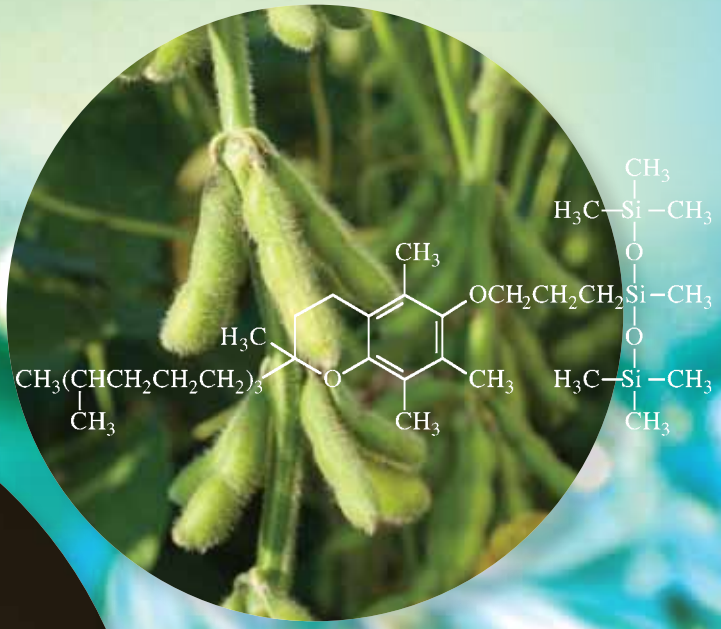
Hybrid Fluids

FOR PERSONAL CARE



Gelest

Enabling Your Technology

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Hybrid Fluids for Personal Care

Hybrid Fluids combine the properties of Organic materials with Siloxanes in order to create structures that:

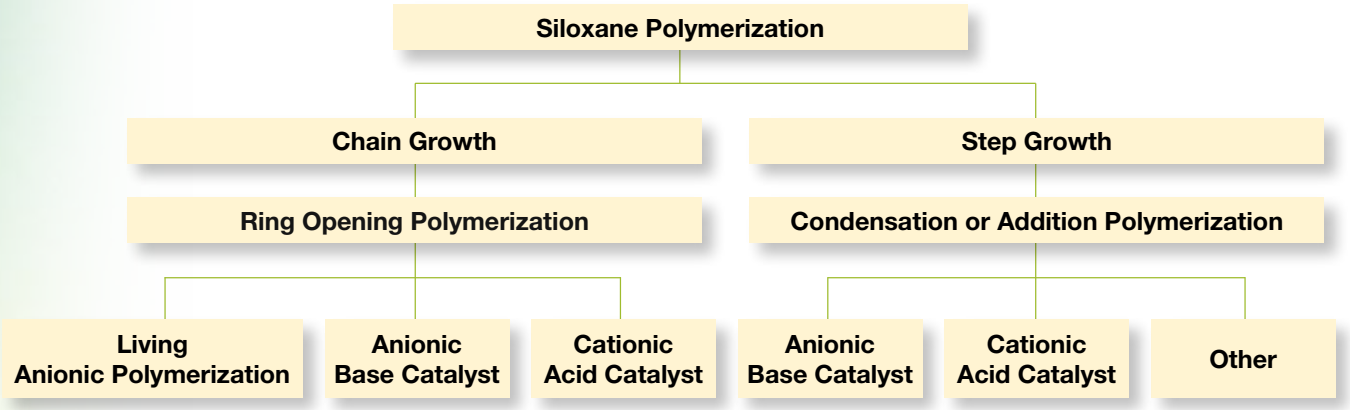
- Achieve unique skin feel
- Improve wear properties
- Improve solubility
- Lower surface tension
- Introduce a dimethicone slip with a light natural feel
- Allow greater formulation latitude
- Improve perfume retention
- Enhance dispersion of pigments and fillers
- Offer compatibility with natural cosmetic ingredients

GELEST OFFERS TWO CLASSES OF HYBRID FLUIDS:

SiBrid® Fluids Organic modified siloxanes that cross the boundaries between organics and silicones. SiBrid® fluids are soluble in most organics and silicones.

Vertasil® Fluids High natural product content derived silicones. Vertasil® fluids are natural products modified by incorporation of oligomeric siloxanes that offer reduced surface tension, increased spreadability and enhanced compatibility.

