

Sensory Enhanced Emollients



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GLOBAL LEADERSHIP. Sonneborn is the global leader in the manufacture and supply of the highest quality refined hydrocarbons, including White Mineral Oil, Petrolatum, Microcrystalline Wax and SonneNatural® 100% vegetable-based emollients for Personal Care, Pharmaceutical and Cosmetic Markets. Sonneborn is committed to providing customers with premium products, progressive technical capabilities and dependable service so that they receive the very best value in the industry. Together with continued growth in fundamental product lines, Sonneborn has applied core strengths to transcend traditional technologies and deliver exciting new products to the market.

THE POWER OF SENSORY ATTRIBUTES. When developing new ingredients for personal care formulations we want to balance physical and functional properties along with the desired usage experience for the consumer. The aesthetic and sensory attributes are equally important to the tangible, physical benefits of personal care products. The perceivable quality and feel of a finished product greatly influences a consumer's likelihood to repeat the purchase. This focus on sensory attributes led us to the development of a unique group of specialty petrolatums, including SonneCone® CM and DM1, and Sonneborn Elegance, Sublime XS and Satin. In addition, both Lilac® and Iris®, each a highly refined alkane blend used as D5 alternatives, offer preferred skin-feel compared to other market alternatives.

Each ingredient imparts an elegant skin-feel, while still delivering the functional benefits of petrolatum and white mineral oil.



SonneCone®

Sensory Enhanced Petrolatums

DISTINCTLY UNIQUE. By applying developmental expertise, we have created two different SonneCone products that are not easily recognizable as petrolatum.

SonneCone CM and DM1 have a sensory profile that compliments many personal care formulations with their silky skin-feel, excellent spreadability, easy handling, and smooth application as they melt at skin temperature. Both are 100% USP Petrolatums that also meet the FDA requirements for food grade petrolatum in 21CFR 172.880.

SonneCone® CM is a soft, translucent, high gloss petrolatum that offers a powdery soft after feel. It is an excellent emollient for skin lotions designed to be lightweight, yet deliver optimal moisturizing benefits.

SonneCone® DM1 is soft and translucent with medium gloss and higher cushion. Both are excellent options for enhancing products where skin protection and TEWL are critical, but a more luxurious skin-feel is desired.

APPLICATIONS & PROPERTIES. Combining the traditional benefits of a petrolatum with enhanced sensory characteristics, SonneCones can be some of your most versatile formulating ingredients. They are suitable for oil-free formulations and recommended for use in cosmetic applications where an emollient

and moisturizer are required. The unique “non-greasy” SonneCone texture offers a smoother, drier, low tack after feel with a more satiny appearance after rub-in.

SonneCone® Applications

	SonneCone® CM	SonneCone® DM1
PERSONAL CARE		
Anti-Ash Skin Products	X	X
Color Cosmetics	X	X
Dry Body Oil	X	X
Hair Smoothing	X	X
Hair Styling	X	X
Hand Cleaners	X	X
Hand & Body Lotions	X	X
Massage Cream	X	X
Moisturizing Lotions	X	X
Moisturizing Body Wash	X	X
Scalp Protector	X	X
Skin Creams and Lotions	X	X
Sun Care Products	X	X
PHARMACEUTICAL		
Barrier/Skin Protectants	X	X
Medicated Ointments	X	X

Typical Properties of SonneCone®

Melting Point ASTM D-127		Consistency ASTM-D-937	Viscosity @ 210° F ASTM D-445	Color Lovibond
°C	°F	USP	SUS (cSt)	
38/51.6	100.4/125	240/300	39(3.95)	White

RHEOLOGY AND SKIN-FEEL. Petrolatum has long been a benchmark for moisturization and skin protection, but at high levels it often imparts a heavy feel on the skin surface. For this reason, rheology plays an important role in how face and bodycare products are applied, spread, and absorbed into the skin's surface. SonneCone products have been developed to enhance skin-feel without compromising the many functional benefits of classic petrolatum. There are two

properties described on the following pages which illustrate the rheological enhancement of SonneCone products over that of standard petrolatums; these are known as Flow Onset and Complex Viscosity. *Flow onset* relates to spreadability properties, whereas *complex viscosity*, which provides similar information, is more related to rub-in and absorption.



FLOW ONSET. The rheology of petrolatum can be defined by the decrease in viscosity with increasing temperature. We define flow onset as the temperature at which the dynamic viscosity reaches 25 Pa.S (pascal-second). By looking at the difference between the flow onset temperature of a “standard” petrolatum used in typical personal care products, versus that of the SonneCone products, one can predict the relative rheology and therefore its spreadability, drag and overall skin-feel properties upon application.

