

Silquat® J2-XB-PG series

Silicone Quat, EO Free,
Multifunctional Emulsifiers

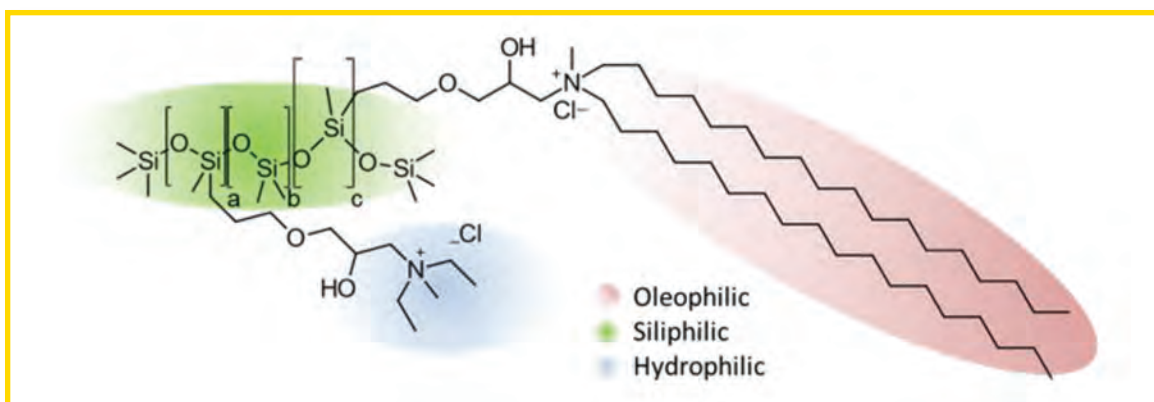


INNOVATIVE SILICONE SPECIALTIES

DESCRIPTION

Silquat® J2-4B-PG, Silquat J2-6B-PG, and Silquat J2-8B-PG are a series of novel silicone emulsifiers and conditioners. **Silquat J2-XB-PG** products are PEG free and 70% active in propylene glycol. Their unique structure and weak cationic charge results in molecules that provide not only excellent emulsification properties, but conditioning effects on hair and skin. The INCI name is *Distearmonium/ Diethonium Chloride PG Dimethicone and Propylene Glycol*.

This new class of compounds, represented by the **Silquat J2-XB-PG** products, are multi-domain silicone quaternary emulsifiers. They are represented by the generic structure on the right which shows that some of the quaternary ammonium groups remain hydrophilic from their charge, while others have lipophilic C₁₈H₃₇ chains in proximity. That dual nature, coupled with the hydrophobic surface active silicone polymer, gives a very unique structure and performance.



TYPICAL PROPERTIES

PROPERTY	Silquat J2-4B-PG	Silquat J2-6B-PG	Silquat J2-8B-PG
Appearance	Hazy Liquid	Hazy Liquid	Hazy Liquid
Colour, Gardner	1	1	1
Solid Content %	70	70	70
Viscosity, cps	6000	7000	8000
Experimental HLB	9	7	5

Benefits:

- Multifunctional Emulsification
- Excellent Skin Feel
- Wet and Dry Combability
- High Actives Loading
- Increased SPF
- Sensory Masking
- Free of Polyethylene Glycol (PEG), a chemical of concern in some markets.

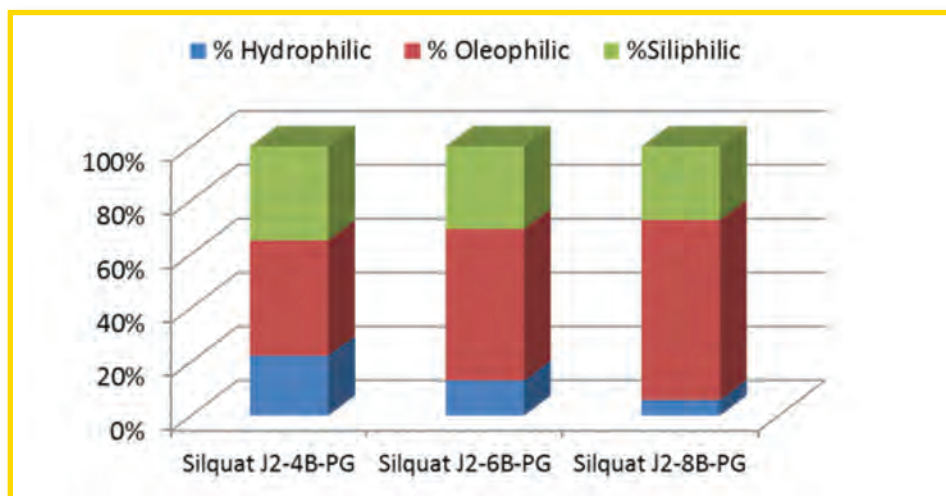
Typical use levels are 0.5% - 5% as received. 3-5% when used as an emulsifier.

