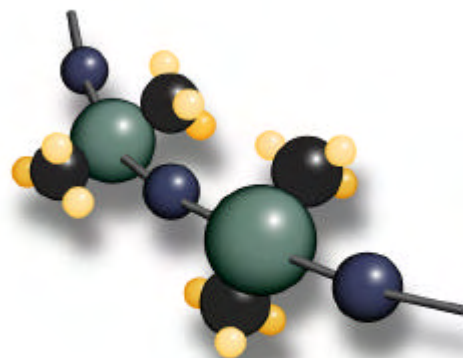


Polymer Systems Technology Limited

UK & Ireland Distributor



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PERSONAL CARE MATERIALS SELECTION GUIDE

For over 25 years NuSil has provided custom silicone helping make the world a more beautiful place by providing solutions to a variety of industries and thousands of customers. Our silicone chemists and technicians are dedicated to working with your team to develop a solution for each unique application.

Research and Development

NuSil's research and development services are most recognized for its custom development of silicone materials. Our well equipped laboratories are staffed with knowledgeable chemists and technicians who are experts in polymer formulation, chemical analysis, and physical testing of silicones. If a feature or testing requirement is not performed, NuSil, will work with you to custom develop testing parameters or incorporate testing procedures for your specific application.

Regulatory Support

What differentiates NuSil from other silicone manufacturers is the unsurpassed level of regulatory support for our products. NuSil offers the following:

- Meets USP Class VI Standards
- Several ISO 10993 Test Requirements
- Master Access Files (MAFs) Registered with the U.S. FDA.
- Trace Metal Analysis
- Cytotoxicity Testing Performed on a Per-lot Basis

Customer Service

All of our relationships with customers are met with respect and confidentiality. As an extended part of the services program, exclusivity agreements may be available to qualified customers that require proprietary, customized formulations.

Custom Compounding

NuSil has been directly incorporating custom ingredients in silicones as part of its exceptional service for over 10 years and is a demonstrated leader in manufacturing specialty ingredient delivery products.

Some typical incorporated ingredients are:

- Naturals
- Actives
- Antimicrobials
- Pigments
- Solvents

Manufacturing

NuSil offers more than a one-size-fits all. Whether your challenge requires large or small quantities, we promise accurate and precise silicone solutions. When your custom material is ready to scale up, NuSil can respond quickly and effectively.

All our materials are either developed and qualified in our own ISO 9001:2000 certified laboratories, ensuring consistent processes and standard across the globe. NuSil offers several manufacturing locations in the United States capable of producing batches from less than 1 kilogram to thousands of kilograms.

Corporate Headquarters Carpinteria, California

- 250,000 ft² Production Facility
- Advanced Research and Development Facility
- Center for Global Technical Sales and Support

FDA registered Manufacturing Facility Bakersfield, California

- 58,000 ft² of Manufacturing Space
- Plan to Expand and Grow in the Near Future



Silicone Hybrid Technology

Silicones are consistently used across many industries such as aerospace and photonics — to the healthcare industry for medical device and drug delivery applications. In the photonics industry high refractive index silicones are used to enhance brightness and light production in light emitting diodes (LED) as well as in specialized optical applications such as intraocular lenses implanted into the human eye to restore clear vision. The same principals used to achieve benefits found in photonics and medical devices can be applied to cosmetic formulations. The breadth of crossover technology associated with silicones makes them an attractive ingredient for custom use in the personal care industry.

Custom Silicone Technology

Many properties can be selected by building functional polymers and copolymers to produce desirable properties and a natural feel.

Our silicone polymers can be built with various pendant groups to add to the myriad of properties to give formulators a wide range of custom options.

Typical Pendant Groups Include:

- Methyl
- Phenyl
- TriFluoropropyl
- Polyethylene glycol (PEG)
- Polypropylene glycol
- Lauryl
- Cetyl
- Stearyl
- Caprylyl
- Vinyl

Silicone Personal Care Options

Three distinct classes of silicone systems — siloxane polymers, siloxysilicates and silsequioxanes, and vinyl cross polymers, can be altered or incorporated with custom ingredients. These customizable options provide formulators with a broad range of benefits for general hair care, skin care, make-up, and sun care applications as described below.

Siloxane Polymers

Siloxane polymers are linear polymers of repeating Si-O units with organic pendant groups.

General Hair Care

- Manageability
- Smoothness
- Luster & Shine
- Conditioning

Skin Care

- Moisturize
- Slip & Extended Rub-in Application Enhancement
- Wrinkle Reduction

Liquid and Make-up

- Pigment Dispersal & Suspension
- Crème to Powder Effect

Sun Care

- Moisturize
- Wash & Transfer Resistance
- Increased SPF

Siloxysilicates and Silsequioxanes

Various reactive groups can be added to create specialty siloxysilicates. These materials come in a broad range of viscosities from 100 cps to crystalline solid.

General Hair Care

- Manageability
- Smoothness
- Softness

Fixative Hair Care

- Hold & Moisture Resistance
- Shine
- Comb-through

Vinyl Cross Polymers

Vinyl cross polymers are curable into compliant solids from which the tack can be adjusted for specific patch type delivery applications. Ingredients are typically compounded into the silicone prior to curing to the desired patch configuration.

