

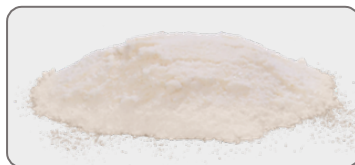
## SILIGEL™

### FORMULATION ADVICE

#### **DESCRIPTION**

Siligel™ is a natural gelling agent for aqueous media with an excellent resistance to electrolytes and providing high sensorial benefits to formulas. Very versatile, Siligel™ can be also used as a co-emulsifier, a stabilizer or a viscosity adjuster for O/W emulsions.

Siligel™ is a light beige powder.



#### **FORMULATION WITH SILIGEL™**

##### *1. Recommended dosage*

Siligel™ is generally used from 0.3% to 2%. It is recommended not to exceed 3%.

Used as a skin feel agent: from 0.3%

Used as a gelling agent: from 0.5%

Used as a co-emulsifier: from 0.5%

Used as a suspending agent: from 1.2%

##### *2. Recommended process*

Watch video process on: <http://lucasmeyercosmetics.com/en/videos/index.php>

##### *a. Recommended temperature*

Siligel™ can be used via cold and hot (max 80°C) process.

b. Introduction process

i. The way of incorporation

The optimized composition of Siligel™ allows a direct incorporation into aqueous phase, by sprinkling the powder under stirring. Nevertheless, a pre-dispersion into a glycol phase is possible.

ii. The introduction stage

Siligel™ can be used as an aqueous phase gelling agent at the beginning of the manufacturing process before the emulsification step. In addition, it can also be introduced after emulsification or at the end of the process using a strong stirring in order to adjust the viscosity or stabilize the emulsion and on the condition that the emulsion is not shear sensitive.

c. Tools and time processing

Various mixers can be used to develop the gel.

Nonetheless, in order to maximize the viscosity result, it is highly recommended to be under the highest shear conditions as possible, by using a rotor stator type homogenizer and/or by applying the highest rotation speed as possible. The higher the shear force applied, the quicker the gel development and the higher the viscosity.

Accordingly, the user will set up the laboratory process carefully to ensure the best manufacturing scale up.

The necessary time to develop Siligel™ depends on the type of mixer

See below for some guidelines for the laboratory process\*.

<b>Tools</b>	<b>Speed (rpm)</b>	<b>Approximate time (min)</b>	<b>Average viscosity <sup>**</sup>(mPa.s), D+1 at 2% in deionized water</b>
Rotor stator type VMI (Rayneri)	2500	5	12000 - 15000
Rotor stator type Silverson	2500	5	12000 - 15000
Tooth propeller	Vortex max: 1000	30	9000 - 11000
Blade propeller	Vortex max: 1000	30	9000 - 10000
Ultra-Turrax (IKA)	10000	7	10000 - 11000

\* The stated viscosity values are indicative and depend on the entire process conditions.

\*\* Brookfield Viscosity, RV, Spindle 3, speed 5 rpm, 25°C+/-0.5°C.

### 3. Stabilization and co-emulsifying properties

Siligel™ acts as a co-emulsifier thanks to its optimized composition of lecithin and hydrocolloids. The co-emulsifying and suspending properties provide stabilization properties.

Siligel™ is compatible with all kinds of oil phases.

For more information, please refer to the Techfile Siligel™.

