



MOMENTIVE
performance materials

Silsoft* Silicone Gel

Product Description

Silsoft silicone gel is a cross-linked high molecular weight silicone swollen in cyclopentasiloxane. The material spreads evenly and quickly for a silky, cushioning feel. This gel offers significantly reduced balling effect normally associated with elastomer gels.

The crystal-clear gel contains an alkyl moiety to provide good organic and silicone compatibility. Improving the sensory aesthetics of tacky formulations due to organic oils or sunscreens is possible with the addition of Silsoft silicone gel.

Silsoft silicone gel can be easily incorporated into the oil phase of a formulation by simple mixing. It also has the ability to withstand heat and high shear adding to the ease of formulation processing. There is generally no need for post homogenization.

Key Features and Typical Benefits

- Smooth, silky delivery onto the skin with excellent spreading capacity
- Soft, non-greasy, rub-in during application
- Reduced tack in finished formulations
- Formulation flexibility together with strong organic compatibility
- Can be used with clear anhydrous serums
- Easy to use during manufacturing
- Minimal balling during application
- Able to thicken the oil phase

Typical Physical Properties⁽¹⁾

Appearance	Clear, colorless gel
Non-Volatile Solids, %	5.1 - 5.4
Initial Viscosity, cps	10,000 - 25,000

(1) Typical Properties cannot be used as specifications

INCI Name: Cyclopentasiloxane (and) Cetearyl Dimethicone/Vinyl Dimethicone Crosspolymer

Momentive Performance Materials provides versatile materials as the starting point for our creative approach to ideas that help enable new developments across hundreds of industrial and consumer applications. We are helping customers

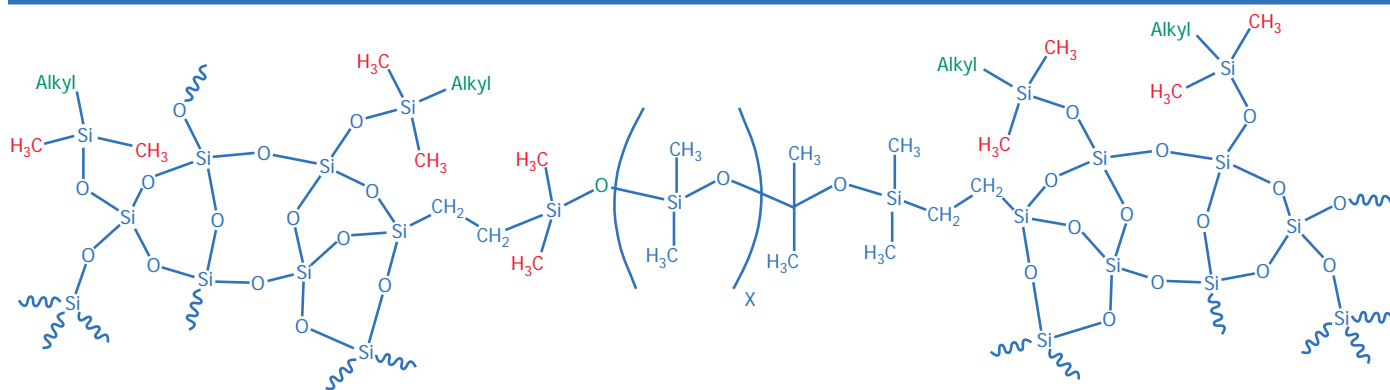
solve product, process, and performance problems; our silanes, fluids, elastomers, sealants, resins, adhesives, urethane additives, and other specialty products are delivering innovation in everything from car engines to biomedical devices.

From helping to develop safer tires and keeping electronics cooler, to improving the feel of lipstick and ensuring the reliability of adhesives, our technologies and enabling solutions are at the frontline of innovation.

