TCI AMERICA

SAFETY DATA SHEET

Revision number: 2
Revision date: 10/06/2014

1. IDENTIFICATION

Product name: Zirconocene Chloride Hydride
Product code: Z0010

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

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2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200:
Acute Toxicity - Oral [Category 4]
Acute Toxicity - Dermal [Category 4]
Acute Toxicity - Inhalation [Category 4]
Eye Damage/Irritation [Category 1]
Flammable Solids [Category 2]
Substances and Mixtures which, in Contact with Water, Emit Flammable Gases [Category 3]
Skin Corrosion/Irritation [Category 1B]

Signal word: Danger!

Hazard Statement(s):
Causes serious eye damage
Causes severe skin burns and eye damage
Flammable solid
Harmful if swallowed
Harmful in contact with skin
Harmful if inhaled
In contact with water releases flammable gas

Pictogram(s) or Symbol(s):

Precautionary Statement(s):
[Prevention]
Do not eat, drink or smoke when using this product. Wash hands and face thoroughly after handling. Wear protective gloves and protective clothing. Avoid breathing dusts or mists. Use only outdoors or in a well-ventilated area. Do not breathe dusts or mists. Wear protective gloves, protective clothing, eye protection and face protection. Wear eye protection. Wear face protection (full length face shield). Keep away from heat, sparks, open flames or other hot surfaces. - No smoking. Ground or bond container and receiving equipment. Use explosion-proof electrical, ventilating, lighting, and equipment. Wear protective gloves, eye protection and face protection. Handle under inert gas. Protect from moisture.

2. HAZARD(S) IDENTIFICATION

[Response] If swallowed: Immediately call a poison center or doctor. Rinse mouth. If on skin: Wash with plenty of water. Call a poison center or doctor if you feel unwell. Take off contaminated clothing and wash it before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a poison center or doctor. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. In case of fire: Use dry chemical, CO2, sand, earth, water spray or regular foam to extinguish. Brush off loose particles from skin and immerse in cool water or wrap in wet bandages. In case of fire: Use dry chemical, soda ash, lime or DRY sand to extinguish.

[Storage] Store locked up. Store in a dry place. Store in a closed container.

[Disposal] Dispose of contents and container in accordance with US EPA guidelines for the classification and determination of hazardous waste listed in 40 CFR 261.3. (See Section 13)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Substance
Components: Zirconocene Chloride Hydride
Percent: >96.0%(T)
CAS Number: 37342-97-5
Molecular Weight: 257.87
Chemical Formula: $C_{10}H_{11}ClZr$
Synonyms: Bis(cyclopentadienyl)zirconium Chloride Hydride , Schwartz's Reagent

4. FIRST-AID MEASURES

Inhalation: Immediately call a poison center or doctor. Effects of exposure (inhalation) to substance may be delayed. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Skin contact: For severe burns, immediate medical attention is required. Immediately call a poison center or doctor. Remove and wash contaminated clothing before re-use. Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Eye contact: IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Eye contact with vapors or substance may cause severe injury, burns, or death. Call emergency medical service. Move victim to fresh air. Check for and remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Ingestion: Harmful if swallowed. Do not induce vomiting with out medical advice. Call a physician or Poison Control Center immediately. Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Loosen tight clothing such as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Symptoms/effects:

Acute: Pain. Redness.
Delayed: No data available

Immediate medical attention: WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is harmful. WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is corrosive. For severe burns, immediate medical attention is required. If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, soda ash, lime or dry sand. Consult with local fire authorities before attempting large scale fire fighting operations.

Unsuitable extinguishing media: Do NOT use water or foam.

5. FIRE-FIGHTING MEASURES

Specific hazards arising from the chemical

Hazardous combustion products: These products include: Carbon oxides Halogenated compounds Metallic oxides
Other specific hazards: WARNING: Highly toxic HCl gas is produced during combustion.

Special precautions for fire-fighters:
Use water spray or fog; do not use straight streams. Dike fire-control water for later disposal; do not scatter the material. May re-ignite after fire is extinguished. Runoff to sewer may create fire or explosion hazard. Do not get water inside containers. Cylinders exposed to fire may vent and release gasses through pressure relief devices. Containers may explode when heated. Move containers from fire area if you can do it without risk.
Special protective equipment for fire-fighters:
Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid contact with skin, eyes, and clothing. Keep people away from and upwind of spill/leak. Use spark-proof tools and explosion-proof equipment. Remove all sources of ignition. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (Section 8). Warn unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Personal protective equipment: Wear eye protection (splash goggles) and face protection (full length face shield). Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).

Emergency procedures: Do not use water as spilled material may react with it. Prevent dust cloud. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in the immediate area). Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.

Methods and materials for containment and cleaning up:
ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if without risk. Do not direct water at spill source. DO NOT get water inside container. All equipment used when handling the product must be grounded. Absorb with DRY earth, sand or other non-combustible material. Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal. Do not clean-up or dispose except under supervision of a specialist. Ventilate the area.
Environmental precautions:
Keep away from living quarters. Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into sewers, basements or confined areas; dike if needed.

7. HANDLING AND STORAGE

Precautions for safe handling: Avoid inhalation of vapor or mist. Manipulate under an adequate fume hood. Do not ingest. Avoid contact with skin and eyes. Avoid contact with skin. Avoid mechanical shock and friction. Avoid formation of dust and aerosols. Keep away from heat and sources of ignition. Use explosion-proof equipment. Use only non-sparking hand tool when handling this product. Ground all equipment containing material. Take measures to prevent build up of electrostatic charge. Never add water to this product. Good general ventilation should be sufficient to control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources of ignition.

