

## TEGO® Care PL 4

Emulsifier for PEG-free O/W Lotion Wipes

- Suitable for the formulation of PEG-free Impregnating Liquids
- Long-term stable emulsions with a very fine particle size
- Emulsions with good heat and freeze stability

Goldschmidt Personal Care

## INCI Name (CTFA name)

Polyglyceryl-4 Laurate

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

Form	viscous liquid
HLB-value	approx. 11

### Properties

- TEGO® Care PL 4 offers a new approach to PEG-free low viscosity O/W lotions, especially for the formulation of impregnating liquids for Wet Wipes.
- TEGO® Care PL 4 is a non-ionic, PEG-free polyglycerin based O/W emulsifier.
- In combination with TEGO® Care PS (Methyl Glucose Sesquistearate) and preservative-mixtures containing phenoxyethanol TEGO® Care PL 4 is able to form microemulsion-like concentrates for a series of cosmetic emollients at temperatures above 40 °C.
- These microemulsion-like concentrates can be easily diluted with water to be used as impregnating liquids for cosmetic lotion wipes.
- The impregnating liquids have a very fine degree of dispersion (absolutely comparable to P.I.T. emulsions based on ethoxylated emulsifiers) which leads to a good long-term stability.
- The most favourable emulsifier combination is a 1:1 mixture of TEGO® Care PL 4 and TEGO® Care PS (Methyl Glucose Sesquistearate). Depending on the emollient system used, the emulsifier ratio might be adapted.
- The emulsifier concentration is about 1/3 of the total emollient concentration.
- Emollients tested successfully using this emulsifier combination comprise e. g. TEGOSOFT® OP (Ethylhexyl Palmitate), TEGOSOFT® CI (Ceteryl Isononanoate), TEGOSOFT® DEC (Diethylhexyl Carbonate) and TEGOSOFT® DC (Decyl Cocoate).
- Active ingredients such as TEGO® Cosmo C 100 (Creatine), Panthenol and Dihydroxyacetone as well as Polyalcohols (glycerine, propylene glycol) and up to 5 % alcohol are well tolerated by the final impregnating liquid.

- Rheological additives such as TEGO® Carbomer 141 or TEGO® Carbomer 341 ER can be added to the low viscosity lotions to adjust viscosity.
- Emulsions based on the emulsifier combination TEGO® Care PL 4 and TEGO® Care PS (Methyl Glucose Sesquistearate) can be prepared in a pH range from 4 to 7.
- Formulations emulsified with TEGO® Care PL 4 have been shown to be stable between -5 °C and 45 °C.
- Impregnating liquids based on the emulsifier system TEGO® Care PL 4 and TEGO® Care PS (Methyl Glucose Sesquistearate) are also suitable for the formulation of sprayable emulsions. The sprays contain 5 – 10 % of oil phase.

### Preparation

The manufacturing of impregnating liquids for cosmetic lotion wipes is done in a two-step process.

TEGO® Care PL 4 in combination with TEGO® Care PS (Methyl Glucose Sesquistearate), preservative-mixtures containing phenoxy-ethanol and the emollient are mixed at 50 – 80 °C with simple stirring (no homogenizer needed). A transparent or almost transparent microemulsion-like concentrate with 50 – 80 wt% oil phase is obtained.

Since the microemulsion-like concentrate normally is not stable at temperatures below 40 °C, the system has then to be diluted at about 40 °C with water of about 25 °C to obtain the final impregnating liquids.

As the dilution is made out of a microemulsion-like phase with very low interfacial tension, impregnating liquids (containing 1 – 10 wt% oil phase) with a very fine particle size and good long-term stability can be obtained.

Due to the relatively high amount of preservative in the microemulsion-like concentrate an additional preservation of the resulting impregnating liquid may not be necessary.

## Application

TEGO® Care PL 4 is especially suitable for:

- Cosmetic Wet Wipes for the application
  - Facial Care
  - Baby Care
  - Self-tanning
- O/W Sprayable Emulsions
- Low viscosity lotions

## Recommended usage concentration

5.0 – 10.0 % TEGO® Care PL 4 in concentrate

0.5 – 1.0 % TEGO® Care PL 4 in impregnating liquid

## Storage/Handling

TEGO® Care PL 4 tends to cloudiness and crystallization after storage time. This is reversible and has no negative influence on the quality. Short heating (65 °C) and stirring will provide adequate homogenization.

## Packaging

200 kg drum

## 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 sheets.

## Examples for Concentrates:

### Concentrate 1

Phase A	
TEGO® Care PL 4	7.0 %
TEGO® Care PS (Methyl Glucose Sesquistearate)	7.0 %
TEGOSOFT® OP (Ethylhexyl Palmitate)	42.0 %
Phenoxyethanol; Methylparaben; Butylparaben; Ethylparaben; Propylparaben; Isobutylparaben (Phenonip)	8.0 %
Phase B	
Water	34.0 %
Phase C	
Perfume	2.0 %

### Concentrate 2

Phase A	
TEGO® Care PL 4	7.0 %
TEGO® Care PS (Methyl Glucose Sesquistearate)	7.0 %
TEGOSOFT® CI (Cetaryl Isononanoate)	42.0 %
Phenoxyethanol; Methylparaben Butylparaben; Ethylparaben; Propylparaben; Isobutylparaben (Euxyl K 300)	8.0 %
Phase B	
Water	34.0 %
Phase C	
Perfume	2.0 %

## Processing Concentrate:

1. Heat phase A and phase B separately to 55 – 65 °C while stirring.
2. Add phase B to phase A while stirring.
3. Cool down to 40 °C.
4. Add phase C with stirring.
5. Keep the concentrate at 40 °C.

## Impregnating Liquids

Impregnating Liquids with 5 % oil phase can be prepared by using 5.9 % of concentrate 1 or 2 diluted with water.

### Processing Impregnating Liquid:

1. Keep the concentrate (phase A) at 40 °C.
2. Charge the vessel with water of about 25 °C and add concentrate with simple stirring. <sup>1)</sup>
3. Cool down to room temperature.

<sup>1)</sup> Important information:

It is possible to charge the vessel with concentrate first and dilute with water while stirring.

### Examples for Impregnating Liquids

In order to illustrate the composition of the Impregnating Liquid the concentration of the single ingredients is shown.

#### Impregnating Liquid 1

<b>Phase A (Concentrate 1)</b>	
TEGO® Care PL 4	0.625 %
TEGO® Care PS (Methyl Glucose Sesquistearate)	0.625 %
TEGOSOFT® OP (Ethylhexyl Palmitate)	3.750 %
Phenoxyethanol; Methylparaben; Butylparaben; Ethylparaben; Propylparaben; Isobutylparaben (Phenonip)	0.720 %
Perfume	0.180 %
<b>Phase B</b>	
Water	93.850 %
TEGO® Cosmo C 100 (Creatine)	0.250 %

#### Impregnating Liquid 2

<b>Phase A (Concentrate 2)</b>	
TEGO® Care PL 4	0.625 %
TEGO® Care PS (Methyl Glucose Sesquistearate)	0.625 %
TEGOSOFT® CI (Cetearyl Isononanoate)	3.750 %
Phenoxyethanol; Methylparaben; Butylparaben; Ethylparaben; Propylparaben; Isobutylparaben (Euxyl K 300)	0.720 %
Perfume	0.180 %
<b>Phase B</b>	
Water	94.100 %

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