SAFETY DATA SHEET

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SECTION 1. IDENTIFICATION

Product Name: Boron Trichloride

Product Number: All applicable American Elements product codes, e.g. BO-CL-02 , BO-CL-025 , BO-CL-03 , BO-CL-035 , BO-CL-04 , BO-CL-05

CAS #: 10294-34-5

Relevant identified uses of the substance: Scientific research and development

Supplier details:
American Elements
10884 Weyburn Ave.
Los Angeles, CA 90024
Tel: +1 310-208-0551
Fax: +1 310-208-0351

Emergency telephone number:
+1 800-424-9300

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)
GHS02 Flame
Flam. Liq. 2 H225 Highly flammable liquid and vapor.
GHS06 Skull and crossbones
Acute Tox. 2 H300 Fatal if swallowed.
Acute Tox. 3 H331 Toxic if inhaled.
GHS08 Health hazard
Repr. 2 H361 Suspected of damaging fertility or the unborn child.
STOT RE 2 H373 May cause damage to the peripheral nervous system, the lung, the kidneys, the liver, the reproductive system and the brain through prolonged
or repeated exposure. Route of exposure: Inhalative.
Asp. Tox. 1 H304 May be fatal if swallowed and enters airways.
GHS05 Corrosion
Skin Corr. 1B H314 Causes severe skin burns and eye damage.
GHS07
STOT SE 3 H336 May cause drowsiness or dizziness.
Hazards not otherwise classified No data available
GHS label elements, including precautionary statements
Hazard pictograms



GHS02 GHS05 GHS06 GHS07 GHS08
Signal word Danger
Hazard-determining components of labeling:
Boron trichloride
n-Hexane
3-Methylpentane
Hazard statements
H225 Highly flammable liquid and vapor.
H300 Fatal if swallowed.
H331 Toxic if inhaled.
H314 Causes severe skin burns and eye damage.
H361 Suspected of damaging fertility or the unborn child.
H336 May cause drowsiness or dizziness.
H373 May cause damage to the peripheral nervous system, the lung, the kidneys, the liver, the reproductive system and the brain through prolonged or repeated
exposure. Route of exposure: Inhalative.
H304 May be fatal if swallowed and enters airways.
Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
WHMIS classification
B2 - Flammable liquid
D1A - Very toxic material causing immediate and serious toxic effects
D2A - Very toxic material causing other toxic effects
E - Corrosive material
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)
HEALTH
FIRE
REACTIVITY
3
3
2
Health (acute effects) = 3
Flammability = 3
Physical Hazard = 2
Other hazards
Results of PBT and vPvB assessment
PBT: N/A
vPvB: N/A

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization: Mixtures
Dangerous components:
110-54-3 n-Hexane
Flam. Liq. 2, H225; Repr. 2, H361; STOT RE 2, H373; Asp. Tox. 1, H304; Skin Irrit. 2, H315; STOT SE 3, H336
54.73%
96-14-0 3-Methylpentane
Flam. Liq. 2, H225; Asp. Tox. 1, H304; Skin Irrit. 2, H315; STOT SE 3, H336
21.05%
10294-34-5 Boron trichloride
Press. Gas, H280; Acute Tox. 2, H300; Acute Tox. 2, H330; Skin Corr. 1B, H314
15.8%
107-83-5 2-Methylpentane
Flam. Liq. 2, H225; Asp. Tox. 1, H304; Skin Irrit. 2, H315; STOT SE 3, H336
4.21%
96-37-7 Methylcyclopentane
Flam. Liq. 2, H225; Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335
4.2092%
Additional information None known.
Non-Hazardous Ingredients
71-43-2 Benzene
Flam. Liq. 2, H225; Muta. 1B, H340; Carc. 1A, H350; STOT RE 1, H372; Asp. Tox. 1, H304; Skin Irrit. 2, H315; Eye Irrit. 2, H319
0.0008%

SECTION 4. FIRST AID MEASURES

Description of first aid measures
General information
Immediately remove any clothing soiled by the product.
Remove breathing apparatus only after contaminated clothing has been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
If inhaled:
Supply patient with fresh air. If not breathing, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
In case of skin contact:
Immediately wash with soap and water; rinse thoroughly.
Seek immediate medical advice.
In case of eye contact:
Rinse opened eye for several minutes under running water. Consult a physician.
If swallowed:
Do not induce vomiting; immediately call for medical help.
Information for doctor
Most important symptoms and effects, both acute and delayed
Causes severe skin burns.
Causes serious eye damage.
Indication of any immediate medical attention and special treatment needed:
No data available

SECTION 5. FIREFIGHTING MEASURES

Extinguishing media
Suitable extinguishing agents In case of fire, use sand, carbon dioxide or powdered extinguishing agent. Never use water.
For safety reasons unsuitable extinguishing agents Water
Special hazards arising from the substance or mixture
Reacts violently with water
If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
Hydrogen chloride (HCl)
Boron oxide
Advice for firefighters
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources
Environmental precautions: Do not allow product to enter drains, sewage systems, or other water courses.
Methods and materials for containment and cleanup:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents
Prevention of secondary hazards: Keep away from ignition sources.
Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7. HANDLING AND STORAGE

