SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product Identifier: (5N) 99.999% Zirconium(IV) Chloride

Product Code: ZR4-CL-05

CAS Number: 10026-11-6

Relevant identified uses of the substance: Scientific research and development

Supplier details:
American Elements
10884 Weyburn Ave.
Los Angeles, CA 90024
Tel: +1 310-208-0551
Fax: +1 310-208-0351
Emergency telephone number:
+1 800-424-9300

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
GHS05 Corrosion
Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.
GHS07
Acute Tox. 4 H302 Harmful if swallowed.
Classification according to Directive 67/548/EEC or Directive 1999/45/EC
C; Corrosive
R34: Causes burns.
Xn: Harmful
R22: Harmful if swallowed.
R14: Reacts violently with water.
Information concerning particular hazards for human and environment: N/A
Hazard not otherwise classified: No data available
Label elements
Labelling according to Regulation (EC) No 1272/2008
The substance is classified and labeled according to the CLP regulation.
Hazard pictograms
GHS05 GHS07
Signal word: Danger
Hazard statements
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
Precautionary statements
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P301+P330+P311 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
WHMIS classification
D2B - Toxic material causing other toxic effects
E - Corrosive material
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)
HEALTH
FIRE
REACTIVITY
3
0
2
Health (acute effects) = 3
Flammability = 0
Physical Hazard = 2
Other hazards
Results of PBT and vPvB assessment
PBT: N/A
vPvB: N/A

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances
CAS No. / Substance Name:
10026-11-6 Zirconium(IV) chloride
Identification number(s):
EC number: 233-058-2
Additional information:
Zirconium is routinely found with a low level of hafnium since separation of the two elements is difficult.

SECTION 4. FIRST AID MEASURES

Description of first aid measures
General information: Immediately remove any clothing soiled by the product.
If inhaled:
Supply patient with fresh air. If not breathing, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
In case of skin contact:
Immediately wash with soap and water; rinse thoroughly.
Seek immediate medical advice.
In case of eye contact: Rinse opened eye for several minutes under running water. Consult a physician.
If swallowed: Seek medical treatment.

Information for doctor
Most important symptoms and effects, both acute and delayed
Causes severe skin burns.
Causes serious eye damage.
Indication of any immediate medical attention and special treatment needed: No data available

SECTION 5. FIREFIGHTING MEASURES

Extinguishing media
Suitable extinguishing agents: In case of fire, use sand, carbon dioxide or powdered extinguishing agent. Never use water.
For safety reasons unsuitable extinguishing agents: Water
Special hazards arising from the substance or mixture
Reacts violently with water
If this product is involved in a fire, the following can be released:
Hydrogen chloride (HCl)
Metal oxide fume
Advice for firefighters
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Environmental precautions:
Do not allow material to be released to the environment without official permits.
Do not allow product to enter drains, sewage systems, or other water courses.
Do not allow material to penetrate the ground or soil.
Methods and materials for containment and cleanup:
Use neutralizing agent.
Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents
Prevention of secondary hazards: No special measures required.
Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
SECTION 7. HANDLING AND STORAGE

Handling
Precautions for safe handling
Handle under dry protective gas.
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Information about protection against explosions and fires: No data available
Conditions for safe storage, including any incompatibilities
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility:
Store away from water/moisture.
Store away from strong bases.
Store away from oxidizing agents.
Further information about storage conditions:
Store under dry inert gas.
This product is moisture sensitive.
Protect from humidity and water.
Keep container tightly sealed.
Store in cool, dry conditions in well-sealed containers.
Specific end use(s): No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute
Control parameters
Components with limit values that require monitoring at the workplace: 10026-11-6 Zirconium(IV) chloride (100.0%)
PEL (USA) Long-term value: 5 mg/m³ as Zr
TLV (USA) Short-term value: 10 mg/m³
Long-term value: 5 mg/m³ as Zr
EL (Canada) Short-term value: 10 mg/m³
Long-term value: 5 mg/m³ as Zr
Additional information: No data
Exposure controls
Personal protective equipment
Follow typical protective and hygienic practices for handling chemicals.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use suitable respirator when high concentrations are present.
Protection of hands:
Impervious gloves
Inspect gloves prior to use.
Suitability of gloves should be determined both by material and quality, the latter of which may vary by manufacturer.
Penetration time of glove material (in minutes): No data available
Eye protection:
Tightly sealed goggles
Full face protection
Body protection: Protective work clothing

