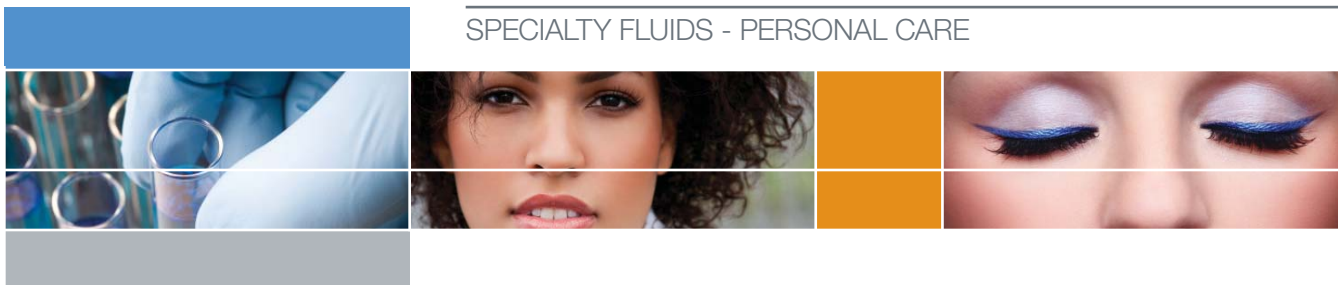


VELVESIL* DM silicone

SPECIALTY FLUIDS - PERSONAL CARE



Velvesil DM silicone is a patented and unique multi-functional silicone copolymer network. Velvesil DM silicone helps deliver consumer-perceivable enhanced sensory benefits in skin care and color cosmetic formulations. It spreads easily on the skin leaving an exquisite, long-lasting silky feel.

Velvesil DM silicone is a non-emulsifying silicone copolymer network dispersed in dimethicone and appears as a creamy, transparent gel. Velvesil DM silicone contains ~17% copolymer and exhibits shear thinning behavior, which results in cosmetic products that spread easily during application. These performance properties make it an excellent candidate for anti-aging, sunscreen and moisturizer products.

Velvesil DM silicone is also an effective thickener for anhydrous formulations and the oil phase of emulsions.

The performance properties of Velvesil DM silicone make it an excellent material of choice for shower conditioners/in shower body lotions. In addition to providing unique sensory, both during and after use, Velvesil DM silicone acts as a carrier for fragrances to enhance fragrance deposition and longevity after the wash.

Velvesil DM silicone can also be formulated in a wide range of hair care products such as rinse-off and leave-on conditioners. Velvesil DM silicone is an excellent choice for styling products especially for heat-styling applications.

Typical Physical Properties

Property	Value	Unit of Measure
Appearance	Clear/translucent gel	-
Percent Copolymer	16-18	%
Viscosity	>65,000	cSt
Flash Point	137 (280)	°C (°F)
Freeze Thaw Stable	yes	n.a.

Proposed INCI name:
Dimethicone (and) Cetearyl Dimethicone Crosspolymer

Cas #: 756876-51-4

VELVESIL * DM Silicone

Key Features and Typical Benefits

Key Features	Benefits
Long-lasting silky feel	Consumer delight
Cold-processable	Increased manufacturing efficiency
Broad pH range stability	Ability for formulate products with low or high pH
Yields clear gels	Suitable for clear gel products
Shear thinning rheology	Excellent application properties
Effective thickener	Ability to formulate anhydrous products
No tackiness	Superior sensory feel
Good compatibility with personal care ingredients	Formulation flexibility

Potential Applications

Skin Care

- Moisturizing creams and lotions
- Anti-aging products
- Shaving products
- Massage creams
- Sunscreens lotions and anhydrous sunscreens
- Skin care gels: Eye gels, after-sun gels and treatment serums

Color Cosmetics

- Foundations
- Eye shadows and blushes
- Mascaras
- Make-up removers
- Lipstick products and lip color formulations

Hair Care

- Styling products - Mousses, gels, glazes, lotions
- Conditioners

Cleansing Products

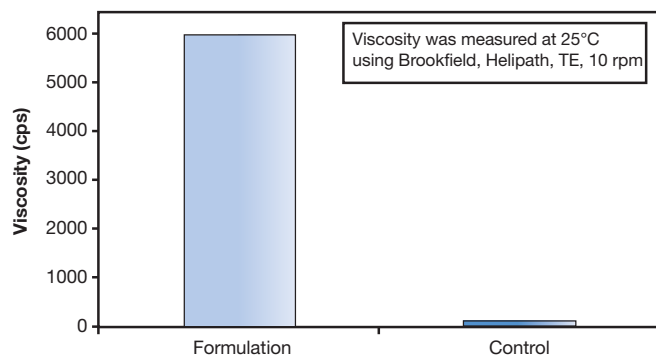
- Shower conditioners
- Facial scrubs
- Facial cleansers
- Shower gels
- Liquid hand soaps