Handling
Precautions for safe handling
Handle under dry protective gas.
Keep container tightly sealed.
Keep away from heat and direct sunlight.
Ensure good ventilation at the workplace.
Open and handle container with care.
Information about protection against explosions and fires:
Protect against electrostatic charges.
Fumes can combine with air to form an explosive mixture.
Keep ignition sources away.
Conditions for safe storage, including any incompatibilities
Requirements to be met by storerooms and receptacles: Refrigerate

Information about storage in one common storage facility:
Protect from heat.
Store away from water/moisture.
Store away from oxidizing agents.
Further information about storage conditions:
Store under dry inert gas.
This product is moisture sensitive.
Protect from humidity and water.
Keep container tightly sealed.
Protect from heat and direct sunlight.
Refrigerate
Specific end use(s) No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
Control parameters
Components with limit values that require monitoring at the workplace:
110-54-3 n-Hexane (54.73%)

PEL (USA) Long-term value: 1800 mg/m^3, 500 ppm

REL (USA) Long-term value: 180 mg/m^3, 50 ppm

TLV (USA) Long-term value: 176 mg/m^3, 50 ppm
Skin; BEI
EL (Canada) Long-term value: 20 ppm
Skin

EV (Canada) Long-term value: 176 mg/m^3, 50 ppm
96-14-0 3-Methylpentane (21.05%)

REL (USA) Long-term value: 350 mg/m^3, 100 ppm

Ceiling limit value: 1800* mg/m^3, 510* ppm
*15-min

TLV (USA) Short-term value: 3500 mg/m^3, 1000 ppm

Long-term value: 1760 mg/m^3, 500 ppm
107-83-5 2-Methylpentane (4.21%)

REL (USA) Long-term value: 350 mg/m^3, 100 ppm

Ceiling limit value: 1800* mg/m^3, 510* ppm
*15-min

TLV (USA) Short-term value: 3500 mg/m^3, 1000 ppm

Long-term value: 1760 mg/m^3, 500 ppm
96-37-7 Methylcyclopentane (4.2092%)

REL (USA) Long-term value: 350 mg/m^3, 100 ppm

Ceiling limit value: 1800* mg/m^3, 510* ppm
*15-min

TLV (USA) Short-term value: 3500 mg/m^3, 1000 ppm

Long-term value: 1760 mg/m^3, 500 ppm
71-43-2 Benzene (0.0008%)

PEL (USA) Short-term value: 15* mg/m^3, 5* ppm

Long-term value: 3* mg/m^3, 1* ppm
*table Z-2 for exclusions in 29CFR1910.1028(d)
REL (USA) Short-term value: 1 ppm
Long-term value: 0.1 ppm
See Pocket Guide App. A

TLV (USA) Short-term value: 8 mg/m^3, 2.5 ppm

Long-term value: 1.6 mg/m^3, 0.5 ppm
Skin; BEI
EL (Canada) Short-term value: 2.5 ppm
Long-term value: 0.5 ppm
Skin; ACGIH A1; IARC 1
EV (Canada) Short-term value: 2.5 ppm
Long-term value: 0.5 ppm
Skin
Ingredients with biological limit values:
110-54-3 n-Hexane (54.73%)
BEI (USA) 0.4 mg/L
Medium: urine
Time: end of shift at end of workweek
Parameter: 2.5-Hexanedione without hydrolysis
71-43-2 Benzene (0.0008%)
BEI (USA) 25 µg/g creatinine
Medium: urine
Time: end of shift Parameter
Parameter: S-Phenylmercapturic acid (background
500 µg/g creatinine
Medium: urine
Time: end of shift
Parameter: t,t-Muconic acid (background)
Additional information: No data
Exposure controls
Personal protective equipment
Follow typical protective and hygienic practices for handling chemicals.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Do not inhale dust / smoke / mist.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use self-contained respiratory protective device in emergency situations.
Recommended filter device for short term use:
Use a respirator with organic vapor/acid gas cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying
respirators are appropriate. Only use equipment tested and approved under appropriate government standards such as NIOSH (USA) or CEN (EU).
Protection of hands:
Impervious gloves
Inspect gloves prior to use.
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Eye protection:

Tightly sealed goggles
Full face protection
Body protection: Protective work clothing.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
Appearance:
Form: Liquid
Color: Colorless
Odor: Not determined
Odor threshold: Not determined.
pH: Not determined.
Melting point/Melting range: Not determined
Boiling point/Boiling range: Not determined
Sublimation temperature / start: Not determined
Flash point: -23 °C (-9 °F) (Hexane)
Flammability (solid, gas) Not determined.
Ignition temperature: 240 °C (464 °F)
Decomposition temperature: Not determined
Autoignition: Product is not selfigniting.
Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures is possible.
Explosion limits:
Lower: 1.2 Vol %
Upper: 7.7 Vol %
Vapor pressure at 20 °C (68 °F): 160 hPa (120 mm Hg)

Density at 20 °C (68 °F): 0.738 g/cm^3 (6.159 lbs/gal)
Relative density Not determined.
Vapor density Not determined.
Evaporation rate Not determined.
Solubility in / Miscibility with
Water: Reacts violently
Partition coefficient (n-octanol/water): Not determined.
Viscosity:
Dynamic: Not determined.
Kinematic: Not determined.
Solvent content:
Organic solvents: 54.7 %
Other information No data available
Additional information This product may form a precipitate.

