

SAFETY DATA SHEET

Version 6.17 Revision Date 04/22/2021 Print Date 09/18/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

1.2			of the substance or mixture and uses advised against
	Brand		Aldrich
	Product Number	:	B1252
	Product name	:	Boron trifluoride-methanol solution

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Inc. 3050 SPRUCE ST ST. LOUIS MO 63103 UNITED STATES
Telephone Fax		+1 314 771-5765 +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225 Acute toxicity, Oral (Category 3), H301 Acute toxicity, Inhalation (Category 3), H331 Acute toxicity, Dermal (Category 3), H311 Skin corrosion (Category 1A), H314 Serious eye damage (Category 1), H318 Specific target organ toxicity - single exposure (Category 1), Eyes, Central nervous system, H370

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



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Signal word	Danger
Hazard statement(s) H225 H301 + H311 + H331 H314 H370	Highly flammable liquid and vapor. Toxic if swallowed, in contact with skin or if inhaled. Causes severe skin burns and eye damage. Causes damage to organs (Eyes, Central nervous system).
Precautionary statement(s) P210) Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233 P240 P241 P242	Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ ventilating/ lighting/ equipment. Use only non-sparking tools.
P243 P260 P264 P270	Take precautionary measures against static discharge. Do not breathe dust/ fume/ gas/ mist/ vapors/ spray. Wash skin thoroughly after handling. Do not eat, drink or smoke when using this product.
P271 P280	Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P301 + P330 + P331 P303 + P361 + P353	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	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.
P307 + P311 P362 P370 + P378	IF exposed: Call a POISON CENTER or doctor/ physician. Take off contaminated clothing and wash before reuse. In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233 P403 + P235 P405 P501	Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up. Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS Strong hydrogen fluoride-releaser

Reacts violently with water.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
Methanol			
CAS-No.	67-56-1	Flam. Liq. 2; Acute Tox. 3;	>= 70 - < 90
EC-No.	200-659-6	STOT SE 1; H225, H301,	%

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Index-No. Registration number	603-001-00-X 01-2119433307-44- XXXX	H331, H311, H370 Concentration limits: >= 10 %: STOT SE 1, H370; 3 - < 10 %: STOT SE 2, H371;	
Boron Trifluoride			
CAS-No.	7637-07-2	Press. Gas Compr. Gas;	>= 20 - < 30
EC-No.	231-569-5	Acute Tox. 2; Skin Corr.	%
Index-No.	005-001-00-X	1A; Eye Dam. 1; H280, H330, H314, H318	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Consult a physician. Show this material safety data sheet to the doctor in attendance.Consult a physician. Show this material safety data sheet to the doctor in attendance.First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

First treatment with calcium gluconate paste. In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: fresh air. Make victim drink ethanol (e.g. 1 drinking glass of a 40% alcoholic beverage). Call a doctor immediately (mention methanol ingestion). Only in exceptional cases, if no medical care is available within one hour, induce vomiting (only in fully conscious persons) and make victim drink ethanol again (approx. 0.3 ml of a 40% alcoholic beverage/kg body weight/hour). Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media Carbon dioxide (CO2) Dry powder

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Unsuitable extinguishing media Water Foam

5.2 Special hazards arising from the substance or mixture

Carbon oxides Hydrogen fluoride Borane/boron oxides Combustible. Pay attention to flashback. Vapors are heavier than air and may spread along floors. May not get in touch with: Water Development of hazardous combustion gases or vapours possible in the event of fire. Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

For personal protection see section 8.

6.1 Personal precautions, protective equipment and emergency procedures Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols. Keep workplace dry. Do not allow product to come into contact with water.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures

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Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

Never allow product to get in contact with water during storage.

Storage stability

Recommended storage temperature 2 - 8 °C

Moisture sensitive. Handle under nitrogen, protect from moisture. Store under nitrogen. Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Ingreatents with		control parameters				
Component	CAS-No.	Value	Control parameters	Basis		
Methanol	67-56-1	TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)		
	Remarks	Danger of	Danger of cutaneous absorption			
		STEL	250 ppm	USA. ACGIH Threshold Limit Values (TLV)		
		Danger of	cutaneous absor	ption		
		TWA	200 ppm 260 mg/m3	USA. NIOSH Recommended Exposure Limits		
		Potential for	or dermal absorp	tion		
		ST	250 ppm 325 mg/m3	USA. NIOSH Recommended Exposure Limits		
		Potential for	Potential for dermal absorption			
		TWA	200 ppm 260 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants		
		STEL	250 ppm 325 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000		
		Skin notati	on			
		TWA	200 ppm 260 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000		
		Skin notati	on			

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		С	1,000 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		
		PEL	200 ppm 260 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin	·	
		STEL	250 ppm 325 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		
Boron Trifluoride	7637-07-2	TWA	0.1 ppm	USA. ACGIH Threshold Limit Values (TLV)
		С	0.7 ppm	USA. ACGIH Threshold Limit Values (TLV)
		С	1 ppm 3 mg/m3	USA. NIOSH Recommended Exposure Limits
		С	1 ppm 3 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		С	1 ppm 3 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		С	1 ppm 3 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Methanol	67-56-1	Methanol	15 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as	possible after exp	oosure ceases)
Boron Trifluoride	7637-07-2	Fluoride	2 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift	(16 hours	after exposure cea	ases)
		Fluoride	3 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as	possible after exp	osure ceases)

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8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact Material: butyl-rubber Minimum layer thickness: 0.3 mm Break through time: 480 min Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact Material: Nitrile rubber Minimum layer thickness: 0.4 mm Break through time: 30 min Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
		Color: colorless

b) Odor Aldrich - B1252 No data available

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada



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c)	Odor Threshold	No data available
d)	рН	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	9.7 °C (49.5 °F)
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
I)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available
O+L	or cafoty informatio	2

9.2 Other safety information No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapors may form explosive mixture with air.

