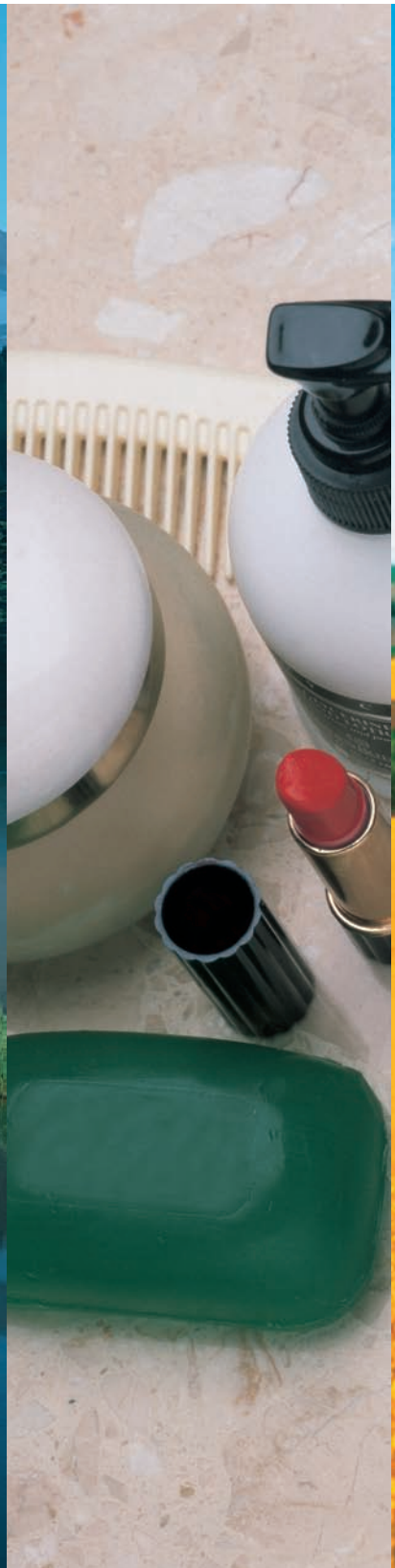
Glossamer®

natural polymer



Glossamer®... a new natural polymer for skin, sun and hair care applications

A new, natural polymer for skin, sun and hair care applications.

Polymers, as a class of additive materials, are important in cosmetic and personal care product formulations. Based on their strong film forming properties, they can form occlusive barriers, fix and protect active ingredients on the skin, enhance reflectance and sheen, and modify tactile properties. These polymeric features can enable or enhance the ability of the formulator of skin and hair care products to make the claims that appeal to consumers such as moisturizing, conditioning, water and/or rub-off resistant, or improved gloss or shine.

Synthetic polymers have been used to impart one or more of these consumer benefits, with varying degrees of success. However, synthetic polymers often times contain residual monomers, and reaction by-products. They can also present solubilization difficulties or other formulation constraints. Furthermore, synthetic polymers detract from a "natural" product position and often hinder market claims of non-comedogenic and biodegradable.

The ERUCiCHEM® Division of ILI has created in ***Glossamer***® a natural, environmentally friendly polymer with unparalleled performance, and wide formulation flexibility. ***Glossamer***® natural polymer is produced by the copolymerization of purified vegetable oils. The moisturizing, conditioning and high solvency properties of the natural oils are maintained while copolymerization builds molecular weight and viscosity. Film forming features confer benefits including gloss, water and wear resistance, delivering truly *multifunctional* performance. An environmental- and consumer-friendly position is retained due to ***Glossamer***'s natural basis, non-animal character, purity and biodegradability.

Glossamer L6600 natural polymer is a pourable liquid derived from the copolymerization of purified vegetable oils from Brassica Campestris and Aleurities Fordi sources. ***Glossamer***, an unsaturated complex ester, is light in color and odor. Its average molecular weight is 6500-7500 daltons. ***Glossamer*** natural polymer is compatible with a wide range of components typically found in cosmetic formulations including esters, fatty acids, amides, alcohols, oils and surfactants.

