

TEGO® Solve 55

PEG-free solubilizer for essential oils and perfume oils

Benefits at a glance

- Effective solubilization of essential and perfume oils in water based systems
- Fully based on renewable raw materials
- PEG-free
- Easy to handle, cold processable
- Very low impact on foaming
- Very mild cleansing properties / mitigating in surfactant solutions
- Excellent make-up removing properties
- Moisturizing benefits
- Suitable for AP/Deo formulations with high content of Aluminum Chlorohydrate
- Very low influence on color and odor of final formulation

INCI (PCPC name, proposed)

Polyglyceryl-3 Caprylate/Caprate/Succinate;
Propylene Glycol

Chemical and physical properties (not part of specification)

Appearance	clear to turbid, colorless to slightly yellow liquid
CMC	~0.3 g/l
Surface tension (1% in H ₂ O, r.t.)	~26 mN/m
HLB (experimental)	~15

Properties

TEGO® Solve 55 provides very good solubilizing properties for essential oils (e.g. Rosemary, Lavender or Lemon oil) as well as for perfume oils.

Figure 1 demonstrates its efficacy compared to PEG-40 Hydrogenated Castor Oil, a market standard solubilizer, and its superior efficacy compared to an existing PEG-free solubilizer (Polyglyceryl-4 Caprate).

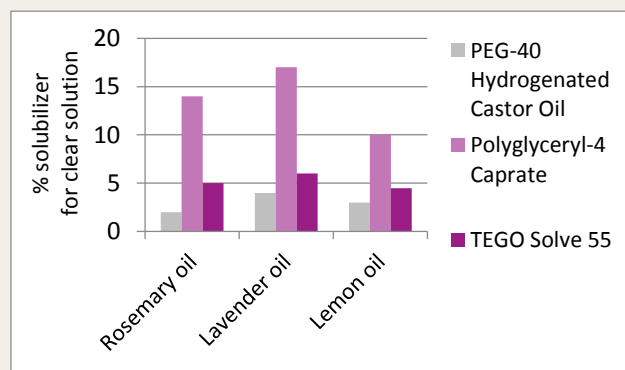


Figure 1: Solubilization of 1.0% essential oil in water

Figure 2 shows the solubilizing efficacy for different perfume oils in water. TEGO® Solve 55 is comparable with PEG-40 Hydrogenated Castor oil and outperforms the PEG-free benchmark.

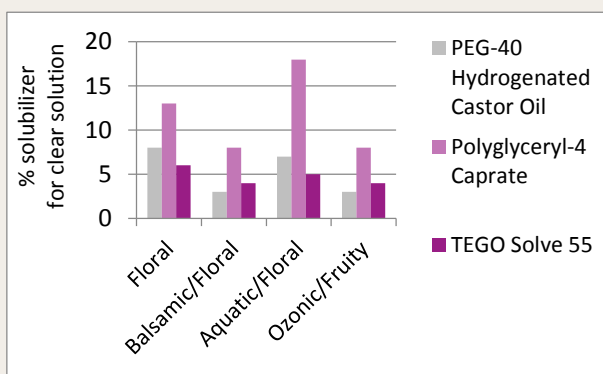


Figure 2: Solubilization of 1.0% perfume oil in water

Floral: Freesia – Lily Of The Valley – Rose, in DPG
 Balsamic/Floral: Fruity – Aldehyde – Musk, in DPG
 Aquatic/Floral: Balsamic – Powdery – Sandalwood, in DPG
 Ozonic/Fruity: Citrus – Melon – Musk, in DPG
 (All perfumes from Fragrance Resources)

TEGO® Solve 55 is also suitable for AP/Deo applications including Aluminum Chlorohydrate (ACH). Figure 3 shows the solubilizing efficacy for different perfume oils in an AP/Deo roll-on formulation including 20% ACH. Depending on the perfume, TEGO® Solve 55 is able to outperform the standard PEG-40 Hydrogenated Castor Oil. Compared to the PEG-free benchmark, the efficacy is significant better.

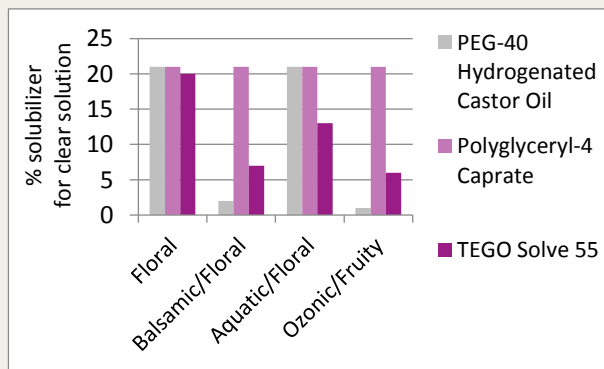


Figure 3: Solubilization of 1.0% perfume oil in Deo roll-on, including 20% ACH

Floral: Freesia – Lily Of The Valley – Rose, in DPG
 Balsamic/Floral: Fruity – Aldehyde – Musk, in DPG
 Aquatic/Floral: Balsamic – Powdery – Sandalwood, in DPG
 Ozonic/Fruity: Citrus – Melon – Musk, in DPG
 (All perfumes from Fragrance Resources)

Dissolved in water, TEGO® Solve 55 is able to efficiently remove make-up. It was tested in comparison to common solubilizers, which are already used for this application. Figure 4 indicates the make-up removal efficacy, tested with an internal standard method. A long lasting make-up was applied with a defined thickness on frosted Polymethylmethacrylate (PMMA) plates. After a defined time of drying, the make-up was removed in a standardized way by using cotton pads soaked with defined amounts of the test product.