SECTION 10. STABILITY AND REACTIVITY

Reactivity Reacts violently with water.
Chemical stability Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions
Reacts with strong oxidizing agents
Reacts violently with water

Conditions to avoid No data available
Incompatible materials:
Oxidizing agents
Water/moisture
Heat
Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Hydrogen chloride (HCl)
Boron oxide
Additional information: This product may form a precipitate.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity:
Fatal if swallowed.
Toxic if inhaled.
Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.
LD/LC50 values that are relevant for classification:
110-54-3 n-Hexane
Oral LD50 15840 mg/kg (rat)
Inhalative LC50/4H 48000 ppm/4H (rat)
Skin irritation or corrosion: Causes severe skin burns.
Eye irritation or corrosion: Causes serious eye damage.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for components in this product.
Carcinogenicity:
EPA-I: Data are inadequate for an assessment of human carcinogenic potential.
EPA-II: Inadequate information to access carcinogenic potential.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.
Reproductive toxicity:
Suspected of damaging fertility or the unborn child.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for components in this product.
Specific target organ system toxicity - repeated exposure:
May cause damage to the peripheral nervous system, the lung, the kidneys, the liver, the reproductive system and the brain through prolonged or repeated
exposure. Route of exposure: Inhalative.
Specific target organ system toxicity - single exposure: May cause respiratory irritation.
Aspiration hazard: May be fatal if swallowed and enters airways.
Subacute to chronic toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
The product shows the following dangers according to internally approved calculation methods for preparations:
Corrosive
Very toxic

SECTION 12. ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity: No data available
Persistence and degradability No data available
Bioaccumulative potential No data available
Mobility in soil No data available
Additional ecological information:
Do not allow product to reach groundwater, water courses, or sewage systems.
Danger to drinking water if even small quantities leak into the ground.
Also poisonous for fish and plankton in water bodies.
Toxic to aquatic life.
May cause long lasting harmful effects to aquatic life.
Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: N/A
vPvB: N/A
Other adverse effects No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation Consult official regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

SECTION 14. TRANSPORT INFORMATION

UN-Number
DOT, IMDG, IATA UN3286
UN proper shipping name
DOT Flammable liquid, toxic, corrosive, n.o.s. (Boron trichloride, Hexanes)
IMDG, IATA FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (BORON TRICHLORIDE, HEXANES)
Transport hazard class(es)
DOT
Class 3 Flammable liquids.
Label 3+6.1+8
Class 3 (FTC) Flammable liquids
Label 3+6.1+8
IMDG, IATA
Class 3 Flammable liquids.
Label 3+6.1+8
Packing group
DOT, IMDG, IATA II
Environmental hazards:
Marine pollutant (IMDG): No
Special precautions for user Warning: Flammable liquids
EMS Number: F-E,S-C
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code N/A

Transport/Additional information:
DOT
Marine Pollutant (DOT): No
UN "Model Regulation": UN3286, Flammable liquid, toxic, corrosive, n.o.s. (Boron trichloride, Hexanes), 3 (6.1+8), II

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements, including precautionary statements
Hazard pictograms
GHS02 GHS05 GHS06 GHS08
Signal word Danger
Hazard-determining components of labeling:
Boron trichloride
n-Hexane
3-Methylpentane
Hazard statements
H225 Highly flammable liquid and vapor.
H300 Fatal if swallowed.
H331 Toxic if inhaled.
H314 Causes severe skin burns and eye damage.
H361 Suspected of damaging fertility or the unborn child.
H336 May cause drowsiness or dizziness.
H373 May cause damage to the peripheral nervous system, the lung, the kidneys, the liver, the reproductive system and the brain through prolonged or repeated
exposure. Route of exposure: Inhalative.
H304 May be fatal if swallowed and enters airways.
Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).
SARA Section 313 (specific toxic chemical listings)
110-54-3 n-Hexane 54.73%
10294-34-5 Boron trichloride 15.8%
71-43-2 Benzene 0.0008%
California Proposition 65
Prop 65 - Chemicals known to cause cancer
71-43-2 Benzene 0.0008%
Prop 65 - Developmental toxicity
71-43-2 Benzene 0.0008%
Prop 65 - Developmental toxicity, female
None of the ingredients are listed.

Prop 65 - Developmental toxicity, male
71-43-2 Benzene 0.0008%
Information about limitation of use: For use only by technically qualified individuals.
Other regulations, limitations and prohibitive regulations
Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.
None of the ingredients are listed.
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the
market and use must be observed.
None of the ingredients is listed.
Annex XIV of the REACH Regulations (requiring Authorisation for use)
None of the ingredients is listed.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). 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 safety precautions. It does not represent any guarantee of the properties of the product. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. COPYRIGHT 1997-2022 AMERICAN ELEMENTS. LICENSED GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.