Potential Applications

• Suncare Products Physical/Organic UV absorbers	After Suncare	Oil-Free
• Emulsions Moisturizers	Anti-aging	Body Lotions
• Color Cosmetics Foundations	Lip Colors	Pressed Powders
• Anhydrous Products Eye Serums	Facial Serums	AP/DEO
• Hair Care Products Styling Aids	Leave-in conditioners	

Chemical Structure

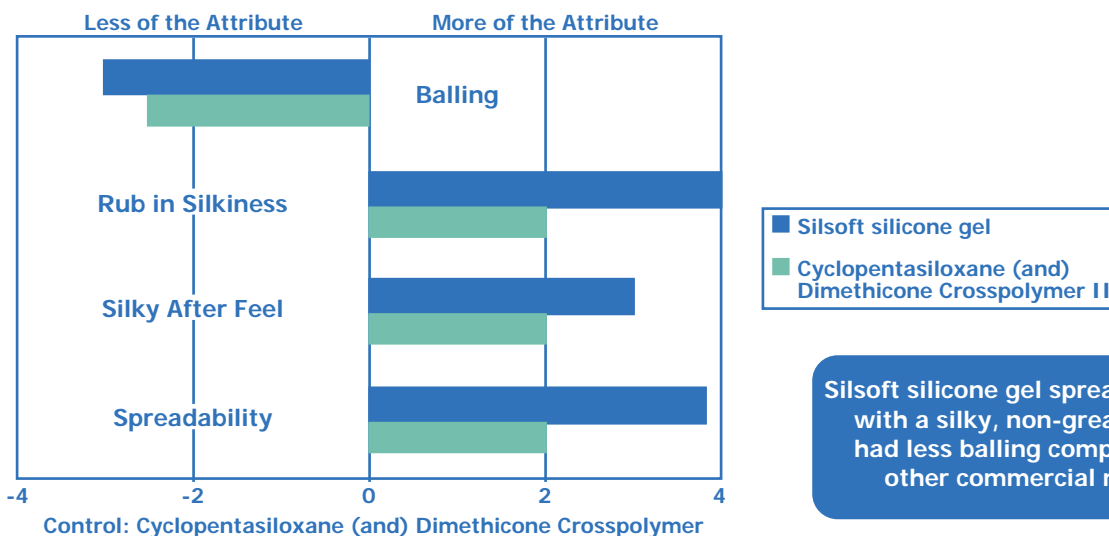


Silsoft silicone gel is a clear, cross-linked gel that contains a substituted alkyl functionality to increase organic compatibility in personal care formulations.

Performance Data

Sensory

During an expert skincare panel evaluation, Silsoft silicone gel was compared to two typical elastomer gels, one of which was set as the control standard. The control standard was given a value of zero. Every panelist received a small sample of each of the materials to rate on a scale of -5 to +5 against the control for various attributes that are important in the personal care market.



Silsoft silicone gel spread more easily with a silky, non-greasy feel and had less balling compared to the other commercial materials

Note: Test results. Actual results may vary.

If the material achieved a higher attribute rating compared to the standard, the measurement is to the right of the zero line, if the material was given a lower attribute rating compared to the standard, the measurement is to the left of the zero line. The resulting data clearly demonstrates that Silsoft silicone gel can provide an enhanced sensory experience. Understanding these findings can translate into a finished formulation that has better spreadability and a smoother, silkier feeling.

Silsoft* Silicone Gel

Performance Data (continued)

Compatibility

The combinations listed below were at a 1:1 ratio of Silsoft silicone gel to solvent.

Solvent	Solubility ⁽¹⁾
Mineral Oil	D
Petrolatum	C
Isododecane	C
Isopropyl Myristate	C
Isopropyl Palmitate	C
Isononyl Isononanoate	C
C12-15 Alkylbenzoate	D
Capric/Caprylic Triglycerides	P
Octylsalicylate	C
Octocrylene	D
Ethanol	P
SF1632 Cetearyl Methicone	C
SF1642 C30-45 Alkyl Dimethicone	C

