Technical Information

ISOLAN® 17 MB

Discover & extend your boundaries naturally

Intended use

W/O Emulsifier

Benefits at a glance

- Completely based on vegetable raw materials and readily biodegradable
- Superior emulsion stabilization properties even of demanding systems
- Suitable for all types of textures such as butters, creams, soft creams, quick-breaking emulsions, aerosols and sprays
- Compatible with all types of ingredients, e.g. pigments, UV filters, actives, silicone oils or electrolytes
- Easy-to-handle liquid product allows production of W/O emulsions based on cold-cold process

INCI (PCPC name)

Polyglyceryl-4 Diisostearate/Polyhydroxystearate/Sebacate; Caprylic/Capric Triglyceride; Polyglyceryl-3 Oleate; Diisostearoyl Polyglyceryl-3 Dimer Dilinoleate

Structure

ISOLAN® 17 MB is a fully vegetable based W/O emulsifier. Its high molecular weight and polymeric and polyfunctional composition leads to best-in-class stabilization comparable to silicone emulsifiers.

Properties

ISOLAN® 17 MB is a clear to slightly turbid liquid with an active matter of approx. 70%. It has an HLB value of approx. 5.

Application Characteristics

- ISOLAN® 17 MB is suitable for the formulation of cosmetic W/O butters, creams, lotions, sprays and aerosols.
- As typical usage concentration 1.5 – 5.0% ISOLAN® 17 MB are recommended depending on the type of formulation. In general no co-emulsifiers are needed to obtain stable emulsions.
- Due to its high molecular weight, the addition of a low-molecular weight co-emulsifier (e.g. 0.5 – 1.0% ISOLAN® GO 33) can accelerate the water uptake during processing or can contribute to the wetting of pigments.
- ISOLAN® 17 MB is particularly suitable for the formulation of demanding W/O systems.
- Consistency enhancing or emulsion stabilizing waxes can be combined with ISOLAN® 17 MB. A typical wax combination is consisting of hydrogenated castor oil with high-melting hydrocarbon waxes or beeswax.
- ISOLAN® 17 MB shows a high flexibility regarding the oil phase content of a cosmetic emulsion. Quick-breaking emulsions with 10% oil phase are possible as well as sprays with 50% oil phase.
- For lotions and creams typical oil phase contents of 20-30 and 15-12% can be formulated respectively.
- ISOLAN® 17 MB is compatible with all types of cosmetic emollients such as ester oils, natural triglycerides, mineral oils or silicone oils (up to 70% silicone oil in oil phase).
- Electrolytes are required in amounts of 1.0 to 3.0%. Amongst others, Zinc Sulfate Heptahydrate is best suitable.

- It is possible to process W/O Lotions based on ISOLAN® 17 MB cold/cold. In cold processed formulations a viscosity enhancing and stabilizing system in the oil phase is necessary. 0.5% Zinc Stearate proved to be most effective.
- ISOLAN® 17 MB is suitable for the formulation of high SPF sun care products as it tolerates high amounts of organic and anorganic UV filters.
- ISOLAN® 17 MB can also be used to formulate color cosmetic products.
- ISOLAN® 17 MB is compatible with propellants and is applicable to stabilize W/O aerosol systems.

Suggested usage concentration

The usage concentration is depending on the desired emulsion viscosity and the related oil phase ratio. In general, the following concentrations can be applied.

Sprays:	3.0 – 5.0% ISOLAN® 17 MB
Lotions:	2.0 – 4.5% ISOLAN® 17 MB
Creams:	2.5 – 4.0% ISOLAN® 17 MB
Quick-break emulsions:	1.5 – 3.0% ISOLAN® 17 MB

Influence on the viscosity of the emulsion

The viscosity of W/O emulsions based on ISOLAN® 17 MB can be adjusted by three variables: viscosity of the oil phase, ratio between water and oil phase and droplet size distribution.

Preparation

A pre-requisite for this is careful adjustment of the formulation (phase ratio, viscosity of the oil phase) and optimum emulsification.

The favorable droplet size for W/O is typically in the range of 1 – 4 µm. More coarsely dispersed emulsions tend to separate upon storage.

Thorough, but not too intensive homogenization is required. Extreme energy input frequently causes the formation of highly viscous, metastable secondary structures which break down on storage. Under such conditions lotions may transiently reach cream-like consistency, e. g. by several passages through a colloid mill.

For W/O sprays, intensive homogenization and higher emulsifier concentrations are recommended in order to obtain small droplet sizes which are necessary to prevent creaming.

For quick-break emulsions low energy input during homogenization is recommended due to the high internal phase. Too intensive homogenization will lead to water separation during the homogenization process and will result in inhomogeneous emulsions.

