

# 5 Things You Should Know About...

## Titanium dioxide



- 1. Titanium dioxide is a naturally occurring compound.** Titanium dioxide is the eighth most common compound in the earth's crust, although it's very often impure in its natural state and requires chemical processing. Because it does not bioaccumulate (build up in the body of humans or animals), there is little concern over reintroduction into the environment after consumer use.
- 2. When you think brightness, think titanium dioxide.** Its unique optical properties make titanium dioxide the most widely used white pigment in paints, coatings, plastics, paper, inks, fibers, cosmetics, and foods. The FDA and European Food Safety Authority approve the use of titanium dioxide in food—the substance is used to brighten, whiten, and enhance the texture of a wide variety of foods from powdered donuts to candy to skim milk. Titanium dioxide also brightens colored pigments, so makeup is richer and paints lighter and brighter. It's also a safer alternative replacing hazardous lead compounds widely used in paints until the 1970s.
- 3. Titanium dioxide is one of the most effective UV absorbers and reflectors.** Most sunscreens, even 'all natural' brands, contain titanium dioxide and the substance is widely used in many cosmetics and lotions. Titanium dioxide is also used in food packaging, as an additive in plastics, and coatings on pharmaceuticals to protect against light damage and ensure longer shelf lives. Important coatings containing titanium dioxide protect steel infrastructure and buildings from long-term damage caused by sunlight.
- 4. In most applications, replacing titanium dioxide is extremely difficult.** In most applications, titanium dioxide alternatives are neither safer nor comparable in performance. In the case of calcium phosphate and silica dioxide – two other commonly used whiteners – almost twice as much pigment must be used to achieve the same level of whiteness which titanium dioxide produces. Sunscreen would have to contain a new variety of UVA and UVB blockers to achieve a comparable level of broad-spectrum sun protection, since even chemically-based sunscreens often contain some amount of titanium dioxide. Recent economic analysis suggests switching to an alternative product would equate to \$11.6 billion in substitution and equipment costs.
- 5. Titanium dioxide is extremely well-researched and safe.** While the International Agency on the Research of Cancer names titanium dioxide as a "possible human carcinogen," the decision was based on two studies of rats exposed to extremely high levels of titanium dioxide. Similar effects have not been seen in humans; in fact, European regulatory authorities and scientists caution that exposing animals to excessive amounts of particles has little relevance for humans. In fact, studies of thousands of workers exposed to titanium dioxide through their jobs have shown no correlation between exposure to titanium dioxide and cancer or other lung diseases.

Some environmental and health groups have raised concerns about "nanoparticles" of titanium dioxide, especially as used in sunscreen. However, there is no evidence that these tiny particles are actually absorbed through the skin and there is no evidence showing that nanoparticles pose a risk to human health. Extensive reviews by government agencies around the globe have concluded titanium dioxide is safe as currently used.