# SAFETY DATA SHEET

**Creation Date** 13-Jun-2014 **Revision Date** 19-Jan-2018 **Revision Number** 4

## 1. Identification

**Product Name** **Borane-tetrahydrofuran complex, 1M solution in THF, stabilized**

**Cat No. :** **AC175080000; AC175081000; AC175088000**

**Synonyms** Trihydro(tetrahydrofuran)boron in THF.

**Recommended Use** Laboratory chemicals.
**Uses advised against** Food, drug, pesticide or biocidal product use.

**Details of the supplier of the safety data sheet**

**Company**

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

**Emergency Telephone Number**
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
**CHEMTREC** Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

## 2. Hazard(s) identification

**Classification**
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| | |
|---|---|
| Flammable liquids | Category 2 |
| Substances/mixtures which, in contact with water, emit flammable gases | Category 1 |
| Acute oral toxicity | Category 4 |
| Skin Corrosion/Irritation | Category 2 |
| Serious Eye Damage/Eye Irritation | Category 1 |
| Carcinogenicity | Category 2 |
| Specific target organ toxicity (single exposure) | Category 3 |

Target Organs - Respiratory system, Central nervous system (CNS).

**Label Elements**

**Signal Word**
Danger

**Hazard Statements**
Highly flammable liquid and vapor

In contact with water releases flammable gases which may ignite spontaneously
Harmful if swallowed
Causes serious eye damage
May cause respiratory irritation
May cause drowsiness or dizziness
Suspected of causing cancer
Causes skin irritation

**Precautionary Statements**
**Prevention**
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep away from any possible contact with water, because of violent reaction and possible flash fire
Handle under inert gas. Protect from moisture
Keep cool
**Response**
IF exposed or concerned: Get medical attention/advice
**Inhalation**
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
**Skin**
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Brush off loose particles from skin. Immerse in cool water/wrap with wet bandages
**Eyes**
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
**Ingestion**
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
**Fire**
In case of fire: Use CO2, dry chemical, or foam for extinction
**Storage**
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in a dry place. Store in a closed container
**Disposal**
Dispose of contents/container to an approved waste disposal plant
**Hazards not otherwise classified (HNOC)**
Reacts violently with water
May form explosive peroxides
**Other hazards**

Stench.

## 3. Composition/Information on Ingredients

| Component | CAS-No | Weight % |
|---|---|---|
| Tetrahydrofuran | 109-99-9 | 91.4 |
| Boron, trihydro(tetrahydrofuran)-, (T-4)- | 14044-65-6 | 8.6 |

## 4. First-aid measures

**General Advice** If symptoms persist, call a physician.

**Eye Contact** Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

**Skin Contact** Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

**Inhalation** Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

**Ingestion** Clean mouth with water and drink afterwards plenty of water.

**Most important symptoms and effects** Causes severe eye damage. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Causes central nervous system depression

**Notes to Physician** Treat symptomatically

## 5. Fire-fighting measures

**Suitable Extinguishing Media** $CO_2$, dry chemical, dry sand, alcohol-resistant foam. Water mist may be used to cool closed containers.

**Unsuitable Extinguishing Media** DO NOT USE WATER

**Flash Point** -21.7 °C / -7.1 °F

**Method -** No information available

**Autoignition Temperature** 103 °C / 217.4 °F

**Explosion Limits**

**Upper** 13 vol %

**Lower** 1.5 vol %

**Sensitivity to Mechanical Impact** No information available

**Sensitivity to Static Discharge** No information available

**Specific Hazards Arising from the Chemical**

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition. Thermal decomposition can lead to release of irritating gases and vapors. Water reactive. Contact with water liberates extremely flammable gases. Reacts violently with water. Vapors may form explosive mixtures with air.

**Hazardous Combustion Products**

Carbon monoxide (CO). Carbon dioxide ($CO_2$). Hydrogen. Oxides of boron.

**Protective Equipment and Precautions for Firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

**NFPA**

| Health | Flammability | Instability | Physical hazards |
|---|---|---|---|
| 2 | 3 | 2 | W |

## 6. Accidental release measures

**Personal Precautions** Use personal protective equipment as required. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

**Environmental Precautions** Should not be released into the environment.

**Methods for Containment and Clean Up** Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Do not expose spill to water. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

## 7. Handling and storage

**Handling** Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Do not allow contact with water. If peroxide formation is suspected, do not open or move container. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges. Handle under inert gas, protect from moisture.

**Storage** Shelf life 12 months. May form explosive peroxides on prolonged storage. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. Keep container tightly closed. Keep away from heat, sparks and flame. Keep under nitrogen. Keep away from water or moist air. Keep refrigerated.

