

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Zirconium Dioxide, Enriched in Zirconium**
Chemical Formula ZrO_2
Molecular Weight 123.22 g/mol
CAS No. 1314-23-4
EC No. 215-227-2
Synonym Zirconia
Supplier Address* ISOFLEX USA
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United States

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Preparation Information ISOFLEX USA
Product Safety
+1 415-440-4433

2. HAZARDS IDENTIFICATION

Emergency Overview:

OSHA Hazards: Irritant
GHS: Hazard statement(s): **H315** Causes skin irritation; **H319** Causes serious eye irritation; **H335** May cause respiratory irritation. Precautionary statement(s): **P261** Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray; **P305 + P351 + P338** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

NFPA Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health Hazard = 2 Flammability = 0 Reactivity = 0



HMIS Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health Hazard = 2 Flammability = 0 Physical Hazard = 0

HEALTH HAZARD	2
FLAMMABILITY	0
PHYSICAL HAZARD	0

Potential Health Effects

<i>Inhalation</i>	May be harmful if inhaled; causes respiratory tract irritation
<i>Skin</i>	May be harmful if absorbed through skin; causes skin irritation
<i>Eyes</i>	Causes eye irritation
<i>Ingestion</i>	May be harmful if swallowed

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name:	Zirconium Dioxide
CAS No.:	1314-23-4
Chemical Formula:	ZrO ₂
Molecular Weight:	123.22 g/mol

4. FIRST AID MEASURES

<i>General Advice</i>	Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.
<i>Inhalation Exposure</i>	If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
<i>Dermal Exposure</i>	Wash off with soap and plenty of water. Consult a physician.
<i>Eye Exposure</i>	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
<i>Oral Exposure</i>	Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE FIGHTING MEASURES

<i>Suitable Extinguishing Media</i>	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Firefighting	
<i>Protective Equipment</i>	Wear self-contained breathing apparatus for firefighting if necessary.
<i>Special Hazards</i>	Zirconium oxides

6. ACCIDENTAL RELEASE MEASURES

<i>Personal Precautions</i>	Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.
<i>Environmental Precautions</i>	Do not let product enter drains.
<i>Methods for Cleaning Up</i>	Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Component	CAS No.	Value	Control parameters	Update	Basis
Zirconium dioxide	1314-23-4	TWA	5 mg/m ³	1993-06-30	USA. Occupational Exposure Limits (OSHA)-Table Z-1 Limits for Air Contaminants
		TWA	5 mg/m ³	1989-03-01	USA.OSHA-TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	10 mg/m ³	1989-03-01	USA.OSHA-TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	5 mg/m ³	1996-05-18	USA. ACGIH Threshold Limit Values (TLV)
Remarks	<p>Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. <i>In vitro</i> or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.</p> <p>1996 Adoption</p> <p>Refers to Appendix A -- Carcinogens.</p>				
		STEL	10 mg/m ³	1996-05-18	USA. ACGIH Threshold Limit Values (TLV)
	<p>Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. <i>In vitro</i> or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.</p> <p>1996 Adoption</p> <p>Refers to Appendix A -- Carcinogens.</p>				

Personal Protective Equipment

Respiratory Protection

Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand Protection

Handle with gloves.

<i>Eye Protection</i>	Safety glasses with side-shields conforming to EN166
<i>Body Protection</i>	Choose body protection according to the amount and concentration of the dangerous substance at the workplace.
<i>Hygiene Measures</i>	Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	Powder
Color	White

Safety Data

pH:	No data available
Melting Point:	2700 °C (4892 °F)
Boiling Point:	5000 °C (9032 °F)
Flash Point:	Not applicable
Ignition Temperature:	No data available
Lower Explosion Limit:	No data available
Upper Explosion Limit:	No data available
Density:	5.89 g/mL at 25 °C (77 °F)

10. STABILITY AND REACTIVITY

<i>Chemical Stability</i>	Stable under recommended storage conditions
<i>Conditions to Avoid</i>	No data available
<i>Materials to Avoid</i>	Strong oxidizing agents, strong acids
<i>Hazardous Decomposition Products</i>	Hazardous decomposition products formed under fire conditions: Zirconium oxides

11. TOXICOLOGICAL INFORMATION

<i>Acute Toxicity</i>	No data available
<i>Skin Corrosion/Irritation</i>	No data available
<i>Serious Eye Damage/Eye Irritation</i>	No data available
<i>Respiratory or Skin Sensitization</i>	No data available
<i>Germ Cell Mutagenicity</i>	No data available

Carcinogenicity

<i>IARC</i>	No component of this product present at levels greater than or equal to 0.1% is identified as a probable, possible or confirmed human carcinogen by IARC.
<i>ACGIH</i>	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
<i>NTP</i>	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
<i>OSHA</i>	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