Technical Background – Hybrid Fluids

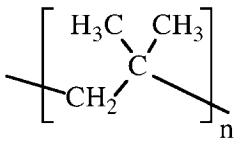


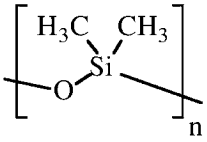
A variety of technologies are employed by Gelest to combine natural and organic functionality with siloxane structures to form new hybrid polymer architectures.

The introduction of natural or organic components into siloxanes usually constitutes initiation, termination, graft copolymer and block polymerization methods. The natural and organic hybrids discussed throughout this brochure represent materials which have been shown to have both utility and impact in cosmetic formulations. In another sense, these materials are simply examples of the possibilities this technology platform offers for innovation.

Hybrid Fluids extend the range of organic and natural products by introducing alternating silicon and oxygen bond segments into their structure. The alternating silicon-oxygen segments have exceptionally low barriers to rotation leading to molecular flexibility. The result is that the desirable characteristics of organic and natural products are extended – greater emolliency, wider ranges of liquid behavior and broader formulation options. The ability of Hybrid Fluids to cross compatibility barriers not only allows them direct applicability in both organic and silicone formulations but allows them to act as co-compatibilizing additives.

A useful illustration to distinguish the difference of pure organic systems with siloxane systems is to consider the differences between polyisobutylene and polydimethylsiloxane. The molecular scaffold of polyisobutylene is constrained by the rotational barrier of the carbon-carbon bond, 3.3 kcal/mole, while the molecular scaffold of polydimethylsiloxane is essentially unconstrained since the rotational barrier of the silicon-oxygen bond is essentially zero. The carbon-carbon bond is also shorter than the silicon-oxygen bond, resulting in more tightly packed molecular structures for pure organics. Among other effects, siloxanes allow permeation of moisture and oxygen. At the same time, the strength of the silicon-oxygen bond is greater than the strength of the carbon-carbon bond.





Property	hydrocarbon	polydimethylsiloxane
form	amorphous	amorphous
glass transition, Tg	-70°	-123°
viscosity, n=10	570 cSt	5 cSt
viscosity, n=100	5,000,000 cSt	140 cSt
surface tension	33mN/m^3	22mN/m^3
oxygen permeability	0.81 cm^3 -cm/cm^2 •s•cmHg	60 cm^3-cm/cm^2•s•cmHg

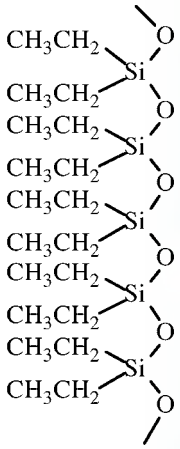
These fundamental differences in properties of siloxanes compared to hydrocarbons offer advantages in product formulations due to:

- Low Surface Energy
- Wide viscosity range
- Spreading behavior
- Lower Reactivity
- Biocompatibility
- UV-resistance
- Modified Hydrophilic-Lipophilic Balance

SiBrid® Hydrocarbon Hybrids

SiBrid® Fluids are organic-modified siloxanes that cross the boundaries between organics and silicones. SiBrid® Fluids are soluble in most organics and silicones.

Diethicone – Polydiethylsiloxane (INCI name)



Diethicone compared to Dimethicone*

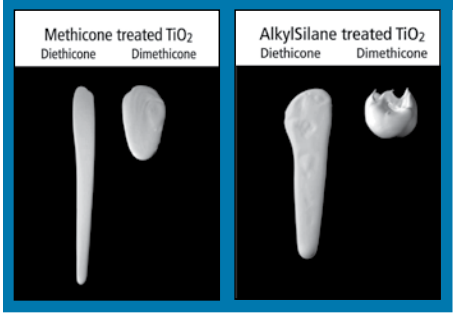
	Diethicone	Dimethicone
Surface Tension	25-28 mN/m	20-22 mN/m
Glass Transition, Tg	-139°C	-121°C
Refractive Index	1.43-1.45	1.40-1.41
Viscosity	Full Range	Full Range
Organic Compatibility	Wide Range	Slight

* Typical properties for fluids in the viscosity range of 10-500 cSt.

