



A BETTER WAY TO FORMULATE

VERSASTIQUE™

CLEAR STIQUE TECHNOLOGY

The Versastique™ product line is a multi-functional material that provides a better way to formulate through simplified creation of functional and aesthetic solid stick applications. With translucent and clear stick properties, Versastique is ideal for natural, mineral and synthetic ingredients in cosmetics, personal care, skin care, sun care and health care products.

Versastique offers formulators excellent performance and stability benefits:

- Formulation Friendly – efficient delivery system, easy to use (simply melt and mix).
- Cost Effective – reduces amount of structural material required to make a stick application.
- Versatility – compatible with a wide variety of low polarity ingredients.
- Performance – excellent suspension properties and superior moisture delivery.
- Stability – stabilizes and protects active ingredients in a self-preserving formulation base.
- No harsh chemicals – milder to the skin and low toxicity.

For more than 100 years, Penreco® has specialized in niche product blending to meet customer specific requirements. If you are interested in finding out more about the many attributes of our gelled and solid stick technology, we can provide supporting clinical and in-vitro studies. Please contact your Penreco sales representative and our technical experts will be happy to find a solution that's right for you.

Let us show you a better way to formulate.

penreco®

138 Petrolia St., Karns City, PA 16041
800.437.3188 ■ 724.756.1050 ■ penreco@clmt.com

To request a sample, visit penreco.com.

VERSASTIQUE™ LOW MELT

CLEAR STIQUE TECHNOLOGY

FORMULATING STICKS WITH VERSASTIQUE™ LOW MELT

The major challenge in formulating stick products is balancing good in-use and mold-release properties with physical and chemical stability. Making the stick too hard with high melting point waxes can provide good heat stability, but often results in poor application (transfer rate or payout) on skin. Using Versastique in your formulation can significantly reduce friction while maintaining sufficient payout — without sacrificing stability of your stick products.

Formulating stick products typically involve heating the ingredients to a molten state to facilitate thorough mixing followed by extrusion or pouring. A lower melting point product base allows incorporation of heat sensitive and volatile ingredients while also providing a safer processing temperature. Additionally, the higher flash point of the Versastique Low Melt series enables an even greater margin of safety by increasing the difference between the processing temperature and the flash point.

APPLICATIONS

- Color Cosmetics: concealer, foundation, blush/highlighter, face and body paint, lipstick, lip liner, eye liner, multi-stick
- Personal Care: deodorant, cleanser, mask/peels
- Skin Care: oils, insect repellent, cuticle oil, complexion correction, aftershave
- Sun Care: sunblock/sunscreen, after-sun cooling
- Health Care: scar treatment, topicals, ointments, wound-healing products, pain relief, acne treatment
- Hair Care: pomades, styling products, treatments

The Versastique Low Melt product line includes gelling four substrates:

- SQ Squalane
- ML C12-15 Alkyl Benzoate
- ME Hydrogenated Polyisobutene
- M Mineral Oil

VERSASTIQUE SQ

Anti-Aging

Solid stick form of squalane derived from plant sugar is a sustainable replacement for shark and olive squalene. It closely mimics the body's natural moisturizers and is absorbed quickly and effectively, without leaving greasy residue on the skin.

VERSASTIQUE ML

Soothing

Solid stick form of C12-15 alkyl benzoate provides a light and dry skin feel. It's known as an emulsifier and stabilizer for antiperspirant actives.

VERSASTIQUE ME

Light-Moisturizing

Solid stick form of hydrogenated polyisobutene is very light, non-greasy, and has good spreading properties. It has a wide range of chemical compatibility, and solubility for sunscreen agents and is a great mineral oil-free alternative.

VERSASTIQUE M

Moisturizing

Solid stick form of mineral oil provides increased moisturization and convenience over regular mineral oil.