The typical flow onset temperature of a “standard” USP Petrolatum (for example, Sonneborn’s White Protopet 1S) is between 45°C and 55°C, whereas the flow onset temperature of the SonneCone product line occurs between 30°C and 40°C. At body temperature, the SonneCone material becomes fluid, therefore exhibiting easier spreadability, less drag and an overall lighter skin-feel upon application. Most petrolatums are resistant to spreading, and have a heavier/greasier skin-feel. Conversely, the spreadability of the SonneCone products resembles that of some silicones.

The table below shows the flow onset temperatures of the SonneCone products versus White Protopet 1S Petrolatum:

Product	*Flow Onset °C
SonneCone® CM	31.7
SonneCone® DM1	39.7
White Protopet® 1S	53.0

This particular SonneCone property adds a more appealing sensory dimension to USP grade petrolatum, while still delivering the same attributes of moisturization, occlusivity and skin protection.

COMPLEX VISCOSITY. *Complex viscosity* is another characteristic that helps to predict certain sensory attributes of petrolatum. Between the temperature range of 35°C to 45°C, the complex viscosity $|\eta^*|$ for the SonneCones approaches 0.1 Pa. The temperature for the complex viscosity to reach 0.1 Pa for typical USP Petrolatum is above 47°C. The table below describes the temperature at which G' is equal to 0.1 Pa, or the pressure at which there is no “drag” or resistance when rubbing a product into the skin; i.e. the point at which a product feels light and absorbed into the skin.

Product	$ \eta^* = 0.1\text{Pa.S}$
SonneCone® CM	35.9°C
SonneCone® DM1	36.3°C
White Protopet® 1S	>65°C

* Instrument used in study is TA AR2000ex Rheometer

The temperature range at which the SonneCone viscosity approaches 0.1 Pa, is close to that of skin temperature. When SonneCone is applied to the skin, it spreads smoothly and without the drag or tackiness that is characteristic of standard petrolatum. This characteristic further enhances the elegant application and skin-feel of the SonneCone product line.

