

## TEGO® Care PSC 3

A natural, cost-efficient O/W emulsifier with excellent performance

### Intended use

O/W emulsifier

### Benefits at a glance

- Completely based on natural raw materials
- Suitable for all types of cosmetic O/W emulsions, including natural formulations
- Forms stable emulsions between pH 3.5 and 8.5
- Applicable for "natural" preservation systems
- No polyacrylate-based thickeners needed for stabilization
- Low usage concentration of 1.5 – 3.0%

### INCI (PCPC name)

Polyglyceryl-3 Dicitrate/Stearate

### Chemical and physical properties (not part of specifications)

Form	pellets
HLB value	approx. 11

### Properties

TEGO® Care PSC 3 is a non-ionic, PEG-free emulsifier that is completely based on renewable raw materials. TEGO® Care PSC 3 is based on glycerol, stearic acid and citric acid. In a first step, a polycondensation reaction of glycerol to polyglycerol-3 is carried out. Polyglycerol-3 is subsequently esterified with stearic acid and a substoichiometric amount of citric acid.

- TEGO® Care PSC 3 provides excellent stabilization for all types of classical O/W creams and lotions.
- TEGO® Care PSC 3 is suitable for the formulation of O/W creams and lotions with all types of cosmetic oils at a pH of 3.5 to 8.5.
- The recommended usage concentration of TEGO® Care PSC 3 is approx. 3.0% in creams and 1.5 – 3.0% in lotions.
- Typical oil phase contents of emulsions based on TEGO® Care PSC 3 are 20 – 35% for creams and 10 – 25% for lotions.
- TEGO® Care PSC 3 has been optimized to build up viscosity (by forming lamellar structures) in cosmetic emulsions, together with consistency enhancers like Glyceryl Stearate, Stearyl Alcohol or Stearic Acid.
- Typical combinations for O/W creams are 3.0% TEGO® Care PSC 3 with 2.5 – 4.0% consistency enhancers. Suitable combinations include TEGIN® M Pellets (Glyceryl Stearate) and TEGO® Alkanol 18 (Stearyl Alcohol) in a ratio of 70:30 or 50:50. In most O/W lotions, 2 – 3% of TEGO® Care PSC 3 is already sufficient to obtain the desired viscosity and stability profile, without additional consistency enhancers.
- TEGO® Care PSC 3 can either be used in combination with polyacrylate-based thickeners or, in natural formulation types, without using polyacrylates.

- It is recommended to combine TEGO® Care PSC 3 with Xanthan Gum (0.2% for creams and 0.3 to 0.5% for lotions) in order to optimize the texture and stability of the emulsions. In order to avoid a negative impact on the lamellar structures formed by the emulsifier and consistency enhancers, it is recommended to add Xanthan Gum below 40 °C to the emulsions.
- The addition of Carbomers can provide further benefits in terms of flexibility, stability and texture. It is recommended to use 0.1 – 0.2% of TEGO® Carbomer 134 in creams and 0.1 – 0.3% of TEGO® Carbomer 141 for lotions. As the amount of consistency enhancers can be reduced when using Carbomers, the overall sensory profile can change towards a lighter skin feel.
- TEGO® Care PSC 3 is suitable for systems preserved with natural preservatives such as organic acids (e. g. Benzoic Acid and Sorbic Acid). When using organic acids for the preservation, it is recommended to add them below 40 °C to the emulsion. In order to prevent partial crystallization of the organic acids, it is recommended that the necessary amount of Sodium Hydroxide to neutralize those acids be incorporated in the emulsion prior to adding such natural preservatives. After addition of the acids, it is recommended to adjust to a final pH of 5.0 – 5.5.
- In general, the sensory profile of O/W emulsions based on TEGO® Care PSC 3 can be adapted by altering the oil phase content, the consistency enhancer content, the polymer thickener content and the type of oils.
- TEGO® Care PSC 3 is particularly recommended for the formulation of face and body care products. As it is a natural based emulsifier, it also represents an interesting option for baby care products.
- Emulsions based on TEGO® Care PSC 3 in general have a good compatibility with active ingredients and UV filters.

## Preparation

TEGO® Care PSC 3 belongs to the group of the so called lipid emulsifiers. As lipid emulsifiers are optimized to form lamellar structures in O/W emulsions, they have a lower HLB compared to classical ethoxylated emulsifiers such as PEG-100 Stearate or Cetareth-25. Therefore some adjustments in the production process might be necessary.