KEY TYPICAL PROPERTIES	VERSASTIQUE LOW MELT			
	SQ 5 T	ML 5 T	ME 5 T	M 5 T
Viscosity @ 130 °C (cPs) D2983	4.6	4.1	5.2	4.3
Specific Gravity @ 25/25 °C D4052	0.81	0.93	0.83	0.85
Flash Point ASTM D92 (°C)	220	195	145	188
Melting Point (°C) D3954	85	81	85	88
Appearance	Clear solid	Clear solid	Clear solid	Clear solid
Gardner Color	0.6	0.3	0.6	0.3
Hardness (g) typical	20	20	20	20

International Nomenclature of Cosmetic Ingredients (INCI)

The **Versastique Low Melt** product line includes the gelled (substrate) and Butyl Stearate, Isostearyl Alcohol, Hydrogenated Styrene/Butadiene Copolymer, Dibutyl Ethylhexanoyl Glutamide, Dibutyl Lauroyl Glutamide, Pentaerythrityl Tetra-di-butyl Hydroxyhydrocinnamate

Please note that only the viscosity and appearance are listed on the CoA.
The remaining data are typical results that are not regularly reported on the CoA.

VERSASTIQUE™ SUNCARE

MINERAL SUNSCREEN STUDY

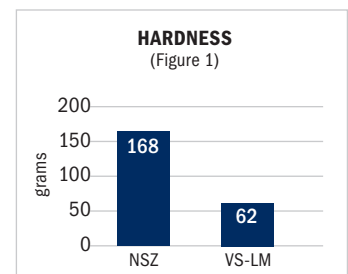
WHY FORMULATE WITH VERSASTIQUE

Studies on the Versastique product line demonstrate that formulations utilizing the Penreco® Versastique Low Melt products (VS-LM) provide an effective solution for creating high performing mineral sunscreen sticks. To illustrate the benefits of formulating with Versastique, mineral sunscreen prototypes were developed and tested against a market-leading commercial benchmark (NSZ).

The studies performed utilize a texture analyzer and third party In-vitro SPF water-resistance testing. The studies demonstrated the Versastique products offer comparable or improved hardness, friction, transfer rate and efficacy.

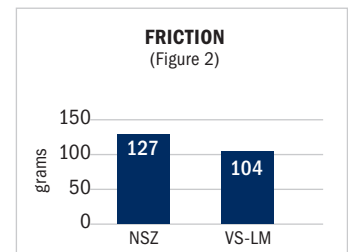
HARDNESS

Versastique prototypes have lower hardness (grams) than the wax-structured benchmark while maintaining sufficient structure and integrity. Softer stick products are gentler to apply onto the skin. (Figure 1)



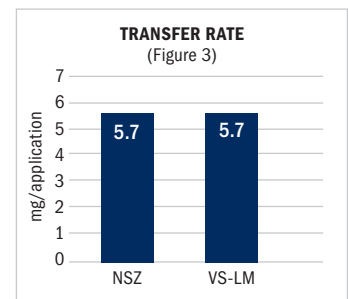
FRICTION

Versastique prototypes have lower friction (grams) than the commercial benchmark. Thus, we can conclude that the Versastique prototypes take less force to spread product over the surface. (Figure 2)



TRANSFER RATE

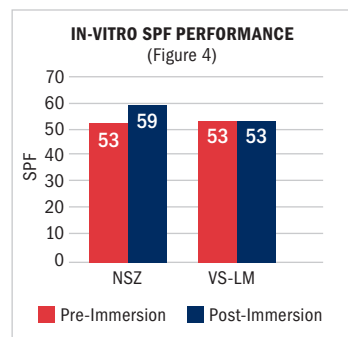
Versastique sunscreen prototypes have comparable or improved transfer rates (mg/application) compared to NSZ. Thus, we can conclude the amount of product being applied is equivalent or improved compared to the benchmark. This means Versastique sunscreens are gentler and easier to apply without applying excess product to the skin. (Figure 3)



EFFICACY

In-Vitro SPF Performance (static vs. post-immersion)

Versastique sunscreen prototypes have comparable SPF performance to the benchmark. The water-resistant properties of Versastique enable equivalent or higher **SPF post-immersion** vs. the **static or pre-immersion** values. The mildness, high efficiency, and water resistance properties of Versastique makes it an attractive base for high-performance mineral sunscreens. Due to the performance/formulation dynamics of mineral UV filters, it is important to optimize mineral sunscreen formulation. The incorporation or removal of one ingredient can significantly change overall product performance. (Figure 4)



RR# 2019 - 0006

RR# 2019 - 0002.

