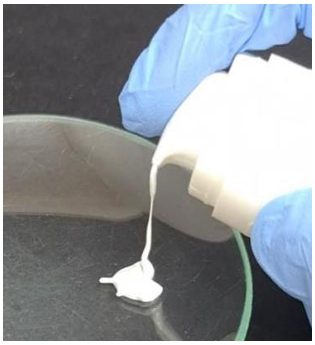
PERSONAL CARE

Mineral High Protection Sunscreen SPF 50 with 1/3 UVA BR0156

A 100% mineral sunscreen that delivers high performance with minimum whitecast in the skin. This inorganic formulation also offers great spreadability and emollience in the skin, delivering a pleasant sensorial with low skin glow for the consumers. The selection of right emollients combined with a very efficient emulsifiers gives the good dispersion and excellent stabilization for the formulation



Technical Overview:

- UV Filter: To achieve **High Performance** and balance of **Minimum whitecast** and **Cost- effectiveness**: **Solaveil Clarus (TiO2 nano-sized particle), Solaveil Clarus (ZnO nano-sized particle), Solaveil Spextra (TiO2 non-nano sized)**
    - Solaveil Clarus Powder: **Solaveil CTP1** (**TiO2 - UVB**) – Powder format provides greater formulation flexibility.
    - Solaveil Clarus Dispersion**: Solaveil CZ-100** (**ZnO - UVA**) - for **ease of handling**. And with C12-15 Alkyl Benzoate, carrier fluid that offers a **light, non-greasy feel**.
    - Solaveil SpeXtra (Oil Dispersion): **Solaveil XT-300** (**Broad spectrum**) - for **ease of handling**. And with Caprylic/Capric Triglyceride, **natural carrier fluid** besides offers a **good aesthetic** for the. And has a **good compatibility** with **Solaveil CTP1**.
        - Combination of TiO2 and ZnO of Solaveil Clarus and TiO2 of Solaveil SpeXtra to obtain the best relationship between performance, cost effectiveness and minimum whitecast on application: Balancing the transparency of Solaveil Clarus, due to the tightly controlled nano-sized particle distribution; and Solaveil SpeXtra, which provides a broad spectrum of protection from a single, non-nano-sized ingredient.
- Emollients: **Crodamol PC**, **Crodamol GTCC** and **Crodamol IPIS.** Effective **wetting agents for Solaveil CTP1**. Have **light sensorial** and due to their **low viscosity they offer good spreadability** and **aesthetic** for the formula. And these have **low refractive index** that contribute to a **minimum skin glow. High Natural %** (ISO16128) Crodamo PC 75%, Crodamol GTCC 100% and Crodamol IPIS 84%.
- Emulsifiers: Association of **Cithrol PG32IS** and **Cithrol DPHS** is a **highly efficient W/O emulsifier** system to give good stability **for sunscreen formulas** besides this type of emulsion are a **very efficient vehicle for sunscreen actives**, and is particularly **suitable for oil-based dispersions** of TiO2 and ZnO.

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- **Cithrol PG32IS** is a **good dispersing** medium for inorganic pigments, as its liquid form is compatible for cold **process**. Is 100% **Natural** (ISO 16128)
  Cithrol DPHS has an **excellent stabilisation** due to high molecular weight, and large polymeric oil- and water phase anchors. Easy and reproducible emulsion processing, including semi-cold process.