- **10.2 Chemical stability** sensitive to moisture
- **10.3 Possibility of hazardous reactions** No data available
- **10.4** Conditions to avoid

Warming. Moisture.

10.5 Incompatible materials

Acids, Oxidizing agents, Alkali metals, Acid chlorides, Acid anhydrides, Reducing agents, Boron trifluoride reacts vigorously with alkyl nitrates after an induction period up to several Aldrich - B1252

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hours. Reacts with alkali or alkaline earth metals. Do not use mercury manometers as boron trifluoride is soluble in mercuryMagnesium, zinc alloys, various plastics, Strong oxidizing agentsAlkali metals, Boron trifluoride reacts vigorously with alkyl nitrates after an induction period up to several hours. Reacts with alkali or alkaline earth metals. Do not use mercury manometers as boron trifluoride is soluble in mercury

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity Acute toxicity estimate Oral - 137.12 mg/kg (Calculation method)

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Acute toxicity estimate Inhalation - 4 h - 2.18 mg/l (Calculation method) Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

Acute toxicity estimate Dermal - 411.1 mg/kg (Calculation method) No data available

Skin corrosion/irritation

Mixture causes severe burns.

Serious eye damage/eye irritation Mixture causes serious eye damage. Risk of blindness!

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

- IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

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Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

Mixture causes damage to organs. - Eyes, Central nervous system

Specific target organ toxicity - repeated exposure No data available

Aspiration hazard

No data available

11.2 Additional Information

Not available

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea Vomiting, Fever, Rapid respiration, pneumonitis, pulmonary edema, Cough, wheezing, laryngitis, Shortness of breath, Headache, Abdominal pain Fluoride ion can reduce serum calcium levels possibly causing fatal hypocalcemia. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

Components

Methanol

Acute toxicity

Acute toxicity estimate Oral - 100.1 mg/kg (Expert judgment) Symptoms: Nausea, Vomiting Acute toxicity estimate Inhalation - 4 h - 3.1 mg/l (Expert judgment) Symptoms: Irritation symptoms in the respiratory tract. Acute toxicity estimate Dermal - 300.1 mg/kg (Expert judgment)

Skin corrosion/irritation

Skin - Rabbit Result: No skin irritation Remarks: (ECHA) Drying-out effect resulting in rough and chapped skin.

Serious eye damage/eye irritation

Eyes - Rabbit Result: No eye irritation Remarks:

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(ECHA)

Respiratory or skin sensitization

Sensitisation test: - Guinea pig Result: negative (OECD Test Guideline 406)

Germ cell mutagenicity

Based on available data the classification criteria are not met. Ames test Salmonella typhimurium Result: negative In vitro mammalian cell gene mutation test Chinese hamster lung cells Result: negative OECD Test Guideline 474 Mouse - male and female - Bone marrow Result: negative

Carcinogenicity

Did not show carcinogenic effects in animal experiments.

Reproductive toxicity

Based on available data the classification criteria are not met.

Specific target organ toxicity - single exposure

Causes damage to organs. - Eyes, Central nervous system Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2) Acute oral toxicity - Nausea, Vomiting Acute inhalation toxicity - Irritation symptoms in the respiratory tract.

Specific target organ toxicity - repeated exposure No data available

Aspiration hazard

No data available

Boron Trifluoride

Acute toxicity

LC50 Inhalation - Rat - male and female - 4 h - 1.21 mg/l (OECD Test Guideline 403)

Skin corrosion/irritation

Serious eye damage/eye irritation Causes serious eye damage.

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Respiratory or skin sensitization Germ cell mutagenicity Carcinogenicity Reproductive toxicity Specific target organ toxicity - single exposure Specific target organ toxicity - repeated exposure Aspiration hazard

SECTION 12: Ecological information

12.1 Toxicity

Mixture No data available

12.2 Persistence and degradability No data available

- 12.3 Bioaccumulative potential No data available
- **12.4 Mobility in soil** No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects No data available

Components

Methanol

Toxicity to fish	flow-through test LC50 - Lepomis macrochirus (Bluegill) - 15,400.0 mg/l - 96 h (US-EPA)
Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - Daphnia magna (Water flea) - 18,260 mg/l - 96 h (OECD Test Guideline 202)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (green algae) - ca. 22,000.0 mg/l - 96 h (OECD Test Guideline 201)
Toxicity to bacteria	static test IC50 - activated sludge - > 1,000 mg/l - 3 h (OECD Test Guideline 209)

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 3286 Class: 3 (6.1, 8) Packing group: I Proper shipping name: Flammable liquid, toxic, corrosive, n.o.s. (Methanol, Boron Trifluoride) Reportable Quantity (RQ): Poison Inhalation Hazard: No

IMDG

UN number: 3286 Class: 3 (6.1, 8) Packing group: I EMS-No: F-E, S-C Proper shipping name: FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (Methanol, Boron Trifluoride)

ΙΑΤΑ

UN number: 3286 Class: 3 (6.1, 8) Packing group: I Proper shipping name: Flammable liquid, toxic, corrosive, n.o.s. (Methanol, Boron Trifluoride) IATA Passenger: Not permitted for transport

SECTION 15: Regulatory information

Boron Trifluoride	CAS-No.	Revision Date
	7637-07-2	2007-07-01

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Methanol	CAS-No. 67-56-1	Revision Date 2007-07-01
Boron Trifluoride	7637-07-2	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

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SECTION 16: Other information

Further information

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. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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