EREZTECH LLC
11555 Medlock Bridge Road, Suite 100, Johns Creek, GA 30097, USA
T: +1.888.658.1221 F: 1.678.619.2020
E: info@ereztech.com W: https://ereztech.com

SAFETY DATA SHEET

Section 1. Identification

Product Name: Zirconium(IV) acetylacetonate
Product Type: Solid
CAS Number: 17501-44-9
Product Number: ZR1449
Recommended Use: Laboratory chemicals, synthesis of substances.
Product Manufacturer: Ereztech LLC
11555 Medlock Bridge Road, Suite 100
Johns Creek, GA 30097
Product Information: (888) 658-1221
In Case of an Emergency: CHEMTREC: 1-800-424-9300 (USA);
+1 703-527-3887 (International); CCN836180
*** Contact manufacturer for all non-emergency calls.

Section 2. Hazards Identification

Appearance/Odor: White to off-white powder, crystals or granular powder; odor mild to odorless.
Classification: ACUTE TOXICITY, ORAL – Category 4, H302
ACUTE TOXICITY, DERMAL – Category 4, H312
SKIN CORROSION/IRRITATION - Category 2, H315
SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2A, H319
ACUTE TOXICITY, INHALATION – Category 4, H332
SPECIFIC ORGAN TOXICITY, SINGLE EXPOSURE; RESPIRATORY TRACT IRRITATION - Category 3, H335

GHS Label Elements
Hazard Pictograms:

Signal Word: WARNING.
Hazard Statements: H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H315: Causes skin irritation.

Section 2. Hazards Identification

Hazard Statements (cont.):

H319: Causes serious eye irritation.
H332: Harmful If inhaled.
H335: May cause respiratory irritation.

Precautionary Statements

Prevention:

P261: Avoid breathing dusts, aerosols, vapors and gases.
P264 + P265: Wash hands and exposed skin thoroughly after handling. Do not touch eyes.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P317: IF SWALLOWED: Get medical help.
P302 + P352: IF ON SKIN: Wash with plenty of water.
P304 + P340: IF INHALED: Remove victim to fresh air and keep comfortable for breathing.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P317: Get medical help.
P330: Rinse mouth.
P332 + P317: If skin irritation occurs: Get medical help.
P337 + P317: If eye irritation persists: Get medical help.
P362 + P364: Take off contaminated clothing and wash it before reuse.

Storage:

P403 + P233: Store in a well ventilated place. Keep container tightly closed.
P405: Store locked up.

Disposal:

P501: Dispose of contents/ container to accordance with federal, state and local regulations.

OSHA/HCS Status:

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Hazards Not Otherwise Classified [HNOC]:

None identified.

Section 3. Composition/Information on Ingredients

Synonyms : 2,4-pentanedione zirconium(IV) derivative; tetrakis(2,4-pentanedionato)zirconium; zirconium(IV) 2,4-pentanedionate; tetraacetylacetonate zirconium; zirconium tetrakis(acetylacetonate); Zr(acac)4.

Molecular Formula : $C_{20}H_{32}O_8Zr$

Molecular Weight : 487.66 g/mol

CAS-No. : 17501-44-9

Section 3. Composition/Information on Ingredients

Ingredient Name	%	CAS Number
Zirconium(IV) acetylacetonate	≥ 96	17501-44-9

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First Aid Measures

Description of Necessary First Aid Measures

General Advice: Move out of dangerous area. Get immediate medical help. Show this safety data sheet to the doctor in attendance.

Eye Contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue rinsing. Get medical help if eye irritation develops and persists.

Skin Contact: Take off contaminated clothing and shoes immediately. Wash off contaminated skin with soap and plenty of water. Get medical help if irritation develops and persists, if symptoms develop or if you feel unwell.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical help if symptoms develop or if you feel unwell.

Ingestion: Rinse mouth. Do NOT induce vomiting. Remove dentures if any. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical help if symptoms develop or if you feel unwell.

Most Important Symptoms/Effects, Acute and Delayed Potential Acute Health Effects

Eye Contact: Symptoms may include stinging, tearing, redness, swelling and blurred vision.

Inhalation: Product is harmful if inhaled and may be irritating to respiratory system. Symptoms may include a burning sensation, coughing, sneezing with phlegm production, sore throat, nausea and headache.

