

GERMANIUM DIOXIDE SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product Identity: Germanium Dioxide

Trade Names and Synonyms: Germanic acid; germanium oxide; germania; G-15; ACC10380.

Manufacturer:

Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8
Emergency Telephone: 250-364-4214

Supplier:

In U.S.:
Teck American Metal Sales Incorporated
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USA 99202

Preparer:

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Suite 3300 – 550 Burrard Street
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Other than U.S.:

Teck Metals Ltd.
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Toronto, Ontario
M5H 4C7

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Product Use: Germanium dioxide is used in the production of phosphors, transistors and diodes, infrared-transmitting glass, and as a catalyst in the manufacture of PET resin. It is often converted to other germanium compounds for use in applications such as fibre optics and chemotherapy.

SECTION 2. HAZARDS IDENTIFICATION

CLASSIFICATION:

Health		Physical	Environmental
Acute Toxicity (Oral, Inhalation)	– Does not meet criteria	Does not meet criteria for any Physical Hazard	Aquatic Toxicity – Short Term/Long Term Does not meet criteria
Skin Corrosion/Irritation	– Does not meet criteria		
Eye Damage/Eye Irritation	– Does not meet criteria		
Respiratory or Skin Sensitization	– Does not meet criteria		
Mutagenicity	– Does not meet criteria		
Carcinogenicity	– Does not meet criteria		
Reproductive Toxicity	– Category 2		
Specific Target Organ Toxicity			
Acute Exposure	– Does not meet criteria		
Chronic Exposure	– Does not meet criteria		

LABEL:

Symbols:		Signal Word:	WARNING
Hazard Statements		Precautionary Statements:	
Suspected of damaging fertility or the unborn child.		Obtain special instructions before use. Do not use until all safety precautions have been read and understood. Wear protective clothing when using this product. Store locked up or in a secure location. Dispose of contents/containers in accordance with local regulations. If exposed or concerned: get medical advice/attention.	

Emergency Overview: An odourless white powder which is non-combustible. Germanium dioxide poses little immediate hazard to personnel or the environment in an emergency situation. However, acrid and irritating smoke can form at very high temperatures. Contact with hydrochloric acid will emit volatile germanium tetrachloride, which is corrosive and irritating.

Potential Health Effects: Inhalation or ingestion of germanium dioxide dust may cause localized irritation. Direct contact of germanium dioxide with eyes or skin may cause local irritation. Animal experiments with germanium dioxide have resulted in reproductive effects. It is not considered a human carcinogen by OSHA, NTP, ACGIH, IARC or the EU (see Toxicological Information, Section 11).

Potential Environmental Effects: Germanium dioxide is considered to have low bioavailability and toxicity when released into the environment; therefore, it poses no immediate ecological risk (see Ecological Information, Section 12).

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	CAS Registry No.	CONCENTRATION (% wt./wt.)
Germanium Dioxide	1310-53-8	100%

Note: See Section 8 for Occupational Exposure Guidelines.

SECTION 4. FIRST AID MEASURES

Eye Contact: *Symptoms:* Mild irritation. If irritation occurs, cautiously rinse eye(s) with lukewarm, gently flowing water for 5 minutes, while holding the eyelids open. If eye irritation persists, get medical advice/attention.

Skin Contact: *Symptoms:* No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes. If irritation occurs, obtain medical advice.

Inhalation: *Symptoms:* Possible respiratory irritation. If symptoms are experienced remove source of contamination or move victim from exposure area to fresh air immediately. Get medical advice/attention if you feel unwell or are concerned.

Ingestion: *Symptoms:* If swallowed, no specific intervention is indicated as this material is not likely to be hazardous by ingestion. However, if you feel unwell or are concerned, get medical advice/attention.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Germanium dioxide is non-combustible and is a negligible fire or explosion hazard when exposed to heat or flame. However, acrid and irritating smoke can form at very high temperatures.

Extinguishing Media: Use any means of extinction appropriate for surrounding fire conditions such as water spray, carbon dioxide, dry chemical, or foam.

Fire Fighting: Fire fighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible to do so safely. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection and using methods which will minimize dust generation (e.g., vacuum solids, dampen material and shovel or wet sweep). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labelled containers for later recovery in view of the economic value of germanium dioxide. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Personal Precautions: Protective clothing, gloves, and a respirator are recommended for persons responding to an accidental release (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with the dust.

