

# Sensogel™ Novus

Liquid Polymeric Thickeners



*Create Possibilities*



# Sensogel™ Novus

Liquid Polymeric Thickeners



## Clean + Effortless Thickening featuring **SPE Complex Technology**

Applechem is proud to introduce our new Sensogel NOVUS oil-in-water emulsifying thickener, designed to meet the sensory, stability, and safety demands of the modern day consumer.

### Clean Beauty Friendly

PEG-Free, Silicone-Free, Oil-Free, Acrylamide-Free, Non-Irritating, Non-Sensitizing, Combined EWG Score: 1

### Substantive, Water-Fresh Sensory

Promotes a quick break, refreshing hydrogel profile at any usage rate, even in heavier skin care formulations

### Formulation Stability

Combines strong thickening functionality with robust pH tolerance

### Globally Compliant

Suitable for use in all global markets

### Manufacturing Friendly

No oil separation in raw material, eliminate remixing and enjoy consistent thickening performance in every batch



## Features & Benefits

### Stronger, More Stable, Easier to Use

Sensogel Novus was designed with three major goals in mind:

- Improving safety of acrylate thickeners to meet clean beauty standards
- Improving stability issues characteristic of older liquid polymer thickeners
- Improving sensory profile while creating new texture possibilities



#### Sustainably Clean

- Ethylene-Oxide Free
- RIPT Tested as Non-Irritating and Non-Sensitizing
- Not defined as microplastic due to liquid polymer structure
- All components have an EWG Green Rating of 1
- RSP0 Mass Balance Certified



#### Stress-Free Stability

- Never need to remix before use.
- Consistent polymer concentration means consistent thickening from batch to batch
- Manufacturing flexibility - effective in hot process, cold process, post-addition



#### Featherlight, Quick-Break Feel

- Rich-looking emulsions with silky, shear-thinning rheology
- Retains light sensory profile even in heavier cream/butter formulas
- Create shear-thinning elastomeric hydro-gels, mimicing silicone elastomer sensory!



## Product INCI

| TRADE NAME            | INCI   |
|-----------------------|--|
| <b>Sensogel Novus</b> | Hydroxyethyl Acrylate/Sodium Acryloyldimethyl Taurate Copolymer (and) Water (and) C15-C23 Alkane (and) Decyl Glucoside (and) C13-C14 Alkane (and) Glycerin |

# Introducing SPE Complex Technology

## The Sensogel-Polyol-Elastomer Complex

Applechem's research team discovered a new type of molecular interaction between Sensogel polymers and polyol-type ingredients that has tremendous implications for personal care formulation.

What we call the SPE Complex is essentially a strong hydrogen bonding interaction between polyols like sorbitol and glycerin with Sensogel, which creates a stable, cohesive elastomeric gel similar to silicone-type elastomers.

## The Silicone-Free "Silicone" Elastomer

A combination of Sensogel NOVUS, glycerin, sorbitol, emollients, and water - create rich, hydrophilic gels with a cushioned, velvety sensory, all without a single drop of silicone.

# A New Level of Versatility

- Improving hydration and texture possibilities of glycerin and other natural humectants
- Improving stability issues using polyol humectants instead of additional thickeners
- Improving sensory profile of value formulations without using multiple high-end sensory modifiers
- Improving film forming of water phase due to cohesive Sensogel-Polyol bonding
- Allows for the creation of new glycerin-based cleansers, serums, and sanitizers!