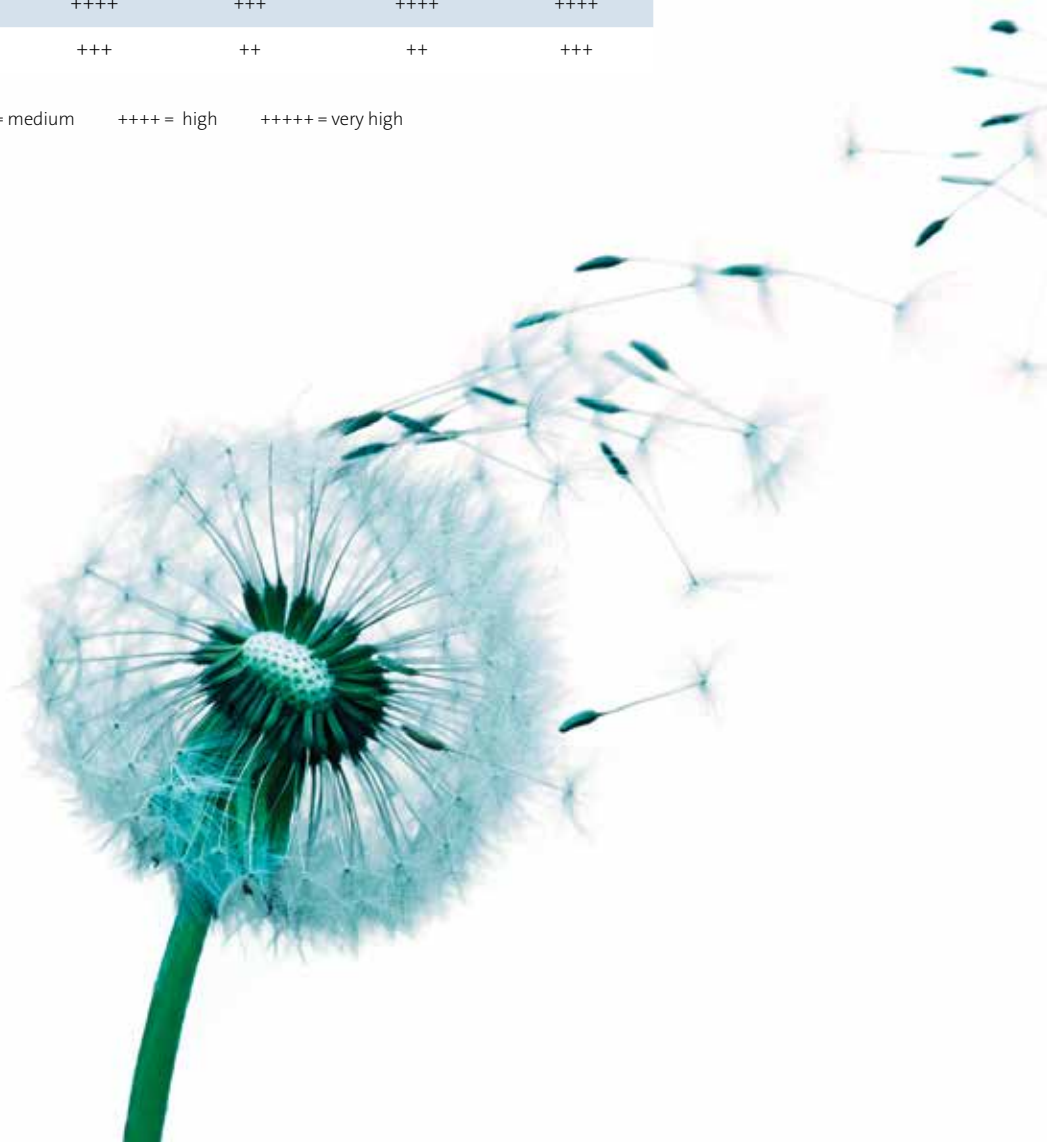


SENSORY PROFILE. SonneCone CM and DM1 are both 100% USP petrolatum products, offering the advantages of a petrolatum with CM having less cushion and higher gloss than DM1. To help in choosing the right product for your

particular formulation, please refer to the sensory selection guide below where each is compared to White Protopet 1S as the standard.

Product	Cushion	Lubricity	Gloss	Slip	Playtime
SonneCone® CM	++	++++	++++	++++	++++
SonneCone® DM1	+++	++++	+++	++++	++++
White Protopet® 1S	++++	+++	++	++	+++

+ = very low ++ = low-medium +++ = medium ++++ = high +++++ = very high



Sonneborn Elegance, Sublime XS and Satin

Sensory Enhanced Petrolatums

INNOVATIVE SENSORY AND TEXTURE. Driven by the consumer appeal for soft and supple skin-feel, it was high time for creating a new generation of unique sensory enhanced petrolatum products. Introducing: Sonneborn Elegance, Sublime XS and Satin – the newest, freshest approach to petrolatum in delivering performance and the desired sensory properties for personal care formulations.

Sonneborn Elegance is an exciting new soft and silky petrolatum having a unique non-greasy texture. This petrolatum guarantees the right cosmetic elegance.

Sonneborn Sublime XS is more creamy than Elegance, and spreads smoothly, with low tack and medium playtime. XS stands for Extra Smooth, making Sublime XS an ideal base for cosmetic formulations requiring exceptional silky, velvety attributes.

Sonneborn Satin is a supremely soft, translucent-white, glossy petrolatum with high slip, medium cushion and long playtime. This unique combination of softness and relatively low melting point allows it to melt at skin temperature and provide excellent spreadability with low tack.

Sonneborn Elegance, Sublime XS and Satin Applications

	SB Elegance	SB Sublime XS	SB Satin
PERSONAL CARE			
Hand & Body Lotions	X	X	X
Hair Conditioning & Smoothing	X	X	X
Scalp Protector	X	X	X
Moisturizing Body Wash	X	X	X
Shower Cream	X	X	X
Massage Cream	X	X	X
Color Cosmetics	X	X	X
Dry Body Oil	X	X	X
Sun Care & SPF Products	X	X	X
BB/CC Creams	X	X	X



Properties of Sonneborn Elegance, Sublime XS and Satin Petrolatums

Product	Drop Melting Point °C ASTM D-127	Drop Point °C acc. EP Typical Values	Congealing Point °C ASTM D-938	Cone Penetration dmm @ 25 °C ASTM D-937	Lovibond Color 2"Cell (* = 3" Cell)	Purity
SB Elegance	35-70	56	48-53	170-200	1.5Y Max	EP
SB Sublime XS	35-70	65	57-64	170-200	1.0Y Max.	EP
SB Satin	38-51.6	36	35-45	240-300	1.0Y Max*	EP/USP

As with all Sonneborn products, this new generation of petrolatum is highly refined. Both Elegance and Sublime XS meet the purity requirements of the European Pharmacopoeia,

and Satin is a USP petrolatum that meets the FDA requirements for food grade petrolatum in 21CFR172.880.

SENSORY PROFILE. The new enhanced sensory line has been added to the Sonneborn product portfolio, primarily to offer a more silky, smooth and creamy product that suits the needs of the dynamic Personal Care industry where sensory characteristics are becoming more and more important.