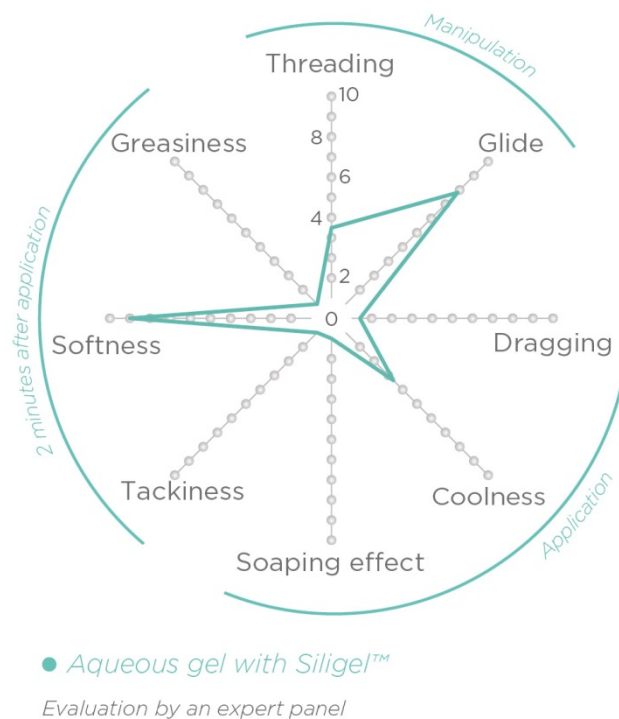
### 4. Organoleptic and sensory properties

Siligel™ provides light beige gels, translucent but not transparent.

To ensure good color and odor stabilities and to prevent oxidation, the addition of a chelating agent and an anti-oxidant are highly recommended.

Siligel™ gels are non-threading, offering a very high glide with a very soft skin feel but without any soaping, greasy or tacky effects. Siligel™ provides a silicone-like skin feel in formulas.

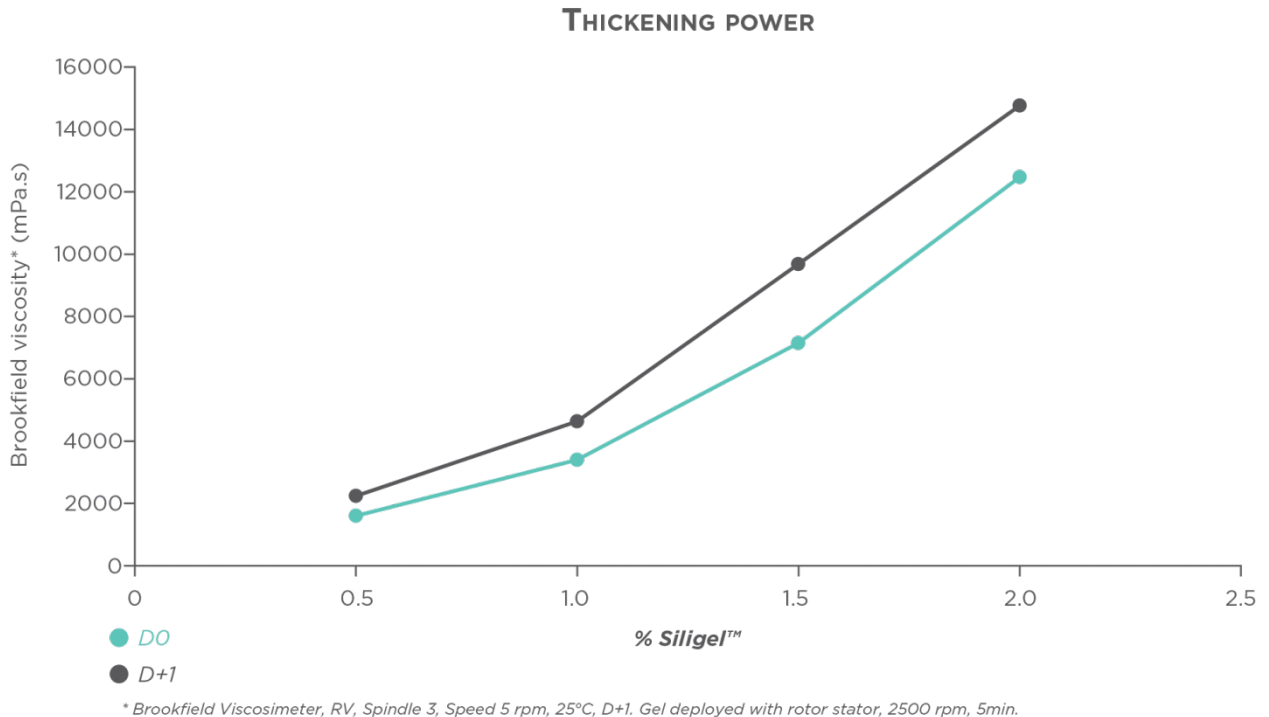
See the sensory profile of a 1% Siligel™ gel below.