Optimum manufacturing conditions correspond to the principles of typical production processes for W/O emulsions.

The water phase is incorporated slowly into the oil phase which contains the emulsifier while stirring intensively. The coarsely dispersed pre-emulsion is then homogenized. The final homogenization should be performed below 30 °C.

The temperature program is variable and can take the form of:

- hot/hot procedure (H/H)
- hot/cold procedure (H/C)
- cold/cold procedure (C/C)

In addition to the traditional hot/hot procedure (both phases 80 – 90 °C) the hot/cold procedure can be used. It is characterized by incorporation of the cold water phase (15 – 30 °C) into the hot oil phase which significantly shortens the time of manufacture. Homogenization should be carried out below 30 °C in order to ensure that the waxes have recrystallized.

The decisive criterion for production is the viscosity. Mechanical processing is discontinued when the viscosity is equal to that of the standard emulsion developed and tested in the laboratory.

Emulsifying machines

Stirring equipment or planetary mixers with high sheering force are suitable for the manufacture of creams and lotions in the laboratory and production scale, provided that they can insure uniform work-up of the emulsion. Machines predominately used in the cosmetic industry, which are equipped with stirrer, stripper and rotor-stator homogenizer, fulfil all requirements for optimum emulsification.

However, utilization of their maximum capacity may result in over-emulsification. High-pressure emulsifiers may cause problems because of the danger of over-emulsification and liberation of water due to cavitation.

Hazardous goods classification

Information concerning

- classification and labelling according to regulations for transport of chemicals
- protective measures for storage and handling
- measures in case of accidents and fire
- toxicological and ecotoxicological effects

is given in our safety data sheets.

Guideline formulations

Essential Elegance Face Care (MK 9/17-13)	
Phase A	
ISOLAN® 17 MB	3.00%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	4.50%
dermofeel® sensolv MB (Isoamyl Laurate)	4.50%
Phase B	
Water	77.50%
Glycerin	7.00%
Zinc Sulfate Heptahydrate*	1.50%
Verstatil® SL non GMO (Aqua; Sodium Levulinate; Potassium Sorbate)	2.00%
Phase Z	
Perfume	q.s.

Preparation

1. Adjust pH of phase B to 5.5.
2. Add phase B to phase A slowly while stirring (250 rpm) during 2 – 3 minutes.
3. Homogenize for 2 minutes at 1100 rpm.

Remarks

Viscosity: 200 Pa*s (Brookfield RV DV-I, sp. D, 5 rpm)

Microbiological stability: challenge test passed

Natural content cn (incl. water, ISO 16128): 78.8%
Natural origin content cno (incl. water, ISO 16128): 98.3%
*Not considered for calculation of c_n and c_{no}

Ultra Defense Sunscreen Spray SPF 50 (FU 15/17-8)	
Phase A	
ISOLAN® 17 MB	5.00%
TEGOSOFT® DEC (Diethylhexyl Carbonate)	12.00%
TEGOSOFT® TN (C12-15 Alkyl Benzoate)	10.00%
Diethylamino Hydroxybenzoyl Hexyl Benzoate (Uvinul A plus, BASF SE)	5.00%
Bis-ethylhexyloxyphenol Methoxyphenyl Triazine (Tinosorb S, BASF SE)	4.00%
Ethylhexyl Salicylate	5.00%
Ethylhexyl Methoxycinnamate	4.00%
Zinc Stearate	0.40%
Phase B	
Water	30.60%
Glycerin	3.00%
Sodium Chloride	1.00%
Phase C	
Water	15.44%
Phenylbenzimidazole Sulfonic Acid	4.00%
Sodium Hydroxide	0.56%
Phase Z	
Perfume	q.s.

Preparation

1. Heat phase A to approx. 80 °C.
2. Add phase C to phase B.
3. Add phase B/C to phase A while stirring.
4. Homogenize.
5. Cool down below 30 °C.
6. Homogenize again.

Remarks

Viscosity: 0.8 Pa*s (Brookfield RV DV-I, sp. 5, 100 rpm)

Microbiological stability: not tested

SPF: 50.9, UVA-Balance: 34%, CW 372 nm
(Calculated values, BASF Sunscreen Simulator)

Propellant: Combine emulsion with propellant

DRIVOSOL® 27D60 (Propane, n-Butane; *iso*-Butane; Evonik Performance Materials GmbH) in mass ratio 8:2.

Alternatively, the emulsion can be used for pump sprays without propellant.

