

1. PRODUCT AND MANUFACTURER IDENTIFICATION

Product names:

NanoActive[®]-S Titanium (IV) Oxide

Manufacturer:

NanoScale Corporation
1310 Research Park Drive
Manhattan, KS 66502
(785) 537-0179

Product Information:

(785) 537-0179

24-Hour Chemtrec Emergency Number:

U.S. (800) 424-9300

International (703) 527-3887

2. CHEMICAL COMPOSITION AND EXPOSURE LIMITS

<u>Component</u>	<u>CAS Number:</u>	<u>OSHA PEL:</u>	<u>ACGIH TLV:</u>
Titanium (IV) Oxide	13463-67-7	15 mg/m ³ dust	10 mg/m ³ dust
Surfactant	Proprietary	Not Established	Not Established
Deionized Water	7732-18-5	Not Established	Not Established

3. HAZARD IDENTIFICATION AND EMERGENCY OVERVIEW

Appearance and odor: Gray liquid, no odor.

Routes of exposure: Eye and skin contact, inhalation, ingestion.

Eye Contact: May cause irritation.

Skin Contact: May cause irritation.

Inhalation: Irritation of upper respiratory tract.

Ingestion: May cause irritation of the digestive tract.

Acute Health Effects: Acute effects include irritation of mucous membranes and upper respiratory tract causing coughing.

Signs and symptoms of overexposure: Acute effects include irritation of mucous membranes and upper respiratory tract. Exposure may cause diarrhea.

4. FIRST AID MEASURES

Skin: In case of skin contact, flush with copious amounts of water for at least 15 minutes.

Inhalation: Move to fresh air immediately, If not breathing, give artificial respiration. Seek medical attention.

Eyes: In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating eyelids with fingers. Seek medical attention.

Ingestion: If swallowed, wash out mouth with water provided that person is conscious. Seek medical attention.

For internal contact via wounds, flush wound with water.

5. FIRE-FIGHTING MEASURES

Aqueous product, for fires involving dried material use water, carbon dioxide, dry chemical, and foam extinguishing agents as necessary during firefighting operations. Titanium dioxide is neither flammable nor explosive.

6. ACCIDENTAL RELEASE MEASURES

Clean up spills immediately, using appropriate protective equipment. Dike or dam liquid spills. Vacuum or sweep up dried material and place into a suitable disposal container. Avoid generating dust during transfer of solids. Provide adequate ventilation.

7. HANDLING AND STORAGE

Store in a tightly closed container in a cool, dry, well-ventilated area.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Use adequate general or local exhaust ventilation to keep airborne solids concentrations below the permissible exposure limits.

Respiratory Protection: Not required under normal use. If mist is present, use a NIOSH approved respirator for mists.

Skin Protection: Wear appropriate protective gloves.

Eye Protection: Wear appropriate protective glasses or chemical safety goggles.

Other Protective Equipment: Wear appropriate protective clothing to minimize contact with skin.

Titanium dioxide can adsorb moisture and natural oils from the surface of the skin during prolonged exposure. Prolonged exposure should be avoided by wearing suitable protective gloves and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color/Appearance: Gray liquid

Odor: None

Molecular Weight: TiO₂: 79.90

10. STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressures

Hazardous Polymerization: None

Incompatibility: None reported

Decomposition Products: None reported

11. TOXICOLOGICAL INFORMATION

Acute Oral Toxicity: LD₅₀ > 2 g/kg

Acute Dermal Toxicity: LD₅₀ > 5 g/kg

Acute Dermal Irritation: PII = 0, non-irritating

Skin Sensitization: Non-sensitizer

Acute Eye Irritation: Practically non-irritating

Acute Inhalation: EPA Toxicity Category IV, non-toxic.

Chronic *dust* inhalation exposure (250 mg/m³ for 6hrs/day, 5day/week for 2 years) can be a potential carcinogen to rats. The authors of this study concluded that based on the excessive dust loading and overwhelmed clearance mechanism in the lungs of rats exposed chronically at 250 mg/m³, the biological relevance of lung tumors to man appears to be negligible.

A number of epidemiology studies evaluating > 20,000 TiO₂ industry workers in Europe and the United States have been reported. Workers employed for at least six months in TiO₂ production were assessed using company records and quality controls, taking into account the different manufacturing procedures used at the sites as well as the actual relative levels of exposure to respirable TiO₂. Exposure categories such as job site, title, and calendar years on the job were examined. Findings from each of the studies were similar, in that the authors concluded that the results did not suggest a carcinogenic effect of TiO₂ dust on the human lung, and mortality from other chronic diseases, including other respiratory diseases, was not associated with exposure to TiO₂ dust. Based upon the results of these studies, NanoScale Corporation concludes that titanium dioxide will not cause lung cancer or chronic respiratory disease in humans at concentrations experienced in the workplace.

Carcinogen status: OSHA – No, NTP – No, ACGIH (TiO₂) – Group 3; Not classifiable as a human carcinogen. IARC (TiO₂) – 2B; possibly carcinogenic to humans

Although the three animal studies reviewed by IARC showed evidence of tumors it is important to note that these studies tested pigmentary and ultrafine titanium dioxide. As stated in the IARC *draft* monograph, volume 93, primary particle sizes for pigmentary titanium dioxide are typically between 0.2 and 0.3 μm. Ultrafine grades range from 10-50 nm. NanoScale's NanoActive[®] Titanium Dioxide particles are larger and do not fall into the pigmentary or ultrafine classifications. Also, as realized in studies reviewed by NIOSH, the toxicity seems to be more related to the particle size rather than the chemical itself.

12. ECOLOGICAL INFORMATION

None available.

13. DISPOSAL CONSIDERATIONS

Disposal should be in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

(49 CFR 172.101-2): Not listed

15. REGULATORY INFORMATION

TSCA: Components of this material are listed in the TSCA inventory.

SARA (Title 313): None

CERCLA RQ: None

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

16. OTHER INFORMATION

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