For more information, please refer to the Techfile Siligel™.

## 5. Rheology

- *Thickening power*



The viscosity is stabilized the day after the manufacturing: a rise of 15-40% of viscosity is noted between D0 and D+1 depending on the Siligel™ concentration.

- *Shear sensitivity*

Siligel™ is non shear sensitive; as a result, a shear rate stirring can be applied on the gel at any time of the manufacturing process.

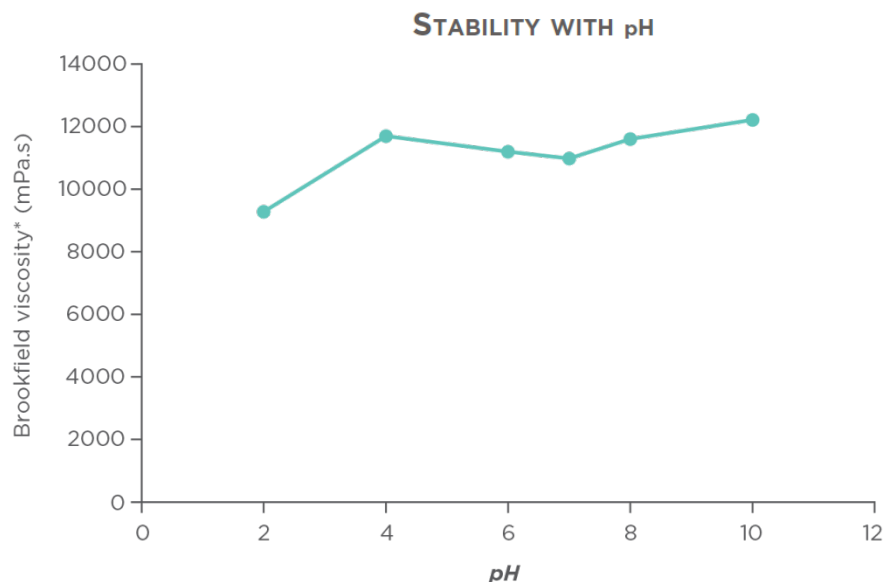
*For more information regarding the rheological behavior, please refer to the Techfile Siligel™.*

## 6. Compatibilities

- *pH*

Siligel™ can be used in a wide range of pH: 2 - 10 because the gels are stable over time.