Environmental Precautions: Germanium dioxide is considered to have low bioavailability and toxicity when released into the environment; therefore, it poses no immediate ecological risk. Releases of the product to water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling: Minimize the release of dust into the workplace. Avoid breathing dust. Clean up any significant spills immediately. Good housekeeping is important to prevent accumulations of dust.

Conditions for Safe Storage: Store germanium dioxide in a tightly closed container in a cool, dry, covered area away from incompatible materials. No special packaging materials are required.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines:

<u>Component</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>NIOSH REL</u>
Germanium Dioxide	None established	None established	None established

NOTE: OEGs for individual jurisdictions may differ from those given above. Check with local authorities for the applicable OEGs in your jurisdiction.

ACGIH - American Conference of Governmental Industrial Hygienists; OSHA - Occupational Safety and Health Administration; NIOSH - National Institute for Occupational Safety and Health. TLV – Threshold Limit Value, PEL – Permissible Exposure Limit, REL – Recommended Exposure Limit.

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Ventilation: Use adequate local or general ventilation to maintain the concentration of germanium dioxide dust in the working environment as low as practicable. Supply sufficient replacement air to make up for air removed by the exhaust system.

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when germanium dioxide is processed. Eye protection should be worn where dust is generated.

Respirators: Where germanium dioxide dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-95 particulate filter cartridge).

General Hygiene Considerations: Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate designated areas.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colourless crystals or white powder	Odour: None	Odour Threshold: Not Applicable	pH: Not Applicable
Vapour Pressure: <9.25 Pa @ 25°C	Vapour Density: Not Applicable	Melting Point/Range: 1115°C	Boiling Point/Range: Not Applicable
Relative Density: (Water = 1) 4.23	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: log Pow = 2.21	Solubility: 4.14 g/L @ 20 °C, 4.5 g/L @ 25°C, 10.7 g/L @ 100°C
Bulk Density: 1614 Kg/m ³			
Flammability: Non-combustible solid.	Flammable Limits (LEL/UEL): Not Applicable	Auto-ignition Temperature: None	Decomposition Temperature: None

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Germanium dioxide is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Incompatibilities: Germanium dioxide is incompatible with strong oxidizing agents and concentrated hydrochloric acid.

Hazardous Decomposition Products: Acrid and irritating smoke will form at very high temperatures. Contact between germanium dioxide and hydrochloric acid emits volatile germanium tetrachloride, which is corrosive and irritating.

SECTION 11. TOXICOLOGICAL INFORMATION

General: On the basis of both animal experiments and industrial experience it is believed that elemental germanium and germanium dioxide are of low acute toxicity by all routes of administration including inhalation.

- American Conference of Governmental Industrial Hygienists, 2018, Guide to Occupation Exposure Values.
- American Conference of Governmental Industrial Hygienists, 2018, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urban Ed.) 1995.
- European Economic Community, European Regulation (EC) No 1272/2008 (Classification, Labelling and packaging of substances and mixtures).
- Handbook on the Toxicology of Metals, 3rd Ed., Gunnar F. Nordberg, Bruce A. Fowler, Monica Nordberg and Lars Friberg, Editors, Academic Press, New York, NY (2007).
- Health Canada, SOR/2015-17, Hazardous Products Regulations, 11 February 2015.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank. (On-line version).
- Patty's Toxicology, Fifth Edition, 2001: E. Bingham, B. Cohnsen & C.H. Powell, Ed.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health. NIOSH Pocket Guide to Chemical Hazards, CD-ROM Edition DHHS (NIOSH) Publication September 2005.

Acronyms not spelled out elsewhere in the SDS:

CAS: Chemical Abstract Service

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

DOT: Department of Transportation

EPCRA: Emergency Planning and Community Right-to-Know Act

IMO: International Maritime Organization

LD50, LC50: Lethal Dose 50%, Lethal Concentration 50%

MSHA: Mine Safety and Health Administration, U.S. Department of Labour

TSCA: Toxic Substances Control Act

Wt.: Weight

Notice to Reader

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