

SAFETY DATA SHEET

Revision Date 19-January-2018

Revision Number 4

1. Identification

Product Name Borane dimethyl sulfide complex, 2M solution in tetrahydrofuran
Cat No. : AC185070000; AC185071000; AC185078000
Synonyms Dimethyl sulfideborane; BMS
Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company

Importer/Distributor
Fisher Scientific
112 Colonnade Road,
Ottawa, ON K2E 7L6,
Canada
Tel: 1-800-234-7437

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Manufacturer

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

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

WHMIS 2015 Classification Classified as hazardous under the Hazardous Products Regulations (SOR/2015-17)

| | |
|---|------------|
| 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). | |
| Physical Hazards Not Otherwise Classified | Category 1 |
| Reacts violently with water | |
| May form explosive peroxides | |

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 skin irritation
Causes serious eye damage
May cause respiratory irritation
May cause drowsiness and dizziness
Suspected of causing cancer
Reacts violently with water
May form explosive peroxides



Precautionary Statements

Prevention

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Do not allow contact with water
Keep container tightly closed
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Handle under inert gas. Protect from moisture
Ground/bond container and receiving equipment
Use only non-sparking tools
Take precautionary measures against static discharges
Avoid breathing dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area

Response

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower
IF INHALED: Remove person to fresh air and keep comfortable for breathing
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/doctor
Rinse mouth
Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages
Wash contaminated clothing before reuse
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish

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

Other Hazards

Stench

3. Composition/Information on Ingredients

| Component | CAS-No | Weight % |
|-----------|--------|----------|
|-----------|--------|----------|

| | | |
|--|------------|-------|
| Tetrahydrofuran | 109-99-9 | 80-84 |
| Boron, trihydro[thiobis[methane]]-, (T-4)- | 13292-87-0 | 16-20 |
| Dimethyl sulfide | 75-18-3 | < 2 |

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. Get medical attention. |
| Skin Contact | Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician. |
| Inhalation | Move 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/effects | Causes severe eye damage. 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. Cool closed containers exposed to fire with water spray. |
| Unsuitable Extinguishing Media | No information available |
| Flash Point | -17 °C / 1.4 °F |
| Method - | No information available |
| Autoignition Temperature | No information available |
| Explosion Limits | |
| Upper | No data available |
| Lower | No data available |
| Sensitivity to Mechanical Impact | No information available |
| Sensitivity to Static Discharge | No information available |

Specific Hazards Arising from the Chemical
 Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Reacts violently with water.

Hazardous Combustion Products
 Hydrogen chloride gas Carbon monoxide (CO) Carbon dioxide (CO₂) Sulfur oxides 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 2 | Flammability 4 | Instability 2 | Physical hazards W |
|--------------------|--------------------------|-------------------------|------------------------------|

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Remove all sources of

Environmental Precautions ignition. Take precautionary measures against static discharges. Should not be released into the environment.

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

7. Handling and storage

Handling Do not get in eyes, on skin, or on clothing. Wear personal protective equipment. Ensure adequate ventilation. 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.

Storage Keep away from heat and sources of ignition. Never allow product to get in contact with water during storage. Refrigerator/flammables. Keep under nitrogen. Keep container tightly closed in a dry and well-ventilated place. 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 away from water.

8. Exposure controls / personal protection

Exposure Guidelines

| Component | Alberta | British Columbia | Ontario TWAEV | Quebec | ACGIH TLV | OSHA PEL | NIOSH IDLH |
|------------------|---|--------------------------------------|--------------------------------------|--|--------------------------------------|--|--|
| Tetrahydrofuran | TWA: 50 ppm TWA: 147 mg/m ³ STEL: 100 ppm STEL: 295 mg/m ³ Skin | TWA: 50 ppm STEL: 100 ppm Skin | TWA: 50 ppm STEL: 100 ppm Skin | TWA: 100 ppm TWA: 300 mg/m ³ | TWA: 50 ppm STEL: 100 ppm Skin | (Vacated) TWA: 200 ppm (Vacated) TWA: 590 mg/m ³ (Vacated) STEL: 250 ppm (Vacated) STEL: 735 mg/m ³ TWA: 200 ppm TWA: 590 mg/m ³ | IDLH: 2000 ppm TWA: 200 ppm TWA: 590 mg/m ³ STEL: 250 ppm STEL: 735 mg/m ³ |
| Dimethyl sulfide | TWA: 10 ppm TWA: 25 mg/m ³ | TWA: 10 ppm | TWA: 10 ppm | | TWA: 10 ppm | | |

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

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

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection

Goggles

Hand Protection

Protective gloves

| Glove material | Breakthrough time | Glove thickness | Glove comments |
|-----------------------|-----------------------------------|------------------------|------------------------|
| Butyl rubber | See manufacturers recommendations | - | Splash protection only |

Inspect gloves before use. observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information) gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion. gloves with care avoiding skin contamination.