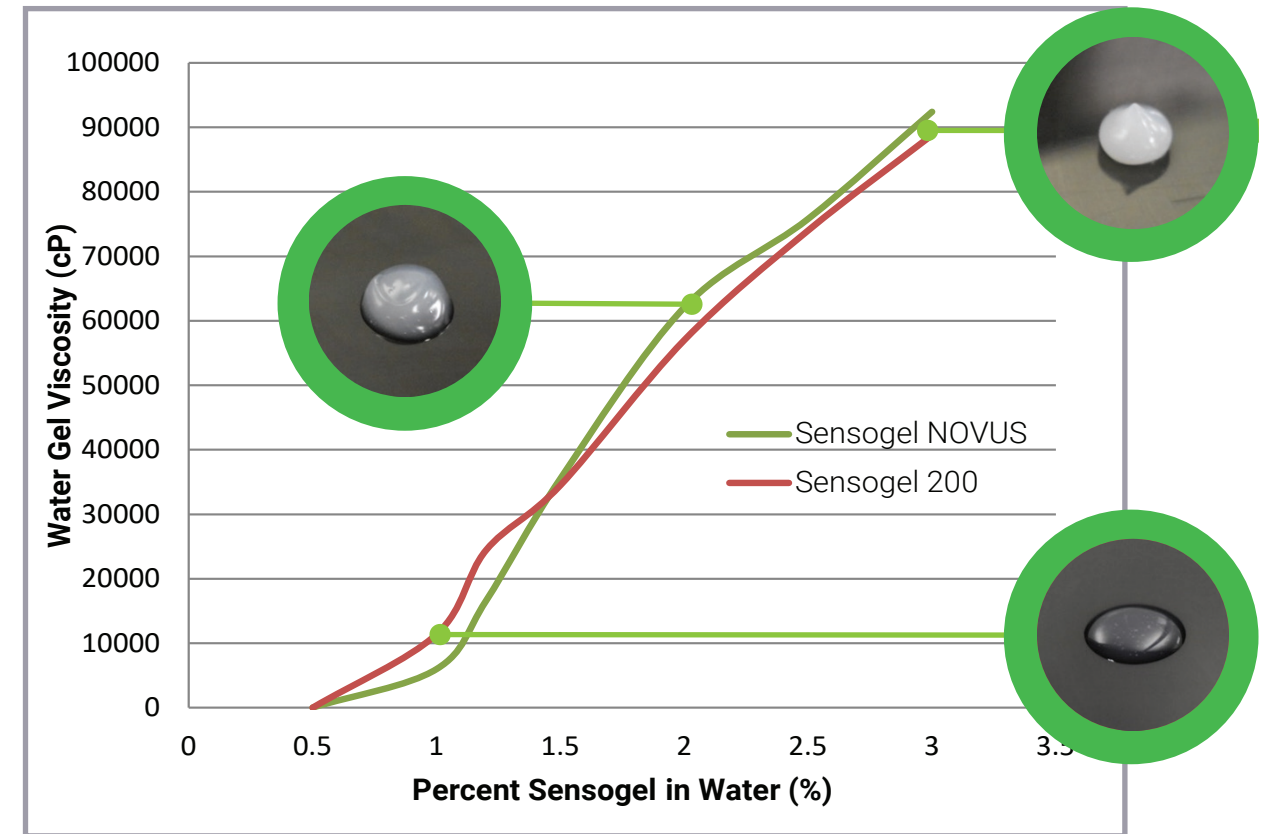
### A Step Forward with Hand Sanitizer Innovations:

Sensogel's SPE Complex technology has very interesting implications for the development of new types of hydro-alcoholic gels. This is due to its ability to leverage glycerin as a way to simultaneously increase viscosity, stability, hydration and sensory in hydro-alcoholic gel and spray systems.

