

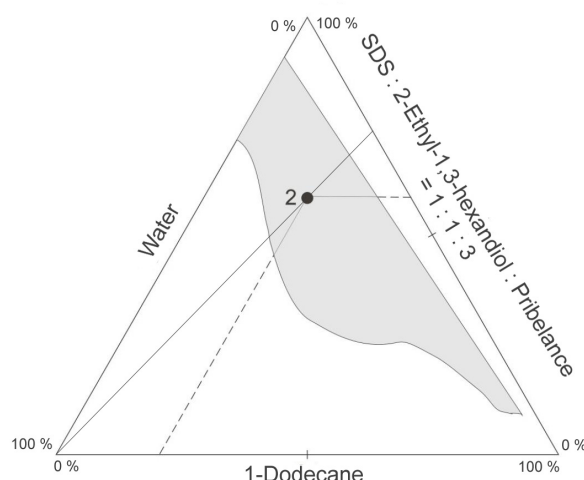
## CABB Pribalance™

### Successful tests in sun cream formulations as solubilizing and emulsifying agent

Pribalance™ is a newly patented<sup>[1]</sup> naturally based molecule designed by CABB which gives a unique combination of properties and opens new ways to product formulations, which were not possible to achieve before. Pribalance™ is a naturally based non-ionic molecule with forthcoming chemical and ecological properties. Recently its properties have been tested positively in sunscreen products as solubilizing and emulsifying agent.

It has been shown that Pribalance™ as a multifunctional additive has significant effects on the stability of oil based micro-emulsions and concentrates as well as on water based emulsions (see diagrams below). Through its unique structure Pribalance™ improves the stability and leads to low foaming and better wetting. It is known that Pribalance™ is an effective co-surfactant/co-emulsifier for cosmetic formulations.<sup>[2]</sup>

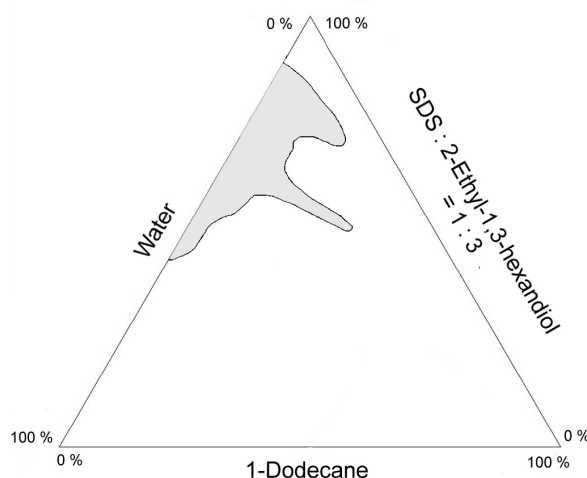
Pribalance™ helps to reduce the amount of surfactants necessary to achieve clear microemulsions having a constant amount of oily substances incorporated. This property may help to improve skin sensorics. Additionally it improves skin sensorics by antiwhitening. Being liquid over a wide temperatur range from below -50 °C to about 300 °C it's much easier to incorporate Pribalance™ compared to e.g. the widely used long-chain alcohols, which are solid at room temperature.



**Phase diagram with Pribalance™**  
(Source: CABB GmbH, University of Regensburg, Germany)

■ Area of stable microemulsions  
SDS = Sodium Dodecylsulfate

Depending on the formulation a hydrophilic co-surfactant should be added for the best performance of Pribalance™. In the testing which results are shown above as an example 2-Ethyl-1,3-hexanediol has been chosen because in this case it helps to improve the hydrophilic/hydrophobic balance and it is allowed for cosmetic formulations.



**Phase diagram without Pribalance™**  
(Source: CABB GmbH, University of Regensburg, Germany)

■ Area of stable microemulsions  
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Additional testing has shown that Pribelance™ is leading to slightly finer particle distribution over a range of tested concentrations added to e.g. an O/W cream formulation containing the well known emulsifier system PEG-20 Methyl Glucose Sesquistearate and Methyl Glucose Sesquistearate. Best results are obtained by reducing the content of the emulsifier system to a minimum. All emulsions were homogenized with a High Pressure Homogenizer (1x 100 bar). See also pictures below.



