





Material Safety Data Sheet

| HAZARD WARNINGS | RISK PHRASES | PROTECTIVE CLOTHING |
|---|--|---|
|    | <p>Corrosive to eyes and skin on contact. Flammable material; avoid heat and sources of ignition. Toxic compound, do not ingest or inhale. Avoid all contact with this material. Water-reactive. May ignite or generate flammable gas in the presence of moisture. Freeze.</p> |  |

Section I. Chemical Product and Company Identification

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|------------------|--|---|---|
| Chemical Name | Boron Trichloride - Methanol Reagent (5-10%) [for Esterification] (1ml*10) | | |
| Catalog Number | X0033 | Supplier | TCI America 9211 N. Harbortgate St. Portland OR 1-800-423-8616 |
| Synonym | Not available. | <div style="border: 2px solid black; padding: 5px;"> <p>In case of Emergency Call</p> <p>Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)</p> </div> | |
| Chemical Formula | Not available. | | |
| CAS Number | 36254-91-8 10294-34-5 (Boron Trichloride) 67-56-1 (Methanol) | | |

Section II. Composition and Information on Ingredients

| Chemical Name | CAS Number | Percent (%) | TLV/PEL | Toxicology Data |
|---|--|--|----------------|--|
| Boron Trichloride - Methanol Reagent (5-10%) [for Esterification] (1ml*10) | 36254-91-8 10294-34-5 (Boron Trichloride) 67-56-1 (Methanol) | 5-10% (Boron Trichloride) 90-95% (Methanol) | Not available. | (Boron Trichloride) Rat LC ₅₀ (inhalation) mg/m ³ /4H (Methanol) Rat LD ₅₀ (oral) 5600 mg/kg Rabbit LD ₅₀ (dermal) 15800 mg/kg Rat LC ₅₀ (inhalation) 64000 ppm/4H |

Section III. Hazards Identification

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| Acute Health Effects | <p>Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested. Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death.</p> <p>Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.</p> |
| Chronic Health Effects | <p>CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY: Reproductive Effects. (Methanol) Rat TCLo Inhalation 20000 ppm/7 hours, female 1-22 days of pregnancy TOXIC Effects: Specific Developmental Abnormalities - Musculoskeletal system Specific Developmental Abnormalities - Cardiovascular (circulatory) system Specific Developmental Abnormalities - Urogenital system Rat TDLo Oral 35295 mg/kg, female 1-15 days of pregnancy TOXIC Effects: Effects on Fertility - Female fertility index Effects on Fertility - Pre-implantation mortality Effects on Fertility - Post-implantation mortality Mouse TDLo Oral 4 gm/kg, female 7 days of pregnancy TOXIC Effects: Specific Developmental Abnormalities - Craniofacial Specific Developmental Abnormalities - Musculoskeletal system Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.</p> |

Section IV. First Aid Measures

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| Eye Contact | Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention. |
| Skin Contact | In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately. |
| Inhalation | If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve. |
| Ingestion | DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. |

Section V. Fire and Explosion Data

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| Flammability | Flammable. | Auto-Ignition | 464 °C (867.2 °F) (Methanol) |
| Flash Points | 12 °C (53.6 °F). (Methanol) | Flammable Limits | LOWER: 5.5% UPPER: 44% (Methanol) |
| Combustion Products | These products include toxic carbon oxides (CO, CO ₂), halogenated compounds, Borates. WARNING: Highly toxic HCl gas is produced during combustion. | | |
| Fire Hazards | Not available. | | |
| Explosion Hazards | Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. | | |
| Fire Fighting Media and Instructions | Flammable liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Consult with local fire authorities before attempting large scale fire-fighting operations. | | |


Section VI. Accidental Release Measures

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| Spill Cleanup Instructions | Flammable material. Corrosive material. Toxic material. Water reactive material. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT get water inside container. DO NOT touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal. |
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Section VII. Handling and Storage

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| Handling and Storage Information | FLAMMABLE. CORROSIVE. TOXIC. WATER-REACTIVE. FREEZE. Keep locked up. Keep under inert atmosphere. Keep container dry. DO NOT ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Treat symptomatically and supportively. Always store away from incompatible compounds such as oxidizing agents, reducing agents, acids. |
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Section VIII. Exposure Controls/Personal Protection

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| Engineering Controls | Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location. |
| Personal Protection | Face shield. Lab coat. Vapor respirator. Boots. Gloves. A MSHA/NIOSH approved respirator must be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.  |
| Exposure Limits | Not available. |

Section IX. Physical and Chemical Properties

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| Physical state @ 20 °C | Liquid. | Solubility | Not available. |
| Specific Gravity | 0.79 (water=1) (Methanol) | | |
| Molecular Weight | BCl ₃ = 117.17 (Boron Trichloride) CH ₃ OH = 32.04 (Methanol) | Partition Coefficient | Not available. |
| Boiling Point | 12.5 °C (54.5 °F) (Boron Trichloride) 64 °C (147.2 °F) (Methanol) | Vapor Pressure | 1128 mmHg (@ 20 °C) (Boron Trichloride) 97.68 mmHg (@ 20 °C) (Methanol) |
| Melting Point | -107 °C (-160.6 °F) (Boron Trichloride) -98 °C (-144.4 °F) (Methanol) | Vapor Density | 4.05 (Air = 1) (Boron Trichloride) 1.1 (Air=1) (Methanol) |
| Refractive Index | Not available. | Volatility | Not available. |
| Critical Temperature | Not available. | Odor | Not available. |
| Viscosity | Not available. | Taste | Not available. |