It is recommended to avoid the addition of the hot water phase into the hot oil phase while stirring. This “inverse” processing is likely to lead to the formation of a W/O emulsion (recognizable by high viscosity). During the cooling process, this emulsion converts to an unstable oil-in-water emulsion with a large particle size.

For the preparation of creams and lotions, the oil and water phases should be heated separately to 70 to 80 °C. It is suggested to add the hot oil phase to the hot water phase **while stirring**. The coarsely dispersed pre-emulsion is then homogenized.

If the above mentioned processing is not possible, the hot water phase should be added to the hot oil phase **without stirring** (to avoid the building of the water-in-oil form) and start afterwards with the homogenization. During the homogenization process the homogenizer must be placed in the water phase to ensure that the oil phase will be incorporated into the water phase.

During cooling, a constant horizontal and vertical movement of the emulsion has to be ensured. The viscosity of the liquid emulsion increases to a creamy consistency, as the consistency enhancers solidify.

It is recommended that thickeners, such as Carbomers or alkyl modified Carbomers, are dispersed in oil and then added to the emulsion. The dispersion of TEGO® Carbomer 141, TEGO® Carbomer 134 or TEGO® Carbomer 341 ER in oil (e. g. in mineral oil, ethylhexyl stearate; not in triglycerides) is added at 60 °C. Then, the emulsion is homogenized again.

Perfume, temperature-sensitive substances or electrolyte-containing ingredients, such as LACTIL®, are added at 35 – 40 °C.

Phenoxyethanol-containing preservatives should be incorporated at this temperature, as well. Since phenoxyethanol is an amphiphilic molecule it can interfere with the emulsification process when added directly to the oil or water phase.

It is also suggested to add natural preservatives, such as Benzoic Acid or Sorbic Acid, at temperatures below 40 °C.

Neutralization of the emulsion is done at approx. 35 °C.

The particle size of the dispersed oil droplets for emulsions with long-term stability is approx. 1 to 8 µm. More coarsely dispersed emulsions tend to separate.

### Recommended usage concentration

1.5 – 3.0% TEGO® Care PSC 3

### Packaging

600 kg pallet (24 x 25 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 case of accidents and fires
- toxicity and ecological effects

is given in our material safety data sheets.

### Guideline formulations

Natural Wellness Body Lotion F 11/10-16	
Phase A	
TEGO® Care PSC 3	3.00%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	4.00%
TEGOSOFT® OER (Oleyl Erucate)	3.00%
Prunus Amygdalus Dulcis (Sweet Almond) Oil	5.00%
Phase B	
Water	80.50%
Glycerin	3.00%
Phase C	
Xanthan Gum (Keltrol CG-SFT, CP Kelco)	0.50%
Phase D	
Sodium Hydroxide (10% in water)	0.20%
Phase E	
Benzyl Alcohol; Glycerin; Benzoic Acid; Sorbic Acid (Rokonsal BSB-N, ISP)	0.80%
Phase Z	
Perfume	q. s.
<b>Preparation:</b> <ol style="list-style-type: none"> <li>1. Heat phase A and B separately to 70 – 75 °C.</li> <li>2. Add phase A to phase B with stirring<sup>1)</sup>.</li> <li>3. Homogenize.</li> <li>4. Cool with gentle stirring.</li> <li>5. Add phase C at 40 °C.</li> <li>6. Homogenize for a short time.</li> <li>7. Add phase D.</li> <li>8. Add phase E and adjust pH to 5.0 – 5.5.</li> </ol> <p><sup>1)</sup>Important: If phase A has to be charged into the vessel first, phase B must be added <b>without stirring</b>.</p>	

All-natural Face & Body Cream F 11/10-17	
Phase A	
TEGO® Care PSC 3	3.00%
TEGIN® M Pellets (Glyceryl Stearate)	1.20%
TEGO® Alkanol 18 (Stearyl Alcohol)	1.30%
TEGOSOFT® OER (Oleyl Erucate)	5.00%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	8.50%
Persea Gratissima (Avocado) Oil	6.00%
Phase B	
Water	67.00%
Glycerin	3.00%
Phase C	
Water	3.80%
Xanthan Gum (Keltrol CG-SFT, CP Kelco)	0.20%
Phase D	
Sodium Hydroxide (10% in water)	0.20%
Phase E	
Benzyl Alcohol; Glycerin; Benzoic Acid; Sorbic Acid (Rokonsal BSB-N, ISP)	0.80%
Phase Z	
Perfume	q. s.
<b>Preparation:</b> <ol style="list-style-type: none"> <li>1. Heat phase A and B separately to 70 – 75 °C.</li> <li>2. Add phase A to phase B with stirring<sup>1)</sup>.</li> <li>3. Homogenize.</li> <li>4. Cool with gentle stirring and add phase C below 40 °C.</li> <li>5. Add phase D.</li> <li>6. Add phase E and adjust pH to 5.0 – 5.5.</li> </ol> <p><sup>1)</sup>Important: If phase A has to be charged into the vessel first, phase B must be added <b>without stirring</b>.</p>	