Glossamer L6600
Features and typical characteristics:

INCI Name: Brassica Campestris/Aleurites Fordi Oil Copolymer

CAS Number:	185323-46-0
Color (Gardener)	5 maximum
Odor	Slight, typical
Viscosity	1700 cP
Peroxide Value	5 maximum
Saponification Value	180
Solubility in Water	nil

Glossamer natural polymer offers the following benefits:

To Skin:	To Hair
Moisturization	Shine/gloss enhancement
Soft smooth after-feel	Conditioning
Water resistance	Ease of formulation
Rub-off resistance	
Fragrance fixation	
Ease of formulation	

Glossamer natural polymer finds wide application in:

Lipsticks
Lip Balms
Hand and Body Lotions
Facial Creams
Fragrance Sticks
Sunscreens
Sunscreen Sticks
Shampoo
Conditioners
Liquid Soaps
Body Washes
Bar Soaps
Liquid Make-ups
Mascara
Pomades
Bath Oils

Applications: Suggested formulations are included for a variety of products.

Moisture Rich
Moisturizing Body Lotion

INCI (CFTA) Name	%
PHASE A	
Water	83.45
Magnesium Aluminum Silicate	0.20
Methylparaben	0.15
Disodium EDTA	0.05
Glycerin	2.00
Carbomer	0.05
Triethanolmine	0.70
Propylparaben	0.10
PHASE B	
Stearic Acid	2.50
Dimethicone	1.00
Cetyl Alcohol	0.70
Glyceryl Stearate	1.50
C12-C15 Alkyl Benzoate	1.00
B. Campestris / A. Fordii Oil Copolymer	2.50
PHASE C	
Glycerin	3.00
Aluminum Starch Octenyl Succinate	1.00
PHASE D	
DMDM Hydantoin/Iodoporpynyl Butylcarbamate	0.10

Renew Your Senses
Moisture Rich Massage Butter

INCI (CFTA) Name	%
Coconut (*Cocos nucifera*) oil and Tiare (*Gardenia tahitensis*) Flower	40.00
Cocoa (*Theobroma Cacao*) Seed butter	20.00
Mango (*Mangifera Indica*) Seed Butter	20.00
Hydrogenated Docosanyl Castor Esters	10.00
B. Campestris / A. Fordii Oil Copolymer	5.00
Decyl Olivate and Squalene	5.00

Procedure:

1. Combine all ingredients together and heat slowly (while mixing) until the batch is melted (~75°).
2. Start cooling the batch. Continue mixing as long as the mixture is in liquid state and then let it solidify.

Complete Protection
Moisturizing Sunscreen

INCI (CFTA) Name	%
PHASE A	
Cyclomethicone and Dimethicone Copolyol	8.00
Cyclomethicone	14.80
Cyclomethicone and Dimethiconol	3.00
Methyl Glucomes Dioleate	1.70
Dimethicone Copolyol	3.00
B. Campestris / A. Fordii Oil Copolymer	5.00
PHASE B	
Titanium Dioxide and Aluminum Hydroxide and Aluminum Stearate	10.00
PHASE C	
Lanolin Alcohol	0.30
PHASE D	
Water	54.00
Sodium Chloride	0.20
	100.00

Procedure:

1. Combine ingredients of phase A at room temperature. Mix with propeller agitator until uniform.
2. Slowly and gradually add phase B to A while homogenizing. Homogenize until phase B is well dispersed and phase is uniform.
3. Add phase C and heat to 55-60°C.
4. Heat water phase D to 55-60°C and add to silicone/oil phase very slowly under high speed mixing (homogenization preferable). Cool the batch to 40°C.

