SECTION 1. IDENTIFICATION

Product Identifier: (5N) 99.999% Zirconium(IV) Butoxide Solution

Product Code: ZR-BOX-05-SOL

CAS Number: 1071-76-7

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 in accordance with 29 CFR 1910 (OSHA HCS)
GHS02 Flame
Flam. Liq. 3 H226 Flammable liquid and vapor.
GHS05 Corrosion
Eye Dam. 1 H318 Causes serious eye damage.
GHS07
Skin Irrit. 2 H315 Causes skin irritation.
STOT SE 3 H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness. Hazards not otherwise classified No data available.
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)
Hazard pictograms

GHS02 GHS05 GHS07
Signal word Danger
Hazard-determining components of labeling:
Zirconium n-butoxide
1-Butanol

Hazard statements
H226 Flammable liquid and vapor.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261 Avoid breathing 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.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification
B3 - Combustible liquid
D2B - Toxic material causing other toxic effects

Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH
FIRE
REACTIVITY
2
2
1

Health (acute effects) = 2
Flammability = 2
Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment:
PBT: N/A.
vPvB: N/A.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

GHS02 GHS05 GHS07
Signal word Danger

Hazard-determining components of labeling:
Zirconium n-butoxide
1-Butanol

Hazard statements
H226 Flammable liquid and vapor.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261 Avoid breathing 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.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHIMIS classification
B3 - Combustible liquid
D2B - Toxic material causing other toxic effects

Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH

FIRE

REACTIVITY

2
2
1

Health (acute effects) = 2
Flammability = 2
Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment:
PBT: N/A.
vPvB: N/A.

SECTION 4. FIRST AID MEASURES

Description of first aid measures
If inhaled:
Supply 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 No information available.
Indication of any immediate medical attention and special treatment needed No information available.

SECTION 5. FIREFIGHTING MEASURES

Extinguishing media
Suitable extinguishing media Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special hazards arising from the substance or mixture
If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
Zirconium oxide  
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  
Wear protective equipment. Keep unprotected persons away.  
Ensure adequate ventilation  
Keep away from ignition sources  
Environmental precautions: Do not allow product to reach sewage system or any water course.  
Methods and material for containment and cleanup:  
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).  
Ensure adequate ventilation.  
Prevention of secondary hazards: Keep away from ignition sources.  
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 adequate ventilation.  
Prevent formation of aerosols.  
Information about protection against explosions and fires:  
Protect against electrostatic charges.  
Fumes can combine with air to form an explosive mixture.  
Keep ignition sources away.  
Conditions for safe storage, including any incompatibilities  
Storage  
Requirements to be met by storerooms and receptacles: No special requirements.  
Information about storage in one common storage facility:  
Store away from water/moisture.  
Do not store together with acids.  
Store away from strong bases.  
Store away from oxidizing agents.  
Store away from halogens.  
Store away from alkali metals.  
Further information about storage conditions:  
Store under dry inert gas.  
This product is moisture sensitive.  
Keep container tightly sealed.  
Store in cool, dry conditions in well-sealed containers.  
Protect from humidity and water.
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:
1071-76-7 Zirconium n-butoxide (80.0%)
- 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
71-36-3 1-Butanol (20.0%)
- PEL (USA) Long-term value: 300 mg/m³, 100 ppm
- REL (USA) Ceiling limit value: 150 mg/m³, 50 ppm
- Skin
  - TLV (USA) Long-term value: 61 mg/m³, 20 ppm
  - EL (Canada) Short-term value: C 30 ppm
  - Long-term value: 15 ppm
- EV (Canada) Long-term value: 20 ppm
Additional information: No data