USES AND APPLICATIONS

These **Silquat J2-XB-PG** multi-domain silicone quaternary products provide ease of formulation, enhanced performance, and extraordinary skin feel. They are multifunctional providing emulsion stability as well as typical silicone properties such as improved feel and conditioning, emmollency, improved coverage, increased efficacy of SPF and other actives, and gloss.

We have found **Silquat J2-XB-PG** emulsifiers to be especially effective in the following applications:

- **Hair Care:** **Silquat® J2-XB-PG** products provide extraordinary wet comb and dry comb as well as unique lubricity, antistatic properties and smoothness to the hair fibres.
- **Skin Care:** **Silquat J2-XB-PG** products provide the skin with a smooth powdery after-feel, extraordinary softness, unique lubricity and substantivity.
- **Oil-in-Water Emulsifiers:** **Silquat J2-XB-PG** products are unique cationic O/W emulsifiers for skin care, hair care, sun care and make-up products. They offer a rich smooth powdery after-feel that allows high active loadings without sacrificing efficacy.
- **Cationic Emulsifiers:** **Silquat J2-XB-PG** products can be used as conditioning agents in combination with a non-ionic organic or silicone emulsifier to impart unique sensory properties such as rich non-greasy, luxurious, very soft, smooth powdery dry feel and smooth powdery velvety skin feel.
- **High Actives Loading:** **Silquat J2-XB-PG** products allow for high lipophilic, high SPF and highly concentrated pigmented products for skin care, sun care and make-up. These products offer benefits such as a non-greasy and superior feel and with improved spreadability to give better coverage.
- **Improved Sensory Properties:** **Silquat J2-XB-PG** products mask the negative sensory properties of high lipophilic loading in skin moisturizers with specific aesthetics, giving the final products a very soft smooth powdery skin feel and an improved long lasting moisturizing effect.
- **Silquat J2-4B-PG** with a HLB of 9 is very effective as an emulsifier for oil-in-water/ethanol emulsions. **Silquat J2-4B-PG** is also a very good skin feel modifier.
- **Silquat J2-8B-PG** with an HLB of 5, when used in make-up color cosmetics provides a very soft smooth powdery and improves dispersibility and stability of pigments, pearlescent reagents, and other powders.

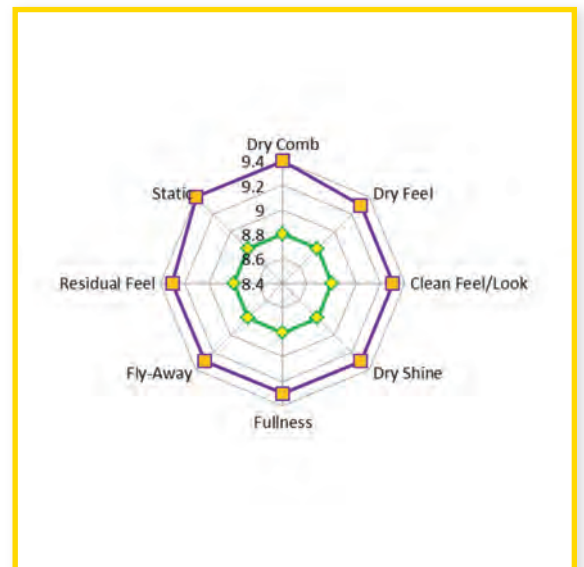
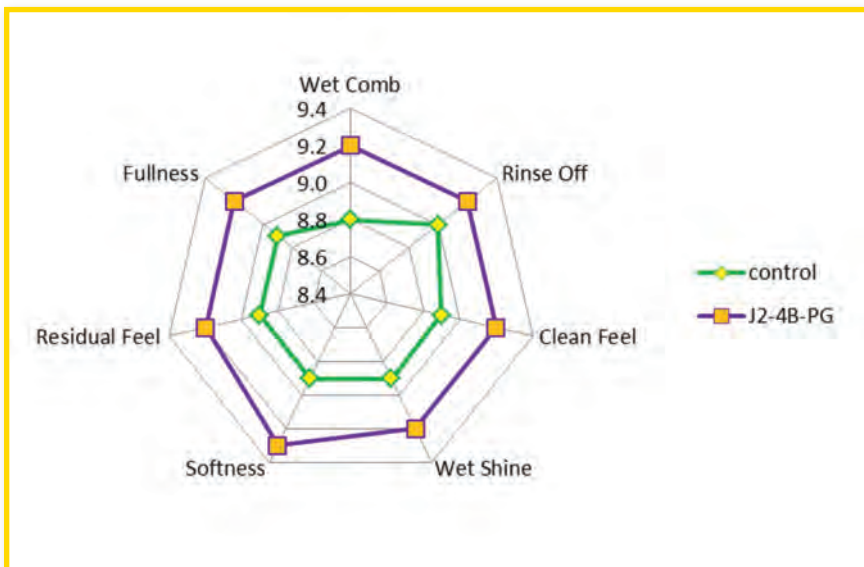


