



SIGMA-ALDRICH

Material Safety Data Sheet

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Section 1 - Product and Company Information

Product Name Borane-tetrahydrofuran complex, 1.0M solution in tetrahydrofuran
Product Number 176192
Brand Aldrich Chemical

Company Sigma-Aldrich
Street Address 3050 Spruce Street
City, State, Zip, Country SAINT LOUIS, MO 63103 US
Technical Phone: 314 771 5765
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Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
BORANE TETRAHYDROFURAN COMPLEX, 1.0M SOLUTION IN TETRAHYDROFURAN	None	No		
Ingredient Name	CAS #	Percent	SARA 313	
TETRAHYDROFURAN	109-99-9	90.440 %	No	
BORANE TETRAHYDROFURAN COMPLEX	14044-65-6	9.560 %		
Stabilized with:				
SODIUM BOROHYDRIDE	16940-66-2			

Formula C4H11BO
Synonyms

Section 3 - Hazards Identification

Emergency Overview

Flammable (USA) Highly Flammable (EU). Harmful.
 Reacts violently with water, liberating extremely flammable gases. May form explosive peroxides. Harmful if swallowed. Irritating to eyes, respiratory system and skin.
 Possible Carcinogen (US). Target organ(s): Liver. Central nervous system.

HMIS Rating
 Health: 2* Flammability: 3 Reactivity: 3 Special Hazard(s): Water reactive

NFPA Rating
 Health: 2 Flammability: 3 Reactivity: 3 Special Hazard(s): Water reactive

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure

In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

Flammable Hazards: Yes

Peroxide Former: Yes

Explosion Hazards

Vapor may travel considerable distance to source of ignition and flash back.
 Container explosion may occur under fire conditions.

Conditions of Flammability

Reacts with water to liberate flammable and/or explosive gas.

Flash Point: -5.8 °F -21.8 °C

Explosion Limits: Lower: 1.58 % Upper: 12.42 %

Autoignition Temp: 167 °C **Flammability:** Yes

Extinguishing Media

Suitable
 Dry chemical powder.

Unsuitable
 Do not use water.

Firefighting

Protective Equipment
 Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s)
 Flammable liquid. Emits toxic fumes under fire conditions.

Specific Method(s) of Fire Fighting
 Use water spray to cool fire-exposed containers.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill

Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

Procedure(s) of Personal Precaution(s)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling

User Exposure

Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Open carefully.

Storage

Suitable

Keep container closed. Keep away from heat, sparks, and open flame. Handle and store under nitrogen. Store at 2-8°C

Incompatible Materials

Do not allow contact with water.

Special Requirements

Handle and store under inert gas. May develop pressure. Open carefully. Do not distill to dryness.

Section 8 - Exposure Controls / PPE

Engineering Controls

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures

Wash thoroughly after handling. Wash contaminated clothing before reuse.

Section 9 - Physical/Chemical Properties

Appearance

Physical State	Color
Liquid	Colorless

Molecular Weight: 85.94 AMU

pH	N/A
BP/BP Range	N/A
MP/MP Range	N/A
Freezing Point	N/A
Vapor Pressure	N/A
Vapor Density	N/A
Saturated Vapor Conc.	N/A
SG/Density	0.876 g/cm ³ 25 °C
Bulk Density	N/A
Odor Threshold	N/A
Volatile%	N/A
VOC Content	N/A
Water Content	N/A
Solvent Content	N/A
Evaporation Rate	N/A
Viscosity	N/A
Partition Coefficient	N/A
Decomposition Temp.	N/A
Flash Point °F	-5.8 °F
Flash Point °C	-21.8 °C
Explosion Limits	Lower: 1.58 %

Flammability	Upper: 12.42 %
Autoignition Temp	N/A
Solubility	167 °C
	N/A

N/A = not available

Section 10 - Stability and Reactivity

Stability

Conditions to Avoid

Protect from moisture.

Materials to Avoid

Acids, Acid chlorides, Acid anhydrides, Alcohols, Oxidizing agents, Oxygen.

Hazardous Decomposition Products

Hazardous Decomposition Products

Carbon monoxide, Carbon dioxide, Borane/boron oxides, Diborane, Liberates flammable/explosive hydrogen gas.

Hazardous Polymerization

Hazardous Polymerization

Will not occur.

Section 11 - Toxicological Information

Route of Exposure

Skin Contact

Causes skin irritation.

Skin Absorption

May be harmful if absorbed through the skin.

Eye Contact

Causes eye irritation.

Inhalation

May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion

Harmful if swallowed.

Target Organ(s) or System(s)

Central nervous system. Liver. Kidneys.

Signs and Symptoms of Exposure

Prolonged or repeated exposure to skin causes defatting and dermatitis. Can cause CNS depression. Exposure can cause: Narcotic effect. Coughing, chest pains, difficulty in breathing. Nausea, dizziness, and headache. Unconsciousness.

RTECS Number: N/A

Chronic Exposure - Carcinogen

Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Organometallic compound [or] Compound solution [or] Compound dispersion, water-reactive, flammable, n.o.s.
UN#: 3207
Class: 4.3
Packing Group: Packing Group I
Hazard Label: Dangerous when wet.
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Organometallic compound solution, water-reactive, flammable, n.o.s.
IATA UN Number: 3207
Hazard Class: 4.3
Packing Group: I
Not Allowed - Aircraft: Cargo aircraft only. Not permitted on passenger aircraft.

Section 15 - Regulatory Information

EU Additional Classification

Symbol of Danger: F Xn

Indication of Danger

Highly Flammable. Harmful.

Risk Statements R: 22 36/37/38 14/15 19

Harmful if swallowed. Irritating to eyes, respiratory system and skin. Reacts violently with water, liberating extremely flammable gases. May form explosive peroxides.

Safety Statements S: 16 33 36/37/39

Keep away from sources of ignition - no smoking. Keep container tightly closed in a cool well-ventilated place. Take precautionary measures against static discharges. Wear suitable protective clothing, gloves, and eye/face protection.

US Classification and Label Text

Indication of Danger

Flammable (USA) Highly Flammable (EU). Harmful.

Risk Statements

Reacts violently with water, liberating extremely flammable gases. May form explosive peroxides. Harmful if swallowed. Irritating to eyes, respiratory system and skin.

Safety Statements

Keep away from sources of ignition - no smoking. Take precautionary measures against static discharges. Wear suitable protective clothing, gloves, and eye/face protection. Keep container tightly closed in a cool well-ventilated place.

US Statements

Possible Carcinogen (US). Target organ(s): Liver. Central nervous system.

United States Regulatory Information

SARA Listed: No

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: No

NDSL: No

Section 16 - Other Information

Disclaimer

For R&D use only. Not for drug, household or other uses.

Warranty

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

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