## 8. Exposure controls / personal protection

**Exposure Guidelines**

| Component | ACGIH TLV | OSHA PEL | NIOSH IDLH | Mexico OEL (TWA) |
|---|---|---|---|---|
| Tetrahydrofuran | TWA: 50 ppm<br>STEL: 100 ppm<br>Skin | (Vacated) TWA: 200 ppm<br>(Vacated) TWA: 590 mg/m³<br>(Vacated) STEL: 250 ppm<br>(Vacated) STEL: 735 mg/m³<br>TWA: 200 ppm<br>TWA: 590 mg/m³ | IDLH: 2000 ppm<br>TWA: 200 ppm<br>TWA: 590 mg/m³<br>STEL: 250 ppm<br>STEL: 735 mg/m³ | TWA: 200 ppm<br>TWA: 590 mg/m³<br>STEL: 250 ppm<br>STEL: 735 mg/m³ |

*Legend*

*ACGIH - American Conference of Governmental Industrial Hygienists*
*OSHA - Occupational Safety and Health Administration*
*NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health*

**Engineering Measures** Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

**Personal Protective Equipment**

| | |
|---|---|
| **Eye/face Protection** | Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. |
| **Skin and body protection** | Wear appropriate protective gloves and clothing to prevent skin exposure. |
| **Respiratory Protection** | Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. |
| **Hygiene Measures** | Handle in accordance with good industrial hygiene and safety practice. |

## 9. Physical and chemical properties

| | |
|---|---|
| **Physical State** | Liquid |
| **Appearance** | Colorless |
| **Odor** | Stench |
| **Odor Threshold** | No information available |
| **pH** | No information available |
| **Melting Point/Range** | -108 °C / -162.4 °F |
| **Boiling Point/Range** | approx 66 °C / 150.8 °F |
| **Flash Point** | -21.7 °C / -7.1 °F |
| **Evaporation Rate** | No information available |
| **Flammability (solid,gas)** | Not applicable |
| **Flammability or explosive limits** | |
| **Upper** | 13 vol % |
| **Lower** | 1.5 vol % |
| **Vapor Pressure** | 145 mmHg @ 20 °C |
| **Vapor Density** | No information available |
| **Specific Gravity** | 0.876 |
| **Solubility** | Reacts with water |
| **Partition coefficient; n-octanol/water** | No data available |
| **Autoignition Temperature** | 103 °C / 217.4 °F |
| **Decomposition Temperature** | No information available |
| **Viscosity** | No information available |

## 10. Stability and reactivity

| | |
|---|---|
| **Reactive Hazard** | Yes |
| **Stability** | Reacts violently with water, liberating extremely flammable gases. Moisture sensitive. Air sensitive. May form explosive peroxides. |
| **Conditions to Avoid** | Exposure to air. Incompatible products. Exposure to moist air or water. Exposure to moisture. Keep away from open flames, hot surfaces and sources of ignition. |
| **Incompatible Materials** | Acids, Water, Alcohols, Bromine, Acid anhydrides, Acid chlorides |
| **Hazardous Decomposition Products** | Carbon monoxide (CO), Carbon dioxide ($CO_2$), Hydrogen, Oxides of boron |
| **Hazardous Polymerization** | Hazardous polymerization does not occur. |
| **Hazardous Reactions** | None under normal processing. Reacts violently with water. |

## 11. Toxicological information

**Acute Toxicity**

**Product Information**

**Oral LD50** Category 4. ATE = 300 - 2000 mg/kg.
**Dermal LD50** Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
**Vapor LC50** Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

**Component Information**

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| Tetrahydrofuran | 1650 mg/kg ( Rat ) | > 2000 mg/kg (Rabbit) | 180 mg/L ( Rat ) 1 h<br>53.9 mg/L ( Rat ) 4 h |

**Toxicologically Synergistic Products** No information available

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Irritation** Severe eye irritant; Irritating to respiratory system Irritating to skin

**Sensitization** No information available

**Carcinogenicity** The table below indicates whether each agency has listed any ingredient as a carcinogen. Limited evidence of a carcinogenic effect.

| Component | CAS-No | IARC | NTP | ACGIH | OSHA | Mexico |
|---|---|---|---|---|---|---|
| Tetrahydrofuran | 109-99-9 | Group 2B | Not listed | A3 | X | A3 |
| Boron, trihydro(tetrahydrofuran)-, (T-4)- | 14044-65-6 | Not listed | Not listed | Not listed | Not listed | Not listed |

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

*A1 - Known Human Carcinogen*
*A2 - Suspected Human Carcinogen*
*A3 - Animal Carcinogen*
*ACGIH: (American Conference of Governmental Industrial Hygienists)*

**Mutagenic Effects** No information available

**Reproductive Effects** No information available.

**Developmental Effects** No information available.

**Teratogenicity** No information available.

**STOT - single exposure** Respiratory system Central nervous system (CNS)
**STOT - repeated exposure** None known

**Aspiration hazard** No information available

**Symptoms / effects,both acute and delayed** Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Causes central nervous system depression