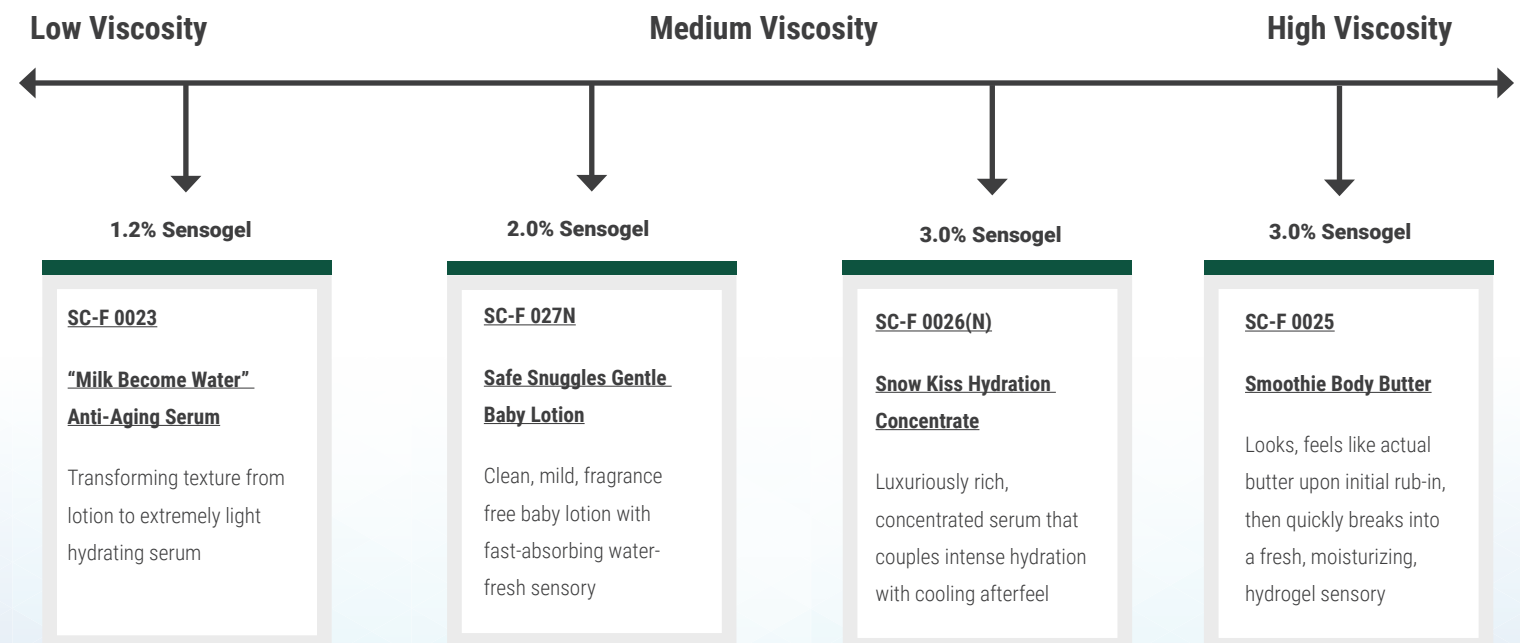
See our **"Restore + Sanitize Dynamic Hydrogel Cream"** in the formulary section for an example of how formulators can refresh a product category traditionally lacking in cosmetic innovation.

# Perpetual Featherlight Sensory

Create a Full Texture Portfolio While Retaining Shear-thinning, Hydrogel Sensory



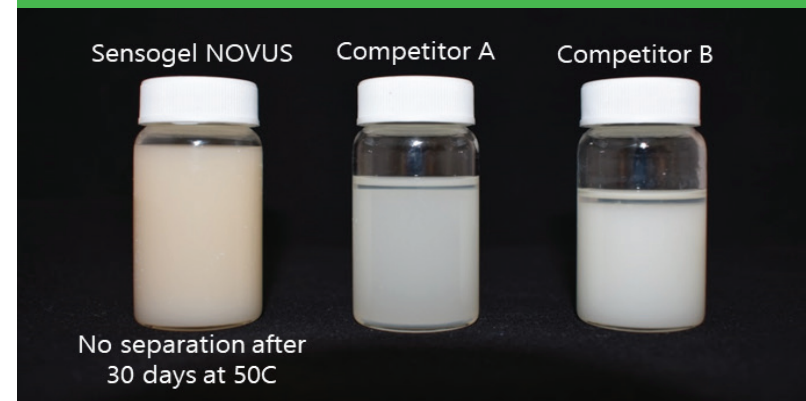
Sensogel's rheological profile makes it easy to move from low viscosity serums all the way to thick body butters, all by simply adjusting the usage rate.



# Formulate Fast, Scale Up Faster

Combines stress-free stability with easy processing for turnkey commercialization

