

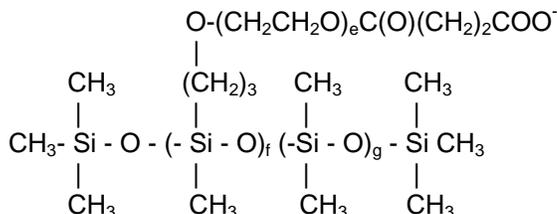
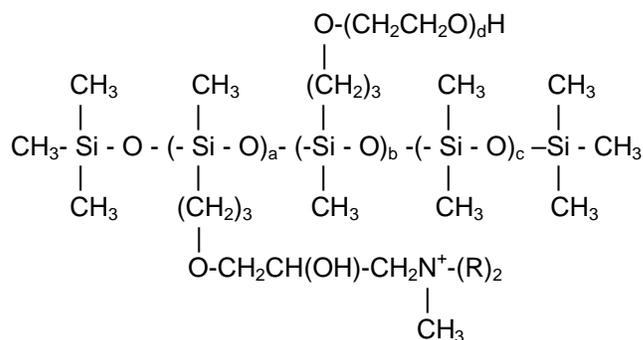


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TECHNICAL INFORMATION

**SilPlex<sup>®</sup> J2-S**  
 Silicone Quaternium-20

Siltech has developed a new series of patent pending conditioning agents based on complexation chemistry. We believe that SilPlex<sup>®</sup> J2-S, which has the INCI name of Silicone Quaternium-20, represents a significant step in the development of highly effective conditioners for hair and skin. Specifically, SilPlex<sup>®</sup> J2-S combines anionic and cationic silicone polymers that conform to the following structures;



The nature of water and the hydrogen bonding that occurs between molecules of water makes water a unique material and a material necessary to life as we know it. The interaction of ionic surfactants in dilute aqueous solutions is important in formulation and utilization of personal care products. This product has been designed to be soluble in water and compatible with anionic surfactants while still providing outstanding conditioning at low concentrations.

**Product Evaluation**

Since anionic and cationic materials have opposite charges they attract one another and form a salt complex. It is the nature of this complex rather than the properties of the polymers themselves that determines how the formulations function. As ionic materials are added to water opposite charges attract and the same charges repel. As the concentration of point charges are increased, the solution becomes so ordered that either (a) the solubility product of the salt is exceeded and a precipitate occurs, (b) the viscosity of the solution increases or (c) the complex becomes insoluble. It is the nature of this interaction that is of interest to the present study. We have dubbed complexes that are made up on anionic and cationic surfactants in aqueous solutions that thicken and remain clear as Soft Complexes, while insoluble complexes are

referred to as Hard Complexes. The chemical structure of each determines the hardness or softness of the complex. As the number of anionic and cationic species becomes equal, the number of interaction complexes will be greatest and therefore the concentration of uncomplexed surfactants becomes lowest. It is for this reason that the highest viscosity of the blends of anionic and cationic surfactant occurs at equal amounts.

SilPlex® J2-S has been developed to maximize the disruption of the hydrogen bonding between water molecules, yet still maintaining water solubility. The result is a complex that despite its water solubility achieves the lowest free energy by deposition on the hair and skin. The result is a very effective conditioning of the hair and skin.

### **Salon Evaluation**

Silquat® J208-1B            A silicone quat  
 SilPlex® J2-S                A silicone quat complex

	Shampoo Base
Ingredients	%
Water	Qs
Sodium laureth-2 sulfate	30.00
Cocamidopropyl betaine	7.00
Cocamide DEA	4.00
Na <sub>2</sub> EDTA	0.10
Silquat® J208-1B or SilPlex® J2-S	2.50
Germaben II	1.00
Citric Acid (25% solution)	Qs

All formula pH adjustments ranged from 6.65 to 6.80, specs being 6.30 to 6.80.

#### Comments:

All products were yellow in color.

The product made with SilPlex® J2-S was crystal clear, while the one made with Silquat® J208-1B had a slight haze.

The product with the SilPlex® J2-S did not affect the viscosity.

#### Foam Heights:

The product with the SilPlex® J2-S was similar in both foam and viscosity to the control.

The product with Silquat® J208-1B had lower foam and viscosity indicating interaction between the cation and anion.

### **Evaluations**

These two products were then evaluated for wet and dry combing on 10 inch Virgin Brown Hair. Three two gram swatches were used with one gram of shampoo for each swatch. The water temperature used for wetting and rinsing the hair was a constant 25°C. All the swatches were rinsed until squeaky clean or for at least one minute. After the wet hair evaluation, the swatches were left to air dry and then the dry comb evaluation was performed.

The scale used for all evaluations is from 1 to 5, 5 being the best.

WET COMBING EVALUATION			
	Water only (Control)	Silquat <sup>®</sup> J208-1B	SilPlex <sup>®</sup> J2-S
Wet comb	1.0	4.0	5.0
Rinse off	3.0	4.0	5.0
Clean feel	1.0	4.0	5.0
Shine	3.0	4.0	5.0
Average	2.0	4.0	5.0

DRY COMBING EVALUATION			
	Water only (Control)	Silquat <sup>®</sup> J208-1B	SilPlex <sup>®</sup> J2-S
Dry comb	2.0	4.0	5.0
Feel	2.0	4.5	5.0
Manageability	2.0	4.0	5.0
Shine	3.0	5.0	5.0
Clean look	2.0	4.0	5.0
Flyaway	2.0	3.0	4.5
Static	2.0	3.0	4.5
Residual feel	3.0	4.5	5.0
Average	2.25	4.00	4.88

### **Conclusion**

SilPlex<sup>®</sup> J2-S is an excellent product for use in a 2 in 1 shampoo and for adding sheen and softness to color treated hair. It left the hair silky soft with no residual feel and the combing was without any tugging or pulling. The comb slipped easily through the swatches. But best of all was the shine, which was far superior to the Silquat J208-1B for the wet or dry combing. Overall, SilPlex<sup>®</sup> J2-S provides conditioning comparable to high molecular weight dimethicones, yet in a clear product.

### **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<sup>0</sup>C, SilPlex<sup>®</sup> J2-S has a shelf life of 24 months from date of shipping.

### **Packaging**

SilPlex<sup>®</sup> J2-S is available in 20 Kg and 200 Kg containers.

### **Legal Disclaimer**

Siltech Corporation believes that the information in this technical data sheet is an accurate description of the typical uses of the product. Siltech Corporation, 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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