High Caring O/W Natural Cream (35% oil phase) F 21/10-10	
Phase A	
TEGO® Care PSC 3	3.00%
TEGIN® M Pellets (Glyceryl Stearate)	2.00%
TEGO® Alkanol 18 (Stearyl Alcohol)	1.00%
TEGOSOFT® P (Isopropyl Palmitate)	8.00%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	11.00%
Prunus Amygdalus Dulcis Oil	10.00%
Phase B	
Water	61.00%
Glycerin	3.00%
Phase C	
Sodium Hydroxide (10% in water)	0.20%
Phase D	
Benzyl Alcohol; Glycerin; Benzoic Acid; Sorbic Acid (Rokonsal BSB-N, ISP)	0.80%
Phase Z	
Perfume	q. s.
<b>Preparation:</b> <ol style="list-style-type: none"> <li>1. Heat phase A and phase B separately to 70 – 75 °C.</li> <li>2. Add phase A to phase B with stirring<sup>1)</sup>.</li> <li>3. Homogenize.</li> <li>4. Cool with gentle stirring and add phase C below 40 °C.</li> <li>5. Add phase D and adjust the pH to 5.0 – 5.5.</li> </ol> <p><sup>1)</sup>Important: If phase A has to be charged into the vessel first, phase B must be added <b>without stirring</b>.</p>	

Daily Skin Renewal Body Lotion FU 16/09-5	
Phase A	
TEGO® Care PSC 3	3.00%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	5.00%
TEGOSOFT® OP (Ethylhexyl Palmitate)	5.00%
TEGOSOFT® E (PPG-15 Stearyl Ether)	2.00%
Phytosphingosine SLC (Salicyloyl Phytosphingosine)	0.20%
Phase B	
Water	80.00%
Glycerin	3.00%
Phase C	
TEGO® Carbomer 141 (Carbomer)	0.20%
TEGOSOFT® OP (Ethylhexyl Palmitate)	0.80%
Phase D	
Sodium Hydroxide (10% in water)	q.s.
Phase E	
Dipropylene Glycol; Methylparaben; Ethylparaben; Aqua; Methylisothiazol- inone (Microcare MEM, Thor GmbH)	0.80%
Phase Z	
Perfume	q. s.
<b>Preparation:</b> 1. Heat phase A and B separately to approx. 80 °C. 2. Add phase A to phase B with stirring <sup>1)</sup> . 3. Homogenize. 4. Cool with gentle stirring to approx. 60 °C and add phase C. 5. Homogenize for a short time. 6. Cool with gentle stirring and add phase D and phase E below 40 °C.  <sup>1)</sup> Important: If phase A has to be charged into the vessel first, phase B must be added <b>without stirring</b> .	

Rejuvenating Facial Cream F 11/10-9	
Phase A	
TEGO® Care PSC 3	3.00%
TEGIN® M Pellets (Glyceryl Stearate)	1.50%
TEGO® Alkanol 18 (Stearyl Alcohol)	1.00%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	10.00%
TEGOSOFT® OP (Ethylhexyl Palmitate)	7.50%
TEGOSOFT® TIS (Triisostearin)	2.00%
Phase B	
Water	70.10%
HyaCare® 50 (Hydrolyzed Hyaluronic Acid)	0.10%
Glycerin	3.00%
Phase C	
TEGO® Carbomer 134 (Carbomer)	0.20%
TEGOSOFT® OP (Ethylhexyl Palmitate)	0.80%
Phase D	
Sodium Hydroxide (10% in water)	q. s.
Phase E	
Phenoxyethanol; Methylparaben; Propylparaben; Ethylparaben (Phenonip XB, Clariant AG)	0.80%
Phase Z	
Perfume	q. s.
<b>Preparation:</b> 1. Heat phase A and B separately to approx. 80 °C. 2. Add phase A to phase B with stirring <sup>1)</sup> . 3. Homogenize. 4. Cool with gentle stirring to approx. 60 °C and add phase C. 5. Homogenize for a short time. 6. Cool with gentle stirring and add phase D and phase E below 40 °C.  <sup>1)</sup> Important: If phase A has to be charged into the vessel first, phase B must be added <b>without stirring</b> .	