Solvent	Solubility ⁽¹⁾
SF1202 Cyclopentasiloxane	C
SF96*-5 Dimethicone 5cst	C
SF96-200 Dimethicone 200cst	C
Silsoft 034 organosilicone fluid Caprylyl Methicone	C
Silsoft 900 dimethicone copolyol PPG-12 Dimethicone	P
Silsoft 805 dimethicone copolyol PEG-8 Dimethicone	C
Silsoft 305 dimethicone copolyol PEG/PPG-5/3 Methicone	P
Silsoft 895 dimethicone copolyol PEG-17 Dimethicone	C
SF1550 Phenyl Trimethicone	C
Tospearl* 145A microspheres Polymethylsilsesquioxane	D
Silsoft ETS trisiloxane Ethyl Trisiloxane	C
SS4230 Cyclopentasiloxane (and) Trimethylsiloxysilicate	C
SS4267 Dimethicone (and) Trimethylsiloxysilicate	C

(1) In the presence of other personal care ingredients, compatibility can be enhanced

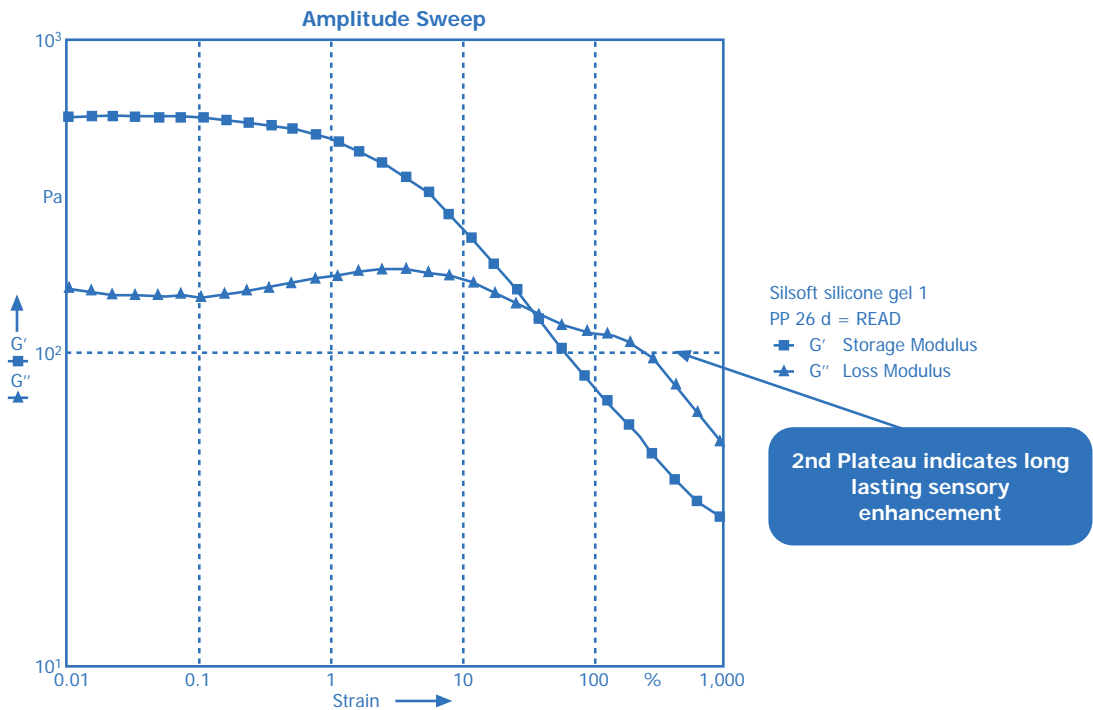
- C = Compatible
- D = Dispersible
- P = Partially Compatible
- N = Non Compatible

Silsoft silicone gel also offers good compatibility with many other oil phase formulation ingredients.

Performance Data (continued)

Rheology

Rheology measurements can be a good indicator for predicting performance characteristics of a given material. For silicone gels, rheology has been used to study structure behavior during the application of shear.



The linear viscoelastic range for the Silsoft silicone gel extends to 0.1% strain. Through this range the storage modulus G' is significantly higher than the loss modulus G'' , indicating that this gel exhibits typical viscoelastic behavior. However, outside this LVE range, two soft plateaus can be seen for the loss modulus G'' . This behavior is not typically observed for cross-linked elastomer gels.

