

Silube® 316

PEG / PPG Free Silicone Invert Emulsifier



INNOVATIVE SILICONE SPECIALTIES

DESCRIPTION

Silube® 316 is a unique multi-hydroxyl functional silicone which acts as a low HLB emulsifier. **Silube 316** has no ethoxylated components. The proposed INCI name is *Lauryl, bis-hydroxymethyl butyl propyl ether, dimethicone*.

TYPICAL PROPERTIES

PROPERTY	Silube 316
Appearance	Clear Liquid
Colour, Gardner	2
Viscosity, cps	700
Solid Content %	100%
Hydroxyl value	85
Estimated HLB Value	4
Solubility (1%/10%):	
Water	Insoluble/Insoluble
IPA	Soluble/Soluble

USES AND APPLICATIONS

- **Silube 316** is a PEG-free, water-insoluble, alcohol soluble silicone that stabilizes water in oil (W/O) and water in silicone (W/Si) emulsions while also providing novel features and textures to the emulsions.
- **Silube 316** provides a unique light skin feel especially in color cosmetics.
- **Silube 316** is effective in difficult systems like sunscreens, make ups and complex emulsion systems.
- **Silube 316** is compatible with most cosmetic ingredients, but also with special ingredients such as electrolytes, UV filters, pigments/colors, powders, and various active ingredients.
- **Silube 316** enhances pigment dispersion which minimizes complexity and costs by eliminating the need for additional co-emulsifiers or pigment dispersant additives.
- **Silube 316** can be used in both cold and hot processes.
- **Silube 316** can be used to stabilize invert emulsions such as creams, liquid foundations, sunscreens, and 2-in-1 BB creams (sunscreen makeup). **Silube 316** can be used as a pigment dispersant in color cosmetics such as mascara, eye products, lipsticks, lip gloss, mousse foundation, etc.

Typical use levels are 1 –5%.

APPLICATIONS DATA

The performance of **Silube® 316** has been demonstrated with six example formulations. These include an invert emulsion, a cold process invert emulsion, makeup, sunscreen, W/Si base emulsion and a 2-in-1 BB Sunscreen. These were evaluated for physical properties, feel and appearance.

TABLE 1: INVERT (W/O) EMULSION

TABLE 2: COLD PROCESS (W/O)

TABLE 3: W/SI EMULSION

PHASE A	gms	PHASE A	gms	PHASE A	gms
D.I. Water	65.3	D.I. Water	78.12	D.I. Water	77.2
Glycerine	5.0	Propylene Glycol	5.0	Propylene Glycol	5.0
MgSO ₄ ·7H ₂ O	2.0	NaCl	1.0	MgSO ₄ ·7H ₂ O	2.0
PHASE B		PHASE B1		PHASE B1	
Mineral Oil	11.2	Silube 316	1.68	Silube 316	1.6
C ₁₃₋₁₅ Isoparaffin	7.6	Silwax B116	1.7	Silwax D02	1.0
Silube 316	5.0	Silwax® D02	1.0	Siltech F-100	8.7
Microcrystalline Wax	2.4	Siltech F-50	4.0	Siltech C-955	4.0
Macadamia Nut Oil	1.5	Siltech C-955	4.0	PHASE B2	
PHASE C		Eutanol G	3.0	Magnesium Stearate	0.3
Citric Acid	q.s.	PHASE B2		PHASE C	
		Magnesium Stearate	0.3	Sharomix MCI	0.2
		PHASE C			
		Sharomix MCI	0.2		

Procedure (W/O Emulsion):

1. Combine ingredients in Part A and mix well, then heat to 75°C.
2. Combine ingredients in Part B and mix well, then heat to 75°C.
3. Add Part A into Part B under mixing at 75°C.
4. Cool down batch to room temperature and then add q.s. citric acid to pH around 5.5 ~ 6.
5. Homogenize at 20,000 rpm for 1 minute.

