




ION Surface Technology Congress

Titanium dioxide : European industry overview & EU regulatory status

13 November 2018

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Overview

- About the Titanium Dioxide Manufacturers Association (TDMA)
- How is titanium dioxide (TiO_2) manufactured and where is it used?
- What are the concerns regarding titanium dioxide?
- Impacts of potential EU Regulation and its impacts on our daily work




About TDMA

- The Titanium Dioxide Manufacturers Association (TDMA) is a sector group of the European Chemical Industry Council (CEFIC)
- We represent the major producers of TiO_2 acting as their responsible voice in Europe since 1974
- We promote and defend the merits of titanium dioxide in all suitable applications by bringing forward evidence of its safety and efficacy



 CINKARNA Cérje, Slovenia	
 CRISTAL Thann, France Stallingborough, UK	
 EVONIK Rheinfelden, Germany	
 VENATOR Pori, Finland Lentlingen, Germany Quilburg, Germany Scarino, Italy Huelva, Spain Grafton, UK	
 KRONOS Langerbrugge, Belgium Leverkusen, Germany (2 plants) Norderham, Germany Fredrikstad, Norway	
 PRECHEZA Prenov, Czech Republic	
 TRONOX LLC Botlek, Holland	
 ZPN Police, Poland	
 LONMIN BILLIONS EUROPEAN HD Stockton-on-Tees, UK	
 THE CHEMOURS COMPANY Kalle, Belgium	

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Production of TiO_2

The overall process of manufacture is to take an impure TiO_2 feedstock and to convert this into the pure white TiO_2 pigment

- The element titanium and the compound TiO_2 are linked to other elements such as iron, rocks and mineral sands
- TiO_2 exists in three fundamental crystal forms: anatase, rutile and brookite
- The principal source of titanium dioxide is mined ilmenite ore, which contains 45-60 percent TiO_2
- From the natural sources, two methods are used to manufacture pure TiO_2 : a sulphate process and a chloride process
- Of the two methods of extraction, the sulphate process is currently the most popular method of producing TiO_2 in the European Union, accounting for 70 percent of European sources



Applications of TiO₂

- The demand for TiO₂ in the European Economic Area (EEA) was 1100 ktonnes accounting for 20% of global demand
- EEA demand comprises 67-68% EEA-produced TiO₂, the remaining is imported with the majority coming from the USA, Mexico and China
- EEA exports of TiO₂ amounted to 360 ktonnes in 2015



Paints & Coatings

Architectural: 36%

Industrial: 17%

Inks: 4%



Specialty applications

Food, Pharma, etc.: 1%

Catalysts: 1%

Other (e.g. cosmetics): 4%




Plastics

25%



Paper

12%

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Sustainable properties of TiO₂



Less waste with longer lasting products

TiO₂ improves the durability of products due its weatherability and UV reflective properties, reducing waste and the consumption of virgin raw materials



Reduced energy consumption

TiO₂ allows brighter colours in interior and light reflectivity for exterior coatings which reduces energy consumption due to reduced need for lighting and cooling



Combating air pollution

TiO₂ has photocatalytic applications combating air pollution. The technology is also used to remove pollutants from water



Less food waste

TiO₂ in food packaging extends the life of the products reducing food waste as it protects from light degradation



Innovative energy technologies

TiO₂ is finding new applications in innovative sustainable energy solutions like batteries and solar cells



TDMA and sustainability- Life Cycle Analysis

- Committed to provide high quality products that enable more sustainable solutions in downstream applications.
- Product sustainability should be assessed across the whole value chain using a cradle-to-grave life cycle approach.
- Responding to requests from downstream users, TDMA developed a rigorous Titanium Dioxide product footprint accounting and reporting method. This method provided the basis for the representative cradle-to-gate carbon footprint of Titanium Dioxide manufacture that TDMA published in 2010 and 2012.
- In 2014, TDMA compiled a state-of-the art life cycle inventory (LCI) of Titanium Dioxide manufacture from cradle (extraction) to gate (factory gate of the Titanium Dioxide plant).
- LCI data were updated based on 2016 production data with improved accuracy about ore feedstock.

Independent external reviewer
Manage complex standards
ISO 14040 & 14044

Refine Carbon Footprint
method/calculator
targeting 14
Environmental Impacts

TDMA
All members establish industry dataset

Generate Lifecycle
Inventory dataset
(LCI)


Populate EC Reference
Lifecycle Database
LCDN - ILCD



Users
e.g. CEPE Ind Paints, Ecoinvent

use TiO₂ ILCD dataset to
calculate final product
Environmental Impact



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TiO₂ is safe

TiO₂ has been consistently confirmed by a large number of regulatory bodies to be a nontoxic, inert, and safe material

- In October 2017, the Committee for Risk Assessment (RAC) of the European Chemicals Agency (ECHA) proposed that TiO₂ should be classified as a suspected carcinogen (cat. 2) under the EU's classification and labelling (CLP) Regulation
- This proposal is based on based solely on inhalation exposure studies in rats with TiO₂ in powered form, showing lung overload conditions
- There has been no robust evidence to suggest TiO₂ is harmful to humans with 50 years of epidemiological data demonstrating no link between cancer in humans and exposure to TiO₂



Harmonized classification process for TiO₂

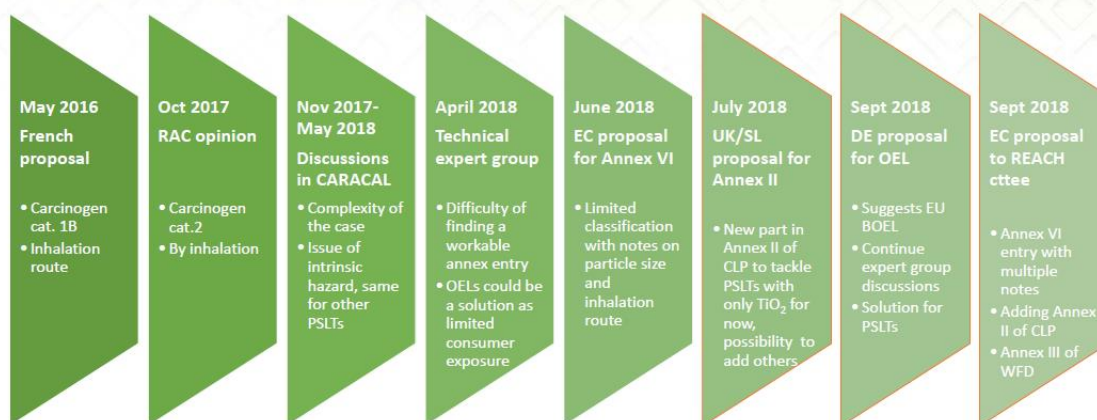
- Since October 2017, the European Commission, Member State Competent Authorities and TiO₂ stakeholders have engaged constructively on how best to move forward with the RAC's proposal
- The discussions have thus far confirmed that the potential concern for TiO₂ is predominantly a question of occupational safety and health (OSH)
- The hazard profile described by the RAC is shared by 300+ granular dusts (poorly soluble low toxicity particles), highlighting the need for a harmonized approach
- This has raised questions about the value of proceeding with a classification and the discussions are continuing among stakeholders



TDMA 

Harmonized classification process for TiO₂

Overview of key developments



Impacts of category 2 classification



Questions?

