Standard Operating Procedure

Titanium Dioxide

*This is an SOP template and is not complete until: 1) lab specific information is entered into the box below 2) lab specific protocol/procedure is added to the protocol/procedure section and   
3) SOP has been signed and dated by the PI and relevant lab personnel.*

Print a copy and insert into your   
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.   
Refer to instructions for assistance.

|  |  |
| --- | --- |
| **Department:** | Click here to enter text. |
| **Date SOP was written:** | Click here to enter a date. |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Click here to enter text. |
| **Internal Lab Safety Coordinator/Lab Manager:** | Click here to enter text. |
| **Lab Phone:** | Click here to enter text. |
| **Office Phone:** | Click here to enter text. |
| **Emergency Contact:** | Click here to enter text. |
| *(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | Click here to enter text. |
| *(Building/Room Number)* |

**Type of SOP:**  Process Hazardous Chemical  Hazardous Class

**Purpose**

Titanium dioxide may cause mild **irritation** and redness with skin contact or eye contact. Chronic exposure or high amounts of dust may result in lung scarring.

May cause gastrointestinal tract irritation if swallowed with nausea, vomiting, and diarrhea.

May be harmful if inhaled, swallowed, or absorbed through skin.

Titanium dioxide has a wide range of uses from paint, to pigment, to sunscreen. It is found in almost every sunscreen because of its strong UV light absorbing properties.

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: 13463-67-7

Class: **Irritant**

Molecular Formula: O2Ti

Form (physical state): solid powder

Color: white

Boiling point: 2500-3000°C

**Potential Hazards/Toxicity**

Titanium dioxide may cause mild **irritation** and redness with skin contact or eye contact. Chronic exposure to dust may result in lung scarring. Possible **carcinogen.**

May cause gastrointestinal tract irritation with nausea, vomiting, and diarrhea.

Has a permissible exposure limit of TWA 15 mg/m3 [skin].

**Personal Protective Equipment (PPE)**

**Respirator Protection**

Use a full-face respirator with multi-purpose combination (US) respirator cartridges as a backup to engineering controls.

Respirators should be used only under any of the following circumstances:

* As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
* When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
* Regulations require the use of a respirator.
* An employer requires the use of a respirator.
* There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
* As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

**Hand Protection**

Gloves must be worn. Use proper glove removal technique to avoid any skin contact. Nitrile gloves recommended.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with Titanium dioxide.

Refer to glove selection chart from the links below:

<http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf>

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

**Eye Protection**

ANSI approved properly fitting safety glasses or chemical splash goggles. Face shield is also recommended.

**Skin and Body Protection**

Flame resistant lab coats must be worn and be appropriately sized for the individual and buttoned to their full length. Laboratory coat sleeves must be of sufficient length to prevent skin exposure while wearing gloves. Full length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle should not be exposed.

**Hygiene Measures**

Wash thoroughly and immediately after handling. Remove any contaminated clothing and wash before reuse.

**Engineering Controls**

Handle using a chemical fume hood with good ventilation and electrically grounded lines and equipment.

**First Aid Procedures**

**If inhaled**

Move into the fresh air immediately and give oxygen. If not breathing give artificial respiration. Seek medical attention immediately.

**In case of skin contact**

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash any contaminated clothing before reuse. Thoroughly clean shoes before reuse. Seek medical attention immediately.

**In case of eye contact**

Check for and remove any contact lenses. Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Seek immediate medical attention and continue eye rinse during transport to hospital.

**If swallowed**

Do NOT induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. Seek medical attention immediately.

**Special Handling and Storage Requirements**

Precautions for safe handling: Avoid contact with skin and eyes and inhalation. Keep away from sources of ignition. Avoid heat and shock or friction when handling.

Conditions for safe storage: Flammable materials should be stored in a separate safety storage cabinet or room. Keep container tightly closed in a cool, dry, and well-ventilated. Keep away from incompatible materials and conditions. Store in original container. Store away from heat sources and in a flame proof area. Keep cool and protect from sunlight.

**Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

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# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

**For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

Use proper personal protective equipment for chemical and properly dispose chemical and contaminated disposables as hazardous waste.

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure (Add lab specific Protocol/Procedure here)**

Click here to enter text.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Documentation of Training** (signature of all users is required)

* Prior to conducting any work with Titanium dioxide, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

**Principal Investigator SOP Approval**

Print name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Approval Date:

I have read and understand the content of this SOP:

|  |  |  |
| --- | --- | --- |
| **Name** | **Signature** | **Date** |
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