Sleek & Chic
Hair Pomade for Hold and Shine

INCI (CFTA) Name	%
PHASE A	
Oleth-10	8.00
B. Campestris / A. Fordii Oil Copolymer	5.00
PEG-40 Hydrogenated Castor Oil	25.00
Oleth-25	4.00
Hydrogenated Polyisobutane	4.00
PHASE B	
Water	43.20
DL Panthenol	0.50
Arabinogalactan	1.50
Polyquaternium-11	2.00
Glycerin	3.00
PHASE C	
Propylene Glycol and Diazolidinyl Urea and Methylparaben and Propylparaben	0.80
PHASE D	
Alcohol	3.00

Procedure:

1. Combine and heat phase A ingredients to ~65-70°C.
2. Combine and heat phase B ingredients to ~65-70°C.
3. Once both phases are at ~65-70°C, SLOWLY add phase B into A and mix with CONSTANT SLOW SWEEP.
4. Once batch is uniform, begin cooling batch with CONSTANT SLOW SWEEP MIXING.
5. Add phase C and D ingredients individually at ~55-60°C and slowly mix until uniform.
6. Slowly pour into container at ~55-60°C.

Nature's Beauty
All Natural Body Balm

INCI (CFTA) Name	%
Coconut (*Cocos nucifera*) oil and Tiare (*Gardenia tahitensis*) Flower	40.00
Hydrogenated Docosanyl Castor Esters	10.00
B. Campestris / A. Fordii Oil Copolymer	10.00
Shea Butter (*Butyrspermum Parkii*) Fruit	40.00

Procedure:

1. Combine all ingredients together and heat slowly (while mixing) until all are melted (~75°).
2. Start cooling the batch. Continue mixing as long as the mixture is in liquid state, then let it solidify.

Healthy Hands
Hand and Nail Cream

INCI (CFTA) Name	%
PHASE A	
Water	68.50
Hydroxyethylcellulose	0.50
Methylparaben	0.20
PHASE B	
Tocopheryl Acetate	0.50
Grape (*Vinis Vinifera*) Seed Oil	5.00
Prunus Amygdalus Dulcis Oil	12.00
B. Campestris / A. Fordii Oil Copolymer	2.00
Glyceryl Stearate, Cetearyl Alcohol, Sodium Stearoyl Lactylate	5.00
Propylparaben	0.10
PHASE C	
Water	1.00
Diazolidinyl Urea	0.20
PHASE D	
Propylene Glycol, Sunflower Seed Extract, Horsetail Extract, Olibanum Extract, Wheat Germ Extract, Arnica Extract	5.00

Glamorous Glittering
Lip Gloss

INCI (CFTA) Name	%
PHASE A	
Mineral Oil and Aloe Barbadensis Leaf Ext.	70.00
B. Campestris / A. Fordii Oil Copolymer	23.90
Tocopherol	0.10
Sorbitan Olivate	5.50
PHASE B	
Synthetic Fluorphlogopite and Titanium Dioxide	0.50

Procedure:

1. Combine all ingredients of phase A and heat it up to 60°C or until Sorbitan Olivate is dissolved.
2. Homogenize the mixture for a short time and then start cooling down.
3. When the batch starts thickening add phase B and mix until well blended and evenly dispersed.

Lasting Beauty
Water Resistant Liquid Makeup

INCI (CFTA) Name	%
PHASE A	
Stearic Acid	2.00
Glycol Stearate	3.00
Isopropyl Palmitate	8.00
B. Campestris / A. Fordii Oil Copolymer	8.00
C12-C15 Alkyl Benzoate	5.00
Dimethicone	0.50
PHASE B	
Deionized Water	50.30
Cellulose Gum	0.50
Glycerin	6.00
PHASE C	
Triethanolamine	1.00
PHASE D	
Titanium Dioxide	2.50
Iron Oxides	1.25
PHASE E	
Propylene Glycol, Diazolidinyl Urea, Methylparaben, Propylparaben	0.50
PHASE F	
Fragrance	0.20
PHASE G	
Water	11.25

Smooth as Silk
Shave Cream Concentrate

INCI (CFTA) Name	%
PHASE A	
Water	76.30
Acrylates/C10-30 Alkyl Acrylate Crosspolymer	0.30
Aloe Barbadensis Extract	0.10
PHASE B	
Stearic Acid	10.00
Triethanolamine	4.20
Oleth-20	1.50
B. Campestris / A. Fordii Oil Copolymer	1.50
Tocopheryl Acetate	0.10
PHASE C	
Water, Sodium Lauroyl Lactylate, Sodium Lauroyl Glutamate, Sodium Cocoyl Isethionate	5.00
Propylene Glycol, Diazolidinyl Urea, Methylparaben, Propylparaben	1.00
For Packaging:	
Shave Cream Concentrate	95.00
Propellant A-46	5.00