Vinyl Cross Polymers in Cyclopentasiloxane

Other types of crosspolymer technologies more common to the Personal Care industry include the paste or cream type which is comprised of the crosspolymer solids suspended in a volatile fluid. These materials are often used to thicken formulations, as a carrier of encapsulants for various ingredients, and to add a silky benefit to a cosmetic formulation.

Cosmeceutical Delivery Systems (Patch or Paste)

- Topical Vitamin & Active Delivery

Skin Care

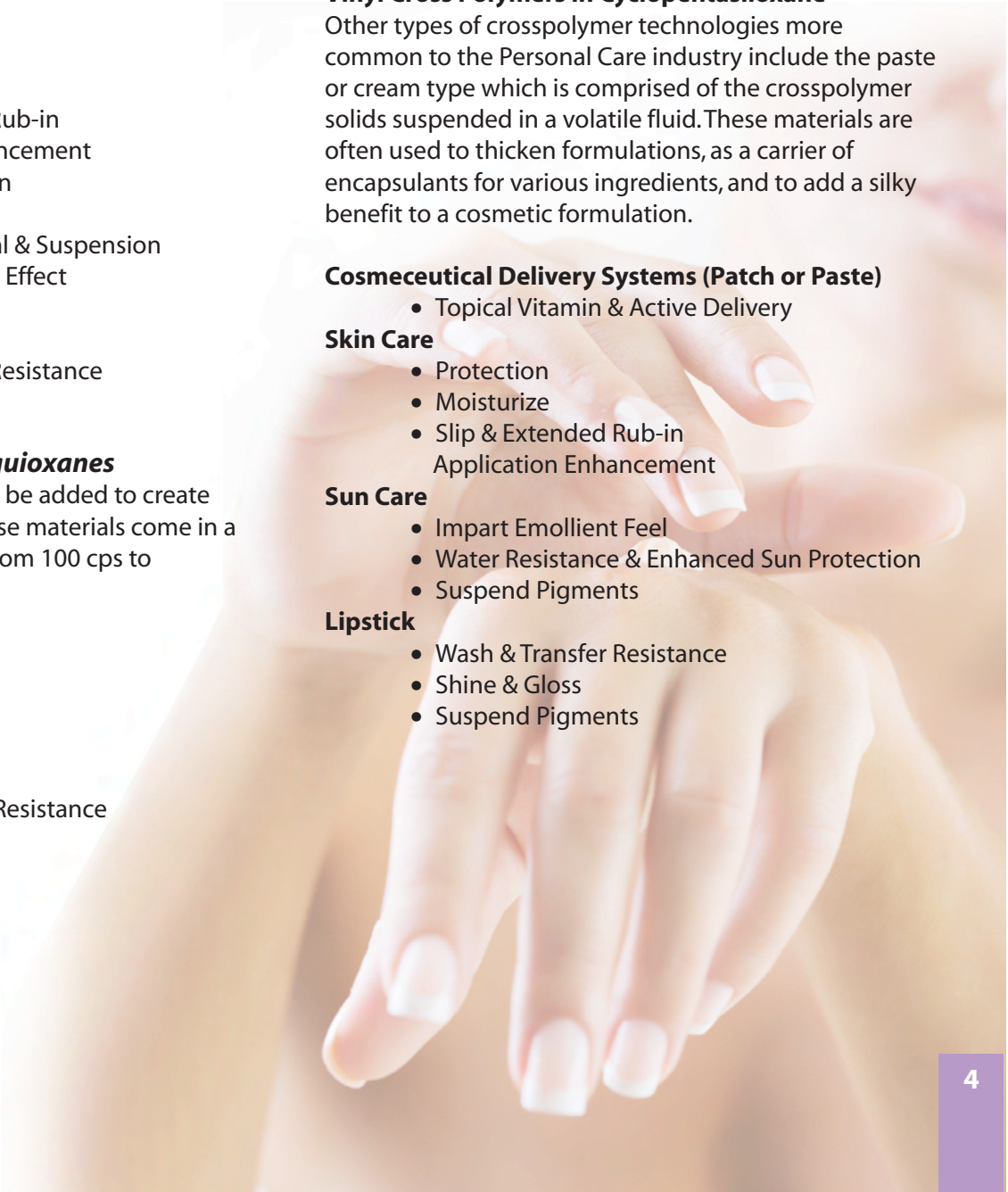
- Protection
- Moisturize
- Slip & Extended Rub-in Application Enhancement

Sun Care

- Impart Emollient Feel
- Water Resistance & Enhanced Sun Protection
- Suspend Pigments

