

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 02.07.2013

Revision: 20.04.2011

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifier**

Trade name

Tri-n-butylborane, 1M soln. in THF

Stock number:

H32518

1.2 Relevant identified uses of the substance or mixture and uses advised against.

Identified use:

SU24 Scientific research and development

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar GmbH & Co.KG
 A Johnson Matthey Company
 Zeppelinstr. 7b
 76185 Karlsruhe / Germany
 Tel: +49 (0) 721 84007 280
 Fax: +49 (0) 721 84007 300
 Email: tech@alfa.com
 www.alfa.com
 Product safety Tel + +049 (0) 7275 988687-0
 Carechem 24: +44 (0) 1235 239 670 (Multi-language emergency number)
 Poison Information Center Mainz
 www.giftinfo.uni-mainz.de Telephone: +49(0)6131/19240

Informing department:

1.4 Emergency telephone number:**SECTION 2: Hazards identification****2.1 Classification of the substance or mixture**

Classification according to Regulation (EC) No 1272/2008



GHS02 flame

Flam. Liq. 2, H225 Highly flammable liquid and vapour.



GHS08 health hazard

Carc. 2, H351 Suspected of causing cancer.



GHS07

Acute Tox. 4, H302 Harmful if swallowed.

Eye Irrit. 2, H319 Causes serious eye irritation.

STOT SE 3, H335 May cause respiratory irritation.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

C; Corrosive

R34: Causes burns.

Xi; Irritant

R37: Irritating to respiratory system.

F; Highly flammable

R11: Highly flammable.

R19: May form explosive peroxides.

Information concerning particular hazards for human and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Other hazards that do not result in classification

No information known.

2.2 Label elements**Labelling according to Regulation (EC) No 1272/2008**

Hazard pictograms

Signal word

The product is classified and labelled according to the CLP regulation.

GHS02, GHS07, GHS08

Danger

Hazard-determining components of labelling:

Tetrahydrofuran

Tributylborane

H225 Highly flammable liquid and vapour.

H302 Harmful if swallowed.

H319 Causes serious eye irritation.

H351 Suspected of causing cancer.

H335 May cause respiratory irritation.

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P241 Use explosion-proof electrical/ventilating/lighting/equipment.

P303+P361+P353 IF ON SKIN (or hair): Remove/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.

EUH019 May form explosive peroxides.

Additional information:**2.3 Other hazards**

Results of PBT and vPvB assessment

PBT:

Not applicable.

vPvB:

Not applicable.

SECTION 3: Composition/information on ingredients**3.2 Mixtures****Dangerous components:**

CAS: 109-99-9 EINECS: 203-726-8	Tetrahydrofuran	☒ Xn R40; ☒ Xi R36/37; ☒ F R11 R19 ☒ Flam. Liq. 2, H225; ☒ Carc. 2, H351; ☒ Eye Irrit. 2, H319; STOT SE 3, H335	78,2%
CAS: 122-56-5 EINECS: 204-554-6	Tributylborane	☒ Xn R22 ☒ Acute Tox. 4, H302	21,8%
Additional information		None known.	

SECTION 4: First aid measures**4.1 Description of first aid measures**

General information

Instantly remove any clothing soiled by the product.

(Contd. on page 2)
DE/E

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 02.07.2013

Revision: 20.04.2011

Trade name **Tri-n-butylborane, 1M soln. in THF**

After inhalation	Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.	(Contd. of page 1)
After skin contact	Seek immediate medical advice. Instantly wash with water and soap and rinse thoroughly.	
After eye contact	Seek immediate medical advice.	
After swallowing	Rinse opened eye for several minutes under running water. Then consult doctor.	
4.2 Most important symptoms and effects, both acute and delayed	Seek medical treatment.	
4.3 Indication of any immediate medical attention and special treatment needed	No further relevant information available.	