To help in choosing the right ingredient for your particular formulation, please refer to the sensory selection guide below where each is compared to standard petrolatum.

Product	Cushion	Lubricity	Gloss	Slip	Playtime	Greasiness
SB Elegance	+++	+++	++	+++	++	++
SB Sublime XS	+++	+++	+++	+++	+++	++
SB Satin	+++	+++	++++	++++	++++	++
White Protopet® 1S	++++	+++	++	++	+++	++++

+ = very low ++ = low-medium +++ = medium ++++ = high +++++ = very high

THE NEW PETROLATUM CHOICE. Specialty Sensory Emollients are a fresh, new approach to the array of Sonneborn petrolatum products. While there may be no better alternative to the many benefits of petrolatum in skincare and pharmaceutical ointments,

with the addition of the SonneCone, and Sonneborn Elegance, Sublime XS and Satin, there are now more distinctive sensory enhanced choices.

Lilac® and Iris®

Sensory Enhanced Alkanes

Lilac (INCI C14-22 Alkane) and Iris (C12-17 Alkane) are both highly refined blends of alkanes ideal for use as lightweight, colorless alternatives to D5 silicones in many personal care applications.

Lilac® offers a preferred after feel compared to other alternatives on the market with its silky spreadability, short playtime and a powdery, soft after feel. The combination of emollient with silicone-like

properties makes this a very versatile ingredient in cosmetic applications where an emollient and moisturizer are required. Lilac is a hydrophobic, colorless, odorless liquid that is biologically stable, is non-comedogenic and does not support bacterial growth. An advantage to using Lilac in formulations is its ability for blending at much higher temperatures, higher safety threshold and preferred after feel over other alternatives in the market.

Lilac® Applications

Lilac Emollient Applications

PERSONAL CARE

AP/DEO

Body Wash

Hair Conditioner

Hair Styling & Finishing

Hand Cleaners

Moisturizing Lotions

Permanent Waves

Scalp Protector

Skin Creams & Lotions

Sun Care Products

PHARMACEUTICAL

Dental Adhesive Formulations

Medicated Ointments

Suppositories

Product Information

INCI Name	C14 – 22 Alkane
CAS Number	8042-47-5
CAS Registry Name (s)	White Mineral Oil, Paraffin Oil

Typical Features

Specific Gravity @ 25°C	ASTM D4052	0.816
Viscosity @ 25°C, cSt	ASTM D445	6.70
Color/Appearance	Visual	Colorless
Refractive Index	ASTM D1218	1.450
Boiling Point	ASTM D2887	>230°C
Flash Point	ASTM D92	>120°C (248°F)
MSDS Section 3	Hazards	None
MSDS Section 9	Odor	None
Color	ASTM D156	30 min.

Iris® is a highly refined mixture of alkanes offering enhanced skin-feel for a wide range of personal care applications. Iris is a colorless, odorless liquid with the sensory characteristics of cyclopentasiloxane and was developed as an alternative to D5 silicones in cosmetic formulations.

Iris® Applications

Iris Emollient Applications

PERSONAL CARE

AP/DEO

Body Wash

Hair Styling & Finishing

Hand Wash

Hand & Body Lotions

Sun Care Products

Product Information

INCI Name	C12 – 17 Alkane
CAS Number	8042-47-5
CAS Registry Name (s)	White Mineral Oil, Paraffin Oil

Typical Features

Specific Gravity @ 25°C	ASTM D4052	0.798
Viscosity @ 25°C, cSt	ASTM D445	3.58
Color/Appearance	LATM	Bright & Clear
Refractive Index@ 25°C	ASTM D1218	1.442
Flash Point	ASTM D92	118°C

SENSORY PROFILE. To help in choosing the right ingredient for your particular formulation with similar properties as silicones,

please refer to the sensory selection guide below where both products are compared to Cyclopentasiloxane.

Product	Cushion	Lubricity	Gloss	Slip	Playtime
Lilac®	+	+++	+++	++++	++
Iris®	+	+++	++	++++	++
Cyclopentasiloxane	+	++	++	++++	++

+ = very low ++ = low-medium +++ = medium ++++ = high +++++ = very high

THE SONNEBORN FAMILY OF PRODUCTS. The primary physical benefits of skin care products are to moisturize, protect and improve the appearance of skin. These tangible deliverables are expected, but favorable sensory attributes are what delights the consumer and influences continual usage and repurchase. Sonneborn enhanced sensory emollients deliver both the ultimate in moisturization and desired sensory attributes.

Sonneborn products have been soothing people since they were babies. We continue to build on our innovation, developing new and better products that deliver value in today's world. As always, we are anxious to hear from you so that we can start on something new.



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