Natural Liquid Foundation (SZ 9/17-2)	
Phase A	
ISOLAN® 17 MB	4.00 %
TEGOSOFT® DC MB (Decyl Cocoate)	8.00%
TEGOSOFT® AC MB (Isoamyl Cocoate)	6.00%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	4.00%
CI 77891, Hydrogenated Lecithin (Unipure White LC 981 HLC, Sensient Technologies Corp.)*	5.00%
CI 77492, Hydrogenated Lecithin (Unipure Yellow LC 182 HLC, Sensient Technologies Corp.)*	0.60%
CI 77491, Hydrogenated Lecithin (Unipure Red LC 381 HLC, Sensient Technologies Corp.)*	0.35%
CI 77499, Hydrogenated Lecithin (Unipure Black LC 989 HLC, Sensient Technologies Corp.)*	0.10%
Phase B	
Cera Alba*	0.50%
Hydrogenated Castor Oil*	0.50%
Phase C	
Water	63.95%
Glycerin	5.00%
Magnesium Sulfate Heptahydrate*	2.00%
Citric Acid (10% in water)*	q.s.
Phase Z	
Perfume*, Preservative*,**	q.s.

Processing

1. Homogenize phase A with Ultra Turrax unitl homogeneous.
2. Combine phase A and phase B, heat to approx. 80 °C while stirring.
3. Adjust pH of phase C to 5.0 – 5.5
4. Add phase C to phases A/B while stirring.
5. Homogenize.
6. Cool down below 30 °C.
7. Homogenize again.

Remarks

Viscosity: 35 Pas (Brookfield RV DV-I, sp. 93, 10 rpm)

Microbiological stability: not tested
**Formulation was tested on emulsion stability with 0.5 % Aqua; Sodium Benzoate; Potassium Sorbate (Euxyl K 712, Schülke & Mayr GmbH).

Natural content cn (incl. water, ISO 16128): 64.0%
Natural origin content cno (incl. water, ISO 16128): 91.9%
* Not considered for calculation of c_n and c_{no}

Give Your Body A Natural Treat Lotion (BR 7/16-13)

Phase A	
ISOLAN® 17 MB	4.50%
Cera Alba*	0.40%
Hydrogenated Castor Oil*	0.60%
TEGOSOFT® AC MB (Isoamyl Cocoate)	7.00%
TEGOSOFT® DC MB (Decyl Cocoate)	2.00%
TEGOSOFT® CR MB (Cetyl Ricinoleate)	0.50%
Prunus Amygdalus Dulcis (Sweet Almond) Oil	10.00%
Simmondsia Chinensis (Jojoba) Seed Oil	3.00%
dermosoft® GMC MB (Glyceryl Caprate)	0.30%
Phase B	
Water	59.70%
Glycerin	5.00%
Panthenol*	0.50%
Zinc Sulfate Heptahydrate*	1.50%
Alcohol*	5.00%
Citric Acid (10% in water)*	q.s.
Phase Z	
Perfume*	q.s.

Preparation

1. Heat phase A to approx. 80 °C.
2. Adjust pH of phase B to 5.0 – 5.5.
3. Add phase B to phase A while stirring.
4. Homogenize.
5. Cool down below 30 °C.
6. Homogenize again.

Remarks

Viscosity: 20 Pa*s (Brookfield RV DV-I, sp. 5, 10 rpm)

Microbiological stability: challenge test passed

Natural content cn (incl. water, ISO 16128): 72.7%
Natural origin content cno (incl. water, ISO 16128): 97.4%
*Not considered for calculation of c_n and c_{no}

Pampering Body Cream (H 6/16-10)

Phase A	
ISOLAN® 17 MB	3.60%
Cera Alba*	0.60%
Hydrogenated Castor Oil*	0.40%
TEGOSOFT® OER MB (Oleyl Erucate)	2.00%
TEGOSOFT® CR MB (Cetyl Ricinoleate)	2.00%
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	4.40%
TEGOSOFT® P (Isopropyl Palmitate)	3.00%
Prunus Amygdalus Dulcis (Sweet Almond) Oil	6.00%
dermosoft® GMC MB (Glyceryl Caprate)	0.50%
Tocopheryl Acetate*	1.00%
Phase B	
Water	70.50%
Zinc Sulfate Heptahydrate*	1.00%
Glycerin	5.00%
Citric Acid (10% in water)*	q.s.
Phase Z	
Perfume*	q.s.

Preparation

1. Heat phase A to approx. 80 °C.
2. Adjust pH of phase B to 5.0 – 5.5.
3. Add phase B to phase A while stirring.
4. Homogenize.
5. Cool down below 30 °C.
6. Homogenize again.

Remarks

Viscosity: 130 Pa*s (Brookfield RV DV-I, sp. D, 5 rpm)

Microbiological stability: challenge test passed
Natural content c_n (incl. water, ISO 16128): 76.5%
Natural origin content c_{no} (incl. water, ISO 16128): 97.5%
*Not considered for calculation of c_n and c_{no}

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