Deodorants and Antiperspirants

VELVESIL * DM Silicone

Performance Data

Thickening Efficiency in a Water-in-Silicone Emulsion



Formulation: 5% Velvesil DM silicone Control: 70% Water
 65% Water 27.5% D5
 27.5% D5 2.5% SF1540
 2.5% SF1540

Velvesil DM silicone is an effective thickener for water-in-silicone emulsions

Thickening Efficiency for Commonly Used Oils and Esters

Ingredients	80% Velvesil DM Viscosity (cps)
Caprilic / Capric Triglyceride	3,000
Isopropyl Myristate	13,000
Octyldodecanol	1,000
C12-15 Alkyl Benzoate	7,500
PPG-14 Butyl Ether	63,500
Hydrogenated Polydecene	2,500
Isododecane	10,000

Ingredients were mixed at room temperature.

Velvesil DM silicone is an effective thickener for commonly used oils and esters

VELVESIL * DM Silicone

Performance Data (continued)

Sensory

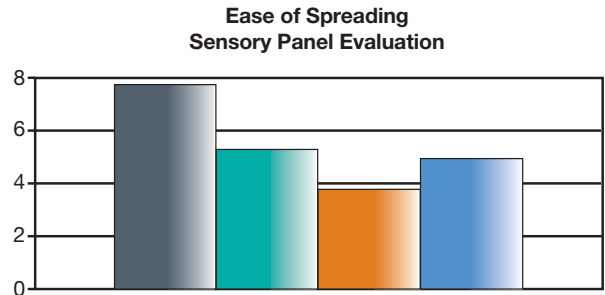
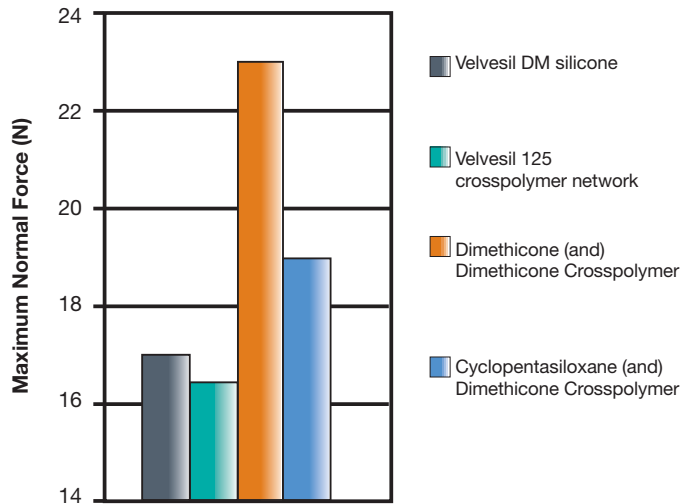
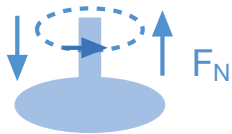
Tack⁽¹⁾

Product Differentiation by “Tack” Performance

A measure of tack was obtained using a rheometer. Product was applied to the fixed bottom plate. The upper plate was then lowered to achieve a specified gap width. Pre-shear was applied and then the maximum Normal Force required to lift the upper plate was determined. The tackier the material the greater the maximum Normal Force.



Measurement of Tack Instrumental Evaluation



(1) = Measured with Anton-Paar-Physica MCR 300 Rheometer with measuring system PP25. Pre-Shear Rotation: 500/s @ 37°C

Lower tack values reflect superior sensory properties and ease of spreading

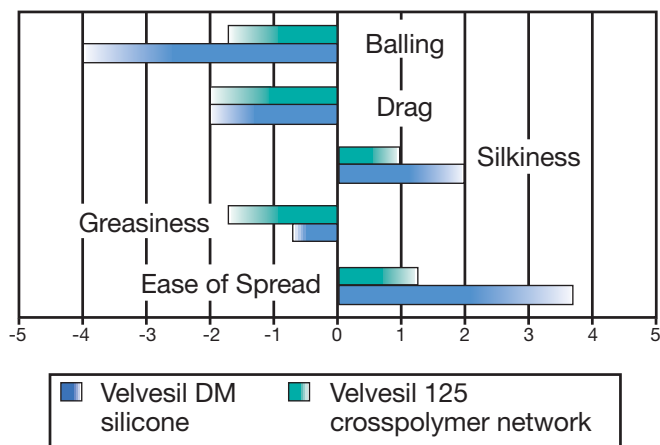
VELVESIL * DM Silicone

Performance Data (continued)