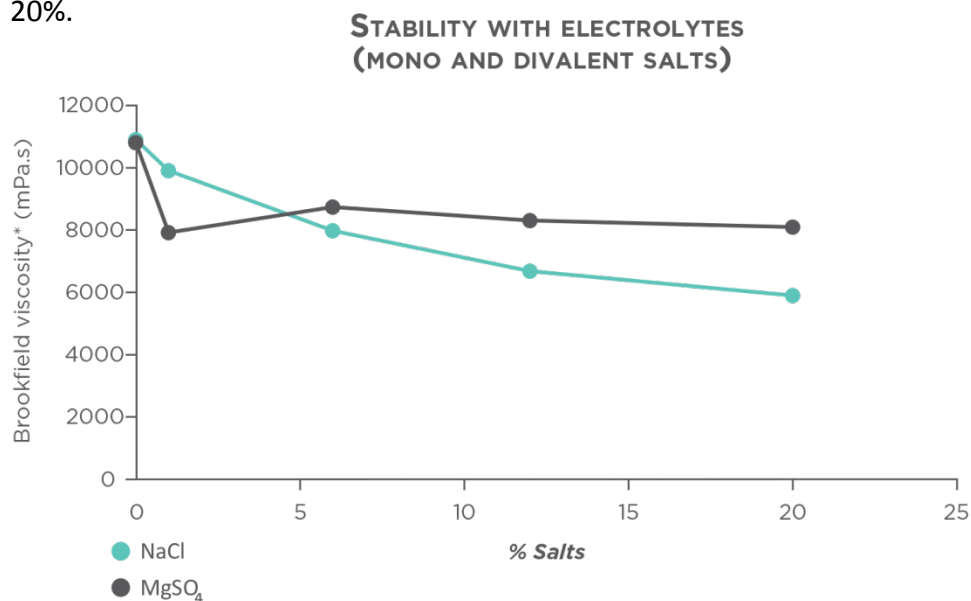
A slight decrease in viscosity is observed at pH 2, which can be balanced by the addition of Siligel™.



\* Brookfield Viscosimeter, RV, Spindle 3, Speed 5 rpm, 25°C, D+1.  
Gel deployed at 2% with a tooth propeller, maximum speed, 30 min.