Skin Contact: Product is harmful in contact with skin. Symptoms may include an itching or burning sensation, reddening and swelling.

Ingestion: Product is harmful if ingested and may cause irritation to the digestive tract. Symptoms may include cramping, abdominal pain, headache, nausea and vomiting.

Section 4. First Aid Measures

Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary

Notes to Physician: Treat symptomatically.

Specific Treatments: No specific treatment.

Protection of First Responders: No action taken shall be taken involving any personal risk without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See Toxicological Information (Section 11)

Section 5. Fire Fighting Measures

General Hazards: None identified.

Suitable Extinguishing Media: Use water spray (fog), alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media: None identified.

Unusual Fire and Explosion Hazards: Unopened and closed containers may explode when exposed to the heat of a fire. Product may become combustible at high temperatures.

Product of Combustion: Decomposition products include carbon oxides (CO_X) and zirconium oxides. Irritating fumes and organic acid vapors may be generated during exposure to elevated temperatures or open flame.

Protection of Firefighters: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Avoid contact with skin or eyes. Avoid the formation and inhalation of dusts, aerosols, vapors and gases.

To reduce the possibility of explosion, use a water spray or fog to reduce direct vapors and to cool unopened containers.

Fire-fighters should wear appropriate protection equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in a positive pressure mode.

Section 6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

For Non-Emergency Personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material.

Section 6. Accidental Release Measures

For Non-Emergency Personnel: (cont.)

Avoid the formation and inhalation of dusts and aerosols. Provide adequate ventilation. Wear respiratory protection. Put on appropriate personal protective equipment.

For Emergency Responders:

If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For Non-Emergency Personnel".

Environmental Precautions:

Do not allow dispersal of spilled material and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for Containment

General:

Avoid the formation and inhalation of dusts and aerosols. Dispose of collected spillage in accordance with federal, state and local regulations (see Section 13). Contaminated binding material may pose the same hazard as the spilled product.

Small Spill:

Collect spillage using a dry, binding material (e.g. sand, earth, vermiculite or diatomaceous earth) and place in dry, sealed container for disposal.

Large Spill:

Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with a dry, binding material (e.g. sand, earth, vermiculite or diatomaceous earth) and place in dry, sealed container for disposal.

Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and Storage

Precautions:

Product is moisture sensitive; handle under a dry, inert gas. Nitrogen with less than 5 ppm each of moisture and oxygen is recommended. Avoid formation and inhalation of dusts and aerosols. Keep container tightly sealed. Avoid contact with skin, eyes and clothing. Do not ingest. Avoid prolonged exposure. Ensure adequate ventilation.

Protective Measures:

Put on appropriate personal protective equipment (see Section 8). Keep in the original container kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Section 7. Handling and Storage

General Occupational Hygiene:

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Safe Storage Conditions:

Product is moisture sensitive; store under an inert gas. Nitrogen with less than 5 ppm each of moisture and oxygen is recommended. Store refrigerated at 2 – 8 °C. Store in original container protected from direct sunlight in a dry and well-ventilated area, away from incompatible materials (strong oxidizing agents, strong acids) and food and drink. Keep container tightly closed and sealed until ready for use. Store locked up.

Section 8. Exposure Controls/Personal Protection

Introductory Remarks:

These recommendations provide general guidance for handling this product. Because work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and conduct regular repairs. Waste from these procedures should be handled in accordance with Section 13.

Occupational Exposure Limits

List	Components	CAS-No.	Type	Value
ACGIH	Zirconium(IV) acetylacetonate	17501-44-9	TLV	5 mg/ m^3 TWA 10 mg/ m^3 STEL
NIOSH	Zirconium(IV) acetylacetonate	17501-44-9	IDLH	5 mg/ m^3 TWA 10 mg/ m^3 STEL 25 mg/ m^3 IDLH
OSHA	Zirconium(IV) acetylacetonate	17501-44-9	PEL	(Vacated) 5 mg/ m^3 TWA* (Vacated) 10 mg/ m^3 STEL*

* - OSHA vacated limits revoked by Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Engineering Controls:

Properly operating explosion-proof, chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute. Provide an eyewash/shower station.