PolydiEthylsiloxanes (Diethicones) are the first of a series of hybrid silicone polymers without methyl substitution. Analogous in structure to Dimethicones, the flexible polymer structure of Diethicones allows the manufacture of a wide range of fluid viscosities. The beneficial properties of Diethicones include excellent spreading, gas permeability, water resistance, lubricity and the ability to reduce tack. Diethicone's tactile properties include a dry feel similar to that of Dimethicone but with increased cushion. Diethicones have dramatically broad compatibility with organics compared to Dimethicones, allowing formulation with common cosmetic raw materials including many hydrocarbons, esters, waxes and surfactants. Diethicones overcome the solubility limitations of Dimethicones with many surfactants, emollient oils and both natural and synthetic waxes.

Diethicones, in contrast to Dimethicones, wet pigments well. The greater organic character of Diethicones allows coated pigments and fillers to disperse more readily in organic vehicles allowing either higher pigment volume concentration at equivalent formulation viscosities or substantially lower viscosities at equivalent pigment loadings.

Pigment Wetting – Diethicone compared to Dimethicone.



Diethicone - Pigment Wetting Color Grind Viscosity

	55% TiO_2 SI (methicone treated)	50% TiO_2 AS (C_8 silane treated)	40% Red 7 (untreated)
Dimethicone DMS-T15 50 cst	**8790 cps** (3 passes)	**>30,000 cps** (3 passes)	**40 cps** (5 passes)
Diethicone DE-15 50 cst	**59 cps** (3 passes)	**552 cps** (2 passes)	**25 cps** (3 passes)

Diethicone Physical Properties

polydiethylsiloxane [63148-61-8]

	Viscosity	Density	Refractive Index	Flashpoint	Molecular Weight
SiBrid® DE-12	15-20 cSt	0.93	1.438	125°	400-500
SiBrid® DE-15	40-50 cSt	0.96	1.442	170°	500-800
SiBrid® DE-23	250-350 cSt	0.99	1.447	250°	1300-2000

VISCOSITY

DE-12 — LIGHT, DRY FEEL

DE-15 — **EMOLLIENCE, CUSHION**

DE-23 — **SUBSTANTIVITY**

Formulations with SiBrid® Diethicone

Long wearing water in silicone foundation

SiBrid® DE-12 is a light emollient that provides excellent spreading and blending and is also an exceptional vehicle for pigment wetting and dispersion. The **Gelest SS treated pigments** create a smooth, creamy feel.

Ingredient	wt %
Water Phase	
Deionized Water	49.10
Magnesium Sulfate	0.20
Butylene Glycol	6.00
Benzoic Acid	0.20
Silicone Phase	
Velvesil 125	10.00
Cyclopentasiloxane	5.00
KF 6038	3.00
SiBrid® DE-12	5.00
Rhodasurf L-790	0.50
Color Grind	
Gelest Titanium Dioxide SS	8.00
Gelest Yellow Iron Oxide SS	1.20
Gelest Red Iron Oxide SS	0.50
Gelest Black Iron Oxide SS	0.20
Gelest Talc SS	4.10
SiBrid® DE-12	7.00
	100.00

Anti-Aging Moisturizing Serum with SPF

This Serum provides moisturization without a heavy or greasy feel. **SiBrid®DE12** improves spreadability and eliminates tack, **SiBrid®TM-181** provides weightless feel, and **SiBrid®TM-VE1** adds skin softening.

Ingredient	wt %
Water Phase	
Deionized Water	q.s.
Propylene Glycol	5.00
Sodium Chloride	1.00
Purslane Extract	q.s.
Fragrance	q.s.
Preservative	q.s.
Silicone Phase	
SiBrid® TM-181	8.30
SiBrid® DE-12	3.00
SiBrid® TM-VE1	1.00
Polyglyceryl Oleate	1.00
Glycol Distearate	0.75
Magnesium Stearate	0.75
Jeesilc EM90	2.00
Homosalate	5.00
Octocrylene	5.00
Avobenzone	3.00
	100.00

Ingredient Information:

DE-12 (Gelest) DE-15 (Gelest) KF-6038 Lauryl PEG-9 Polydimethylsiloxyethyl Dimethicone (Shin-Etsu) Purslane Extract (SK Bioland) Jeesilc EM90 (Jeen International) Velvesil 125 C_{30-45} Alkyl CetearylDimethicone Crosspolymer (Momentive)

