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

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

1.1 Product identifier

Trade name Tri-n-butylborane

Stock number: 33533
CAS Number: 122-56-5
EC number: 204-554-6

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: Thermo Fisher (Kandel) GmbH
Zeppelinstr. 7b
76185 Karlsruhe / Germany
Tel: +49 (0) 721 84007 280
Fax: +49 (0) 721 84007 300
Email: tech@alfa.com
www.alfa.com
Informing department: Product safety Tel + +049 (0) 7275 988687-0

1.4 Emergency telephone number:
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

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

GHS02 flame

Pyr. Liq. 1 H250 Catches fire spontaneously if exposed to air.

GHS05 corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.

GHS07

Acute Tox. 4 H302 Harmful if swallowed.

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

C; Corrosive

R34: Causes burns.

R22: Harmful if swallowed.

F; Highly flammable

R17: Spontaneously flammable in air.

Information concerning particular hazards for human and environment: Not applicable

Other hazards that do not result in classification No information known.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 The substance is classified and labelled according to the CLP regulation.

Hazard pictograms

GHS02 GHS05 GHS07

Signal word Danger

Hazard statements

H250 Catches fire spontaneously if exposed to air.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

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.

P422 Store contents under inert gas.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.
vPvB: Not applicable.

SECTION 3: Composition/information on ingredients

3.1 Substances

CAS# Designation: 122-56-5 Tri-n-butylborane
Identification number(s):
EC number: 204-554-6

SECTION 4: First aid measures

4.1 Description of first aid measures

General information Instantly remove any clothing soiled by the product.

After inhalation Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.

(Contd. on page 2)
Seek immediate medical advice.

After skin contact
Instantly wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact
Rinse opened eye for several minutes under running water. Then consult doctor.

After swallowing
Seek medical treatment.

4.2 Most important symptoms and effects, both acute and delayed
Causes severe skin burns.
Causes serious eye damage.

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
Suitable extinguishing agents
Foam
Limestone powder

5.2 Special hazards arising from the substance or mixture
Spontaneously flammable in air.
Substance/product is auto-flammable.
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.

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 section 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
Handle under dry protective gas.
Keep containers tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation/exhaustion at the workplace.

Information about protection against explosions and fires: Substance/product is auto-flammable.

7.2 Conditions for safe storage, including any incompatibilities
Storage
Requirements to be met by storerooms and containers: No special requirements.
Information about storage in one common storage facility:
Store away from oxidising agents.
Store away from air.
Further information about storage conditions:
Store under dry inert gas.
This product is air sensitive.
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
Store in a locked cabinet or with access restricted to technical experts or their assistants.

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: Not required.
Additional information: No data

8.2 Exposure controls
Personal protective equipment
General protective and hygienic measures
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.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.

Breathing equipment:
Use breathing protection with high concentrations.

Protection of hands:
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.

Material of gloves Impervious gloves
Eye protection:
Tightly sealed safety glasses.
Full face protection
Body protection: Protective work clothing.
SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information

Appearance:
- Liquid

Colour:
- Colourless

Smell:
- Not determined

Odour threshold:
- Not determined

pH-value:
- Not determined

Change in condition

Melting point/Melting range:
- -34 °C

Boiling point/Boiling range:
- 109 °C

Sublimation temperature / start:
- Not determined

Flash point:
- Not determined

Inflammability (solid, gaseous):
- Not applicable

Ignition temperature:
- -35 °C

Decomposition temperature:
- Not determined

Self-inflammability:
- Spontaneously flammable in air

Danger of explosion:
- Not determined

Critical values for explosion:

Lower:
- Not determined

Upper:
- Not determined

Steam pressure at 20 °C:
- 0.1 hPa

Density at 20 °C:
- 0.747 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

9.2 Other information

No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity

Catches fire spontaneously if exposed to air

10.2 Chemical stability

Stable under recommended storage conditions

Thermal decomposition / conditions to be avoided:

No decomposition if used and stored according to specifications

10.4 Conditions to avoid

No further relevant information available

10.5 Incompatible materials:

- Oxidising agents
- Air
- Halocarbons

10.6 Hazardous decomposition products:

- Carbon monoxide and carbon dioxide
- Boron oxide

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity:
- Harmful if swallowed

Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

LD/LC50 values that are relevant for classification:
- No data

Skin irritation or corrosion:
- Causes severe skin burns

Eye irritation or corrosion:
- Causes serious eye damage

Sensitization:
- No sensitizing effect known

Germ cell mutagenicity:
- No effects known

Carcinogenicity:
- No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH

Reproductive toxicity:
- No effects known

Specific target organ system toxicity - repeated exposure:
- No effects known

Specific target organ system toxicity - single exposure:
- No effects known

Aspiration hazard:
- No effects known

Subacute to chronic toxicity:
- No effects known

Additional toxicological information:
- To the best of our knowledge the acute and chronic toxicity of this substance is not fully known

SECTION 12: Ecological information

12.1 Toxicity

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:

General notes:

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 to reach ground water, water course or sewage system

Avoid transfer into the environment

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

Recommendation:
- Hand over to disposers of hazardous waste

Must be specially treated under adherence to official regulations

Consult state, local or national regulations for proper disposal
SECTION 14: Transport information

UN-Number
ADR, IMDG, IATA  UN2845

14.2 UN proper shipping name
ADR  2845 PYROPHORIC LIQUID, ORGANIC, N.O.S. (Tri-n-butylborane)
IMDG, IATA  PYROPHORIC LIQUID, ORGANIC, N.O.S. (Tri-n-butylborane)

14.3 Transport hazard class(es)
ADR

Class  4.2 (S1) Substances liable to spontaneous combustion.
Label  4.2

IMDG, IATA

Class  4.2 Substances liable to spontaneous combustion.
Label  4.2

Packing group
ADR, IMDG, IATA  I

14.5 Environmental hazards:
Not applicable.

14.6 Special precautions for user
Warning: Substances liable to spontaneous combustion.
Kemler Number:  333

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):  E0
Limited quantities (LQ)  0
Transport category  0
Tunnel restriction code  B/E

UN "Model Regulation":  UN2845. PYROPHORIC LIQUID, ORGANIC, N.O.S. (Tri-n-butylborane), 4.2, I

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Australian Inventory of Chemical Substances  Substance is not listed.
Standard for the Uniform Scheduling of Drugs and Poisons  Substance is not listed.

National regulations
Information about limitation of use:
Employment restrictions concerning young persons must be observed.
For use only by technically qualified individuals.

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)  Substance is not listed.

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not 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. Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not 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.

Department issuing SDS: Global Marketing 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: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
IMDG: International Maritime Code for Dangerous Goods
IMDG Code: International Maritime Code for Dangerous Goods
ELINCS (European List of Notified Chemical Substances)  Substance is not listed.

Environmental Substances: Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed. Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

ACKNOWLEDGEMENTS

ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)

DE