



Material Safety Data Sheet

The Dow Chemical Company

Product Name: ADSORBSIA* GTO* Titanium Based Adsorbent

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The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

ADSORBSIA* GTO* Titanium Based Adsorbent

COMPANY IDENTIFICATION

The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

Customer Information Number: 800-258-2436

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 989-636-4400

Local Emergency Contact: 989-636-4400

2. Hazards Identification

Emergency Overview

Color: Off-white

Physical State: Powder or granules

Odor: Odorless

Hazards of product:

Slipping hazard.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: Dust may irritate eyes. Mechanical injury only.

Skin Contact: Essentially nonirritating to skin. May cause drying and flaking of the skin.

Skin Absorption: No adverse effects anticipated by skin absorption.

Inhalation: Vapors are unlikely due to physical properties. Dust may cause irritation to upper respiratory tract (nose and throat).

Ingestion: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

* Indicates a Trademark

Effects of Repeated Exposure: For the component(s) tested: In animals, effects have been reported on the following organs: Lung.

3. Composition Information

Component	CAS #	Amount
Titanium dioxide	13463-67-7	>= 81.0 - <= 99.0 %
Water	7732-18-5	>= 0.1 - <= 10.0 %
Silica	7631-86-9	>= 1.0 - <= 10.0 %
Calcium sulfate, anhydrous	7778-18-9	>= 0.1 - <= 18.0 %
Sulfuric acid disodium salt	7757-82-6	>= 0.1 - <= 30.0 %
Iron(III)oxide	1309-37-1	<= 1.0 %
Diammonium sulfate	7783-20-2	<= 10.0 %
Magnesium sulfate	7487-88-9	>= 0.1 - <= 30.0 %

4. First-aid measures

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Skin Contact: Wash skin with plenty of water.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Ingestion: No emergency medical treatment necessary.

Notes to Physician: Skin contact may aggravate preexisting dermatitis. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Extinguishing Media: This material does not burn. If exposed to fire from another source, use suitable extinguishing agent for that fire.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. This material does not burn. Fight fire for other material that is burning.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Unusual Fire and Explosion Hazards: Not applicable.

Hazardous Combustion Products: Not applicable.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Contain spilled material if possible. Sweep up. Do not breathe dust. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Spilled material may cause a slipping hazard. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Do not breathe dust.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Avoid breathing dust. Keep container closed. Wash thoroughly after handling. Good housekeeping and controlling of dusts are necessary for safe handling of product. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage

Do not store in open containers. Store in a dry place.

Storage Period: 36 Months

Storage temperature: < 100 °C

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Silica	ACGIH	TWA	10 mg/m ³
	OSHA Table Z-1	PEL Total dust.	15 mg/m ³
	OSHA Table Z-1	PEL Respirable fraction.	5 mg/m ³
	Z3	TWA	0.8 mg/m ³ 20 millions of particles per cubic foot of air
Titanium dioxide	ACGIH	TWA	10 mg/m ³
	OSHA Table Z-1	PEL Total dust.	15 mg/m ³
	Z3	Total dust.	5 mg/m ³ 15 millions of particles per cubic foot of air
	Z3	Respirable fraction.	15 mg/m ³ 50 millions of particles per cubic foot of air
Calcium sulfate, anhydrous	ACGIH	TWA Inhalable Particulate	10 mg/m ³ The value is for particulate matter containing no asbestos and <1% crystalline silica.
	OSHA Table Z-1	PEL Respirable fraction.	5 mg/m ³
	OSHA Table Z-1	PEL Total dust.	15 mg/m ³
Iron(III)oxide	ACGIH	TWA Respirable dust as Fe	5 mg/m ³
	OSHA Table Z-1	PEL Fume.	10 mg/m ³
	Z3	Total dust.	Listed.
	Z3	Respirable fraction.	Listed.

Personal Protection

Eye/Face Protection: Use safety glasses. If there is a potential for exposure to particles which could cause eye discomfort, wear chemical goggles.

Skin Protection: Wear clean, body-covering clothing.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Polyvinyl chloride ("PVC" or "vinyl"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). When prolonged or frequently repeated contact may occur, a glove is recommended to prevent contact with the solid material. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. In dusty or misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Particulate filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. Physical and Chemical Properties

Physical State	Powder or granules
Color	Off-white
Odor	Odorless
Flash Point - Closed Cup	No test data available
Flammable Limits In Air	Lower: No test data available Upper: No test data available
Autoignition Temperature	No test data available
Vapor Pressure	No test data available
Boiling Point (760 mmHg)	No test data available.
Vapor Density (air = 1)	No test data available
Specific Gravity (H ₂ O = 1)	No test data available
Freezing Point	not applicable to solids
Melting Point	not applicable to solids
Solubility in Water (by weight)	insoluble in water
pH	essentially neutral
Kinematic Viscosity	Not applicable

10. Stability and Reactivity

Stability/Instability

Stable.