When crosslinked gel structures begin to break down under strain, usually they continue to break down under increasing strain, so that only one plateau is observed in the viscosity/strain curve. For the Silsoft silicone gel, the existence of a second plateau indicates that a change in structure, not a breakdown in structure, is occurring during its deformation under shear. Thus, when the gel is applied to the skin under shear, this rheological property can contribute to a longer lasting, silkier feel with enhanced playtime and a delightful sensory experience.

Formulation Information

Formulation Guide Lines

- Silsoft silicone gel can be used in:
 - O/W Emulsions
 - W/O Emulsions
 - W/Si Emulsions
 - Anhydrous Products
 - Hair Care
- Silsoft silicone gel is added to the Oil or Silicone phase
- Silsoft silicone gel can withstand high shear devices during mixing
- Silsoft silicone gel can be cold processed
- Silsoft silicone gel can be heated during manufacturing
 - Caution must be taken to not volatilize the carrier, cyclopentasiloxane
- Suggested Use Levels: 5 - 30%

Silsoft* Silicone Gel

Formulations

Anti-Aging Cream

Silsoft silicone gel can enhance an elegant sensory experience by smoothing and spreading the collagen easily across the skin's surface.

Part	Commercial Name	INCI Name	Wt/wt%
A	Water	Water	q.s. to 100%†
	Glycerin	Glycerin	4.0
	EDTA	EDTA	0.05
	Cucumber Extract	Cucumber Extract Euphrasia Officinalis Extract	2.0
	Lactic Acid	Lactic Acid	1.0
B	Silsoft silicone gel ⁽¹⁾	Cyclopentasiloxane (and) Cetearyl Dimethicone/vinyl crosspolymer	5.0
	Tospearl* 3000A microspheres ⁽¹⁾	Polymethylsilsequioxane	2.0
	SF1202 ⁽¹⁾	Cyclopentasiloxane	10.0
	SF1540 ⁽¹⁾	Cyclopentasiloxane (and) PEG/PPG-20/15 dimethicone	3.0
	Collagen	Collagen	1.0
	Crodamol CAP ⁽²⁾	Cetearyl Ethylhexanoate and Isopropyl Myristate	3.0
	Preservative	Preservative	per label directions

† quantum sufficit (as much as suffices)

Directions:

- Blend part A and homogenize
- Blend part B and homogenize
- Slowly add part A to part B with good mixing. Gradually increase agitation to high shear as mixture thickens. Continue agitation for 20 minutes.
- Package

Suppliers:

- (1) Momentive Performance Materials
(2) Croda USA Inc.

SPF Facial Lotion

Silsoft silicone gel helps to de-tackify a sunscreen lotion to improve the sensory experience and also assist in the smooth spreading of the oils.

Part	Commercial Name	INCI Name	Wt/wt%
A	Water	Water	20.0
	Neo Heliopan® Hydro ⁽¹⁾	Phenylbenzimidazole Sulfonic Acid	2.0
	Triethanolamine	Triethanolamine	pH 7.0-8.0
B	Water	Water	q.s. to 100%†
	EDTA	EDTA	0.20
	Glycerin	Glycerin	3.0
	Pemulen® TRI ⁽²⁾	Acrylates/C10-30 Alkyl Acrylate Crosspolymer	0.25
C	Isopropyl Palmitate	Isopropyl Palmitate	3.0
	Octyl Methoxycinnamate	Octyl Methoxycinnamate	7.5
	Benzophenone-3	Benzophenone-3	2.0
	Cetearyl Alcohol	Cetearyl Alcohol	2.0
	Polysorbate 80	Polysorbate 80	1.5
	Glyceryl Stearate	Glyceryl Stearate	0.50
	BHT	BHT	0.050
D	Sepigel 305 ⁽³⁾	Polyacrylamide (and) C13-14 Isoparaffin and Laureth-7	1.0
E	Silsoft silicone gel ⁽⁴⁾	Cyclopentasiloxane (and) Cetearyl Dimethicone/vinyl crosspolymer	5.0
	Silsoft ETS trisiloxane ⁽⁴⁾	Ethyl trisiloxane	5.0
	Silsoft 034 organosilicone fluid ⁽⁴⁾	Caprylyl methicone	2.0
F	Tocopheryl Acetate	Tocopheryl acetate	1.0
G	Preservative	Preservative	per label directions