Procedure (Cold Process Invert Emulsion):

1. Combine part B1 with mixing (1000 rpm) at RT.
2. Disperse magnesium stearate (B2) into Part B1 with mixing 1,000 rpm for 1 min at room temperature.
3. Combine Part A, mix well at 400 RPM, then add to Part B at room temperature very slowly.
4. Homogenize for 2 minutes at 1,100 rpm.
5. Add Part C and mix well.

Procedure (W/Si Emulsion):

1. Combine part B1 with mixing (1000 rpm) at RT.
2. Disperse Phase B2 into Part B1 with mixing at 1,000 rpm for 10 min at room temperature.
3. Combine Part A, mix well at 400 RPM, then add to Part B at room temperature very slowly.
4. Homogenize for 2 minutes at 1,000 rpm.
5. Add Part C and mix well.

Procedure (W/O Sunscreen):

1. Combine Part B, blend well with Bamix mixer until homogeneous, while heating up to 75~80°C.
2. Combine Part A with mixing then heat up to 75~80°C.
3. Add Part A into Part B slowly while mixing for 5 minutes after addition
4. Cool down to 45°C while shearing for 1 minute at 20,000 rpm.

TABLE 4: W/O SUNSCREEN

PHASE A	gms
D.I. Water	54.3
Propylene Glycol	5.0
NaCl	1.0
Na ₂ EDTA	0.1
PHASE B	
Silube [®] 316	5.0
Silwax [®] D02	2.0
Caprylic/capric Triglyceride	3.5
Isopropyl Myristate	8.0
Coconut Oil	1.0
Raspberry Seed Oil	1.0
C ₁₀₋₃₀ Alkyl Acrylate	2.5
Titanium Dioxide	2.0
Octyl Methoxycinnamate	7.0
Benzophenone-3	5.0
Avobenzene	2.0
Phenonip	0.6
PHASE C	
Sharomix MCI	q.s.
Fragrance	q.s.

TABLE 5: W/O MAKEUP

PHASE A	gms
D.I. Water	54.19
Propylene Glycol	5.0
NaCl	1.0
PHASE B	
Silube [®] 316	5.0
Silwax [®] D02	2.0
Isopropyl Myristate	8.0
Caprylic/capric Triglyceride	10.0
Siltech F100	1.0
Argan Oil	6.0
C ₁₀₋₃₀ Alkyl Acrylate	1.5
Magnesium Stearate	1.0
Unipure LC 987 AS	3.68
IRIS91-Y-77492	0.74
IRIS91-R-77491	0.22
IRIS91-B-77499	0.07
Phenonip	.06
PHASE C	
Sharomix MCI	q.s.
Fragrance	q.s.

TABLE 6: W/O BB SUNSCREEN CREAM

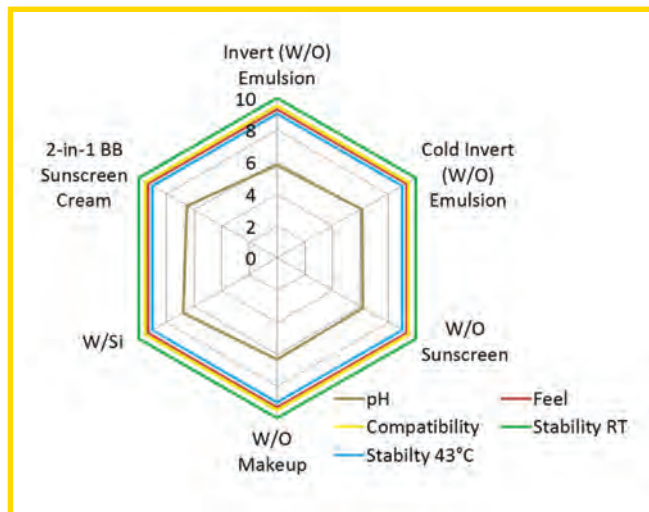
PHASE A	gms
D.I. Water	46.71
Glycerine	5.0
NaCl	1.0
PHASE B	
Silube 316	5.0
Silwax D02	1.28
Argan Oil	3.0
Caprylic/capric Triglyceride	10.0
Isopropyl Myristate	7.0
Siltech F100	1.0
Siltech CE-2000	1.70
Ethylhexyl Methoxycinnamate	7.50
Bentone 38V	0.50
Magnesium Stearate	1.00
Unipure LC 987 AS	3.68
IRIS91-Y-77492	0.74
IRIS91-R-77491	0.22
IRIS91-B-77499	0.07
Phenonip	0.60
PHASE B2	
C ₁₀₋₃₀ Alkyl Acrylate	1.5
Avobenzene	2.5
PHASE C	
Sharomix MCI	q.s.
Fragrance	q.s.