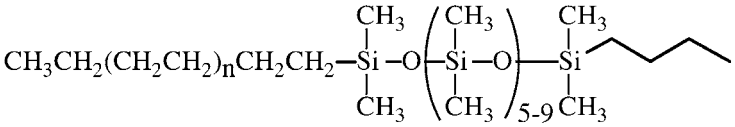
SiBrid® Diethicone Solubility

	DE-12	DE-15	DE-23	Dimethicone
Cyclopentasiloxane	S	S	S	S
Dimethicone, 10 cSt	S	S	S	S
Stearyl Methicone	S	S	PS	I
Hydrogenated Polydecene	S	S	S	PS
10% Microcrystalline Wax	S	S	PS	I
Ozokerite	S	S	PS	I
Octyldodecyl Stearate	S	S	S	I
Triisostearyl Citrate	S	S	S	I
Ethylhexyl Palmitate	S	S	S	S
Octyldodecanol	S	S	S	S
Castor Oil	I	I	I	I
Ethylene-Dimethicone Block Polymer	S	S	S	S

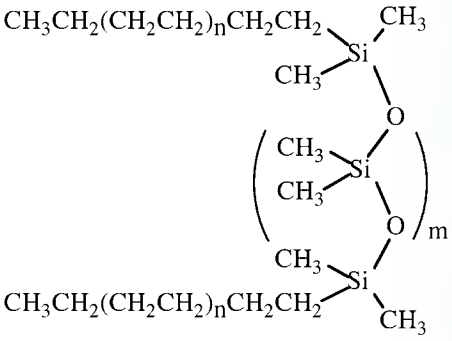
S = Soluble I = Insoluble PS = Partially Soluble

Ethylene Siloxane Block Polymers

SiBrid® ETHYLENE/DIMETHICONE BLOCK COPOLYMERS
Block polymers of ethylene and polydimethylsiloxane are solid low melt-point materials. They offer the smoothness of paraffins without waxy feel. When added to many organic and hydrocarbon systems they reduce tack and increase slip. At higher levels they can form barriers to moisture transmission. Diblock copolymers are more effective in compatibilizing hydrocarbon and silicone materials. Triblock copolymers provide greater emolliency.



SiBrid® EDEB-321
BISPOLYETHYLENE DIMETHICONE (INCI name)
Ethylene-dimethylsiloxane-ethylene triblock copolymer



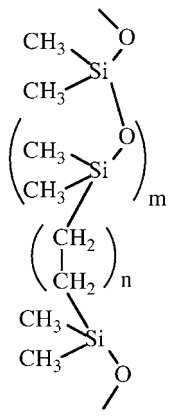
SiBrid® EDEB-211
POLYETHYLENE DIMETHICONE (INCI name)
Bis-(C24-30 Alkyl/Butyl)Dimethicone

Product	Type	Pourpoint	Viscosity
SiBrid® EDEB-211	diblock	18-19°	45 cSt @ 25°
SiBrid® EDEB-321	triblock	44-5°	65 cSt @ 55°

Ethylene Siloxane Copolymers

SiBrid® ETHYLENE-DIMETHICONE COPOLYMER (INCI name proposed)
(Ethylene-polydimethylsiloxane copolymer)

Ethylene Siloxane Copolymers are light vehicles that are primarily used as additives to compatibilize or stabilize mixed silicone organic formulations. Incorporation at low levels, typically 1-3%, helps stabilize silicone-organic mixtures that have a tendency to phase separate during storage.



SiBrid® Ethylene-Siloxane Hybrids - Properties

Product	Viscosity	Density	Refractive Index
SiBrid® PEDC-21	100 cSt	0.92	1.431

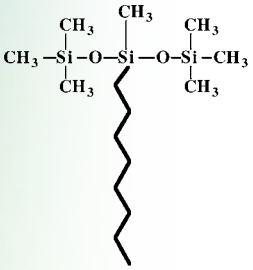
SiBrid® Ethylene-Siloxane Hybrids Solubility

	EDEB-21	PEDC-21	Dimethicone
Cyclopentasiloxane	S (hot)	S	S
Dimethicone, 10 cSt	S (hot)	S	S
Stearyl Methicone	S	S	S
Hydrogenated Polydecene	S	S	S
10% Microcrystalline Wax	S	I	I
Ceresin	S	I	I
Octyldodecyl Stearate	S	S (hot)	I
Triisostearyl Citrate	S	S	I
Ethylhexyl Palmitate	S	S	S
Octyldodecanol	S	I	I
Castor Oil	I	I	I