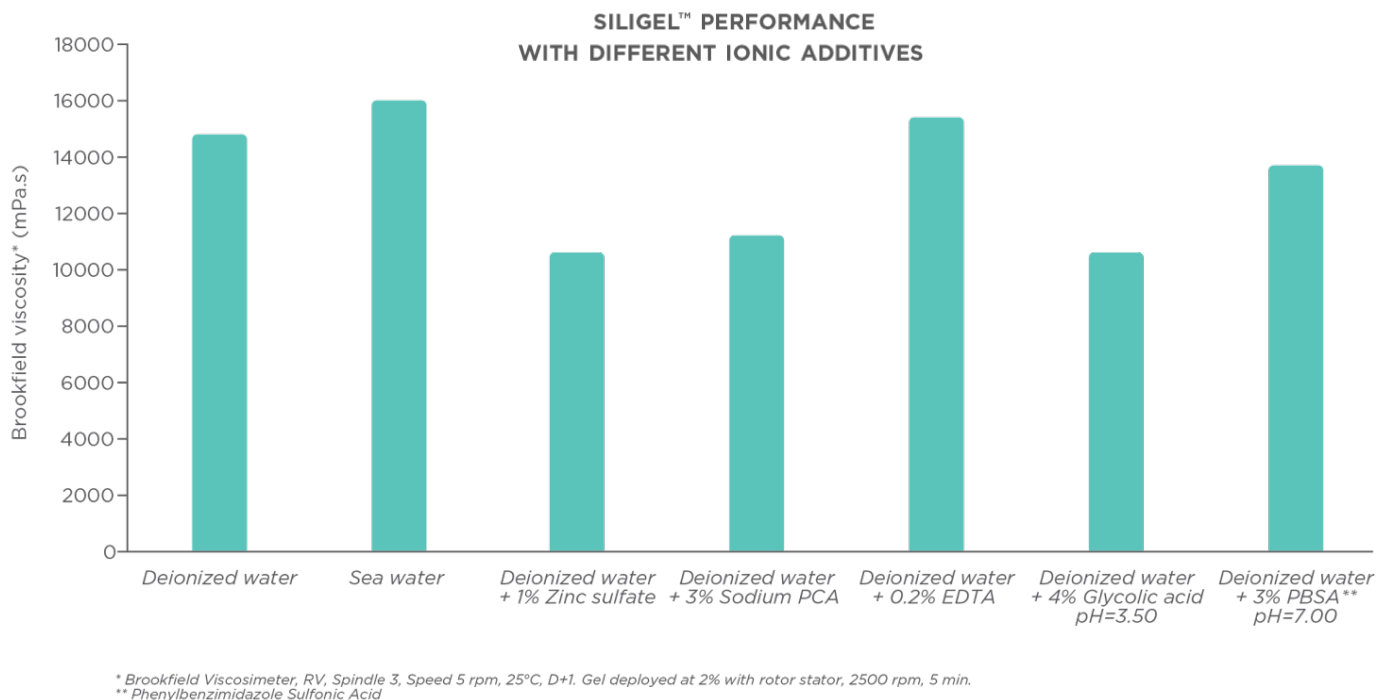
- *Electrolytes*

Siligel™ is compatible with monovalent electrolytes NaCl and divalent electrolytes MgSO<sub>4</sub> up to 20%.



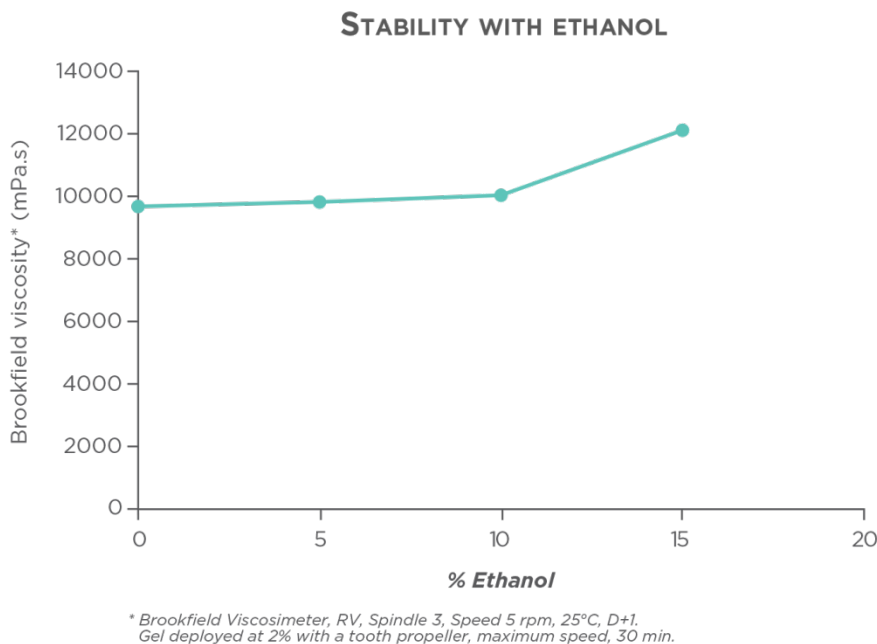
\* Brookfield Viscosimeter, RV, Spindle 3, Speed 5 rpm, 25°C, D+1.  
Gel deployed at 2% with a tooth propeller, maximum speed, 30 min.

Siligel™ is compatible with various ionic additives.