SECTION 5: Firefighting measures

5.1 Extinguishing media	CO ₂ , sand, extinguishing powder. Do not use water.
Suitable extinguishing agents	
5.2 Special hazards arising from the substance or mixture	If this product is involved in a fire, the following can be released: Carbon monoxide and carbon dioxide Boron oxide
5.3 Advice for firefighters	
Protective equipment:	Wear self-contained breathing apparatus. Wear full protective suit.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures	Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation Keep away from ignition sources
6.2 Environmental precautions:	Do not allow material to be released to the environment without proper governmental permits. Do not allow product to reach sewage system or water bodies. Do not allow to enter the ground/soil.
6.3 Methods and material for containment and cleaning up:	Keep away from ignition sources. Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust). Use neutralizing agent. Dispose of contaminated material as waste according to item 13. Ensure adequate ventilation.
Prevention of secondary hazards:	Keep away from ignition sources.
6.4 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 information on disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling	Keep containers tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation/exhaustion 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. Do not distill to dryness. Explosive peroxides may form, handle container cautiously.
7.2 Conditions for safe storage, including any incompatibilities	
Storage	
Requirements to be met by storerooms and containers:	Store in cool location.
Information about storage in one common storage facility:	Store away from oxidizing agents.
Further information about storage conditions:	Store in cool, dry conditions in well sealed containers. Avoid contact with air / oxygen (formation of peroxide). Store in a locked cabinet or with access restricted to technical experts or their assistants. Check container pressure periodically to prevent explosive peroxides.
7.3 Specific end use(s)	No further relevant information 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.
------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------

8.1 Control parameters**Components with critical values that require monitoring at the workplace:****109-99-9 Tetrahydrofuran (78,2%)**

AGW (Germany)	150 mg/m ³ , 50 ppm 2(l);DFG, EU, H, Y
PEL (USA)	590 mg/m ³ , 200 ppm
REL (USA)	Short-term value: 735 mg/m ³ , 250 ppm Long-term value: 590 mg/m ³ , 200 ppm
TLV (USA)	Short-term value: 295 mg/m ³ , 100 ppm Long-term value: 147 mg/m ³ , 50 ppm Skin

Ingredients with biological limit values:**109-99-9 Tetrahydrofuran (78,2%)**

BGW (Germany)	2 mg/l U b Tetrahydrofuran
BEI (USA)	2 mg/L urine end of shift Tetrahydrofuran

Additional information: No data

(Contd. on page 3)
DE/E

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 02.07.2013

Revision: 20.04.2011

Trade name **Tri-n-butylborane, 1M soln. in THF**

(Contd. of page 2)

8.2 Exposure controls**Personal protective equipment****General protective and hygienic measures****Breathing equipment:****Protection of hands:****Material of gloves****Penetration time of glove material****Eye protection:****Body protection:**

The usual precautionary measures should be adhered to in handling the chemicals.

Keep away from foodstuffs, beverages and food.

Instantly remove any soiled and impregnated garments.

Wash hands during breaks and at the end of the work.

Do not inhale gases / fumes / aerosols.

Avoid contact with the eyes and skin.

Maintain an ergonomically appropriate working environment.

Use breathing protection with high concentrations.

Check protective gloves prior to each use for their proper condition.

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Impervious gloves

Not determined

Tightly sealed safety glasses.

Full face protection

Protective work clothing.

SECTION 9: Physical and chemical properties**9.1 Information on basic physical and chemical properties****General Information****Appearance:****Form:**

Liquid

Colour:

Colorless to pale yellow

Smell:

Not determined

Odour threshold:

Not determined.

pH-value:

Not determined.

Change in condition**Melting point/Melting range:**

Not determined

Boiling point/Boiling range:

Not determined

Sublimation temperature / start:

Not determined

Inflammability (solid, gaseous)

Not applicable.

Ignition temperature:

230 °C

Decomposition temperature:

Not determined

Self-inflammability:

Product is not selfigniting.

Danger of explosion:

May form explosive peroxides.

Do not distill to dryness.

Critical values for explosion:**Lower:**

1,5 Vol %

Upper:

12,0 Vol %

Steam pressure at 20 °C:

200 hPa

Density at 20 °C

0,834 g/cm³

Relative density

Not determined.

Vapour density

Not determined.

Evaporation rate

Not determined.

Solubility in / Miscibility with**Water:**

Not miscible or difficult to mix

Partition coefficient (n-octanol/water):

Not determined.

Viscosity:**dynamic:**

Not determined.

kinematic:

Not determined.

Solvent content:**Organic solvents:**

78,2 %

Solids content:

21,8 %

9.2 Other information

No further relevant information available.

SECTION 10: Stability and reactivity**10.1 Reactivity****10.2 Chemical stability****Thermal decomposition / conditions to be avoided:****10.3 Possibility of hazardous reactions****10.5 Incompatible materials:****10.6 Hazardous decomposition products:**

May form explosive peroxides.

Stable under recommended storage conditions.

No decomposition if used and stored according to specifications.

Forms peroxides

Oxidizing agents

Carbon monoxide and carbon dioxide

Boron oxide

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity:**

Swallowing will lead to a strong caustic 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:**109-99-9 Tetrahydrofuran**

Oral LD50 1650 mg/kg (rat)

Inhalative LC50/2H 72000 mg/m3/2H (rat)

Skin irritation or corrosion:**Eye irritation or corrosion:****Sensitization:****Germ cell mutagenicity:****Carcinogenicity:**

Causes severe skin burns.