Lipstick

- Wash & Transfer Resistance
- Shine & Gloss
- Suspend Pigments



PERSONAL CARE MATERIALS SELECTION GUIDE

Product Number	Work Time	Cure Time / Temp °C	Viscosity	Specific Gravity @ 25 °C	Refractive Index 589 nm	Volatility
DIMETHICONES						
PCM-7901	-	-	350 cps	0.97	1.403	-
PCM-7901	-	-	1,000 cps	0.97	1.403	-
PCM-7901	-	-	12,500 cps	0.97	1.403	-
PCM-7902	-	-	350 cps	0.97	1.403	2% max
PCM-7902	-	-	1,000 cps	0.97	1.403	2% max
PCM-7902	-	-	12,500 cps	0.97	1.403	2% max
TRIFLUOROPROPYLMETHICONES						
PCM-7905	-	-	350 cps	1.130 - 1.381	1.38	0.20%
PCM-7905	-	-	1,000 cps	-	1.38	-
PCM-7905	-	-	12,500 cps	-	1.38	-
TRIFLUOROPROPYLTRIMETHICONES						
PCM-7906	-	-	350 cps	-	1.395	0.1%
PCM-7906	-	-	1,000 cps	-	1.395	0.1%
PCM-7906	-	-	12,500 cps	-	1.395	0.1%
PCM-7907	-	-	350 cps	-	1.383	0.2%
PCM-7907	-	-	1,000 cps	-	1.383	0.2%
PCM-7907	-	-	12,500 cps	-	1.383	0.2%
DIPHENYLDIMETHICONES						
PCM-7904	-	-	350 cps	1.01	1.429	4% max
PCM-7904	-	-	1,000 cps	1.01	1.429	4% max
PCM-7904	-	-	12,500 cps	1.01	1.429	4% max
PCM-7916	-	-	575 cSt	1.08	1.52	0.2%
PCM-7917	-	-	1500 cSt	1.04	1.46	<0.1%
AMINOPROPYL DIPHENYLDIMETHICONES						
PCM-7918	-	-	65,000 cps	-	1.55	1%
VINYL CROSSPOLYMERS						
PCM-7926	3 m	15 m / 150	A: 20,000 cps / B: 16,500 cps	1.07	-	-
PCM-7927	25 m	15 m / 150	A: 20,000 cps / B: 15,000 cps	1.07	-	-
PCM-7931	>24 h	1 h / 100	520 cps	0.97	1.402 - 1.404	-
PCM-7932	-	5 h / 140	1,000 cps	0.97	-	-
PCM-7933	45 m	30 m / 140	A: 10,000 cps / B: 6,000 cps	0.97	-	-
CYCLICS						
PCM-7949	-	-	3 cSt	0.95	-	-

h = hour m = minutes

Flash Point °F / °C	Appearance	Comments
600 / 315	Clear Liquid	Acid Number: 0.01mg KOH, Total Mass Loss (TML): 0.06
600 / 315	Clear Liquid	Acid Number: 0.01mg KOH, Total Mass Loss (TML): 0.06
600 / 315	Clear Liquid	Acid Number: 0.01mg KOH, Total Mass Loss (TML): 0.06
600 / 315	Clear Liquid	Acid Number: 0.01mg KOH
600 / 315	Clear Liquid	Acid Number: 0.01mg KOH
600 / 315	Clear Liquid	Acid Number: 0.01mg KOH
>275 / >135	Clear Liquid	Fluid, Trimethyl Endblocked Trifluoropropylmethylsilxane
>275 / >135	Clear Liquid	Fluid, Trimethyl Endblocked Trifluoropropylmethylsilxane
>275 / >135	Clear Liquid	Fluid, Trimethyl Endblocked Trifluoropropylmethylsilxane
>275 / >135	Clear to Amber	20 mole % Fluoronated Copolymer
>275 / >135	Clear to Amber	20 mole % Fluoronated Copolymer
>275 / >135	Clear to Amber	20 mole % Fluoronated Copolymer
>275 / >135	Clear to Amber	60 mole % Fluoronated Copolymer
>275 / >135	Clear to Amber	60 mole % Fluoronated Copolymer
>275 / >135	Clear to Amber	60 mole % Fluoronated Copolymer
600 / 315	Translucent	Fluid, High / Low Temperaorte
600 / 315	Translucent	Fluid, High / Low Temperaorte
600 / 315	Translucent	Fluid, High / Low Temperaorte
>275 / >135	Translucent	30 mole % Diphenylsiloxane Endblocked w/ Reactive Vinyl Groups
>275 / >135	Translucent	18 mole % Diphenylsiloxane Endblocked w/ Reactive Vinyl Groups
>275 / >135	White to Yellow	50 mole % Diphenylsiloxane
>275 / >135	Translucent	Durometer (Type A): 20, Tensil Strength 550 psi, Elongation 475%
>275 / >135	Translucent	Durometer (Type A): 17, Tensil Strength 675 psi, Elongation 575%, Tear Strength 30 ppi
>275 / >135	Translucent	Penetration 10 mm
>284 / >140	Translucent	Penetration can be formulated to specific requirements.
>275 / >135	Translucent	Penetration 3 mm
133 / 56	Translucent	Non-volatile Content: 0.15, Gas Chromatography (D4 Content): 99.5%

** ALL PRODUCTS ARE 100% SILICONE AND CONTAIN NO ACTIVES. **