GELEST SPECIALTY SILICONE FLUIDS

Fluid	Type	Code	Refractive Index	Viscosity cSt	INCI Name	Global	CLAIMS/ CERTIFICATIONS	FEATURES & BENEFITS						APPLICATIONS				
								Slip	Reduces Tack	Emol-liency	Solu-bilizer	Compati bilizer	Improves Water Resistance	Make up	Skin Care	Sun Care	Hair Care	Bath& Body
Diethicone 12	SiBrid®	DE-12	1.438	15-20	Polydiethylsiloxane	G	Reduces Tack, Slip Enhancer, Good Solubilizer	•••	•••	•	•••		••	★	★	★	★	★
Diethicone 15	SiBrid®	DE-15	1.442	40-50	Polydiethylsiloxane	G	Reduces Tack, Slip Enhancer	•••	•••	•	••		••	★	★	★	★	★
Diethicone 23	SiBrid®	DE-23	1.447	250-350	Polydiethylsiloxane	G	Emollient	••	••	•••	•		••	★	★			★
Polyethylene Dimethicone	SiBrid®	EDEB-211		45	Polyethylene Dimethicone		Reduce Tack, Increase Slip, Improved Skin Feel	••	••				•	★	★	★		
BisPolyethylene Dimethicone	SiBrid®	EDEB-321		65	BisPolyethylene Dimethicone		Reduce Tack, Increase Slip, Improved Skin Feel	••	••				•	★	★	★		
Ethylene/Dimethicone Copolymer	SiBrid®	PEDC-21	1.431	100	Ethylene Polydimethlsiloxane copolymer (proposed)		Compatibilizer and Stabilizer for Silicone Organic Formulations				••	••	•	★	★	★		
Lauryl Phenylpropyl Methicone	SiBrid®	PM-212	1.464	1500	Lauryl Phenylpropyl Methicone		High Refractive Index, Shine Enhancer, Improves Wear and Skin Adhesion			•			•	★				
Propyl Trisiloxane	SiBrid®	TM-031	1.399	1-2	Propyl Trisiloxane		D5 Alternate Solubilizer	•	•••		•••			★	★	★	★	★
Caprylyl Methicone	SiBrid®	TM-081	1.413	3	Caprylyl Methicone	G	Slip Enhancer, Solubilizer	•••	•••	•	•••	•••	•	★	★	★		★
Lauryl Methicone	SiBrid®	TM-121	1.431	5-6	Lauryl Methicone		Emollient, Slip Enhancer	••	••	••	••		•	★	★	★		★
Stearyl Methicone	SiBrid®	TM-181	1.433	12-13	Stearyl Methicone		Emollient, Slip Enhancer	•	•	•••	•		•		★			★
omega-Anisyldimethicone	Vertasil®	VAN-07	1.43	7-8	Bis(Methoxyphenyl propyl/ butyl) Dimethicone		Shine & Slip	••	•								★	★
omega-Limonenyldimethicone	Vertasil®	VLM-07	1.424	7-8	Bis(Methylcyclohexenyl-isopropyl/butyl) Dimethicone		Cleansing, Emollient	••	•								★	★
Limonenyltrisiloxane	Vertasil®	TM-L01	1.426	4-5	Methylcyclohexenyl Isopropyl Trisiloxane		Cleansing, Emollient, Compatibilizer	•	•••		•••	•••					★	★
Tocopheryl-oxypropyltrisiloxane	Vertasil®	TM-VE1	1.472	700	Tocopheryloxypropyl Trisiloxane		Solubilizer, Tack, Film Former			•••	•••		••	★	★	★		★

Tailoring an Organic Hook to a Hydrophobic Cloud



Trisiloxanes contain a cluster of seven methyl groups which form one of the lowest energy flexible structures known. The structure has been compared to a hydrophobic cloud. By altering the length and polarity of the organic substituent trisiloxanes range from light dry feeling volatile liquids to emollient fluids and, with polar substitution, super-wetting surfactants. Alkyltrisiloxanes with 6 to 12 carbons in the organic substituent are light, dry, emollient oils with good organic compatibility, particularly when compared to phenyl trimethicone. They are used to enhance slip and reduce tack in skin care and color cosmetics. Organic and inorganic pigments are readily wetted and dispersed in alkyl trisiloxanes, facilitating use in foundations, eyeshadows, blushes and lip color.

SiBrid® TM-081
CAPRYLYL METHICONE (INCI name)

SiBrid® TM-081 Caprylyl Methicone offers an exceptionally light, dry feel combined with excellent spreading qualities. SiBrid® TM-081 is an excellent vehicle for long wearing foundations and eyeshadows. It also performs well as an additive in bath and tanning oils to enhance spreadability and reduce tack in many oil-based formulations.