Procedure (W/O Makeup and BB Sunscreen Cream):

1. Combine Part B, blend well with Bamix mixer until homogeneous, while heating up to 75~80°C.
2. Combine Part A with mixing then heat up to 75~80°C.
3. Add Part A into Part B slowly while mixing for 5 minutes after addition
4. Cool down to 45°C while shearing for 1 minute at 2,000 rpm.
5. Add Part C into batch while mixing.

Properties

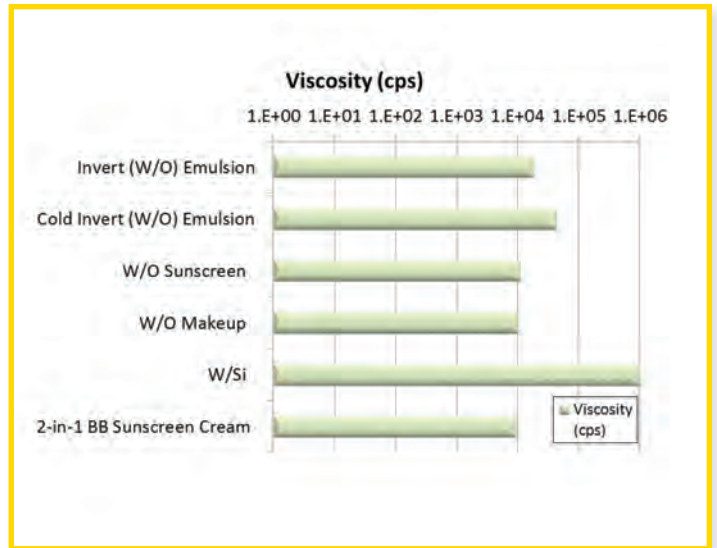
The emulsions made from **Silube 316** are stable at room temperature and 43°C. They show good feel properties, and no separation or oiling of the active ingredients.



APPLICATIONS DATA CONTINUED

The rheological properties of the emulsions made from **Silube® 316** are as expected. The viscosity of the W/Si base emulsions is 1,000,000 cps. The cold process W/O emulsion has a viscosity of 43,000 cps while the others are about 10,000 cps.

Detailed experimental data is available on request or the relevant technical papers can be downloaded from our website www.siltech.com.



SAFETY

Before handling, read the Material Safety Data Sheet and container label for safe use, physical and health hazard information.

STORAGE AND SHELF LIFE

When stored in the original, unopened containers between 10 and 40°C, **Silube 316** has a shelf life of 36 months from date of manufacture.

PACKAGING

Silube 316 is available in 20 Kg and 200 Kg containers.

LEGAL DISCLAIMER

Siltech believes that the information in this technical data sheet is an accurate description of the typical uses of the product. Siltech, however, disclaims any liability for incidental or consequential damages, which may result from the use of the product that are beyond its control. Therefore, it is the user's responsibility to thoroughly test the product in their particular application to determine its performance, efficacy and safety. Nothing contained herein is to be considered as permission or a recommendation to infringe any patent or any other intellectual property right.

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Siltech LLC (US and EU)
1625 Lakes Parkway, Suite O
Lawrenceville, Georgia,
USA 30043
Telephone: 678.442.0210
Facsimile: 678.442.9624

Siltech Corporation Headquarters
225 Wicksteed Avenue
Toronto, Ontario, Canada
M4H 1G5
Telephone: 416.424.4567
Facsimile: 416.424.3158

www.siltech.com