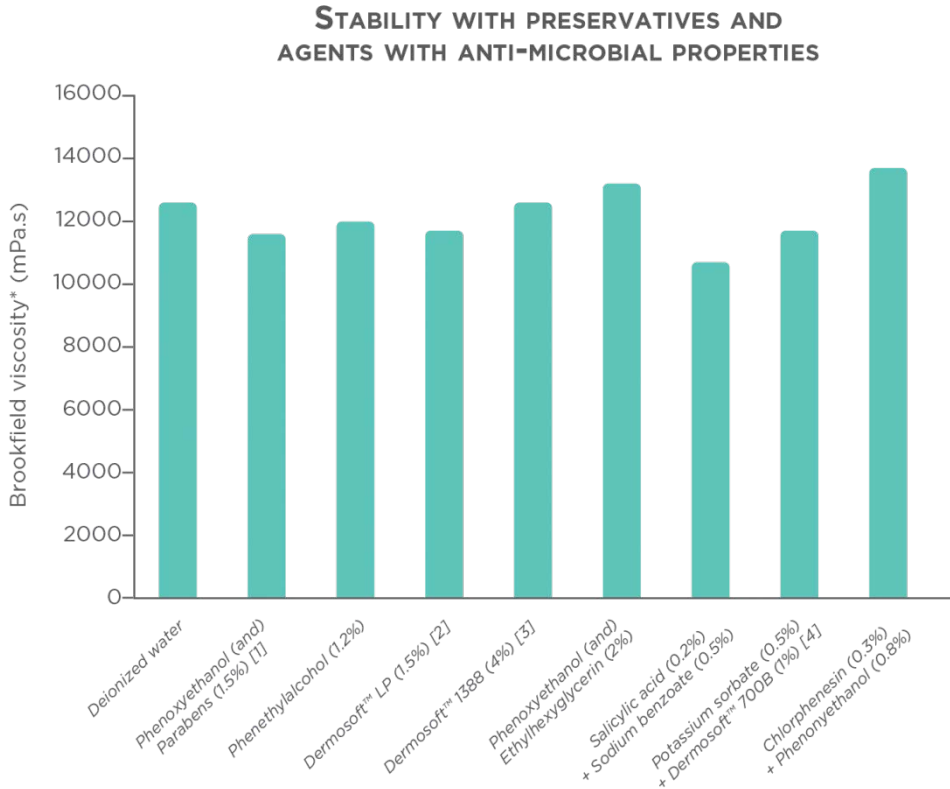
- *Ethanol*

The gel's viscosity is maintained up to 10% of ethanol and is slightly increased with 15% of ethanol. All gels are stable over time.



- *Preservatives and additives*

Siligel™ is compatible with various preservatives and anti-microbial additives.



\* Brookfield Viscosimeter, RV, Spindle 3, Speed 5 rpm, 25°C, D+1. Gel deployed at 2% with a tooth propeller, maximum speed, 20 min and rotor stator 2500 rpm, 2 min30.

- [1] Phenoxyethanol (and) Methylparaben (and) Ethylparaben (and) Butylparaben (and) Propylparaben
- [2] Caprylyl Glycol (and) Glyceryl Caprylate (and) Glycerin (and) Phenylpropanol (and) Water
- [3] Glycerin (and) Water (and) Sodium Levulinate (and) Sodium Anisate
- [4] Levulinic Acid (and) Sodium Levulinate (and) Glycerin (and) Water

- *Other compatibilities*

Siligel™ is compatible with pigments, sunscreens (chemical and mineral), pearls, sparkles and glycols.

Siligel™ can be used with anionic surfactants on condition that the percentage does not exceed 5% in active matter.

## 7. Incompatibilities

Siligel™ is not compatible with aluminum salts and cationic ingredients.

## 8. Summary

### **SILIGEL™ CHARACTERISTICS**

<i>Recommended dosage</i>	0.3 - 2%
<i>Appearance</i>	Light beige powder
<i>Skin-feel</i>	Silicone-like
<i>Gel appearance</i>	White-off, translucent
<i>Textures</i>	Serum to cream/gel-cream/butters
<i>Introduction pathways</i>	Hot and cold process/ high shear stirring/ before or after emulsion/ through aqueous phase
<i>Recommended pH</i>	2-10

### **FORMULATION ADVICE**

<i>Compatibilities</i>	Sunscreens (chemical and mineral)
	Electrolytes up to 20% - monovalent and divalent ions -
	All kinds of preservatives and additives
	Glycols
	Pigments, pearlescent pigments & glitters
	Ethanol up to 15%
<i>Incompatibilities</i>	Anionic surfactants ≤ 5% active matter
	Aluminum salts
	Anionic surfactants > 5% active matter
<i>The viscosity can be increased</i>	Cationic ingredients
	Significantly: by increasing the percentage of Siligel™
	Moderately: by applying a higher shear force or a longer stirring
<i>The final viscosity is achieved</i>	By addition of 15% of ethanol
	The day after the production