Other Sensory Properties

Sensory Performance Relative to Dimethicone (and) Dimethicone Crosspolymer

A sensory panel study was conducted to compare the performance of Velvessil DM silicone and Velvessil 125 crosspolymer network relative to Dimethicone (and) Dimethicone Crosspolymer. A positive score in the chart below means that the product has “more” of a given attribute compared to Dimethicone (and) Dimethicone Crosspolymer and a negative score means that the product has “less” of a given attribute compared to Dimethicone (and) Dimethicone Crosspolymer.



Velvessil DM silicone delivers consumer-perceivable sensory attributes and offers a differentiated and outstanding sensory profile

Formulation Guidelines

Velvessil DM silicone is easy to incorporate into formulations and is compatible with the most commonly used cosmetic ingredients. Just add Velvessil DM silicone to the oil phase of the formula and mix thoroughly.

Recommended use level: Emulsions: 4-25%
Anhydrous gels: 25-90%
Cleansing products: 1-5%
Shower conditioners: 5-40%
Hair care products: 1-5%

VELVESIL* DM Silicone

Formulations

Anhydrous UVA/UVB Suncare Gel

Ingredients	Formulation
	Wt (%)
Dimethicone (and) Cetearyl Dimethicone Crosspolymer (Velvesil DM silicone)	76
Phenylpropyldimethyl Siloxy Silicate (SilShine* 151 multifunctional resin)	4
Caprylyl Methicone (Silsoft* 034 conditioning agent)	0.3
Diisopropyl Adipate	0.7
Octylmethoxycinnamate	7.5
Octyl Salicylate	5
Benzophenone-3	3
Butylmethoxydibenzoylmethane	1.5
Polymethylsilsesquioxane (Tospearl* 145 silicone microspheres)	0.7
Silica D13	1.3

Procedure

Incubate the solid sunscreens including the Tospearl 145 silicone microspheres with SilShine 151 multifunctional resin, Silsoft 034 conditioning agent, the liquid sunscreens and the ester @ 60°C for 10 min @ 500 rpm. Then add Velvesil DM silicone and stir @ 60°C @ 1,100 rpm for 30 min. Then add Silica and agitate for 20 min @ 1,100 rpm.

The resulting product is freeze/thaw stable (3 cycles, -15°C). Viscosity: 159,000 cSt @ 25°C (Brookfield, Helipath, TE, 10 rpm). The product passed a four weeks visual stability test at 50°C. SPF (vitro-skin, 2mg/cm²): 76. No crystals of sunscreen were observed after four weeks at room temperature (23°C-25°C).

Shower Conditioner/In-Shower Body Lotion

Ingredients	Formulation
	Wt (%)
Velvesil DM silicone ⁽¹⁾	15-30
Stearyl Alcohol/Ceteareth-20	1.2
Cetyl Alcohol	1.0
Modified Hydroxycellulose	1.0
Perfume	1.0
Preservative	0.2
Water	q.s. to 100

(1) Note: Blends of Petrolatum and Velvesil DM silicone can also be used to make shower conditioners (recommended levels ratios of 8:1 to 4:1 Petrolatum: Velvesil DM silicone)

Procedure

1. Heat water for formulation to 85°C. Add modified hydroxycellulose to the water slowly as the heat approaches 85°C with stirring.
2. After bringing the water/modified hydroxycellulose mixture to 85°C for 30 minutes with stirring, add stearyl alcohol/ceteareth 20 and cetyl alcohol and mix until melted.
3. Homogenize this mixture for 5 minutes at ~6,500 rpm while maintaining the temperature at 85°C.
4. Return the mixture to the stirrer, add the Velvesil DM silicone to the mixture and cool mixture to room temperature with continued stirring. When cool, add perfume and preservative and stir for another 15 minutes.
5. Finally, homogenize the final product for ~3 minutes (at ~6,500 rpm).

VELVESIL * DM Silicone

Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

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