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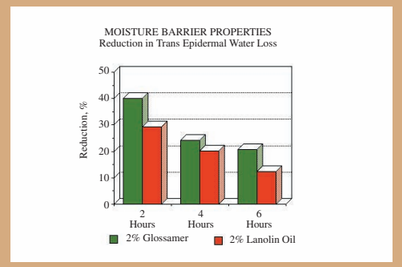
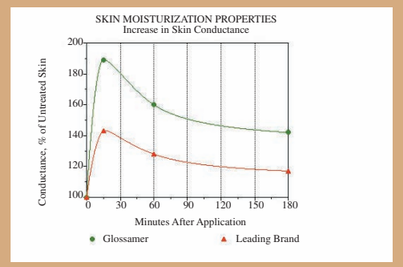
Multifunctional: thickens, moisturizes, conditions, adds gloss, and ruboff resistance to personal care and cosmetic formulations.

MOISTURE RELATED BENEFITS:

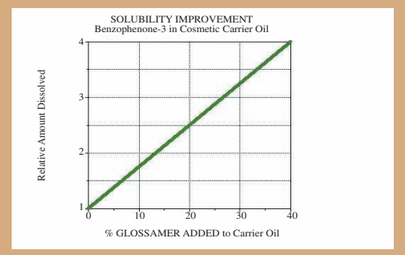


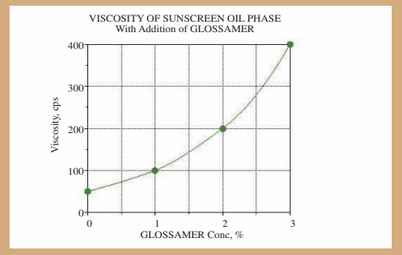


Moisture Retention: Testing of the reduction of Trans Epidermal Water Loss (TEWL) due to the addition of ***Glossamer*** L6600 and Lanolin oil showed lower water losses through the skin with ***Glossamer*** in the formulation than with Lanolin oil.

Skin Moisturization: The electrical conductivity of the skin is directly proportional to its moisture content. Comparison of applications of a moisturizing lotion formula with ***Glossamer*** L6600 and a leading consumer brand of lotion shows the immediate and long-lasting improvement.

FORMULATING BENEFITS





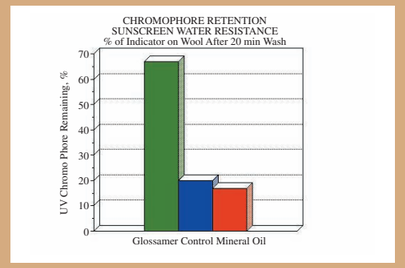
Solubility of Active Ingredients: A small addition of ***Glossamer*** L6600 dramatically increased the solubilized amount of low-solubility Benzophenone-3 in mineral oil base, while providing enhancement of water proofing and rub-off resistance of the formulation. ***Glossamer***'s solubility improvement can enhance the availability to the formulator of compounds that formerly required expensive or undesirable co-solublizers.

Oil Phase Viscosity Increase: The on-skin viscosity of the oil phase of a cream or lotion (after the water is gone) can be significantly increased by the addition of ***Glossamer*** L6600 to the formulation. This increase can manifest itself as improved feel, and increased retention of actives. A sunscreen oil phase consisting of Octyl Methoxycinnamate, Octyl Palmitate, Dimethicone Copolyol, viscosified with ***Glossamer*** L6600 is shown above. The oil phase viscosity was measured as a function of the amount of ***Glossamer*** present in a finished sunscreen formulation.

Shine and Gloss: The high refractive index of ***Glossamer*** natural polymer imparts to lipsticks a perceivable increase in gloss, which is desired by the consumer. This property is also of benefit in shampoos, conditioners and leave-on products such as mousses and gels, where ***Glossamer*** evenly coats the hair shaft to impart the enhanced luster and shine that consumers associate with healthy-looking hair.

