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**Technical Data Sheet**  
**Developmental**

(New: 09/01/2009)

**High Definition Polymers®**

**Product Name: Cosmosurf® CE Series**

**INCI (proposed)** – CE-100 and CE-100 HV poly (octyldodecyl-propyl-citrate)

**INCI (proposed)** – CE-140 and CE-150 poly (octyldodecyl-stearyl-propyl-citrate)

**Chemical Description** The Cosmosurf® CE series is a group of four citrate polyesters derived from only natural raw materials. The products are patent pending compounds that have two different molecular weight ester chains, one solid and one liquid, which when combined into a single molecule make a polymer that is solid, but has very unique flow properties. They are used as additives to formulations in personal care products where there is a desire to have a structured film (provided by the solid fatty group) and flow properties, (provided by the liquid fatty group). These compounds by virtue of their unique structure provide outstanding skin feel and improve both SPF and waterproofing in sunscreen formulations.

Products can be varied in the type and number of ester groups in the molecule and the total molecular weight of the molecule. For example, Cosmosurf® CE-100 differs from Cosmosurf® CE-100 HV in the degree of polymerization (molecular weight), while Cosmosurf® CE-140 and Cosmosurf® CE-150 differ in the ratio of solid to liquid alkyl groups in the molecule.

<b>Product</b>	<b>Property</b>
Cosmosurf® CE-100	Low viscosity liquid product.
Cosmosurf® CE-100 HV	High viscosity liquid product, increased cushion and play time.
Cosmosurf® CE-140	Soft solid, liquefies under pressure
Cosmosurf® CE-150	Harder solid

## Applications

The Cosmosurf® CE Series are recommended for skin care applications, where they provide unique cushion and play time in anhydrous, and emulsion systems. They improve SPF and water resistance in sun care products.

## Sun Screen

### Formulation

Ingredient	LRI A80	LRI 220	LRI A175
<b>Part A</b>			
Water	74.2	72.2	82.9
Carbomer	.25	.25	.25
Disodium Ethylenediaminetetraacetic Acid	.05	.05	.05
Triethanolamine	1	1	1
<b>Part B</b>			
Octocrylene	3	3	3
Octisalate	3	3	3
Oxybenzone	2	2	2
Avobenzone	1	1	1
Stearic Acid	2	1	1
Sorbitan Isostearate	0	1	1
Polyglyceryl-3 Distearate	0	1	1
Glyceryl Stearate Self Emulsifying	3	0	0
Benzyl Alcohol	1	1	1
Dimethylpolysiloxane	.5	.5	.5
VP/Eicosene Copolymer	0	0	2
Methylparaben	0	.2	.2
Propylparaben	0	.1	.1
Finnsolv TN	8	0	0
Cosmosurf® CE-150	0	2	0
<b>Part C</b>			
Liquipar PE (Phenoxyethanol, Isopropylparaben, Isobutylparaben, and n-Butylparaben)	1	0	0

## Procedure

1. Heat Part A and b heated separately to about 160F,
2. Add B to A while rapidly stirring, cooled with stirring to approximately 105 F
3. Add C with stirring.

## **SPF Testing**

All three formulas were SPF tested using a single port Solar Light Model 15S Xenon Arc, Solar Simulator lamp, which has a continuous light spectrum in the UVA and UVB range (290-400 nanometers). The spectral output of the solar simulator is filtered so that it meets the spectral output requirements for testing Sunscreen Drug Products for over-the-counter human use; Proposed Amendment of Final Monograph, CFR Part 352.70 (b) Light Sources, Federal Register, Vol. 72, No. 165, Aug. 27, 2007 and the International Sun Protection Factor (SPF) Test Method, May 2006.

The SPF test for all three formulas was performed on the same subjects. The only difference was that LRI A80 was performed as a static, non water resistant, test and LRI A220 and LRI A175 was performed as an 80 minutes VWR test.

## **Results**

The average values for the SPF tests as reported by Florida Suncare Testing, Inc. was as follows:

LRI A80	$\leq 19$ (static)
LRI 220	28.85(VWR)
LRI A175	29.05(VWR)

Based on the results of these SPF tests has significant value as a SPF waterproofing agent when compared to a control formula without a waterproofing film former. Based on the results of this study, Cosmosurf® CE-150 was equivalent to the well known waterproofing film former, VP/Eicosene Copolymer

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