## Sensogel Stability Eliminates Premixing

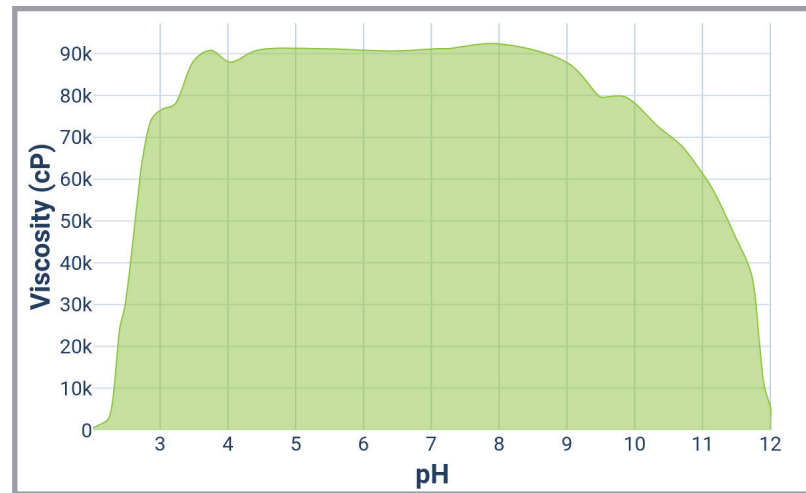


## Consistent Viscosity with Every Batch

Year after year, valuable time and materials are spent trying to rescue batches due to unstable excipients. Sensogel Novus eliminates this risk, remaining completely stable over 1 month at 50 Celsius, while our competitors fall apart within 4 days.

**Competitor A:** Hydroxyethyl Acrylate/Sodium Acryloyldimethyl Taurate Copolymer (and) Isohexadecane (and) Polysorbate 60

**Competitor B:** Sodium Acrylate/Sodium Acryloyldimethyl Taurate Copolymer (and) C15-19 Alkane (and) Polyglyceryl-6 Laurate (and) Polyglycerin-6



## Excellence at Extreme pH

Sensogel products maintain their efficacy in even the most extreme pH ranges, providing strong thickening action from pH 2.5 to 11.5.

Note that Sensogel's efficacy between 2.5 and 4 pH is especially high, which makes it very suitable for low pH treatment formulas (like whitening creams and tanning lotions) containing AHA or DHA.

## Effortless Processing Flexibility

Sensogel is very easy to use and maintains thickening efficacy in a wide range of processing conditions.

Its liquid form is easily dispersed in either aqueous or oil phase of your emulsion.

Sensogel maintains easy dispersability and thickening efficiency in either cold or hot processing temperatures.

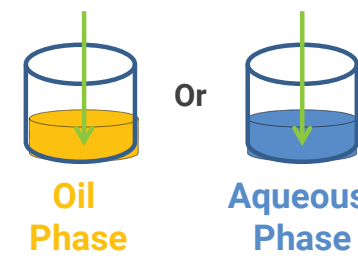


# Product Applications

| TRADE NAME               | PRIMARY APPLICATION  | SECONDARY APPLICATION   | FEATURES   |
|--------------------------|--|---|--|
| <b>Sg</b> Sensogel Novus | <ul style="list-style-type: none"> <li>Clean Beauty Skincare - concentrated hero active lotions to rich body butters</li> <li>Suncare and after-sun products</li> <li>Low pH treatment formulas - self-tanning, bleaching, skin peels and brighteners</li> </ul>       | <ul style="list-style-type: none"> <li>Hand sanitizers</li> <li>Haircare - serums and styling agents</li> <li>Mascara, foundations, and make-up removers</li> </ul> | Liquid, pre-neutralized acrylate thickener. Raw material profile more suitable for clean beauty applications. Combined EWG score of 1. Similar sensory profile to Sensogel 200. Extremely powerful glycerin gellant that can create "glycerin elastomer" textures.             |
| <b>Sg</b> Sensogel 200   | <ul style="list-style-type: none"> <li>Textured skincare - body butters, lotions, light serums</li> <li>Suncare and after-sun products</li> <li>Low pH treatment formulas - self-tanning, bleaching, skin peels and brighteners</li> <li>Spray formulations</li> </ul> | <ul style="list-style-type: none"> <li>Hand sanitizers</li> <li>Haircare - serums and styling agents</li> <li>Mascara, foundations, and make-up removers</li> </ul> | Liquid, pre-neutralized acrylate thickener. Strong stability. Sensory-focused rheological profile - creamy during initial rub-in, followed by a very quick break with fast skin absorption. Effective glycerin and polar solvent thickener. Exceptional performance at low pH. |