**Formulation containing Pribelance™ (3%).**  
(Source: CABB GmbH)



**Formulation not containing Pribelance™.**  
(Source: CABB GmbH)

As the forthcoming properties of Pribelance™ as co-emulsifier and co-surfactant are well known, Pribelance™ has been tested in sun cream formulations by an independent research institute.

Pribelance™ has been tested as a solvent for crystalline UV-filters in comparison to the solvent C12-15 Alkyl Benzoate which is widely used in commercial sunscreen products.

For example the formulation listed below has been tested and has shown good stability.

INCI (EU)	% (w/w) (A)	% (w/w) (B)
Phase A		
Methyl Glucose Sesquistearate	1,200	1,200
PEG-20 Methyl Glucose Sesquistearate	1,500	1,500
Ethylhexyl Methoxycinnamate	10,000	10,000
Ethylhexyl Triazone	2,500	2,500
Diethylamino Hydroxybenzoyl Hexyl Benzoate	5,000	5,000
<b>Dipropylene glycol isobornyl ether (Pribelance™)</b>	---	<b>10,000</b>
C12-15 Alkyl Benzoate	10,000	---
Glyceryl Stearate	3,000	3,000
Cetearyl Stearate	1,500	1,500q
Phenoxyethanol + Parabens	1,000	1,000
Phase B		
Aqua	58,000	58,000
Glycerin, Aqua	5,000	5,000
Carbomer	0,200	0,200
Disodium EDTA	0,100	0,100
Phase C		
Aqua, Sodium Hydroxide	0,700	0,700
Phase D		
Parfum	0,300	0,300
	100,000	100,000

Further testing is ongoing.

Due to these positive results and Pribelance™'s known features as e.g. levelling and dispersing additive in other applications it seems likely that in further connected applications like hair or decorative cosmetics, Pribelance™ will show favorable results and unique properties, which may lead to new product formulations in these applications as well.

**CABB Pribelance™****Successful tests in sun cream formulations as solubilizing and emulsifying agent**

Several toxicological tests have proven the very low toxicity of Pribelance™. It causes no skin irritation (OECD404, rabbit), no eye irritation (OECD405, rabbit), and no sensitization (OECD406, guinea pig). The oral toxicity of Pribelance™ is measured as LD50 > 2000 mg/kg (OECD423, rat) and the dermal toxicity as LD50 > 2000 mg/kg (OECD402, rat). Further it is not mutagenic (OECD471, ames-test). Several data regarding the toxicity tests are available as Pribelance™ is registered under ELINCS.

Pribelance™ has a unique combination of properties:

- Not classified as a surfactant according to the EU regulation on detergents EG 648/2004;
- Not classified as a VOC;
- Very low vapour pressure;
- Low odour;
- Extended liquid range (from -50 °C to 300 °C);
- Thermal stability over a broad temperature range up to 400 °C;
- No acute or chronic toxicity;
- Inherently biodegradable;
- High flash point (142 °C);
- Excellent stability in neutral or alkaline systems.

A short description of the physical properties is listed below:

Form	liquid
Colour	yellow-clear
Odour	Low odour
Boiling point	301,5 °C
Melting temperature	< -50 °C
Flash point	142 °C
Combustion temperature	300 °C
Vapour pressure (50°C)	2,1 * 10 <sup>-2</sup> hPa
Solubility in water	154 mg/l
Partition coefficient (log $p_{ow}$ )	4,58

**Pribelance™** physical properties.

If you would like to have more information on our new product or would like to test Pribelance™ please do not hesitate to contact us:

CABB GmbH  
Robert Gick  
Phone: +49-821-4792683  
Email: [Robert.gick@cabb-chemicals.com](mailto:Robert.gick@cabb-chemicals.com)  
[www.cabb-chemicals.com](http://www.cabb-chemicals.com)

[1] Patent 0943599-B1 (1999-03-11). CABB. Pr.: DE 19812245 1998-03-20.

[2] Schnell, Touraud, Gick, Kunz, *Properties of a new hydrotrope hydrophobic molecule and its potential applications*, Int. J. of Cosm. Sc., **30**, 347-351.