Silquat J2-4B-PG, **Silquat J2-6B-PG** and **Silquat J2-8B-PG** differ by the values of a, b, and c in the structure on **Front Page**. The chart above shows the relative weight percent of hydrophilic, lipophilic and “siliphilic” regions within the molecules. **Silquat J2-4B-PG**, with the most hydrophilic character, has the highest laboratory determined HLB of 9, while **Silquat J2-8B-PG**, which has the least hydrophilic and most lipophilic character has the lowest HLB of 5. The middle product, **Silquat J2-6B-PG**, has an HLB value of 7.

TABLE 1 - SOLUBILITIES

	Solvent	Level	Silquat® J2-4B-PG	Silquat J2-6B-PG	Silquat J2-8B-PG
Water	Water	1%/5%	Disp./Disp.	Disp./Disp.	Disp./Ins.
Hydrocarbons	Mineral Oils	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Isododecane	1%/5%	Disp./Sol.	Sol./Sol.	Sol./Sol.
	Isoparaffin	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
Esters	C ₈ /C ₁₀ Triglycerides	1%/5%	Disp./Disp.	Sol./Sol.	Sol./Sol.
	Isopropyl Myristate	1%/5%	Disp./Disp.	Sol./Sol.	Sol./Sol.
	Trioctyldodecyl Citrate	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	C ₁₂₋₁₅ Alkyl Benzoate	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
Ethers	PPG-14 Butyl Ether	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Dicaprylyl Ether	1%/5%	Disp./Disp.	Disp./Ins.	Sol./Sol.
Silicones	Cyclomethicone (D ₅)	1%/5%	Disp./Ins.	Disp./Ins.	Disp./Ins.
	Dimethicone	1%/5%	Disp./Disp.	Disp./Disp.	Disp./Disp.
	Phenyl Trimethicone	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Trimethylsiloxysilicate	1%/5%	Disp./Disp.	Disp./Disp.	Disp./Disp.
Natural Oils	Olive Oil	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Sunflower Oil	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Castor Oil	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
Alcohols	Octyldodecanol	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Isopropanol	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Ethanol	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
Glycols	Glycerin	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Propylene Glycol	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Butylene Glycol	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.
	Hexylene Glycol	1%/5%	Sol./Sol.	Sol./Sol.	Sol./Sol.

Silquat® J2-4B-PG was evaluated at 1% for conditioning in a 2-in-1 Shampoo model formula. This formulation was stable, viscosity was reduced from 9000 to 7000 cps. The Wet and Dry Combability data are shown:



APPLICATIONS DATA CONTINUED

A number of emulsions were made and evaluated using 3-5% of these **Silquat J2-XB-PG** materials as emulsifiers. In general, stability was very good, and performance was as expected with the additional benefits of silicone feel and quaternary conditioning.

This was especially useful with formulations that had high levels of ingredients with undesirable tactile properties. The **Silquat J2-XB-PG** emulsifiers tended to mask those tactile properties, allowing high use levels of the actives without compromise.

More information is available in the following reference: Fenbao (David) Zhang, Rick Vrckovnik, Tony O'Lenick, "Analyzing Silicone Quaternary Compounds", Personal Care Magazine, pp. 44-48, Nov., 2013.

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, **Silquat J2-XB-PG** series has a shelf life of 36 months from date of manufacture.

PACKAGING

Silquat J2-XB-PG series 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.

Silquat® is a registered trademark of Siltech Corporation, Toronto, Ontario, Canada.



Siltech LLC (US and EU only)
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