SiBrid® TM-121
LAURYL METHICONE (INCI name)

Lauryl Methicone is similar to TM-081 with reduced volatility and increased pigment wetting properties

SiBrid® TM-181
STEARYL METHICONE (INCI name)

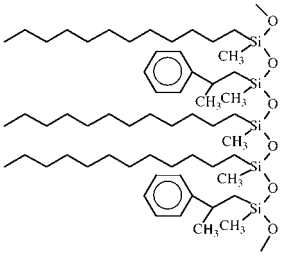
Stearyl Methicone is more lubricious than TM-081 but leaves a smooth weightless feeling on the skin. TM-181 can be used to reduce tack and lend a lighter feel to skin treatment products and liquid foundations.

SiBrid® Trisiloxanes

Product	Name	Viscosity	Density	Refractive Index
SiBrid® TM-081	CAPRYLYL METHICONE	3 cSt	0.82	1.413
SiBrid® TM-121	LAURYL METHICONE	5-6 cSt	0.84	1.431
SiBrid® TM-181	STEARYL METHICONE	12-13 cSt	0.83	1.433

SiBrid® PM-212 LAURYL PHENYLPROPYLMETHICONE
Dodecylmethylsiloxane-2-phenylpropylmethylsiloxane copolymer (INCI name)

SiBrid® PM-212 is a viscous, high refractive index C12 / phenylpropyl modified light amber silicone that gives high luster and shine to lip products. Films formed using SiBrid® PM-212 resist feathering and creeping, allowing the formulation of emollient lip glosses and lipsticks. SiBrid® PM-212 can also be used in skin and sun care products to improve skin adhesion and film forming capability.



Product	Name	Viscosity	Density	Refractive Index
SiBrid® PM-212	LAURYL PHENYLPROPYLMETHICONE	1500 cSt	0.91	1.464

Gloss Lipstick

The high refractive index of **PM-212** creates gloss without excessive tack.

Ingredient (supplier)	INCI name	%
Crystal O (Vertellus)	Castor Oil	8.45
Eutanol G (Cognis)	Octyldodecanol	10.00
Schercemol TISC (ISP)	Triisostearyl Citrate	20.00
SiBrid® DE-15 (Gelest)	Polydiethylsiloxane	10.00
SiBrid® PM-212 (Gelest)	Laurylphenylpropyl Methicone	10.00
Carnauba		1.50
Candelilla		7.00
Microcrystalline Wax 170/180		3.50
Ozokerite 170/180		2.00
Preservatives, antioxidants		0.35
Color Grind		
Castor Oil		9.00
Pigment		10.20
Stearyl Triethoxysilane treated		
Timiron® Splendid Red (EMD Chemicals)		
Mica (and) Titanium Dioxide (and) Silica		8.00
		100.00

Vertasil® Natural Product Tipped Siloxanes

Natural product character is imparted to a short emollient silicone tail by combining natural products with one end of a low molecular weight siloxane. The salient characteristics of the natural product are readily retained in formulations, allowing the desirable accent of a natural product such as shine or cleansing in a form that is silicone compatible.

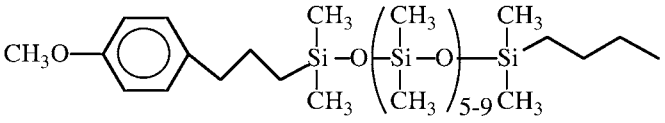
Vertasil®Hybrid Fluids – Properties

Product	Name	Viscosity	Density	Refractive Index
VAN-07	omega-ANISYLDIMETHICONE	7-8 cSt	0.94	1.430
VLM-07	omega-LIMONENYLDIMETHICONE	7-8 cSt	0.92	1.424
TM-L01	LIMONENYLTRISILOXANE	4-5 cSt	0.88	1.426
TM-VE1	TOCOPHERYLOXYPROPYLTRISILOXANE	700 cSt	0.92	1.472

Vertasil® VAN-07 omega-ANISYLDIMETHICONE

BIS(METHOXYPHENYLPROPYL/BUTYL)DIMETHICONE (INCI name)

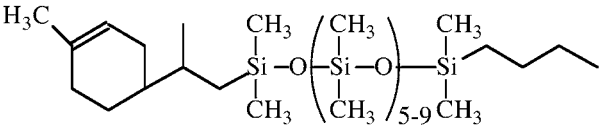
Anisyldimethicone is derived from the essential oil of tarragon. Vertasil® omega-Anisyldimethicone combines the high refractive index of anise with the lower surface tension of polysiloxanes to form high luster thin films compatible with a wide range of organics and silicones.



