

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
  	Water-reactive. May ignite or generate flammable gas in the presence of moisture. Flammable material; avoid heat and sources of ignition. Corrosive to eyes and skin on contact.	

Section I. Chemical Product and Company Identification

Chemical Name	sec-Butylmagnesium Bromide (16% in tetrahydrofuran Soln.)		
Catalog Number	B1884	Supplier	TCI America 9211 N. Harborage St. Portland OR 1-800-423-8616
Synonym	Not available.		
Chemical Formula	CH ₃ CH ₂ CH(CH ₃)MgBr		
CAS Number	922-66-7, 109-99-9	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
sec-Butylmagnesium Bromide (16% in tetrahydrofuran Soln.)	922-66-7, 109-99-9	16, 84	Not available.	Rat LC ₅₀ (inhalation) 21000ppm/3H Rat LD ₅₀ (oral) 1650mg/kg Mouse LD ₅₀ (intraperitoneal) 1900mg/kg (tetrahydrofuran)

Section III. Hazards Identification

Acute Health 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. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY Reproductive: rat (inhalation) 5000ppm/6H. Duration: female 6-19 days of pregnancy. Effects on embryo or fetus- Fetotoxicity. mouse (inhalation) 1800ppm/6H. Duration: female 6-17 days of pregnancy. Effects on fertility- Post-implantation mortality. (tetrahydrofuran) 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.

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. DO NOT use an eye ointment. Flush eyes with running water for a minimum of 15 minutes, occasionally lifting the upper and lower eyelids. Seek medical attention. Treat symptomatically and supportively.
Skin Contact	If the chemical gets spilled on a clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Seek medical attention. Treat symptomatically and supportively. Wash any contaminated clothing before reusing.
Inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. WARNING: It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention and, if possible, show the chemical label. Treat symptomatically and supportively.
Ingestion	DO NOT induce vomiting. Loosen tight clothing such as a collar, tie, belt, or waistband. If the victim is not breathing, administer artificial respiration. 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. Seek immediate medical attention and, if possible, show the chemical label. Treat symptomatically and supportively.

Section V. Fire and Explosion Data			
Flammability	Flammable.	Auto-Ignition	Not available.
Flash Points	-17°C (1.4°F). (tetrahydrofuran)	Flammable Limits	Not available.
Combustion Products	These products are toxic carbon oxides (CO, CO ₂), Some metallic oxides, halogenated compounds.		
Fire Hazards	Reactive with strong oxidizers. Vapors may travel to source of ignition and flash back. Closed containers may explode from heat of a fire. Highly flammable in presence of open flames and sparks, of heat.		
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. No additional information is available regarding the risks of explosion.		
Fire Fighting Media and Instructions	Flammable liquid. SMALL FIRE: Use DRY chemicals, CO ₂ , DO NOT USE WATER OR FOAM. LARGE FIRE: Use DRY chemicals, CO ₂ , DO NOT USE WATER OR FOAM.		

Section VI. Accidental Release Measures	
Spill Cleanup Instructions	Water-reactive. Flammable liquid. Corrosive liquid. Keep away from heat and sources of ignition. 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. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage	
Handling and Storage Information	WATER-REACTIVE. FLAMMABLE. CORROSIVE. Keep container dry. Do not breathe gas, fumes, vapor or spray. Never add water to this product. Wear suitable protective clothing. If you feel unwell, seek medical attention and show the label when possible. Treat symptomatically and supportively. Always store away from incompatible compounds such as oxidizing agents. Reactive with strong oxidizers; may be ignited by heat, sparks or flames. Vapors may travel to source of ignition and flash back. Closed containers may explode from heat of a fire. Empty containers may pose a fire risk. Evaporate residue under a fume hood if possible. Ground all equipment containing material. Handle with caution and minimize exposure. Keep away from heat and sources of ignition. Tightly seal container and store in a cool, dry place. Use only non-sparking hand tool when handling this product.

Section VIII. Exposure Controls/Personal Protection	
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. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
	
Exposure Limits	Not available.