Respiratory Protection

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. 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.

To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

Recommended Filter type: low boiling organic solvent Type AX Brown conforming to EN371 or Organic gases and vapours filter Type A Brown conforming to EN14387

When RPE is used a face piece Fit Test should be conducted

Environmental exposure controls

No information available.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing before re-use. Wash hands before breaks and at the end of workday.

9. Physical and chemical properties

| | |
|---|--------------------------|
| Physical State | Liquid |
| Appearance | Light yellow |
| Odor | Stench |
| Odor Threshold | No information available |
| pH | No information available |
| Melting Point/Range | No data available |
| Boiling Point/Range | No information available |
| Flash Point | -17 °C / 1.4 °F |
| Evaporation Rate | No information available |
| Flammability (solid,gas) | Not applicable |
| Flammability or explosive limits | |
| Upper | No data available |
| Lower | No data available |
| Vapor Pressure | No information available |
| Vapor Density | No information available |
| Specific Gravity | 0.850 |
| Solubility | Reacts with water |
| Partition coefficient; n-octanol/water | No data available |
| Autoignition Temperature | No information available |
| Decomposition Temperature | 44 °C |
| Viscosity | No information available |
| Molecular Formula | C2 H9 B S |
| Molecular Weight | 75.95 |

10. Stability and reactivity

| | |
|------------------------|---|
| Reactive Hazard | Yes |
| Stability | Reacts violently with water, liberating highly flammable gases. Stable under normal |

conditions. Moisture sensitive.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Incompatible products. Exposure to moist air or water. Exposure to moisture.

Incompatible Materials Acids, Water, Alcohols, Bromine, Acid anhydrides, Acid chlorides

Hazardous Decomposition Products Hydrogen chloride gas, Carbon monoxide (CO), Carbon dioxide (CO₂), Sulfur oxides, Oxides of boron

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions 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 53.9 mg/L (Rat) 4 h |
| Boron, trihydro[thiobis[methane]]-, (T-4)- | <500 mg/kg (Rat) | >2000 mg/kg (Rabbit) | Not listed |
| Dimethyl sulfide | > 2000 mg/kg (Rat) | >5000 mg/kg (Rabbit) | LC50 = 40250 ppm (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 Irritating to respiratory system and skin Vapors may cause drowsiness and dizziness Risk of serious damage to eyes

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 | Not listed |
| Boron, trihydro[thiobis[methane]]-, (T-4)- | 13292-87-0 | Not listed | Not listed | Not listed | Not listed | Not listed |
| Dimethyl sulfide | 75-18-3 | 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 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 Disruptors 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 Leuciscus idus: LC50: 2820 mg/L/48h | Not listed | EC50 48 h 3485 mg/l EC50: >10000 mg/L/24h |
| Dimethyl sulfide | Not listed | Not listed | Not listed | EC50: = 23 mg/L, 48h (Daphnia pulex) |

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 water solubility. Is not likely mobile in the environment.

| Component | log Pow |
|------------------|---------|
| Tetrahydrofuran | 0.45 |
| Dimethyl sulfide | 0.84 |

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
Proper technical name Tetrahydrofuran, Boron, trihydro[thiobis[methane]]-, (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

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

| Component | DSL | NDSL | TSCA | EINECS | ELINCS | NLP | PICCS | ENCS | AICS | IECSC | KECL |
|--|-----|------|------|-----------|--------|-----|-------|------|------|-------|------|
| Tetrahydrofuran | X | - | X | 203-726-8 | - | | X | X | X | X | X |
| Boron, trihydro[thiobis(methane)]-, (T-4)- | - | X | X | 236-313-6 | - | | - | - | - | X | - |
| Dimethyl sulfide | X | - | X | 200-846-2 | - | | X | X | X | X | X |

Canada

SDS in compliance with provisions of information as set out in Canadian Standard - Part 4, Schedule 1 and 2 of the Hazardous Products Regulations (HPR) and meets the requirements of the HPR (Paragraph 13(1)(a) of the Hazardous Products Act (HPA)).

| Component | Canada - National Pollutant Release Inventory (NPRI) | Canadian Environmental Protection Agency (CEPA) - List of Toxic Substances | Canada's Chemicals Management Plan (CEPA) |
|------------------|--|--|---|
| Tetrahydrofuran | Part 5, Individual Substances | | |
| Dimethyl sulfide | Part 1, Group A Substance | | |

16. Other information

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Revision Summary This document has been updated to comply with the requirements of WHMIS 2015 to align with the Globally Harmonised System (GHS) for the Classification and Labelling of Chemicals.

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