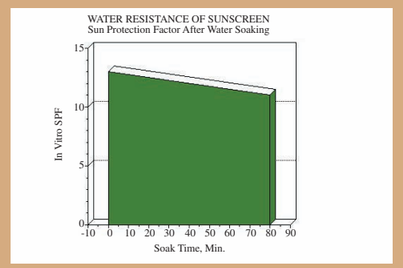
Conditioning and Skin Feel: ***Glossamer*** natural polymer has an affinity for the skin which, combined with its inherent, vegetable oil derived emollient properties, provides for excellent after feel on skin when delivered from a moisturizing cream, liquid hand soap, or bath gel. Consumers report soft feeling skin that is soft and smooth after use. In addition, ***Glossamer*** natural polymer can impart excellent wet and dry combing from rinse-off hair care products such as shampoos and conditioners, increasing customer satisfaction from such products.

WEAR RELATED BENEFITS



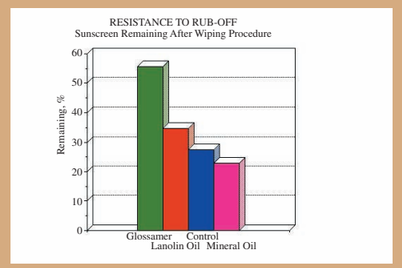
Chromophore Retention Test

Water Resistance: The resistance to water washoff of a sunscreen formulation containing ***Glossamer*** L6600 was tested by two methods. In the first, the retention of a chromophore component in the formula was measured before and after washing using different waterproofing ingredients, ***Glossamer*** and Mineral Oil, as well as in the control case of no water proofing agent. Variations of the sunscreen formula were applied to wool squares and allowed to dry. The fabrics were then hung suspended in a water bath with stirring (in order to facilitate removal of the sunscreen from the fabric) for 20 minutes. The fabrics were then removed from the bath, dried, and the UV chromophore was extracted in boiling isopropanol. The chromophore concentration was determined by UV/Visible Spectrophotometry.



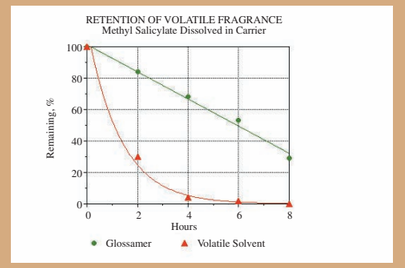
Water Resistance Test

Sunscreen Water Resistance: In the second test, the in vitro Sun Protection Factor (SPF) of a sunscreen formulation containing 2% ***Glossamer*** L6600 was measured before and after immersion in wash water for 80 minutes. The results show that the SPF level is retained after this time in water.



Rub-off Resistance Test

Rub-off Resistance: A sunscreen formulation consisting of either the base as the control, or mineral oil, lanolin oil or ***Glossamer*** L6600 as the rub off resisting agent was applied to preweighed glass plates (20 mil thick film). The films were allowed to dry under controlled conditions. The slides were weighed and then wiped under controlled conditions (paper towel weighed down with a 675 g weight). The slides were then weighed again and the amount of formulation remaining on the slide was calculated. The results clearly demonstrate the resistance to rub-off of the formulation containing ***Glossamer.***



Retention of Volatile Fragrance Test: The effect of ***Glossamer*** L6600 on the retention of volatile components such as fragrances was tested and compared to that of a standard volatile solvent. A 20% solution of Methyl Salicylate in each solvent was applied quantitatively to 6 odorless chamois swatches. One swatch of each solution was weighed and immediately placed into a 20 ml aliquot of methanol in a closed container. The remaining 5 swatches in each of the 5 solutions were weighed and then placed in a controlled, 37°C oven for the specified times of 1, 2, 4, 6, and 8 hours. At each time interval, a swatch was removed from each solution in the oven and placed directly into a 20 ml aliquot of methanol in a closed container. The methanol containers were allowed to stand for 72 hours to allow total dissolution of the product in the chamois. The methanol was then analyzed by Gas Chromatography for the fragrance retained in the sample.

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