fax: +44 (0) 1494 528611
Web: <http://www.siliconepolymers.co.uk>
Email: sales@silicone-polymers.co.uk





Creative Partners in a Material World

VersaSil Materials Selection Guide



Introduction

NuSil Technology is an innovative company specializing in the development and manufacture of advanced silicone products. Since 1979, we have been committed to improving the technology of silicone materials by providing solutions for specific design problems encountered in the aerospace, healthcare and other high-technology industries. With recent significant increases in our global production capabilities, NuSil represents the best value and highest quality silicone product line in the manufacturing market.

Platinum Cure

VersaSil³ 30, 40, 50, 60, 70, and 80 are a family of versatile high-consistency elastomers developed for volume-users who demand maximum flexibility. VersaSil³ can be used for silicone extrusion, molding, and calendaring. This unique 3-part system allows flexibility to adjust the cure rate and the table life to various fabricating requirements. The VersaSil³ series produces tough, durable elastomers with nominal Type A durometers of 30, 40, 50, 60, 70, and 80. Additionally, the base stocks may be blended to produce elastomers of intermediate durometer and other physical properties. This brochure can be used as a guide for anticipated physical and chemical properties from the vulcanized VersaSil³ elastomer system.

Peroxide Cure

The VersaSil³ system can also be vulcanized with a variety of peroxide catalysts, such as 50% Bis-2, 4-dichlorobenzoyl peroxide paste (commercially known as Perkadox PD-50S). It is recommended that the vulcanized material be adequately post-cured when using PD-50S. Post-curing not only stabilizes and enhances the physical properties, but it also removes any volatile by-products generated from the decomposition of the peroxide during the curing process.

Milling Instructions

Soften approximately 25% of the total calculated base stock on a cooled 2-roll mill. Add entire calculated quantity of CAT-40 and mill until homogenous. While the base/CAT-40 mixture is turning on the mill, add the CAT-55 in small increments until the entire calculated amount is added. Finally, mill in the remaining base stock. Take caution to avoid overmilling. Note: CAT-40 and CAT-55 are supplied in highly concentrated masterbatches. These masterbatches are provided at a consistency that can be easily cut with a spatula or knife. Be certain that the instrument used is thoroughly cleaned between contact with CAT-40 and CAT-55.

The following table displays typical properties of the unvulcanized VersaSil³ base stocks and typical properties after vulcanization using CAT-40 and CAT-55 platinum catalyst masterbatches.

Trade Name	NuSil Product Number	Uncured Physical Properties			Cured Physical Properties								Rheometry Data							
		Plasticity	Appearance	Work Time (hours)	Specific Gravity	Durometer (Type A)	Tensile Strength psi (MPa)	% Elongation	Tear Strength ppi (kM/n)	Stress at Strain, 100% (psi)	Stress at Strain, 200% (psi)	Stress at Strain, 300% (psi)	% Shrink	Tensile Set @ 300% Elongation	Compression Set @ 25% (Method B)	Porosity	Min. Torque (in.·lbs.)	Scorch Time (min.)	Cure Time, T90 (min.)	Max. Torque (in.·lbs.)
Platinum Cure - Press Cured with 100 : 1.0 : 1.0 - (Base Stock : CAT-40 : CAT-55)																				
VersaSil 30	MED-4032	60	Translucent	7.7	1.1	30	1200 (8.3)	1100	165 (29.1)	85	150	230	2.6	9	7	0	6.0	1.0	4.0	35
VersaSil 40	MED-4042	63	Translucent	1.8	1.11	40	1475 (10.2)	950	180 (31.7)	145	226	270	1.3	9	5	0	6.0	0.4	5.0	47
VersaSil 50	MED-4052	80	Translucent	9.0	1.16	50	1325 (9.1)	1100	230 (40.6)	190	275	360	2.6	14	9	0	9.0	0.8	4.0	48
VersaSil 60	MED-4062	85	Translucent	10.7	1.16	60	1300 (9.0)	875	250 (44.1)	282	450	360	2.6	16	6	0	8.0	0.7	2.0	33
VersaSil 70	MED-4072	85	Translucent	4.0	1.22	70	1100 (7.6)	875	240 (42.3)	370	450	420	2.5	31	12	0	12.0	0.6	4.0	90
VersaSil 80	MED-4082	115	Translucent	16.0	1.22	80	1050 (7.2)	800	240 (42.3)	380	450	460	1.5	13	7	0	10.0	0.6	2.0	87

Biological Data:

Each lot of material is tested for cytotoxicity and emission spectroscopy, as per ISO-10993 and ASTM E 305 respectively. Master Files for the VersaSil³ series have been filed with the U.S. Food and Drug Administration. Customers interested in authorization to reference the Master Files must contact NuSil Technology LLC.

After being cured with CAT-40 and CAT-55, these elastomers are compliant with USP Class VI (Systemic Toxicity, Intracutaneous Toxicity, and 7-Day Muscle Implant Study) requirements and applicable ISO 10993 requirements. The following table summarizes the biological testing conducted on the formulation components of the VersaSil³ series of elastomers.

Standard FDA Class	Test	Tested Per USP	Tested Per ISO 10993	Test Results
Cytotoxicity	Cytotoxicity Test Using The ISO Elution Method In The L-929 Mouse Fibroblast Cell Line	Yes	Yes	A-Noncytotoxic B-Noncytotoxic C-Noncytotoxic
Hemolysis	In Vitro Hemolysis Study (Extraction Method)	Yes	No	Nonhemolytic
Systemic Extracts	USP Systemic Toxicity Study In The Mouse (Extracts)	Yes	Yes	Nontoxic
Intracutaneous Extracts	Acute Intracutaneous Reactivity Study In The Rabbit (Extracts)	Exceed	Yes	Nontoxic
Implantation One Week	USP Muscle Implantation Study In The Rabbit With Histopathology (One Week)	Yes	No	Nonirritant
Salmonella Mutagen	Ames Salmonella / Mammalian Microsome Mutagenicity Assay	Yes	Yes	Nonmutagenic
Rabbit Pyrogen	Rabbit Pyrogen Study - Material Mediated	Yes	Yes	Nonpyrogenic
Sensitization	Delayed Contact Sensitization Study (A Maximization Method) In The Guinea Pig (Saline Standard Cure)	Yes	No	No Sensitization

Rheometry:

Rheometry is an extremely useful tool for determining the flow properties and cure profiles of silicones. Rheometry is determined by comparing the relationship between stress, strain, temperature and time. By minimizing the amount of CAT-40 masterbatch, a faster cure rate and quicker scorch time can be achieved. If a longer work time is desired, the CAT-40 ratio can be increased in order to yield the optimal table life for custom applications. (Temperatures of the work environment should be taken into account when determining table life values. Work times will be cut in half with every 10°C temperature increase. Work time values are measured at ambient conditions, which are defined at 25°C and 30%-70% relative humidity as per NTTM-008). Typical rheometry properties can be expected by varying CAT-40 concentrations.

Corporate Headquarters
NuSil Technology - USA
1050 Cindy Lane
Carpinteria, CA 93013
+1 (805) 684-8780
+1 (805) 566-9905 Fax
Silicone@NuSil.com
www.NuSil.com

NuSil Technology Europe
Parc d'Activités de Sophia Antipolis
Le Natura B12
1198, avenue Maurice Donat
06250 MOUGINS France
+33 4 92 96 93 31
+33 4 92 96 06 37 Fax
NuSil.Sophia@NuSil.com
www.NuSil.com



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