

TECHNICAL DATA SHEET

Product Name: Micronized Titanium Dioxide

INCI Name: Titanium Dioxide, Aluminum Hydroxide, Lauric Acid

CAS: 13463-67-7, 1333-84-2, 143-07-7

Chemical Classification: Inorganic compound

Functional Category: Sunscreen Agent, Stabilizer – Light Stabilizers, Opacifying / Pearlizing Agent

Origin of Raw Material: USA / China

Description: Micronized Titanium Dioxide, with the INCI name Titanium Dioxide, Aluminum Hydroxide, Lauric Acid, is a specially processed form of mineral UV filter stabilized with additional components to ensure compatibility in cosmetic formulations, especially those intended for sun protection. In this form, Titanium Dioxide is micronized, meaning its particles are mechanically reduced to micrometer size or smaller. This processing enhances aesthetic performance in formulations by avoiding white cast on the skin while maintaining high UVB and partial UVA protection. Unlike nano-forms, which are subject to specific regulatory guidelines, micronized particles remain large enough not to penetrate the epidermis, yet small enough not to leave a visible film on the skin. Aluminum Hydroxide serves as a surface coating that stabilizes the Titanium Dioxide particles and prevents agglomeration. It also inhibits the photocatalytic activity of the mineral filter, reducing the risk of free radical formation under UV exposure and providing additional skin protection from oxidative stress. Lauric acid acts as an additional surface treatment component, improving dispersion in oil phases and contributing to a soft, pleasant texture. As a saturated fatty acid, lauric acid does not clog pores and is often used in stabilizing mineral filters, particularly in oil-rich formulations. This synergistic combination results in a stable, effective, and skin-friendly UV filter, suitable for use in sunscreens, day creams with SPF, BB creams, and other products requiring reliable UV protection without the risk of irritation or phototoxicity. The material is particularly suitable for sensitive areas, such as the skin around the eyes or redness-prone skin.

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Mechanism of Action: Micronized Titanium Dioxide functions as a physical UV filter that protects the skin by reflecting, scattering, and partially absorbing UV radiation. Its protective mechanism is primarily based on the optical properties of the particles, which, once applied to the skin, form a reflective layer that blocks the penetration of harmful UVB and some UVA rays into deeper skin layers. Unlike chemical filters that absorb UV rays and convert them into heat through chemical reactions, Titanium Dioxide acts as a passive, inert barrier, without direct interaction with skin cells. Micronization improves the aesthetic properties particles are small enough not to leave a white cast but still large enough not to penetrate the skin, minimizing the risk of systemic absorption. It is surface-stabilized with coatings such as Aluminum Hydroxide and Lauric Acid, which neutralize its potential photocatalytic activity and prevent the formation of free radicals under UV light. This enhances the photostability of the raw material and provides added safety in formulations applied even to sensitive areas like the eye contour. Thanks to this triple action reflection, dispersion, and partial absorption micronized Titanium Dioxide offers reliable and stable UV protection without causing irritation or phototoxic reactions.

Benefits:

- Reflects and scatters UV radiation from the skin's surface, providing physical protection
- Partially absorbs UVA rays, contributing to broad-spectrum protection
- Does not penetrate the skin or enter systemic circulation
- Non-irritating even for sensitive skin; suitable for children
- Photostable under sun exposure, ensuring prolonged protection
- Does not clog pores or disrupt skin barrier function
- Leaves no visible white residue due to micronized particle size
- Stabilized with surface coatings that prevent free radical formation
- Compatible with various formulations, including emulsions and balms
- Safe for use around the eyes and for individuals with atopic skin

Usage: Micronized Titanium Dioxide is used in a wide range of cosmetic products, primarily sunscreens, but also in tinted creams, BB creams, powders, and daily moisturizers with SPF. Concentration depends on the desired level of UV protection typically 2% to 5% for basic daily protection, and 5% to 15% for higher-SPF products such as sunscreens. In decorative cosmetics, it is also used as a pigment or opacifier, generally at

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concentrations below 5%. In formulation, it is typically dispersed in the oil phase, as it is water-insoluble and stabilizes better in a lipid environment. To ensure uniform distribution and prevent sedimentation, emulsifiers and compatible thickeners should be used for emulsion stability. It is usually added during the heating of the oil phase with gentle stirring; for sensitive formulations, it can be incorporated during the cold-process phase if it has been pre-dispersed well. Care should be taken to ensure homogeneity for consistent protection across the skin surface.

Animal Testing: Not tested

GMO Status: GMO-free

Vegan: Does not contain animal-derived components

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