Causes serious eye damage.

No sensitizing effect known.

The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for components in this product.

EPA-I: Data are inadequate for an assessment of human carcinogenic potential.

ACGIH A3: Animal carcinogen: Agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) not considered relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans.

Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for this product.

(Contd. on page 4)
DE/E

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 02.07.2013

Revision: 20.04.2011

Trade name **Tri-n-butylborane, 1M soln. in THF**

(Contd. of page 3)

Reproductive toxicity:	The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for components in this product.
Specific target organ system toxicity - repeated exposure:	No effects known.
Specific target organ system toxicity - single exposure:	May cause respiratory irritation.
Aspiration hazard:	No effects known.
Experience with humans:	The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for components in this product.
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 the calculation method of the General EC Classification Guidelines for Preparations as issued in the latest version: Corrosive Irritant





SECTION 12: Ecological information

12.1 Toxicity	No further relevant information available.
Aquatic toxicity:	No further relevant information available.
12.2 Persistence and degradability	No further relevant information available.
12.3 Bioaccumulative potential	No further relevant information available.
12.4 Mobility in soil	No further relevant information available.
Additional ecological information:	Do not allow material to be released to the environment without proper governmental permits. Water hazard class 1 (Self-assessment): slightly hazardous for water. Do not allow undiluted product or large quantities of it to reach ground water, water bodies or sewage system. Avoid transfer into the environment.
General notes:	
12.5 Results of PBT and vPvB assessment	
PBT:	Not applicable.
vPvB:	Not applicable.
12.6 Other adverse effects	No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods	Hand over to disposers of hazardous waste.
Recommendation	Must be specially treated under adherence to official regulations. Consult state, local or national regulations for proper disposal.
Uncleaned packagings:	
Recommendation:	Disposal must be made according to official regulations.

SECTION 14: Transport information

UN-Number	UN2924
ADR, IMDG, IATA	
14.2 UN proper shipping name	2924 FLAMMABLE LIQUID, CORROSIVE, N.O.S.
ADR	FLAMMABLE LIQUID, CORROSIVE, N.O.S.
IMDG, IATA	
14.3 Transport hazard class(es)	
ADR	
	
	
Class	3 (FC) Flammable liquids.
Label	3+8
IMDG, IATA	
	
	
Class	3 Flammable liquids.
Label	3+8
Packing group	II
ADR, IMDG, IATA	
14.5 Environmental hazards:	
Marine pollutant:	No
14.6 Special precautions for user	Warning: Flammable liquids.
Kemler Number:	338
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC	
Code	Not applicable.
Transport/Additional information:	
ADR	
Excepted quantities (EQ):	E2
Limited quantities (LQ)	1L
Transport category	2
Tunnel restriction code	D/E
UN "Model Regulation":	UN2924, FLAMMABLE LIQUID, CORROSIVE, N.O.S., 3 (8), II

SECTION 15: Regulatory information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

Australian Inventory of Chemical Substances

109-99-9 | Tetrahydrofuran

Standard for the Uniform Scheduling of Drugs and Poisons

None of the ingredients is listed.

National regulations

Information about limitation of use:

Classification according to VbF:

Technical instructions (air):

Employment restrictions concerning young persons must be observed.
For use only by technically qualified individuals.
Not applicable

Class	Share in %
NK	78,2

(Contd. on page 5)
DE/E

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 02.07.2013

Revision: 20.04.2011

Trade name **Tri-n-butylborane, 1M soln. in THF**

(Contd. of page 4)

Water hazard class: Water hazard class 1 (Self-assessment): slightly hazardous for water.
Other regulations, limitations and prohibitive regulations

ELINCS (European List of Notified Chemical Substances)

None of the ingredients is listed.

Substances of very high concern (SVHC) according to REACH, Article 57

None of the ingredients are listed.

REACH - Pre-registered substances

All ingredients are listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.**SECTION 16: Other information**

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Relevant phrases

H225 Highly flammable liquid and vapour.
H302 Harmful if swallowed.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

R11 Highly flammable.
R19 May form explosive peroxides.
R22 Harmful if swallowed.
R36/37 Irritating to eyes and respiratory system.
R40 Limited evidence of a carcinogenic effect.

Department issuing data specification sheet: Health, Safety and Environmental Department.**Abbreviations and acronyms:**

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
VbF: Verordnung über brennbare Flüssigkeiten, Österreich (Ordinance on the storage of combustible liquids, Austria)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent

DE/E