Section 8. Exposure Controls/Personal Protection

Environmental Exposure Controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual Protection Measures

Hygiene Measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Remove all soiled and contaminated clothing immediately. Avoid the formation and inhalation of dusts and aerosols. Avoid contact with eyes and skin. Do not ingest. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye / Face Protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to dusts or aerosols. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles, faceshield (8-inch minimum). Refer to 29 CFR 1910.133, ANSI Z87.1, or European Standard EN166.

Skin Protection

Hand Protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: Chemical-resistant gloves.

Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product.

Section 8. Exposure Controls/Personal Protection

Hand Protection (cont.): Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. For full contact, wear Neoprene or nitrile rubber gloves.

Other Skin Protection: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory Protection: Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Section 9. Physical and Chemical Properties

Physical State:	Solid (crystals, powder).
Color:	White to off-white, light yellow.
Odor:	Mild to odorless.
Odor Threshold:	No data available.
pH:	No data available.
Melting Point:	192 °C (378 °F) - decomposes.
Boiling Point:	No data available.
Flash Point:	238 °C (460 °F) – flash point solid.
Specific Gravity:	No data available.
Vapor Pressure:	No data available.
Relative Vapor Density @ 20 °C:	No data available.
Water Solubility:	14 g/l @ 20 °C.

Section 10. Stability and Reactivity

Reactivity: No data available.

Chemical Stability: This product is stable when stored under a dry, inert atmosphere and away from heat. Nitrogen containing less than 5 ppm each moisture and air and a temperature range of 2 – 8 °C is recommended.

Section 10. Stability and Reactivity

Conditions to Avoid: Exposure to moisture, extremes of temperature and direct sunlight.

Incompatible Materials: Water/moisture, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Hazardous decomposition products formed under fire conditions: irritating fumes, organic acid vapors, carbon oxides and zirconium oxide fumes. In the event of a fire: see section 5.

Possibility of Hazardous Reactions: Under normal conditions of storage and use noted above, hazardous reactions will not occur. Hazardous reactions or instability may occur under certain conditions of storage or use.

Section 11. Toxicological Information

Information on Toxicological Effects

Acute Toxicity : Harmful if inhaled, ingested or in contact with skin.

Component	CAS No	Result	Species	Dose	Exposure
Zirconium(IV) acetylacetonate	17501-44-9	LD50 Oral	Rat	719 mg/kg	-
		LD50 IP	Mouse	316 mg/ kg	-
		LDLo Ocular	Guinea pig	100 mg/kg	-

Irritation/Corrosion : Product causes skin irritation and serious eye irritation.

Sensitization : No specific data available.

Germ Cell Mutagenicity : No effects known.

Carcinogenity

IARC : No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH : No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by ACGIH.

NTP : No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by NTP.

OSHA : No component of this product present at levels greater than 0.1% is identified as probable, possible or confirmed human carcinogen by OSHA.

Reproductive Toxicity : This product is not expected to cause reproductive or developmental effects.

Section 11. Toxicological Information

Teratogenicity	:	No specific data available.
Specific Target Organ Toxicity (Single Exposure)	:	Inhalation – may cause respiratory tract irritation.
Specific Target Organ Toxicity (Repeated Exposure)	:	No specific data available.
Aspiration Hazard	:	No specific data available.
Information on the Likely Routes of Exposure	:	Common routes of exposure: inhalation (failure to prevent dust formation), dermal (failure to use skin protection), eye (failure to use safety eyewear). Less common: ingestion (failure to employ recommended hygiene measures (e.g. smoking after handling product without washing hands or using hand protection).
Additional Information	:	To the best of our knowledge, the chemical, physical and toxicological properties of this product have not been thoroughly investigated.

Section 12. Ecological Information

Numerical Measures of Toxicity

Toxicity to Fish	:	No specific data available.
Toxicity to Daphnia and Other Aquatic Invertebrates	:	No specific data available.
Toxicity to Algae	:	No specific data available.

Persistence and Degradability

Biodegradability	:	No specific data available.
Bioaccumulative Potential	:	No specific data available.
Mobility in Soil	:	No specific data available.
Other Adverse Effects	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13. Disposal Considerations

Waste Treatment Methods

Product	:	Dispose of in accordance with federal, state, and local regulations. Refer to 40 CFR 260-299 for complete waste disposal regulations. Consult your local, state, or federal agency before disposing of any chemicals.
Contaminated Packaging	:	Empty containers retain product residue (dusts, aerosols) and can be dangerous. Dispose of as unused product.