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES
Information on basic physical and chemical properties
Appearance:
Form: Powder
Color: White to orange
Odor: No data available
Odor threshold: No data available.
\( \text{pH}: \text{N/A} \)
Melting point/Melting range: 331 °C (628 °F) (subl)
Boiling point/Boiling range: No data available
Sublimation temperature / start: No data available
Flammability (solid, gas): No data available.
Ignition temperature: No data available
Decomposition temperature: No data available
Autoignition: No data available.
Danger of explosion: No data available.
Explosion limits:
Lower: No data available
Upper: No data available
Vapor pressure: N/A
Density at 20 °C (68 °F): 2.803 g/cm\(^3\) (23.391 lbs/gal)
Relative density: No data available.
Vapor density: N/A
Evaporation rate: N/A
Solubility in Water (H\(_2\)O): Reacts violently
Partition coefficient (n-octanol/water): No data available.
Viscosity:
Dynamic: N/A
Kinematic: N/A
Other information
No data available

SECTION 10. STABILITY AND REACTIVITY
Reactivity: Reacts violently with water.
Chemical stability: Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions
Reacts with strong oxidizing agents
Reacts violently with water
Conditions to avoid: No data available
Incompatible materials:
Bases
Oxidizing agents
Water/moisture
Hazardous decomposition products:
Hydrogen chloride (HCl)
Metal oxide fume

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity:
Harmful if swallowed. Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach. The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.
LD/LC50 values that are relevant for classification: Oral LD50 1688 mg/kg (rat)
Skin irritation or corrosion: Causes severe skin burns.
Eye irritation or corrosion: Causes serious eye damage.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: No effects known.
Carcinogenicity: ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Subacute to chronic toxicity: No effects known.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity: No data available
Persistence and degradability: No data available
Bioaccumulative potential: No data available
Mobility in soil: No data available
Additional ecological information:
Do not allow material to be released to the environment without official permits.
Do not allow undiluted product or large quantities to reach groundwater, water courses, or sewage systems.
Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: N/A
vPvB: N/A
Other adverse effects: No data available
SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation: Consult official regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

SECTION 14. TRANSPORT INFORMATION

UN-Number
DOT, IMDG, IATA
UN2503
UN proper shipping name
DOT
Zirconium tetrachloride
IMDG, IATA
ZIRCONIUM TETRACHLORIDE

Transport hazard class(es)
DOT
Class
8 Corrosive substances.
Label
8
Class
8 (C2) Corrosive substances
Label
8
IMDG, IATA
Class
8 Corrosive substances.
Label
8
Packing group
DOT, IMDG, IATA
III

Environmental hazards:
N/A
Special precautions for user
Warning: Corrosive substances
EMS Number:
F-A,S-B
Segregation groups
Acids
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
N/A
Transport/Additional information:
DOT
Marine Pollutant (DOT):
No
UN "Model Regulation":
UN2503, Zirconium tetrachloride, 8, III
SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic
Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Non-Domestic Substances List (NDSL).
SARA Section 313 (specific toxic chemical listings): Substance is not listed.
California Proposition 65
Prop 65 - Chemicals known to cause cancer: Substance is not listed.
Prop 65 - Developmental toxicity: Substance is not listed.
Prop 65 - Developmental toxicity, female: Substance is not listed.
Prop 65 - Developmental toxicity, male: Substance is not listed.
Information about limitation of use:
For use only by technically qualified individuals.
This product is subject to the reporting requirements of section 313 of the Emergency Planning and
Other regulations, limitations and prohibitive regulations
Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006: Substance is not listed.
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed: Substance is not listed.
Annex XIV of the REACH Regulations (requiring Authorisation for use): Substance is not listed.
REACH - Pre-registered substances: Substance is listed.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. COPYRIGHT 1997-2019 AMERICAN ELEMENTS. LICENSED GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.