# Formulation Instructions

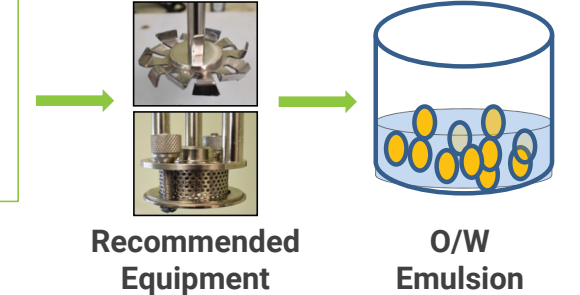
Sensogel can be added into



Aqueous Phase into Oil Phase Preferred

Oil Phase into Aqueous Phase

Emulsion Step



- 0.5 to 3% usage rate in oil-in-water formulations with emulsifiers
- 1 to 4% usage rate in oil-in-water formulations without emulsifiers
- For post-emulsion addition, mix at higher speed to ensure complete dissolution of Sensogel

## Need Samples?

We believe sample requests should be provided generously. We understand trying, testing, and evaluating our ingredients and intermediates are all critical to your research, development, and production processes.

Visit [Applechem.com](http://Applechem.com) or call **862.210.8344** for Sample Requests

# Applechem Formulary - Pandemic Self-Care

## Restore + Sanitize

### Dynamic Hydrogel Cream (SC-H 006(N))

Moisturize, revitalize, and sanitize with this fantastic skincare formulation chassis. Designed for the active professional on the go or a treat that pampers and protects at the end of the day.

This brand new type of instant sanitizer takes advantage of Sensogel's SPE Complex technology, forming a rich hydrogel cream that deep conditions like a hand mask and sanitizes with a CDC-recommended 60% ethanol content.

Combine other choice emollients and actives to create luxurious self-care sensory at an affordable price.

| PHASE | INCI NAME (TRADE NAME) | USAGE (WT%) | USAGE (WT%) | USAGE (WT%) |
|-------|------------------------|-------------|-------------|-------------|
| A     | Glycerin               | 10.0        | 4.44        | 12.5        |
|       | Sensogel 200           | 4.50        | 4.88        |             |
|       | Sensogel NOVUS         |             |             | 11.0        |
|       | Water                  | 24.0        | 24.85       | 14.5        |
|       | Fragrance              | 1.50        | 1.33        |             |
|       | Ethanol (200 Proof)    | 60.0        | 60.0        | 62.0        |
| B     | Emollients             |             | 4.50        |             |
| C     | Sensogel NOVUS         |             |             | 2.0         |

### Processing Method

1. Add the whole Phase A in the beaker without mixing. Then mix Phase A with a propeller blade (a dispersion blade for Sensogel Novus) at 1500- 1800 rpm at room temperature until gel mixture is formed.
2. Add Phase B and mix until homogenous. Then add Phase C and mix until homogenous.

| PHASE          | INCI NAME (TRADE NAME)                     | USAGE (WT%) |
|----------------|--|-------------|
| A              | Isohexadecane                              | 6.50        |
|                | Coco- Caprylate/Caprate                    | 10.0        |
|                | Preservative                               | 0.20        |
|                | Bisbolol (Dragosantol 100)                 | 0.30        |
| B <sub>1</sub> | Glycerin                                   | 30.0        |
|                | Snow Mushroom Extract (PhytoCare-HA CG 1M) | 0.30        |
|                | Sorbitol                                   | 15.0        |
| B <sub>2</sub> | Water                                      | 35.9        |
| B <sub>3</sub> | Sensogel Novus                             | 1.20        |
| C              | Sensogel Novus                             | 0.60        |

### Processing Method

1. Mix Phase B<sub>1</sub> with a dispersion blade for 2 minutes until well-dispersed at room temperature, then add Phase B<sub>2</sub> and continue mixing to dissolve sorbitol.
2. When Phase B<sub>1,2</sub> is homogenous, Phase B<sub>3</sub> while continuing to mix on dispersion blade for 10 minutes at 500 - 1000 rpm at room temperature. Soft gel mixture is formed when Phase B<sub>3</sub> is fully dispersed.
3. Slowly add Phase A into Phase B allowing accumulated oil phase to incorporate before continuing to add oil phase. Continue mixing for 5-10 minutes.
4. Add Phase C to finish thickening the system to a gel consistency and let mix for 10 minutes. Increase mixer speed when a dense gel mixture is formed.