Section 14. Transport Information

	DOT	IMDG	IATA
UN Number	Not regulated	Not regulated	Not regulated
UN Proper Shipping Name	-	-	-
Transport Hazard Classes	-	-	-
Packing Group	-	-	-
Environmental Hazards	-	-	-
Additional Information	-	-	-

Special Precautions for User : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transporting in Bulk According to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.

Section 15. Regulatory Information

TSCA (Toxic Substance Control Act):
This product is listed on the U.S. Toxic Substances Control Act Chemical Inventory (TSCA Inventory).

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 (Acute toxicity (dermal, ingestion, inhalation); Skin corrosion or irritation; Serious eye damage or eye irritation; Specific target organ toxicity, single exposure: respiratory tract irritation).

Massachusetts Right to Know Components
No components are subject to Massachusetts Right to Know Act.

Pennsylvania Right to Know Components
No components are subject to Pennsylvania Right to Know Act.

New Jersey Right to Know Components
No components are subject to New Jersey Right to Know Act.

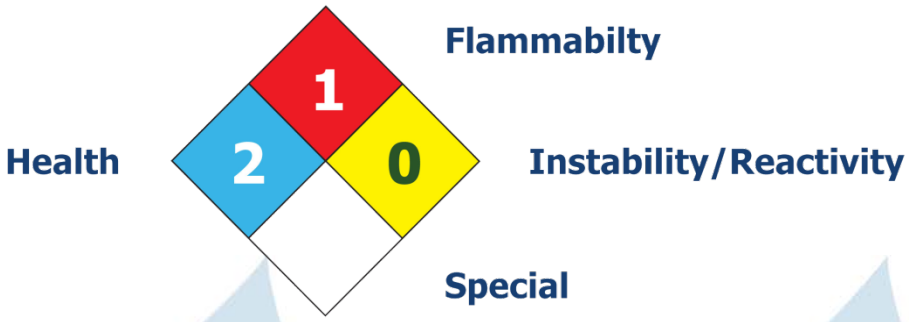
Section 15. Regulatory Information

California Proposition 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Section 16. Other Information

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

HMIS Rating

HEALTH	2
FLAMMABILITY	1
PHYSICAL HAZARD	0

History

Date of Issue/Date of Revision : 8/11/2023

Date of Previous Issue : None.

References : None available.

Abbreviations and Acronyms

ACGIH: American Conference of Governmental Industrial Hygienists.
ATE: Acute Toxicity Estimate
CAS: Chemical Abstracts Service (division of the American Chemical Society).
DOT: US Department of Transportation.
ACGIH: American Conference of Governmental Industrial Hygienists.

Section 16. Other Information

Abbreviations and Acronyms (cont.)

ATE: Acute Toxicity Estimate
CAS: Chemical Abstracts Service (division of the American Chemical Society).
DOT: US Department of Transportation.
GHS: Globally Harmonized System of Classification and Labeling of Chemicals.
HMIS: Hazardous Materials Identification System.
HNOC: Hazards Not Otherwise Classified.
IARC: International Agency for Research on Cancer.
IATA: International Air Transport Association.
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA).
IDLH: Immediately Dangerous to Life or Health (US National Institute for Occupation Health and Safety (NIOSH)).
IMDG: International Maritime Code for Dangerous Goods.
NFPA: National Fire Protection Association.
NIOSH: National Institute of Occupational Safety and Health.
NTP: National Toxicology Program.
OSHA: Occupational Safety and Health Administration.
PEL: Permissible Exposure Limits.
REL: Recommended Exposure Limits.
SARA: Superfund Amendments and Reauthorization Act.
STEL: Short Term Exposure Limit (ACGIH)
STOT: Specific Target Organ Toxicity.
TLV: Threshold Limit Values (ACGIH).
TWA: Time Weighted Average.
VOC: Volatile Organic Compound.

Disclaimer

The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by Ereztech LLC regarding the accuracy or completeness of the information. Ereztech LLC shall not be liable for any damages resulting from the handling, or from the contact with the above product.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.