<i>Reproductive Toxicity</i>	No data available
<i>Specific Target Organ Toxicity / Single Exposure (Globally Harmonized System)</i>	Inhalation - may cause respiratory irritation
<i>Specific Target Organ Toxicity / Repeated Exposure (Globally Harmonized System)</i>	No data available
<i>Aspiration Hazard</i>	No data available
<i>Signs and Symptoms of Exposure</i>	To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
<i>Additional Information</i>	RTECS: ZH8800000

12. ECOLOGICAL INFORMATION

<i>Toxicity</i>	No data available
<i>Persistence and Degradability</i>	No data available
<i>Bioaccumulative Potential</i>	No data available
<i>Mobility in Soil</i>	No data available
<i>PBT and vPvB Assessment</i>	No data available
<i>Other Adverse Effects</i>	No data available

13. DISPOSAL CONSIDERATIONS

<i>Product</i>	Observe all federal, state and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.
<i>Contaminated Packaging</i>	Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT	Not dangerous goods
IMDG	Not dangerous goods
IATA	Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards	Irritant
DSL Status	All components of this product are on the Canadian DSL list.
SARA 302 Components	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
SARA 311/312 Hazards	Acute Health Hazard
Massachusetts Right to Know Components	Zirconium dioxide / CAS No. 1314-23-4 / Revision Date 1993-04-24
Pennsylvania Right to Know Components	Zirconium dioxide / CAS No. 1314-23-4 / Revision Date 1993-04-24
New Jersey Right to Know Components	Zirconium dioxide / CAS No. 1314-23-4 / Revision Date 1993-04-24

16. OTHER INFORMATION

Prepared by	ISOFLEX USA PO Box 29475 San Francisco CA 94129 United States
Issuing Date	January 12, 2014
Revision Date	July 29, 2021
Revision Number	2
Revision Note	Required review and update

ISOFLEX USA's Commonly Used Abbreviations and Acronyms*

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
AICS	Australian Inventory of Chemical Substances
ALARA	As Low As Is Reasonably Achievable
AMU	Atomic Mass Unit
ANSI	American National Standards Institute
BLS	Basic Life Support
BOD5	Biochemical Oxygen Demand
CAM	Continuous Air Monitor
CAS	Chemical Abstracts Service (division of the American Chemical Society)
CEN	European Committee for Standardization
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLP	Classification, Labelling and Packaging (European Union)
COD	Chemical Oxygen Demand
CPR	Controlled Products Regulations (Canada)
CWA	Clean Water Act (USA)
DAC	Derived Air Concentration (USA)
DOE	United States Department of Energy (USA)
DOT	United States Department of Transportation (USA)
DSL	Domestic Substances List (Canada)
EC50	Half Maximal Effective Concentration
ECL	Korean Existing Chemicals List
EINECS	European Inventory of Existing Commercial Chemical Substances
EHS	Environmentally Hazardous Substance
ELINCS	European List of Notified Chemical Substances
EMS	Emergency Response Procedures for Ships Carrying Dangerous Goods
EPA	Environmental Protection Agency (USA)
EPCRA	Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986
GHS	Globally Harmonized System
HMIS	Hazardous Materials Identification System (USA)
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IBC	Intermediate Bulk Containers
ICAO	International Civil Aviation Organization
IDLH	Immediately Dangerous to Life or Health
IECSC	Inventory of Existing Chemical Substances Produced or Imported in China
IMDG	International Maritime Code for Dangerous Goods
LC50	Lethal concentration, 50 percent
LD50	Lethal dose, 50 percent
LDLO	Lethal Dose Low
LOEC	Lowest-Observed-Effective Concentration

MARPOL	International Convention for the Prevention of Pollution from Ships
MSHA	Mine Safety and Health Administration (USA)
NCRP	National Council on Radiation Protection & Measurements (USA)
NDSL	Non-Domestic Substances List (Canada)
NFPA	National Fire Protection Association (USA)
NIOSH	National Institute for Occupational Safety and Health (USA)
NOEC	No Observed Effect Concentration
N.O.S.	Not Otherwise Specified
NRC	Nuclear Regulatory Commission (USA)
NTP	National Toxicology Program (USA)
OSHA	Occupational Safety and Health Administration (USA)
PBT	Persistent Bioaccumulative and Toxic Chemical
PEL	Permissible Exposure Limit
PICCS	Philippines Inventory of Chemicals and Chemical Substances
PIH	Poisonous by Inhalation Hazard
RCRA	Resource Conservation and Recovery Act (USA)
RCT	Radiation Control Technician
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Europe)
RID	Regulations Concerning the International Transport of Dangerous Goods by Rail
RQ	Reportable Quantity
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act (USA)
SNUR	Significant New Use Rule (TSCA)
TDG	Transportation of Dangerous Goods (Canada)
TIH	Toxic by Inhalation Hazard
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
UN	United Nations (Number)
VOC	Volatile Organic Compound
vPvB	Very Persistent Very Bioaccumulative Chemical
WGK	Wassergefährungsklassen (Germany: Water Hazard Classes)
WHMIS	Workplace Hazardous Materials Information System

*One or more of the above-listed items may not appear in this document.

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