Vertasil® VLM-07 omega-LIMONENYLDIMETHICONE

BIS(METHYLCYCLOHEXENYLISOPROPYL/BUTYL)DIMETHICONE (INCI name)

Limonene is the major component of the oil extracted from citrus rind. Vertasil® omega-Limonenyldimethicone has a light emollient touch. Vertasil® omega-Limonenyldimethicone has solubility in a wide range of organics and silicones.

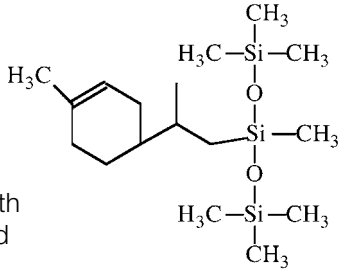


Vertasil® Trisiloxane Modified Natural Products

Incorporation of trisiloxanes to natural products can transform them to hybrid fluids with properties ranging from light, dry feeling, volatile vehicles to emollient fluids. Vertasil® trisiloxane hybrids are used to enhance slip and reduce greasiness in skin care and color cosmetics. Organic and inorganic pigments are more readily wetted by hybrids than by silicones, facilitating use in foundations, eyeshadows and blushes.

Vertasil® TM-L01 LIMONENYLTRISILOXANE

METHYLCYCLOHEXENYLISOPROPYLTRISILOXANE (INCI name)



Vertasil® TM-L01 offers a natural component version of caprylyltrimethicone derived from limonene. Limonene is the major component of the oil extracted from citrus rind but unlike Limonene, Vertasil® TM-L01 is not an allergen. Like Caprylyl Methicone, Vertasil® TM-L01 Limonenyltrisiloxane offers an exceptionally light, dry feel combined with excellent spreading qualities. Limonenyltrisiloxane combines the light feel, and cleansing properties of limonene with the low surface tension of silicones without the characteristic aroma of limonene. It is a distilled product with excellent color, and without any tacky residue. Vertasil® TM-L01 is an excellent vehicle for long wearing foundations and eyeshadows. It also performs well as an additive in bath and tanning oils to enhance spreadability and reduce greasiness in many oil-based formulations.

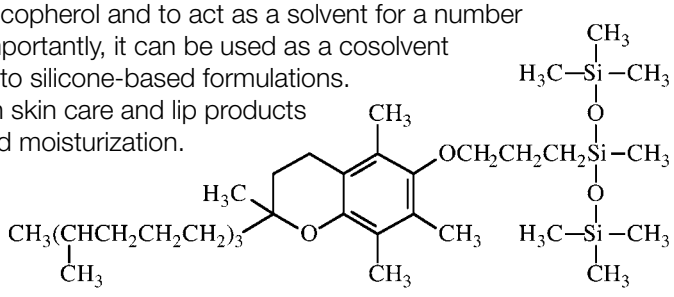
Body Lotion with Vertasil® TM-L01

TM-L01 imparts light emolliency and excellent slip to a body lotion that applies easily to ease dryness and correct uneven skin tone.

Ingredient	INCI name	%
Water Phase		
Deionized Water		70.67
Spectraflex Focus Red	Fluorophlogopite, Titanium Dioxide	0.50
Ultrez 10	Carbomer	0.20
Butylene Glycol		4.00
Methylparaben		0.30
Tween 60	Polysorbate-60	1.00
Disodium EDTA		0.05
Tris Amino	Tromethamine	1.00
Deionized water		3.00
Oil Phase		
Vertasil® TM-L01 Limonenyl Trisiloxane Methylcyclohexenyl Isopropyl Trisiloxane		5.00
Ceraphyl ODS	Octyldodecyl Stearate	9.00
Emersol 132	Stearic Acid	2.00
Cerasynt SD	Glyceryl Stearate	1.00
Span 60	Sorbitan Stearate	1.00
Propylparaben		0.10
Glydant	DMDM Hydantoin	0.18
Deionized Water		1.00
		100.00

Vertasil® TM-VE1 TOCOPHERYLOXYPROPYLTRISILOXANE (INCI name)

Vertasil® TM-VE1 is a unique hybrid fluid formed by adding a small siloxane segment to a natural tocopherol derived from soybean oil. The tocopheryl substituent adds skin treatment properties to the siloxane backbone while the siloxane component improves the slip and skin feel of the tocopherol. This unique structure enables the Tocopheryloxypropyl Trisiloxane to spread more readily than pure tocopherol and to act as a solvent for a number of mineral and vegetable waxes. Importantly, it can be used as a cosolvent to incorporate natural tocopherol into silicone-based formulations. TM-VE1 is recommended for use in skin care and lip products to provide softening, emollience and moisturization.