† quantum sufficit (as much as suffices)

Directions:

- Build part B at 200 rpm and 75 °C and agitate for 45 minutes
- Build part C, D, E at 200 rpm and 75 °C in one pot.
- Build part A by hand stirring at 75 °C.
- Drop part B into C/D/E. Increase agitation to 600 rpm as formulation thickens. Add part F and bring to pH 7-8
- Dropwise add part A into B/C/D/E. Re-test pH and adjust to 7.5 with TEA.
- Stir hot for 15 min, then remove heat and add part G when formula has reached 45 °C. Then continue stirring and cooling.

Suppliers:

- (1) Neo Heliopan is a registered trademark of Symrise GmbH & Co. KG
(2) Pemulen is a registered trademark of Lubrizol Advanced Materials, Inc.
(3) SEPPIC
(4) Momentive Performance Materials

Note: Product formulations are illustrative examples only. Momentive makes no representation or warranty of any kind with respect to such formulations, including, without limitation, concerning the efficacy or safety of any product manufactured using such formulations.

Silsoft* Silicone Gel

Formulations

SPF Body Lotion

Silsoft silicone gel can help to provide a luxurious touch to elevate an ordinary SPF lotion to a premium formulation.

Part	Commercial Name	INCI Name	Wt/wt%
A	Water	Water	20.0
	Neo Heliopan® Hydro ⁽¹⁾	Phenylbenzimidazole Sulfonic Acid	2.0
	Triethanolamine	Triethanolamine	pH 7.0 - 8.0
B	Water	Water	q.s. to 100%†
	Disodium EDTA	Disodium EDTA	0.20
C	Benzophenone-3	Benzophenone-3	2.0
	Isopropyl Palmitate	Isopropyl Palmitate	3.0
	Octyl Methoxycinnamate	Octyl Methoxycinnamate	7.5
	Emulgade® SE-FF ⁽²⁾	Glyceryl Stearate (and) Ceteareth-20 (and) Ceteareth-12 (and) Cetearyl Alcohol (and) Cetyl Palmitate	2.5
	Ceteareth-20	Ceteareth-20	2.5
	Dicaprylyl Carbonate	Dicaprylyl Carbonate	1.5
	BHT	BHT	0.050
D	Almond Oil	Prunus Amygdalus dulcis	1.0
	Silsoft silicone gel ⁽³⁾	Cyclopentasiloxane (and) Cetearyl Dimethicone/vinyl crosspolymer	5.0
	SF1202 ⁽³⁾	Cyclopentasiloxane	10.0
	Silsoft 034 organosilicone fluid ⁽³⁾	Caprylyl Methicone	2.0
E	Tinovis® ADM ⁽¹⁾	Sodium acrylates copolymer (and) mineral oil (and) PPG-1 trideceth-6	3.0
F	Preservative	Preservative	as needed

† quantum sufficit (as much as suffices)

Directions:

- Build parts C, D, E in one pot at 200 rpm and 70°C
- Build part B at 70°C
- Build part A at 200 rpm and 70°C, and add part B to part A
- At 400 rpm and 70°C, drop water phase into oil phase, and increase stirring to 700 rpm as oil phase thickens.
- Use part F to bring to pH 7
- Remove heat source, and when at 45°C, add part G. Then cool further and package.

Suppliers:

- (1) Neo Heliopan is a registered trademark of Symrise GmbH & Co. KG
- (2) Emulgade is a registered trademark of Cognis Deutsch and GmbH & Co. KG
- (3) Momentive Performance Materials
- (4) Tinovis is a registered trademark of Ciba Specialty Chemicals Corporation

Note: Product formulations are illustrative examples only. Momentive makes no representation or warranty of any kind with respect to such formulations, including, without limitation, concerning the efficacy or safety of any product manufactured using such formulations.

Patent Status

Protected by one or more of the following U.S. patents: 5,760,116; 5,929,162; 5,998,542; 6,291,563 and foreign counterpart patents.

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