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Ingredient/INCI Name	Functionality	% w/w
Part A		
Deionized Water	-	To 100
Glycerin	Humectant	1.50
Magnesium sulfate heptahydrate	Salting out	0.70
Part B		
Solaveil CTP1 (Titanium Dioxide (and) Aluminum Stearate (and) Alumina)[1]	Inorganic UVB filter	17.00
Part C		
Crodamol GTCC (Caprylic/ Capric Triglyceride)[1]	Emollient	7.00
Crodamol IPIS (Isopropyl Isostearate)[1]	Emollient	8.00
Crodamol PC (Propylene Glycol Dicaprylate/Dicaprate)[1]	Emollient	10.00
Cithrol PG32IS (Polyglyceryl-3 Diisostearate)[1]	Emulsifier	3.00
Part D		
Cithrol DPHS (PEG 30 Dipolyhydroxystearate)[1]	Emulsifier	0.75
Bentone Gel TNV (C12-15 Alkyl Benzoate (and) Stearalkonium Hectorite (and) Propylene Carbonate)[3]	Rheology modifier	0.75
Polyhydroxystearic Acid	Dispersant	1.50
Part E		
Solaveil XT-300 (Titanium Dioxide (and) Caprylic/Capric Triglyceride (and) Polyhydroxystearic Acid (and) Stearic Acid (and) Alumina)[1]	Inorganic Broad UV filter	10.00
Solaveil CZ-100 (Zinc Oxide (and) C12-15 Alkyl Benzoate (and) Polyhydroxystearic Acid (and) Isostearic Acid)[1]	Inorganic UVA filter	20.00
Lexgard Natural MB (Glyceryl Caprylate (and) Glyceryl Undecylenate)[2]	Preservative	1.00
Part F		
Silica	Sensory modifier	1.00
Aluminum Starch Octenylsuccinate	Sensory modifier	2.00

Suppliers: **1: Croda**, 2: Inolex, 3: Elementis

Procedure:

- Auxiliary beaker 1: Combine Part A (Aqueous phase) and stir until homogenous. Heat until 75-80°C.
- Main beaker: Add Part B (Solaveil CTP1).88
- Auxiliary beaker 2: Combine Part C (Emollients, Dispersant, Cithrol PG32IS), with stirring.
- Bench Process: Add Part C to Part B, with the help of a spatula to run down the beaker wall, in the initial moments of the addition, to avoid the cloud of dust. After all addition, stir for 10 min, until total wetting of Solaveil Powder.
- Part B/C: Homogenize using an Ultra-Turrax at 8.500 - 10.000rpm during 20-30 min or until total dispersion of Solaveil Powder.

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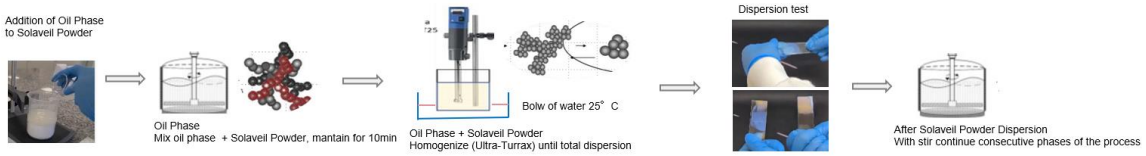
- Adjust the maximum speed of homogenization (8.500 – 10.000rpm), so that there is no loss of bulk outside the beaker.
- Dispersion test: 1 drop of this phase on two slides before proceeding, to ensure full dispersion of the powder.
- Safety: Warming is expected due to the high shear rate, so we recommend placing the beaker in a bowl of water (25°C).

- Return to stirrer and add Part D (Cithrol DPHS and rheology modifier) to Part B/C, stir until get homogeneous. Heat until 75-80°C.
- At 60°C add Part E (Solaveil Dispersions and Preservative) to Part B/C/D, with stirring. Continue heating until 75-80°C to emulsification phase.
- At 75-80°C, add Part A (Aqueous phase) to Part B/C/D/E (Oil Phase) slowly with high stirring. Homogenize using an Ultra-Turrax at 10.000rpm for 1 minutes per 100g.
- Start cooling until 25°C with stirring. At 25-30°C add Part F (Sensory modifiers) (Obs: Add below 40°C (Starch) to ensure sensory modifier functionality). Homogenize with Ultra-Turrax at 4.000rpm for 2 min, until get homogeneous system.

Powder dispersion phase:



Appearance: White Cream; pH: N.A.; Viscosity: 4315 cP (Spindle 64, 30rpm, 1min, room temperature)
Stability: 3 months at 5 ºC, 25 ºC, 45 ºC and 1 month at 50°C and 0ºC/+50ºC 12 hour freeze-thaw cycle
In vivo SPF: 57.8 (ISO 24444:2019, 3 subjects, Allergisa BR)
In vivo UVA: 17.9 (ISO 24442: 2011, 3 subjects, Allergisa BR)
CW: 374nm (ISO 24443: 2012, Allergisa BR)

This formulation was developed in Latin America. Contact your local sales representative with enquiries as ingredient availability can vary by region.