Conditions for safe storage: Keep away from sources of ignition. Store and use away from heat, sparks, open flame, or any other ignition source. Store in a cool, dry place. Keep containers tightly closed in a dry, cool, and well-ventilated place. Store locked up. Keep away from incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods. Store under inert gas (e.g. Argon). Moisture sensitive. Store in refrigerator.

Storage incompatibilities: Bases, Store away from oxidizing agents, Water

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits: No data available

Appropriate engineering controls:
Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.

Personal protective equipment

Respiratory protection: Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
Hand protection: Nitrile gloves.
Eye protection: Safety glasses.
Skin and body protection: Lab coat.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Solid
Form: Crystal - Powder
Color: White - Pale yellow red
Odor: No data available
Odor threshold: No data available

Melting point/freezing point:	No data available	**pH:**	No data available
Boiling point/range:	No data available	**Vapor pressure:**	No data available
Decomposition temperature:	No data available	**Vapor density:**	No data available
Relative density:	No data available	**Dynamic Viscosity:**	No data available
Kinematic Viscosity:	No data available		
Partition coefficient: n-octanol/water (log P_{ow})	No data available	**Evaporation rate:** (Butyl Acetate = 1)	No data available
Flash point:	No data available	**Autoignition temperature:**	No data available
Flammability (solid, gas):	No data available	**Flammability or explosive limits:**	
		Lower:	No data available
		Upper:	No data available

Solubility(ies):

10. STABILITY AND REACTIVITY

Reactivity: Not Available.
Chemical Stability: Water reactive. Air sensitive. Heat sensitive. Light sensitive. Moisture sensitive.
Possibility of Hazardous Reactions: Reacts violently with water.
Conditions to avoid: Air sensitive. Exposure to air. Exposure to light. Exposure to moisture. Heat sensitive. Light sensitive. Moisture sensitive.
Incompatible materials: Oxidizing agents
Hazardous Decomposition Products: No data available

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:
No data available

Skin corrosion/irritation:
No data available

Serious eye damage/irritation:
No data available

Respiratory or skin sensitization:
No data available

Germ cell mutagenicity:
No data available

Carcinogenicity:

No data available

IARC: No data available **NTP:** No data available **OSHA:** No data available

Reproductive toxicity:
No data available

Routes of Exposure: Inhalation, Eye contact, Ingestion, Skin contact.
Symptoms related to exposure:
Overexposure may result in serious illness or death. Skin contact may produce burrns. Skin contact may result in inflammation; characterized by itching, scaling, reddening, or occasionally blistering. Eye contact can result in corneal damage or blindness.
Potential Health Effects:
No specific information available; skin and eye contact may result in irriatation. May be harmful if inhaled or ingested.
Target organ(s): No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Fish:	No data available
Crustacea:	No data available
Algae:	No data available

Persistence and degradability:	No data available
Bioaccumulative potential (BCF):	No data available
Mobillity in soil:	No data available
Partition coefficient: n-octanol/water (log P_{ow})	No data available
Soil adsorption (Koc):	No data available
Henry's Law: constant (PaM^3/mol)	No data available

13. DISPOSAL CONSIDERATIONS

Disposal of product:	Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.
Disposal of container:	Dispose of as unused product. Do not re-use empty containers.
Other considerations:	Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

DOT (US)

UN number:	**Proper Shipping Name:**	**Class or Division:**	**Subrisk(s):**	**Packing Group:**
UN3131	Water-reactive solid, corrosive, n.o.s.	4.3 Dangerous when wet material (water reactive)	8 Corrosive material	II

IATA

UN number:	**Proper Shipping Name:**	**Class or Division:**	**Subrisk(s):**	**Packing Group:**
UN3131	Water-reactive solid, corrosive, n.o.s.	4.3 Dangerous when wet material (water reactive)	8 Corrosive material	II

IMDG

UN number:	**Proper Shipping Name:**	**Class or Division:**	**Subrisk(s):**	**Packing Group:**
UN3131	Water-reactive solid, corrosive, n.o.s.	4.3 Dangerous when wet material (water reactive)	8 Corrosive material	II

Air Transport:	Cargo Aircraft Only.
EmS number:	F-G, S-L

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA 8b.):
This product is NOT on the EPA Toxic Substances Control Act (TSCA) inventory. The following notices are required by 40 CFR 720.36 (C) for those products not on the inventory list:
(i) These products are supplied solely for use in research and development by or under the supervision of a technically qualified individual as defined in 40 CFR 720.0 et sec.
(ii) The health risks of these products have not been fully determined. Any information that is or becomes available will be supplied on a SDS sheet.

US Federal Regulations

CERCLA Hazardous substance and Reportable Quantity:

SARA 313:	Not Listed
SARA 302:	Not Listed

State Regulations

State Right-to-Know

Massachusetts	Not Listed

15. REGULATORY INFORMATION

New Jersey	Not Listed
Pennsylvania	Not Listed
California Proposition 65:	Not Listed

Other Information

NFPA Rating:

Health:	3
Flammability:	3
Instability:	1

HMIS Classification:

Health:	3
Flammability:	3
Physical:	1

International Inventories

WHMIS hazard class:	E: Corrosive material. F: Dangerously reactive material. B4: Flammable Solid. D2A: Materials causing other toxic effects. (Very Toxic)
EC-No:	253-479-5

16. OTHER INFORMATION

Revision date: 10/06/2014
Revision number: 2

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.