### After-Mask Rescue Balm (SC-F 028N)

This silky rich formula is a hydration and anti-irritation powerhouse, designed to instantly replenish damaged skin barriers worn down after a long day of wearing PPE masks. This formulation contains an astounding 30% glycerin along with 15% sorbitol, which utilizes Sensogel's SPE Complex technology to create a dense, applicator-friendly gel that melts into the skin like silicone elastomer without any tacky residue.

The addition of bisbolol and our Phytocare-HA snow mushroom extract creates a double whammy of anti-irritation and hyaluronic acid-like hydration benefits. This is a stable formula that can easily tolerate additional actives, so formulators can add in anti-acne ingredients like salicylic acid to help treat "maskne" as well.

# Applechem Formulary - Skin Care

## Gentle Soothing Hand Cream (SC-H 008N)

A thick, soothing cream that restores hydration and smooths dry, damaged skin. Clean and safe for irritated, chapped hands.

Sensogel helps build a rich, velvety sensorial profile that maintains a light, water-fresh finish.

### Specifications

- 🍏 Viscosity at 5 rpm: 42,000 cP
- 🍏 pH: 5.5
- 🍏 50°C oven: On-going
- 🍏 Freeze-Thaw: Passed 3 Cycles

| PHASE | INCI NAME (TRADE NAME)   | USAGE (WT%) |
|-------|--|-------------|
| A     | Petrolatum   | 3.00        |
|       | Dimethicone  | 5.00        |
|       | Stearic Acid   | 2.00        |
|       | Glyceryl Stearate  | 1.50        |
|       | Cetearyl Alcohol   | 0.50        |
|       | Sensogel Novus   | 2.00        |
| B     | Glycerin   | 8.00        |
|       | Water  | 77.7        |
|       | Sodium Gluconate   | 0.10        |
| C     | Preservative   | 0.20        |
|       | Lavandula Angustifolia (Lavender) Flower/Leaf/Stem Extract (Hydroessentials Lavandula) | Q.S.        |

### Processing Method

1. Heat Phase A to 85 Celsius then mix until homogenous and Sensogel Novus is dispersed.
2. Mix Phase B until homogenous and heat to 85 Celsius.
3. On a dispersion blade, add Phase B to Phase A at 85 Celsius, allow to mix for 10 minutes at 1000-1500 rpm.
4. Cool to 50 Celsius then add Phase C.
5. Cool to 30 Celsius then adjust pH with 10% citric acid (target pH 5.0 -5.5).

# Applechem Formulary - Skin Care

## Smoothie Body Butter (SC-B 025(N))

Finally, a body butter that lives up to the name - the same look and texture of cold butter straight from the fridge combined with a refreshing hydrogel feel during application. A non-greasy, velvety smooth afterfeel that softens skin and absorbs very quickly.

**OleoFLEX** are film forming elastomeric texturizers for natural oils. They increase water resistance and lock the UV actives and natural oils onto the skin. They can also serve as a soft wax substitute which provides a smooth and cushioned feel with great payoff, rather than a hard and waxy feel.

### Specifications

- 🍏 Viscosity at 5 rpm: 620,000 cP
- 🍏 pH: 5.17
- 🍏 50°C oven: 1 month stable
- 🍏 Freeze-Thaw: Passed 3 Cycles

| PHASE | INCI NAME (TRADE NAME)             | USAGE (WT%) |
|-------|------------------------------------|-------------|
| A     | Sensogel Novus                     | 3.00        |
|       | OleoFlex EG-200                    | 10.0        |
|       | Cetearyl Alcohol                   | 2.00        |
|       | Stearic Acid                       | 1.50        |
|       | Shea Butter                        | 2.50        |
|       | Cocos Nucifera (Coconut) Oil       | 2.50        |
|       | Helianthus Annuus (Sunflower) oil  | 1.00        |
|       | Capric/Caprylic Triglyceride       | 6.00        |
|       | Dimethicone                        | 3.50        |
|       | GMS/PEG-100 Stearate (Ritapro 165) | 2.50        |
| B     | Polysorbate-80                     | 1.00        |
|       | Water                              | 58.05       |
|       | Disodium EDTA                      | 0.05        |
|       | Glycerine                          | 4.00        |
| C     | Propylene Glycol                   | 2.00        |
|       | Preservative                       | 0.20        |
|       | Fragrance                          | 0.20        |
|       | FDC Y5 Dye (0.1% aqueous solution) | Q.S.        |