Natural Light O/W Lotion (10% oil phase) MK 9/10-1	
<b>Phase A</b>	
TEGO® Care PSC 3	1.50%
TEGIN® M Pellets (Glyceryl Stearate)	0.50%
TEGO® Alkanol 18 (Stearyl Alcohol)	0.50%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	4.50%
TEGOSOFT® P (Isopropyl Palmitate)	3.00%
<b>Phase B</b>	
Water	85.90%
Glycerin	3.00%
<b>Phase C</b>	
Xanthan Gum (Keltrol CG-SFT, CP Kelco)	0.20%
<b>Phase D</b>	
Sodium Benzoate; Potassium Sorbate; Aqua (Euxyl K 712, Schülke GmbH)	0.90%
<b>Phase Z</b>	
Perfume	q. s.
<b>Preparation:</b> <ol style="list-style-type: none"> <li>1. Heat phase A and phase B separately to 70 – 75 °C.</li> <li>2. Add phase A to phase B with stirring<sup>1)</sup>.</li> <li>3. Homogenize.</li> <li>4. Cool with gentle stirring.</li> <li>5. Add phase C at 40 °C.</li> <li>6. Homogenize for a short time.</li> <li>7. Add phase D and adjust the pH to 5.0 – 5.5.</li> </ol> <p><sup>1)</sup>Important: If phase A has to be charged into the vessel first, phase B must be added <b>without stirring</b>.</p>	

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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)

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## Product specification

**Material** TEGO CARE PSC 3  
**Spec.Code** K00 STANDARD

## Evonik Nutrition & Care GmbH

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Inspection Characteristics	Method	Limits	Units	Z
Colour to Gardner	GM_0140_01	<= 5.0	Gardner	X
Acid Value	GM_0010_01	<= 5.0	mg KOH/g	X
Saponification Value	GM_0030_01	130 - 160	mg KOH/g	X
Melting Point	GM_0150_01	51.0 - 59.0	°C	X

Report on inspection certificate: X = specific/actual value, C = unspecific value/conformity, T = not reported

This product only starting with an E in the batch number is produced in a RSPO certified site.

The raw materials for this product are sourced according to

rules set by the RSPO, Supply Chain Mass Balance,

Evonik AG RSPO Certification Number : RSPO-V-14-13553.

Certificates can only be used from RSPO certified Supply Chain Partners.

This document is computer printed and therefore valid without signature.

All warranty claims in respect of the conformity of our product are subject to our General Terms and Conditions of Sale and Delivery. The data listed above reflects the criteria for our internal quality tests. We do not hereby make any express or implied warranty, whether for specific properties or for fitness for any particular application or purpose. All values are valid for the product when despatched from the works.

The Standard Test Methods can be obtained from specialized publishers. Evonik's test methods are available on request.

# TEGO® Care PSC 3

## Product data record

### 1. General information

#### 1.1 Manufacturer/Supplier

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#### 1.2 Product Description

##### 1.2.1 Raw material category O/W Emulsifier

##### 1.2.2 Ingredients according to INCI

Polyglyceryl-3 Dicitrate/Stearate

##### 1.2.3 Composition

Components	Source	Ratio
Polyglyceryl-3 Dicitrate/Stearate	vegetable	100 %

This composition information serves for information of our customers only.  
It is neither relevant for the composition listing according to Regulation (EC) No 1223/2009, nor does it reflect the chemical composition according to the different chemical regulations in the world which is disclosed in the table "information on ingredients/hazardous components" in the relevant parts of the respective (Material) Safety Data Sheets.

##### 1.2.4 Solvents, preservatives and other additives

	CAS No.	EINECS / EC No.	content	Function
no additives				

No components which are listed in Annex II of the Regulation (EC) No 1223/2009 and its modifications and updates are added to and are not to be expected in the above mentioned product due to the raw materials used and the production process.



## 2. Information on production process

General description of production process:

Conversion of polyglycerol with fatty acids and citric acid

The product is not irradiated.