In-vitro sunscreen evaluation sample numbers: 20-088 to 20-093.

VERSASTIQUE™ SUNCARE

MINERAL SUNSCREEN STUDY

Versastique offers a simplified solution and formula optimization requiring less ingredients to create high-performance, water-resistant stick products. The prototypes achieved comparable performance to a market-leading benchmark with a more efficient formulation (10 ingredients vs. 15) while also providing superior texture. Additionally, the co-polymer system in Versastique provides a higher melt point than traditional wax bases so the sunstick doesn't melt when exposed to the sun or higher temperatures.* Formulation strategy included optimized ingredients such as SPF booster, dispersants, waterproofing agents, structurants and a skin feel enhancer.

The VersaSun stick formulation combines Versastique and mineral sunscreen agents for an even and protective application that goes on smoothly.

FORMULATION

VersaSun LM (VS-LM)

PHASE	TRADE/COMMON NAME	WT%	FUNCTION
A	Versastique Low Melt ME 5T	52.9%	Base
A	Sunflower Wax Granules	10.0%	Structurant
B	Dispersun OL-100	2.5%	Dispersant
C	Z-Cote HP1®	21.6%	Sunscreen agent
D	Hallbrite® BHB	5.0%	SPF Booster + Dispersant
D	SunSpheres™ Powder	2.0%	SPF Booster
D	Cosmedia® DC	2.0%	Water-proofing agent
D	Vitamin E	1.0%	Antioxidant
D	LexFeel™ Natural	2.0%	Skin-feel modifier
D	Valvance® Touch	1.0%	Skin-feel modifier



MIXING INSTRUCTIONS

- Melt Phase A components at approximately 220°F
- Add Phase B to Melted Phase A and mix at 220°F for 15 minutes.
- Add Phase C to the blend and mix at 220°F for 30 minutes.
- Add Phase D components to blend and mix at 220°F for 2 hours.
- Pour blend into sample containers and allow to cool.

*Products in **bold** are supplied by Calumet Specialty Products Partners, L.P.

This formula is distributed by Calumet Refining, LLC ("Calumet"), only for the purpose of promoting the use of mineral oil, petrolatum, Versastique™ and/or Versagel as components of secondary cosmetic products that are manufactured by Customers of Calumet and for no other purpose. Full Disclaimer and Limitation of Liability available at <https://penreco.com/formulation-disclaimer>.

*VersaSun LM melt point = 190.6 °F
NSZ melt point = 167.0 °F

The Benchmark product ingredients include:

Active ingredients: Zinc Oxide (21.6%)

Inactive ingredients: Octyldodecyl, Neopentanoate, C12-15 Alkyl Benzoate, Polyethylene, Paraffin, Silica, Neopentyl Glycol Diethylhexanoate, Ozokerite, Isopropyl Myristate, Adipic Acid/Diglycol Crosspolymer, Triethoxycaprylsilane, Neopentyl Glycol Diisostearate, Caprylyl Glycol, Tocopheryl Acetate

Z-Cote HP1® is a registered trademark of BASF Corporation; Hallbrite® is a registered trademark of Hallstar Beauty & Personal Care Innovations Company Corporation; SunSpheres™ is a registered trademark of Rohm and Haas Company; Cosmedia® is a registered trademark of Cognis Corporation; LexFeel™ is a trademark of Inolex, Inc.; Valvance® is a registered trademark of DSM IP Assets B.V.; Myrilol® is a registered trademark of Cognis IP Management GmbH



Download a digital copy
of this brochure.

penreco

All trademarks are owned by Calumet Refining, LLC ("Calumet"), a wholly-owned subsidiary of Calumet Specialty Products Partners, L.P., unless otherwise specified.
© 2023 Calumet Refining, LLC. All Rights Reserved.

CALUMET
SPECIALTY PRODUCTS PARTNERS, L.P.