### Processing Method

1. Heat Phase A to 85 Celsius and make sure all Sensogel is dispersed.
2. Heat Phase B to 85 Celsius to a homogenous solution.
3. Pour Phase A into Phase B while mixing by a homogenizer at 75 - 85 Celsius, 4000 rpm. Continue mixing for 10 -15 minutes.
4. Cool down to 50 Celsius.
5. Add phase C. Then cool down to 30 Celsius.
6. Adjust pH to 5.0 - 5.8 if necessary.

# Applechem Formulary - Sunscreens

## Dream Clean Sunscreen SPF 40+, Broad Spectrum (SU-OW 0018)

Finally, a PEG-Free oil-in-water sunscreen chock full of clean ingredients that features fantastic sensory, transparency, and best of all, a fully stable, pH-drift free formula that blends in like a dream. This sunscreen utilizes our Sensogel SPE Complex technology, which creates a strong gelling complex between Sensogel polymers and virtually any kind of polyol material.

Any experienced sunscreen formulator is familiar with zinc oxide drifting into the water phase in oil-in-water emulsions, and this formulation uses SPE technology to eliminate this issue resulting in stable, long-term viscosity. No additional xanthan gum or other gummy-like natural thickeners required.

**G-Block** products are COSMOS, NPA approved, high active mineral UV filter dispersions which give predictable SPF and broad-spectrum benefits. Their excellent spreadability simplifies formulation development and the manufacturing process.

**Applecare PDS 300** is a dispersion super booster that helps disperse highly-loaded mineral UV filters more evenly across the skin, providing smoother sensory with improved SPF protection.

### Specifications

- 🍏 SPF: 42.55 ; FDA protocol, 1 subject
- 🍏 CW: 370 nm, Broad Spectrum
- 🍏 Viscosity @ 10 rpm: 31,800 cP
- 🍏 pH: 7.5
- 🍏 50°C oven: 1 month stable
- 🍏 Freeze-Thaw: Passed 3 Cycles

| PHASE | INCI NAME (TRADE NAME)                         | USAGE (WT%) |
|-------|--|-------------|
| A     | Distilled Water                                | 42.0        |
|       | Erythritol                                     | 2.00        |
|       | Sorbitol                                       | 2.00        |
|       | Preservative                                   | 0.50        |
| B     | G-Block DZ 370 CCT                             | 35.5        |
|       | Applecare PDS 300                              | 2.50        |
|       | Isohexadecane                                  | 12.0        |
| C     | Polyglyceryl-10 Mono/Dioleate (Caprol PGE 860) | 0.70        |
|       | Glyceryl Behenate (Compritol 888 CG)           | 0.50        |
|       | Sensogel Novus                                 | 2.30        |

### Processing Method

1. Mix Phase A with a propeller mixer for 5 minutes at room temperature until erythritol and sorbitol are fully dissolved.
2. Mix and heat Phase B in separate vessel at 500 rpm for 15-20 minutes with a dispersion blade at 70 Celsius.
3. Add Phase C into Phase B until homogenous at 70 Celsius.
4. Then move Phase BC to Silverson homogenizer. Add Phase A into Phase BC when homogenizing at 4000-4500 rpm for 5 minutes without continuous heating.
5. Switch to propeller mixing while cooling down to room temperature. Add back water that may have evaporated during processing.
6. Adjust pH to 7.0-7.6 if needed.

# Applechem Formulary - Sunscreens

## Sugary Satin Oil-Free Daily Wear SPF 30, Broad Spectrum (SU-OW 0018C)

PEG-Free, oil-free daily wear sun protection that is light enough for the face and moisturizing enough for the body. Features fantastic sheer-thinning sensory, transparency, and acts as a stable, easy-to-process chassis for your favorite hero ingredients. Sensogel's SPE Complex technology dramatically boosts the hydrating and conditioning power of polyols like sorbitol while simultaneously increasing stability and viscosity.

