

## Green Seal Position on Titanium Dioxide in Certified Products

### What is Titanium Dioxide?

Titanium dioxide (TiO<sub>2</sub>) is a common, naturally occurring compound that has been present in a variety of products since the early 20th century, such as cosmetics, sunscreens, food additives, and paints.<sup>1</sup> In its natural state, TiO<sub>2</sub> is a fine, white powder, making it ideal for use as a whitener or brightener for these and many other products.<sup>2</sup>

### What are the Chemical Risks?

There are three pathways for titanium dioxide to enter the human body; orally via food ingestion or use of dental products, dermally via cosmetics or skincare, and via inhalation in powdered form. The first two pathways – oral and dermal – have not been deemed hazardous to human health. As a result, TiO<sub>2</sub> is a common ingredient as a food additive and cosmetics or sunscreen: TiO<sub>2</sub> has been used as an ingredient in various sunscreens since 1952 and was approved by the FDA for that application in 1999<sup>1</sup>. And since 1966, titanium dioxide has been approved by the U.S. Food and Drug Administration as a food-safe additive.<sup>3</sup>

However, it is the third pathway - when the compound is present as ultrafine particulates that can be easily inhaled – that titanium dioxide is considered to be hazardous to human health. Studies in mice have shown that extended inhalation of TiO<sub>2</sub> can cause an increased risk of lung damage and cancer.<sup>4</sup> As a result, the International Agency for Research on Cancer (IARC) classified TiO<sub>2</sub> as a hazard Class 2B carcinogen, or “possible carcinogenic to humans”, but only in its particulate form.<sup>5</sup> Therefore, several agencies and advocacy groups<sup>6,7</sup> restrict titanium dioxide when there is a risk of inhalation, but not when the user is exposed through dermal or oral pathways.

### How Does Green Seal Regulate TiO<sub>2</sub> in Certified Products?

- Green Seal currently exempts TiO<sub>2</sub> from its requirements on carcinogens when titanium dioxide is bound within a product and there is not a risk of inhalation.
- If there is a risk of inhalation, especially in ultrafine or nanoscale particulate form when TiO<sub>2</sub> is not well-bound in a product, it will not be allowed in certified products.

Green Seal will ensure there is clear language on this position in all standards at their next major update where it does not currently exist.

<sup>1</sup> Titanium Dioxide in our everyday life: is it safe? <https://pmc.ncbi.nlm.nih.gov/articles/PMC3423755/>

<sup>2</sup> Titanium Dioxide. <https://www.chemicalsafetyfacts.org/chemicals/titanium-dioxide/>

<sup>3</sup> Federal Register, Volume 31, Number 18. <https://www.govinfo.gov/content/pkg/FR-1966-01-27/pdf/FR-1966-01-27.pdf>

<sup>4</sup> Titanium dioxide nanoparticles induce emphysema-like lung injury in mice.

<https://faseb.onlinelibrary.wiley.com/doi/10.1096/fj.06-6485fje>

<sup>5</sup> IARC Monographs on the Identification of Carcinogenic Hazards to Humans. <https://monographs.iarc.who.int/agents-classified-by-the-iarc/>

<sup>6</sup> California Proposition 65. <https://www.p65warnings.ca.gov/fact-sheets/titanium-dioxide-airborne-unbound-particles-respirable-size>

<sup>7</sup> EWG Skin Deep. [https://www.ewg.org/skindeep/ingredients/706561-TITANIUM\\_DIOXIDE/](https://www.ewg.org/skindeep/ingredients/706561-TITANIUM_DIOXIDE/)

## Contact Us

If you have questions or comments about this position, Green Seal certification, or the standard development process, please reach out to [standards@green seal.org](mailto:standards@green seal.org).

## About Us

Green Seal is a global nonprofit organization that pioneered the ecolabeling movement with a mission to transform the economy for a healthier, greener world. For 30 years, Green Seal's rigorous standards for health, sustainability, and product performance have driven permanent shifts in the marketplace, empowering better purchasing decisions and rewarding industry innovators. With thousands of certified products, services, and spaces from the world's leading companies, the Green Seal certification mark is a universal symbol that a product or service meets the highest benchmark of health and environmental leadership