TEGO® Care PSC 3 is produced in the strictest absence of any animal derived material of any type.

Residual plant based source (dominant origin of main constituents): palm oil, rapeseed oil

GMO-Status:

The item contains ingredients derived from rapeseed (including oils and other refined ingredients), but these ingredients are sourced from an "Identity Preserved" programme and can be certified NON-GM.

However max 0.9 % cross-contamination is possible. Any protein or DNA is not present. Consequently the product will be PCR negative when tested.

### 2.1 By products

		method
Residual solvents	not applicable	
Free amines	not applicable	
Nitrosamines	not applicable	
Monochloroacetic acid	not applicable	Chromatography
Dichloroacetic acid	not applicable	Chromatography
1,4-Dioxane	not applicable	
Pesticides	meets the valid regulatory requirements for limits on agricultural pesticides	
Total heavy metals	max. 20 ppm	AAS-ICP
As, Cd, Co, Cr, Hg, Ni, Pb, Sb	Each < 1 ppm	AAS-ICP
Latex	not to be expected in the product due to the raw materials used and the production process	
VOC	< 3 % according to SR (Swiss Right) 814.018	

### 2.2 CMR (Carcinogenic, Mutagenic or Reprotoxic)

The use in cosmetic products of substances classified as CMR substances, of category 1A or 1B or 2 under Part 3 of Annex VI to Regulation (EC) No 1272/2008 shall be prohibited.

Further Information:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:342:0059:0209:en:PDF>

Some of the CMR substances mentioned below and listed in Annex VI to Regulation (EC) No 1272/2008 are used as starting materials or solvents for the production of our cosmetic raw materials and may require reporting under California Proposition 65 or the Safe Cosmetics Act, SB 484.

The presence of these prohibited substances has to be seen as non-intended. It is stemming from impurities of the starting materials or the manufacturing process which is technically unavoidable in good manufacturing practice.

CMR substance	Starting material	max. concentration	method
Ethylene Oxide	no		
Propylene Oxide	no		
Octamethylcyclotetrasiloxane (D4)	no		
2-Ethylhexanoic Acid	no		
n-Hexane	no		
Methyl Chloride	no		
Dimethyl Sulphate	no		

### 2.3 "Allergens" according to the Regulation (EC) No 1223/2009

The presence of substances, the mentioning of which is required under the column 'Other' in Annex III, shall be indicated in the list of ingredients in addition to the terms parfum or aroma.

The cosmetic raw materials and the cosmetic actives supplied by Evonik Personal Care are manufactured without the use of perfumes and fragrances. An analytical proof for the absence in traces of the substances to be mentioned in addition to the terms parfum or aroma is not performed in cosmetic raw materials, which are chemically produced.

None of these substances have been intentionally added to our cosmetic raw materials or are formed during the manufacturing process according to our knowledge of the chemistry.

### 2.4 Food Ingredients listed in Annex IIIa of Commission Directive 2007/68/EC.

None of these substances have been intentionally added to our cosmetic raw materials or are formed during the manufacturing process according to our knowledge of the chemistry.

## 3. Microbiological status

Total Viable Count	max. 100 cfu/g
Pathogens*	absent/g

\*Pathogens are: Enterobacteria, Pseudomonas, Enterococci, Candida albicans, Staphylococci

## 4. Shelf life / storage conditions

24 months after production (unopened original packaging)

## 5. Regulatory Status

5.1 Customs tariff number 38249093

### 5.2 Regulatory status (chemical regulations)

Europe

Components	REACH status	CAS No.	EINECS / EC No.
Polyglyceryl-3 Dicitrate/Stearate	Polymer	1208985-39-0	Polymer

Other countries

Country		yes / no	Remark
Australia	AICS:	no	
China	IECSC:	exception permission for Evonik Specialty Chemicals (Shanghai)	up to 120 t/year
Canada	DSL: NDSL:	no	but notified by Evonik Canada Inc. for up to 10 t/year
Taiwan	TCSI:	yes	

In the following countries the relevant authorities currently do not require pre-market approval for cosmetic raw materials:

Brazil, Japan, South Korea, Philippines, USA

#### 5.2.1 Regulatory status (cosmetic regulation)

Country		yes / no	Remark
China	CFDA:	no	
Japan	JSQI:	no	

## 6. Toxicology and Ecotoxicology

Refer to summary of ecotoxicological and toxicological data