Lipstick with TM-VE1

Formulation Features:
Unlike many silicones and silicone derivatives, TM-VE1 is easily incorporated into lip products due to its solubility in a range of polar compounds, including castor oil. Benefits of TM-VE1 in lip products are lip conditioning, lip softening, and protection against the drying effects of the environment.

Ingredient	INCI name	%
Crystal O	Castor Oil	13.45
Scheremol TISC	Triisostearyl Citrate	30.00
Eutanol G	Octyldocecanol	10.00
Vertasil® TM-VE1	**Tocopheryloxypropyltrisiloxane**	**2.50**
Ceraphyl ODS	Octyldodecyl Stearate	2.50
Methylparaben		0.20
Propylparaben		0.10
Ascorbyl Palmitate		0.05
Candelilla		7.00
Carnauba		1.50
Microwax SP 19	Microcrystalline Wax	3.50
Ozokerite 170D	Ozokerite	2.00
Color Grind		
Castor Oil		9.00
Pigment		10.20
Gelest SS (Stearyl Triethoxysilane) treated		
Timiron® Splendid Red; Mica, Titanium Dioxide, Silica		8.00
		100.00

Vertasil® Hybrid Fluids Solubility

	TM-L01	TM-VE1	VAN-07	VLM-07	Dimethicone
Cyclopentasiloxane	S	S	S	S	S
Dimethicone, 10 cSt	S	S	S	S	S
Stearyl Methicone	S	S	S	S	S
Hydrogenated Polydecene	S	S	S	S	PS
10% Microcrystalline Wax	I	S	I	I	I
Ceresin	I	S	I	I	I
Octyldodecyl Stearate	S	S	S	S	I
Triisostearyl Citrate	S	S	S	S	I
Ethylhexyl Palmitate	S	S	S	S	S
Octyldodecanol	S	S	S	S	I
Castor Oil	I	S	I	S	I

Visit www.gelest.com for more information

FOR ADDITIONAL

PRODUCT

INFORMATION

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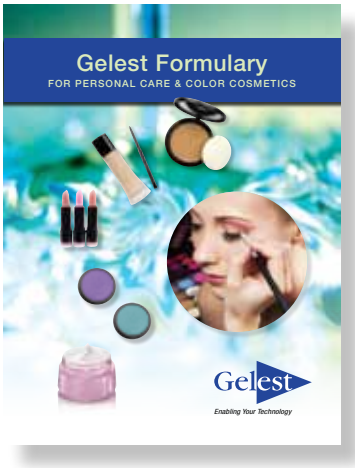

ADDITIONAL GELEST LITERATURE

HYDOPHOBICITY, HYDROPHILICITY AND SILANE SURFACE MODIFICATION
Organosilanes are used extensively for modification of Surface properties. This 80 page brochure describes silane surface modification with an emphasis on making surfaces hydrophobic or hydrophilic.

SILICONE FLUIDS – STABLE INERT MEDIA
Design and Engineering properties for conventional silicone fluids as well as thermal, fluorosilicone, hydrophilic and low temperature grades are presented. The brochure provides data on thermal, rheological, electrical, mechanical and optical properties for silicones. Silicone fluids are available in viscosities ranging from 0.65 to 2,500,000 cSt.

REACTIVE SILICONES – FORGING NEW POLYMER LINKS
Reactive silicones that can be formulated into coatings, membranes, cured rubbers and adhesives for mechanical, optical, electronic and ceramic applications. Information on reactions and cures of silicones as well as physical properties shortens product development time for chemists and engineers.

GELEST 5000-A SILICON COMPOUNDS: SILANES & SILICONES
Detailed chemical properties and reference articles for over 1500 compounds. This handbook of silane and silicone chemistry includes scholarly reviews as well as detailed application information.

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