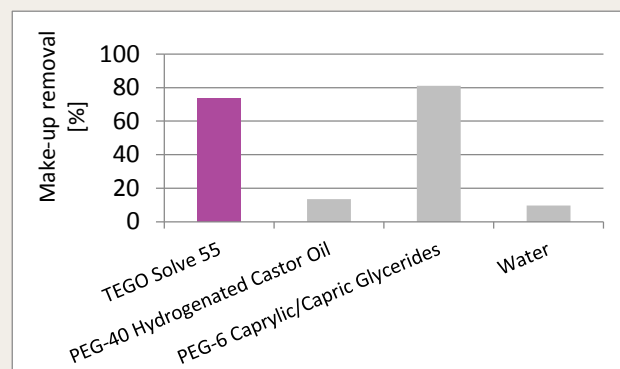


Figure 4: Make-up removal test results – 3% a.m. in water

TEGO® Solve 55 is an ultra-mild surfactant according to RBC tests and shows mildness improvement in surfactant solutions. It can give good skin feel properties and acts as a humectant to provide moisturizing benefits (Corneometer studies).

TEGO® Solve 55 is low foaming in water, so pre-mixes with perfume or essential oils and water can easily be prepared. In surfactant mixtures no effect on the foaming properties has been observed.

Furthermore, TEGO® Solve 55 shows almost no influence on the odor or color of the final formulations.

TEGO® Solve 55 is completely based on renewable raw materials.

Application

TEGO® Solve 55 can be used in e.g.:

- Oil baths
- Make-up remover, “micellar water”
- Facial cleansers
- Perfumes
- AP/Deo formulations
- Wet wipes
- Hair and body shampoos

Suggested usage concentration

1.0 – 25.0% TEGO® Solve 55

Processing

The necessary amount of any solubilizer is highly dependent on oil quality, solubilizer quality, water hardness, pH, temperature, formulation composition and processing method (e.g. speed of water phase addition).

Processing at room temperature is easily possible with TEGO® Solve 55.

Best results for solubilization:

- blend the oil with TEGO® Solve 55
- add water or surfactant mixture very slowly initially (later on it can be added faster)

Combination with TEGO® Solve 61 is recommended for perfumes based on or solubilized with fatty oils (e.g. soy bean oil). This can lead to a higher efficacy: therefore mix the suitable solubilizer with the respective oils and water beforehand and then mix.

Recommended pH range: approx. 4 – 7.

Packaging

800 kg pallet (4 x 200 kg)

Hazardous goods classification

Information concerning

- classification and labelling according to regulations for transport and for dangerous substances
- protective measures for storage and handling
- measures in accidents and fires
- toxicity and ecological effects

is given in our material safety data sheet.

Guideline formulations

Micellar water, PEG-free UL 5803/14

TEGO® Solve 55	2.50%
Perfume	0.05%
Water	ad 100.00%
TEGO® Natural Betaine (Betaine)	2.00%
Hexylene Glycol	1.40%
Glycerin	1.00%
Preservative	q. s.
Preparation: Mix the ingredients in the given order.	
Remarks: Clear, water-thin solution. pH = 5.0. 3in1: cleanses, removes make-up, soothes. Removes even waterproof eye make-up. Application with a cotton pad. No rinsing required.	

**Clear Deo roll-on, PEG- & Ethanol-free
WP 513/4**

A	TEGO® Solve 55	2.00%
	Perfume Spicy Herbs (Fragrance Resources)	0.20%
B	Water	ad 100.00%
	Hydroxyethyl Cellulose	1.00%
C	Aluminum Chlorohydrate (50% solution)	40.00%
	Preservative	q.s.
Preparation:		
Prepare phase B with warm water (~45 °C) and stir well before adding phase C to it.		
Blend phase A and slowly add the premixed phases B-C. Mix well.		
Remarks:		
pH = 4.0.		
Viscosity (Brookfield, 25 °C): ~3750 mPa·s.		
Under prolonged storage at 40 °C the formulation could get turbid at 40 °C, but gets clear again at r.t.		

**Moisturizing, clear wet-wipe liquid, PEG-free
UW 1263/2**

A	TEGO® Solve 61 (Polyglyceryl-6 Caprylate; Polyglyceryl-3 Cocoate; Polyglyceryl-4 Caprate; Polyglyceryl-6 Ricinoleate)	1.50%
	Caprylic/Capric Triglyceride	0.20%
B	TEGO® Solve 55	0.40%
	Perfume Sky (Fragrance Resources)	0.10%
C	Water	ad 100.00%
	Propylene Glycol	3.00%
	ABIL® ME 45 (Silicone Quaternium-22; Polyglyceryl-3 Caprate; Dipropylene Glycol; Cocamidopropyl Betaine)	0.50%
Z	Preservative, Citric Acid	q.s.
Preparation:		
Premix phases A and B separately.		
Add B to A and mix.		
Slowly add the premixed phase C and stir for approx. 30 min.		
Add preservative and adjust the pH with Citric Acid.		
Remarks:		
pH = 5.5		

A 03/16

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments.

The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: April, 2008)

Evonik Nutrition & Care GmbH

Goldschmidtstraße 100 45127 Essen, Germany

P.O.BOX 45116 Essen PHONE + 49 201 173-2854 FAX +49 173-1828

personal-care@evonik.com www.evonik.com/personal-care