Exposure controls
Personal protective equipment
Follow typical general protective and industrial hygiene measures 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.
Breathing equipment: Use suitable respirator when high concentrations are present.
Recommended filter device for short term use:
Use a respirator with organic vapor/acid gas cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards such as NIOSH (USA) or CEN (EU).
Protection of hands:
Impervious gloves
Inspect gloves prior to use.
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Penetration time of glove material (in minutes) No data available.
Eye protection: Tightly sealed goggles
Body protection: Protective work clothing.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
Appearance:
Form: Liquid
**Color:** Colorless to pale yellow  
**Odor:** Alcohol-like  
**Odor threshold:** No data available.  
**pH:** No data available.  
**Melting point/range:** No data available.  
**Boiling point/range:** No data available.  
**Sublimation temperature / start:** No data available.  
**Flash point:** 38 °C (100 °F)  
**Flammability (solid, gas):** No data available.  
**Ignition temperature:** 340 °C (644 °F)  
**Decomposition temperature:** No data available.  
**Auto igniting:** Product is not selfigniting.  
**Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures is possible.  
**Explosion limits:**  
**Lower:** 1.5 Vol %  
**Upper:** 9.4 Vol %  
**Vapor pressure at 20 °C (68 °F):** 5.6 hPa (4 mm Hg)  
**Density at 20 °C (68 °F):** 1.07 g/cm³ (8.929 lbs/gal)  
**Relative density:** No data available.  
**Vapor density:** No data available.  
**Evaporation rate:** No data available.  
**Solubility in / Miscibility with Water:** Hydrolyzes  
**Partition coefficient (n-octanol/water):** No data available.  
**Viscosity:**  
**Dynamic:** No data available.  
**Kinematic:** No data available.  
**Solvent content:**  
**Organic solvents:** 20.0 %  
**Other information:** No information available.

---

**SECTION 10. STABILITY AND REACTIVITY**

**Reactivity:** No data available.  
**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  
**Conditions to avoid:** No information available.  
**Incompatible materials:**  
**Acids**  
**Water/moisture**  
**Bases**  
**Oxidizing agents**  
**Halogens**  
**Alkali metals**  
**Hazardous decomposition products:**  
**Carbon monoxide and carbon dioxide**  
**Zirconium oxide**
SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity: 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:
71-36-3 1-Butanol
Oral LD50 790 mg/kg (rat)
Skin irritation or corrosion: Causes skin irritation.
Eye irritation or corrosion: Causes serious eye damage.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for components in this product.
Carcinogenicity:
EPA-D: Not classifiable as to human carcinogenicity: inadequate human and animal evidence of carcinogenicity or no data are available.
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: The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for components in this product.
Specific target organ system toxicity - repeated exposure: N/A
Specific target organ system toxicity - single exposure:
May cause drowsiness or dizziness.
May cause respiratory irritation.
Aspiration hazard: N/A
Subacute to chronic toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
The product shows the following dangers according to internally approved calculation methods for preparations:
Irritant

SECTION 12. ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity: No information available.
Persistence and degradability: No information available.
Bioaccumulative potential: No information available.
Mobility in soil: No information available.
Additional ecological information:
General notes:
Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
Avoid transfer into the environment.
Results of PBT and vPvB assessment:
PBT: N/A.
vPvB: N/A.
Other adverse effects No information available.
SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation: Consult state, local or national 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 UN1120
UN proper shipping name
DOT Butanols, mixture
IMDG, IATA BUTANOLS, mixture
Transport hazard class(es)
DOT
Class 3 Flammable liquids.
Label 3
Class 3 (F1) Flammable liquids
Label 3
IMDG, IATA
Class 3 Flammable liquids.
Label 3
Packing group
DOT, IMDG, IATA III
Environmental hazards:
Marine pollutant (IMDG): No
Special precautions for user Warning: Flammable liquids
EMS Number: F-E,S-D
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": UN1120, Butanols, mixture, 3, III

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)
Hazard pictograms
GHS02 GHS05 GHS07
Signal word Danger
Hazard-determining components of labeling:
Zirconium n-butoxide
1-Butanol
Hazard statements
H226 Flammable liquid and vapor.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.
Precautionary statements
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.