Continued on Next Page**Emergency phone number (800) 424-9300**

| Section X. Stability and Reactivity Data | |
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| Stability | This material is stable if stored under proper conditions. (See Section VII for instructions) |
| Conditions of Instability | Avoid excessive heat and light. |
| Incompatibilities | Reactive with oxidizing agents, reducing agents, acids. The product REACTS violently with water to emit FLAMMABLE BUT NON TOXIC GASES. |
| Section XI. Toxicological Information | |
| RTECS Number | ED1925000 (Boron Trichloride) PC1400000 (Methanol) |
| Routes of Exposure | Eye Contact. Ingestion. Inhalation. Skin contact. |
| Toxicity Data | (Boron Trichloride) Rat LC ₅₀ (inhalation) mg/m ³ /4H (Methanol) Rat LD ₅₀ (oral) 5600 mg/kg Rabbit LD ₅₀ (dermal) 15800 mg/kg Rat LC ₅₀ (inhalation) 64000 ppm/4H |
| Chronic Toxic Effects | CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY : Reproductive Effects. (Methanol) Rat TCLo Inhalation 20000 ppm/7 hours, female 1-22 days of pregnancy TOXIC Effects: Specific Developmental Abnormalities - Musculoskeletal system Specific Developmental Abnormalities - Cardiovascular (circulatory) system Specific Developmental Abnormalities - Urogenital system Rat TDLo Oral 35295 mg/kg, female 1-15 days of pregnancy TOXIC Effects: Effects on Fertility - Female fertility index Effects on Fertility - Pre-implantation mortality Effects on Fertility - Post-implantation mortality Mouse TDLo Oral 4 gm/kg, female 7 days of pregnancy TOXIC Effects: Specific Developmental Abnormalities - Craniofacial Specific Developmental Abnormalities - Musculoskeletal system Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs. |
| Acute Toxic Effects | Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested. Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound. |

| Section XII. Ecological Information | |
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| Ecotoxicity | Not available. |
| Environmental Fate | (Boron Trichloride) The chemistry of boron is dominated by its tendency to form stable bonds with electronegative atoms, especially oxygen. Reduced boron compounds (halides, hydrides, alkyls and aryls) tend to oxidize and hydrolyze readily, and would be expected to be converted into various boron-oxide compounds in the environment. Inorganic boron compounds are nonvolatile and would not be expected to volatilize from moist or dry soil surfaces. (Methanol) Methanol's production and use as a solvent, fuel additive, and in the production of formaldehyde, acetic acid, and methyl tertiary butyl ether (MTBE) may result in its release to the environment through various waste streams. Methanol has been identified as a natural emission product from various plants and as a biological decomposition product of biological wastes and sewage. If released to the atmosphere, a vapor pressure of 127 mm Hg at 25 deg C indicates that methanol will exist solely in the vapor phase. Vapor phase methanol is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 17 days. If released to soil, methanol is expected to have very high mobility based upon an estimated Koc of 1. Volatilization from moist soil surfaces is expected to be an important fate process based upon a Henry's Law constant of 4.55X10 ⁻⁶ atm-cu m/mole. Methanol may also volatilize from dry soils based upon its vapor pressure. Biodegradation of methanol in soils is expected to occur rapidly based on half-lives in a sandy silt loam from Texas and a sandy loam from Mississippi of 1 and 3.2 days, respectively. If released into water, methanol is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. Volatilization from water surfaces is expected to be an important fate process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 3 and 35 days, respectively. Biodegradation is expected to occur in natural waters since methanol is degraded quickly in soils and was biodegraded rapidly in various aqueous screening tests using sewage seed or activated sludge. BCF values of less than 10, measured in fish suggests bioconcentration in aquatic organisms is low. Hydrolysis of methanol and photolysis in sunlit surface waters are not expected since methanol lacks functional groups that are susceptible to hydrolysis or photolysis under environmental conditions. Occupational exposure to methanol may occur through inhalation and dermal contact with this compound at workplaces where methanol is produced or used. Monitoring data indicate that the general population may be exposed to methanol via inhalation of ambient air, and ingestion of food and drinking water. |

Section XIII. Disposal Considerations

Waste Disposal

Recycle to process, if possible. Consult your local regional authorities. 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. Observe all federal, state and local regulations when disposing of the substance.

Section XIV. Transport Information

DOT Classification

DOT Class 9: Miscellaneous hazardous material

PIN Number

UN3316

Proper Shipping Name

Chemical Kits

Packing Group (PG)

III

DOT Pictograms

**Section XV. Other Regulatory Information and Pictograms**

TSCA Chemical Inventory (EPA)

This compound is **ON** the EPA Toxic Substances Control Act (TSCA) inventory list.

WHMIS Classification (Canada)

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
 CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).
 CLASS E: Corrosive liquid.
 On DSL

EINECS Number (EEC)

233-658-4 (Boron Trichloride)
 200-659-6 (Methanol)

EEC Risk Statements

R10- Flammable.
 R18- In use, may form flammable/explosive vapor-air mixture.
 R23/24/25- Toxic by inhalation, in contact with skin and if swallowed.
 R34- Causes burns.
 R14- Reacts violently with water.

Japanese Regulatory Data

ENCS No. 1-42 (Boron Trichloride)
 ENCS No. 2-201 (Methanol)

Section XVI. Other Information**Version 1.0****Validated on 8/21/2008.****Printed 8/21/2008.****Notice to Reader**

TCI laboratory 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 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 MSDS sheets 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 MSDS sheets 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, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.