**Endocrine Disruptor Information**

| Component | EU - Endocrine Disrupters Candidate List | EU - Endocrine Disruptors - Evaluated Substances | Japan - Endocrine Disruptor Information |
|---|---|---|---|
| Tetrahydrofuran | Group III Chemical | Not applicable | Not applicable |

**Other Adverse Effects** The toxicological properties have not been fully investigated.

## 12. Ecological information

**Ecotoxicity**

Do not empty into drains. Reacts with water so no ecotoxicity data for the substance is available.

| Component | Freshwater Algae | Freshwater Fish | Microtox | Water Flea |
|---|---|---|---|---|
| Tetrahydrofuran | Not listed | 2160 mg/l LC50 = 96 h Pimephales promelas<br>Leuciscus idus: LC50: 2820 mg/L/48h | Not listed | EC50 48 h 3485 mg/l<br>EC50: >10000 mg/L/24h |

**Persistence and Degradability** Persistence is unlikely based on information available.

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Will likely be mobile in the environment due to its volatility.

| Component | log Pow |
|---|---|
| Tetrahydrofuran | 0.45 |

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

| Component | RCRA - U Series Wastes | RCRA - P Series Wastes |
|---|---|---|
| Tetrahydrofuran - 109-99-9 | U213 | - |

## 14. Transport information

**DOT**

**UN-No** UN3399
**Proper Shipping Name** Organometallic substance, liquid, water-reactive, flammable
**Technical Name** Tetrahydrofuran, Boron, trihydro(tetrahydrofuran)-, (T-4)-
**Hazard Class** 4.3
**Packing Group** I

**TDG**

**UN-No** UN3399
**Proper Shipping Name** Organometallic substance, liquid, water-reactive, flammable
**Hazard Class** 4.3
**Subsidiary Hazard Class** 3
**Packing Group** I

**IATA**

**UN-No** UN3399
**Proper Shipping Name** Organometallic substance, liquid, water-reactive, flammable
**Hazard Class** 4.3
**Subsidiary Hazard Class** 3
**Packing Group** I

**IMDG/IMO**

**UN-No** UN3399
**Proper Shipping Name** ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE
**Hazard Class** 4.3
**Subsidiary Hazard Class** 3
**Packing Group** I

## 15. Regulatory information

**United States of America Inventory**

| Component | CAS-No | TSCA | TSCA Inventory notification - Active/Inactive | TSCA - EPA Regulatory Flags |
|---|---|---|---|---|
| Tetrahydrofuran | 109-99-9 | X | ACTIVE | - |
| Boron, trihydro(tetrahydrofuran)-, (T-4)- | 14044-65-6 | X | ACTIVE | - |

**Legend:**
**TSCA** - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

**TSCA 12(b)** - Notices of Export

| Component | CAS-No | **TSCA 12(b)** - Notices of Export |
|---|---|---|
| Tetrahydrofuran | 109-99-9 | Section 4, 1 % de minimus concentration |

**International Inventories**

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

| Component | CAS-No | DSL | NDSL | EINECS | PICCS | ENCS | AICS | IECSC | KECL |
|---|---|---|---|---|---|---|---|---|---|
| Tetrahydrofuran | 109-99-9 | X | - | 203-726-8 | X | X | X | X | KE-33454 |
| Boron, trihydro(tetrahydrofuran)-, (T-4)- | 14044-65-6 | - | X | 237-881-8 | - | - | - | X | - |

**U.S. Federal Regulations**

**SARA 313** Not applicable

**SARA 311/312 Hazard Categories** See section 2 for more information

**CWA (Clean Water Act)** Not applicable

**Clean Air Act** Not applicable

**OSHA** - Occupational Safety and Health Administration Not applicable

**CERCLA** This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

| Component | Hazardous Substances RQs | CERCLA EHS RQs |
|---|---|---|
| Tetrahydrofuran | 1000 lb | - |

**California Proposition 65** This product does not contain any Proposition 65 chemicals.

**U.S. State Right-to-Know Regulations**

| Component | Massachusetts | New Jersey | Pennsylvania | Illinois | Rhode Island |
|---|---|---|---|---|---|
| Tetrahydrofuran | X | X | X | - | X |

**U.S. Department of Transportation**

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

**U.S. Department of Homeland Security** This product does not contain any DHS chemicals.

**Other International Regulations**

**Mexico - Grade** No information available

## 16. Other information

**Prepared By** Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

**Creation Date** 13-Jun-2014

| | |
|---|---|
| **Revision Date** | 19-Jan-2018 |
| **Print Date** | 19-Jan-2018 |
| **Revision Summary** | This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). |

**Disclaimer**

**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text**

## End of SDS