**SENSOGEL NOVUS** is a very powerful polyol thickener which is used to great effect in this formula. Not only does it boost the viscosity of polyols like glycerin from a soft liquid into a structured gel, but also tamps down on the traditional stickiness associated with these types of ingredients.

### Specifications

- 🍏 SPF: 30
- 🍏 Viscosity @ 10 rpm: 31,800 cP
- 🍏 pH: 7.5
- 🍏 50°C oven: 1 month stable
- 🍏 Freeze-Thaw: Passed 3 Cycles

| PHASE | INCI NAME (TRADE NAME)                         | USAGE (WT%) |
|-------|--|-------------|
| A     | Distilled Water                                | 69.70       |
|       | Erythritol                                     | 2.00        |
|       | Sorbitol                                       | 2.00        |
|       | Preservative                                   | 0.50        |
| B     | Avobenzene                                     | 2.00        |
|       | Octocrylene                                    | 10.00       |
|       | Octisalate                                     | 5.00        |
|       | Isohexadecane                                  | 5.00        |
| C     | Polyglyceryl-10 Mono/Dioleate (Caprol PGE 860) | 0.80        |
|       | Glyceryl Behenate (Compritol 888 CG)           | 0.50        |
|       | Sensogel Novus                                 | 2.50        |

### Processing Method

1. Mix Phase A with a propeller mixer for 5 minutes at room temperature until erythritol and sorbitol are fully dissolved.
2. Mix and heat Phase B in separate vessel at 500 rpm for 15-20 minutes with a dispersion blade at 70 Celsius.
3. Add Phase C into Phase B until homogenous at 70 Celsius.
4. Then move Phase BC to Silverson homogenizer. Add Phase A into Phase BC when homogenizing at 4000-4500 rpm for 5 minutes without continuous heating.
5. Switch to propeller mixing while cooling down to room temperature. Add back water that may have evaporated during processing.

# Applechem Formulary - Cleansing

## Cleansing and Conditioning Himalayan Salt Scrub (SC-BS 022N V2)

A unique oil-free, glycerin-based scalp exfoliator with 14.2% surfactant active and natural Himalayan Salt that cleanses dirt and product buildup on wet hair.

Sensogel's SPE technology reduces hair breakage and soothes itchy and flaky scalps. It also acts as a pretreatment for conditioners, smoothing out hair fibres to reduce frizziness and entanglements for effortless conditioner application.

| PHASE | INCI NAME (TRADE NAME)  | USAGE (WT%) |
|-------|---|-------------|
| A     | Cocamide Monoethanolamine   | 4.20        |
|       | Sodium Alpha Olefin (C14-16) Sulfonate (Calsoft AOS-40; 40% active) | 15.2        |
|       | Cocamidopropyl Betaine (35% active)                                 | 11.1        |
| B     | Glycerin  | 27.3        |
|       | Sensogel Novus  | 1.00        |
| C     | Himalayan Salt  | 39.0        |
| D     | Sensogel Novus  | 2.20        |

### Specifications

- 🍏 50°C oven: 1 month stable
- 🍏 Freeze-Thaw: Passed 3 cycles

### Processing Method

1. Mix Phase A at 65 Celsius with a propeller blade until homogenous and then cool down to room temperature.
2. Mix Phase B separately until homogenous at room temperature. Slowly add Phase C and mix at 2000 rpm for 20-30 minutes to grind the salt.
3. Add Phase D to Phase BC and mix until homogenous.
4. Add Phase A to Phase BCD at low speed until homogenous.



Sensogel

Create Possibilities

Gb

Pc

Sbx

Of

Ac

Gg

# applechem

Create Possibilities

*Applechem was founded in 2003 by Dr. Samuel Lin in a tiny laboratory within the Enterprise Development Center (EDC) of the New Jersey Institute of Technology.*

*As one of the state's largest technology incubation centers, the EDC provides an environment where the state and federal government, universities, and investors collaborate with entrepreneurs to create young and dynamic technology companies. Here is where Applechem embarked on its critical years of research and development.*

## Get in touch with us.

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