Titanium Dioxide and NIOSH Current Intelligence Bulletin

In April 2011, the National Institute for Occupational Safety and Health (NIOSH), an arm of the U.S. Centers for Disease Control and Prevention, published Current Intelligence Bulletin 63, “Occupational Exposure to Titanium Dioxide.” In this Bulletin, they recommend a recommended exposure limit (REL) of 2.4 mg/m³ for pigmentary titanium dioxide (TiO₂) and 0.3 mg/m³ for ultrafine TiO₂. They also concluded that ultrafine TiO₂ is a potential occupational carcinogen. The document can be accessed at http://www.cdc.gov/niosh/docs/2011-160/pdfs/2011-160.pdf.

The newly recommended NIOSH RELs, as well as the conclusion that ultrafine TiO₂ is a potential inhalation carcinogen, are based primarily upon two studies in which rats were exposed to excessive concentrations of TiO₂ in a closed chamber for extended periods of time. According to NIOSH, the higher mass-based potency of ultrafine TiO₂ compared to pigmentary TiO₂ is associated with the greater surface area of ultrafine particles for a given mass -- and the NIOSH RELs reflect this mass-based difference in potency.

The NIOSH classification of ultrafine TiO₂ as a carcinogen is based on a single inhalation study at a single concentration in rats (a uniquely sensitive species to lung overload effects; a view shared by many of the world’s toxicologists). Multiple real-world epidemiological studies in the highest-exposed workers have found no association between TiO₂ exposures and lung cancer or non-cancer related lung effects in humans. Therefore, it is our position that the NIOSH RELs rely upon selective interpretation of experimental animal data and are inconsistent with the more relevant human results.

The Titanium Dioxide Stewardship Council’s (TDSC) position on this issue is:

- Titanium dioxide is safe for the people who manufacture it.
- Titanium dioxide is safe for the people who work with it in its intended uses as an ingredient in coatings, paper, and plastics.
- Titanium dioxide is safe for the people who use finished products containing it.
- There is no human evidence to suggest that titanium dioxide, in any form, is an occupational carcinogen.

As stated above, our position is based on real-world epidemiological studies done in our own industry. The researchers who conducted these studies followed some 20,000 people who
worked in both European and U.S. TiO₂ manufacturing plants over a period of more than 40 years. These epidemiology studies did not show an increase in lung cancer in the TiO₂ workforce as a result of exposure to TiO₂ dust.

Per Occupational Safety and Health Administration (OSHA) Hazcom (29 C.F.R. Section 1910.1200), the OSHA Permissible Exposure Limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and manufacturer REL are required to be noted in the Material Safety Data Sheet (MSDS). The NIOSH REL is not required to be listed on an MSDS. Be sure you obtain the proper MSDS for the TiO₂ grade you are using.

Employee exposure within your facilities is unique to your situation. We recommend consulting your industrial hygiene professionals to ensure that the processes used in the handling of these products are in compliance with applicable laws and regulations.