Section IX. Physical and Chemical Properties			
Physical state @ 20°C	Grayish yellow slightly suspended liquid.	Solubility	30% in water @ 25°C. Miscible with alcohols, ketones, esters, ethers and hydrocarbons. >10% in acetone, >10% in benzene, >10% in ether, >10% ethanol. (tetrahydrofuran)
Specific Gravity	Not available.	Partition Coefficient	Not available.
Molecular Weight	161.32	Vapor Pressure	Not available.
Boiling Point	67°C (tetrahydro.)	Vapor Density	Not available.
Melting Point	Not available.	Volatility	Not available.
Refractive Index	1.4050 @ 20°C (tetrahydrofuran)	Odor	Ether-like odor. (tetrahydrofuran)
Critical Temperature	Not available.	Taste	Pungent taste. (tetrahydrofuran)
Viscosity	Not available.		

Section X. Stability and Reactivity Data

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.

Section XI. Toxicological Information

RTECS Number	LU5950000 (tetrahydrofuran)
Routes of Exposure	Eye contact. Ingestion. Inhalation. Skin contact.
Toxicity Data	Rat LC ₅₀ (inhalation) 21000ppm/3H Rat LD ₅₀ (oral) 1650mg/kg Mouse LD ₅₀ (intraperitoneal) 1900mg/kg (tetrahydrofuran)
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY Reproductive: rat (inhalation) 5000ppm/6H. Duration: female 6-19 days of pregnancy. Effects on embryo or fetus- Fetotoxicity. mouse (inhalation) 1800ppm/6H. Duration: female 6-17 days of pregnancy. Effects on fertility- Post-implantation mortality. (tetrahydrofuran) 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.
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. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity	Not available.
Environmental Fate	Tetrahydrofuran's production and use as a solvent for resins, especially polyvinyl chloride, in adhesives, printers ink, lacquers, in magnetic tape production, and as a chemical intermediate, may result in its release to the environment through various waste streams. If released to the atmosphere, tetrahydrofuran will exist solely in the vapor phase in the ambient atmosphere based on a measured vapor pressure of 162 mm Hg at 25°C. Vapor-phase tetrahydrofuran is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals and nitrate radicals with half-lives of about 1 and 3 days, respectively. Measured Koc values of 23 and 18 indicate that tetrahydrofuran will have very high mobility in soil. Volatilization from moist and dry soil surfaces may occur based on a measured Henry's Law constant of 7.05X10 ⁻⁵ atm-cu m/mole and tetrahydrofuran's measured vapor pressure, respectively. Tetrahydrofuran is expected to biodegrade under aerobic conditions but may be resistant to biodegradation in anaerobic environments. In the modified MITI screening test, tetrahydrofuran at 30 mg/l was completely biodegraded in 14 days using an activated sludge inoculum. The EEC manometric respirometric method, tested in 22 different laboratories, gave a mean of 34% of the theoretical BOD within 28 days. Tetrahydrofuran at 50 mg C/l was resistant to anaerobic biodegradation with a lag period of greater than 60 days using a primary digesting sludge as an inoculum; no gas production was seen during this time. Tetrahydrofuran is not expected to adsorb to suspended matter in the water based on its measured Koc values. This compound should volatilize from water surfaces given its Henry's Law constant. Estimated half-lives for a model river and model lake are 13 hours and 6 days, respectively. An estimated BCF value of 1 suggests that tetrahydrofuran will not bioconcentrate in aquatic organisms. The general population may be exposed to tetrahydrofuran by inhalation of contaminated air or ingestion of contaminated drinking water or foods. Workers involved in the manufacture, use, packaging, or transport of this compound may be exposed by inhalation and/or dermal contact.

Section XIII. Disposal Considerations

Waste Disposal	Recycle to process, if possible. Consult your local or 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.
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Section XIV. Transport Information

DOT Classification	DOT CLASS 4.3: Water-reactive. DOT CLASS 3: Flammable liquid.
PIN Number	UN3399
Proper Shipping Name	Organometallic substance, liquid, water-reactive, flammable
Packing Group (PG)	II
DOT Pictograms	

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Emergency phone number (800) 424-9300

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	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 an MSDS sheet.
WHMIS Classification (Canada)	WHMIS CLASS B-2: Flammable liquid with a flash point lower than 35°C (100°F). WHMIS CLASS E: Corrosive liquid.
EINECS Number (EEC)	Not available.
EEC Risk Statements	R10- Flammable. R18- In use, may form flammable/explosive vapor-air mixture. R35- Causes severe burns.
Japanese Regulatory Data	Not available.

Section XVI. Other Information

Version 1.0

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Notice to Reader

TCl laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, household, 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.