Conditions to Avoid: None known.

Incompatible Materials: Avoid contact with: Strong acids.

Hazardous Polymerization

Will not occur.

Thermal Decomposition

Does not decompose.

11. Toxicological Information

Acute Toxicity

Ingestion

Single dose oral LD50 has not been determined.

Skin Absorption

The dermal LD50 has not been determined.

Repeated Dose Toxicity

For the component(s) tested: In animals, effects have been reported on the following organs: Lung. Repeated exposures to dusts of this material are not anticipated to result in systemic toxicity or permanent lung injury; however, excessive exposures may cause less severe respiratory effects.

Chronic Toxicity and Carcinogenicity

Lung fibrosis and tumors have been observed in rats exposed to titanium dioxide in two lifetime inhalation studies. Effects are believed to be due to overloading of the normal respiratory clearance mechanisms caused by the extreme study conditions. Workers exposed to titanium dioxide in the workplace have not shown an unusual incidence of chronic respiratory disease or lung cancer. Titanium dioxide was not carcinogenic in laboratory animals in lifetime feeding studies.

Carcinogenicity Classifications:

Component	List	Classification
Titanium dioxide	IARC	Possible human carcinogen.; 2B

Developmental Toxicity

For the component(s) tested: Did not cause birth defects or any other fetal effects in laboratory animals.

Genetic Toxicology

For the component(s) tested: In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were negative.

12. Ecological Information

CHEMICAL FATE

Data for Component: **Titanium dioxide**

Movement & Partitioning

|| Partitioning from water to n-octanol is not applicable.

Persistence and Degradability

|| Biodegradation is not applicable.

Data for Component: **Silica**

Movement & Partitioning

|| Partitioning from water to n-octanol is not applicable.

Persistence and Degradability

|| Biodegradation is not applicable.

Data for Component: **Sulfuric acid disodium salt**

Movement & Partitioning

|| Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).

Persistence and Degradability

|| Biodegradation is not applicable.

Data for Component: Diammonium sulfate**Movement & Partitioning**

|| Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).

|| **Henry's Law Constant (H):** 3.28E-27 atm*m3/mole; 25 °C Estimated

|| **Partition coefficient, n-octanol/water (log Pow):** 0.48 Estimated

|| **Partition coefficient, soil organic carbon/water (Koc):** 24 Estimated

ECOTOXICITYData for Component: Titanium dioxide

|| Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

|| LC50, sheepshead minnow (Cyprinodon variegatus), 96 h: 240 - 370 mg/l

Aquatic Invertebrate Acute Toxicity

|| LC50, saltwater mysid Mysidopsis bahia, 96 h: 300 - 400 mg/l

Toxicity to Micro-organisms

|| EC50; bacteria: > 5,000 mg/l

Data for Component: Silica

|| Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

|| LC50, zebra fish (Brachydanio rerio): 5,000 - 10,000 mg/l

Aquatic Invertebrate Acute Toxicity

|| EC50, water flea Daphnia magna, immobilization: > 10,000 mg/l

Aquatic Plant Toxicity

|| EC50, green alga Selenastrum capricornutum, biomass growth inhibition: 440 mg/l

Data for Component: Sulfuric acid disodium salt

|| Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

|| LC50, bluegill (Lepomis macrochirus): 3,040 - 13,000 mg/l

Aquatic Invertebrate Acute Toxicity

|| LC50, water flea Daphnia magna: 578 - 1,980 mg/l

Data for Component: Diammonium sulfate

|| Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

|| LC50, fathead minnow (Pimephales promelas): > 100 mg/l

Aquatic Invertebrate Acute Toxicity

|| LC50, water flea Daphnia magna: 433 mg/l

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DOW HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. Landfill. As

a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. Transport Information

DOT Non-Bulk
NOT REGULATED

DOT Bulk
NOT REGULATED

IMDG
NOT REGULATED

ICAO/IATA
NOT REGULATED

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	No
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Titanium dioxide	13463-67-7	>= 81.0 - <= 99.0 %
Silica	7631-86-9	>= 1.0 - <= 10.0 %
Calcium sulfate, anhydrous	7778-18-9	>= 0.1 - <= 18.0 %
Sulfuric acid disodium salt	7757-82-6	>= 0.1 - <= 30.0 %
Iron(III)oxide	1309-37-1	<= 1.0 %
Diammonium sulfate	7783-20-2	<= 10.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

US. Toxic Substances Control Act

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

European Inventory of Existing Commercial Chemical Substances (EINECS)

The components of this product are on the EINECS inventory or are exempt from inventory requirements.

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. Other Information

Product Literature

Additional information on this product may be obtained by calling your Dow Chemical Company sales or customer service contact. Ask for a product brochure.

Recommended Uses and Restrictions

Potable water treatment. Dow recommends that you use this product in a manner consistent with the listed use. If your intended use is not consistent with Dow's stated use, please contact Dow's Customer Information Group.

Revision

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Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have

obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.