

JSC AVIABOR

Page 1 of 6

MATERIAL SAFETY DATA SHEET (MSDS)

according to Regulation (EC) No. 1907/2006

Version 2.0 Revision Date 01.06.2015


1.0 Identification of the substance/preparation and of the company/enterprise

- 1.1 Product identifiers** : Triethylborane (TEB) 1.0 M solution in THF
EINECS : none
CAS : 97-94-9
RTECS : none
- 1.2 Relevant identified uses of the substance or mixture and uses advised against**
Reacts with metal enolates to give the enoxytriethylborates, useful in selective alkylation and aldol reactions.
- 1.3 Details of the supplier of the safety data sheet**
JSC AVIABOR, Nizhny Novgorod Region
606000 Dzerzhinsk, Russia
Tel: (+7)-8313-249 727, Fax: (+7)-8313-249 767
Only Representative – Espace Chemicals GmbH
Tel: +49(0) 30 896779290 - 0, Fax: + 49(0) 30 896779290 - 1
- 1.4 Emergency telephone number**
(+7)-8313-249 750 / 630

2.0 Hazards Identification

2.1 Classification of the substance or mixture

Regulation (EC) No 1272/2008 Annex VI Table

Classification		Labelling		
Hazard Class and Category Code(s)	Hazard Statement Code(s)	Pictogram Signal Word Code(s)	Hazard Statement Code(s)	Suppl. Hazard statement code(s)
Flam. Liq. 2 Pyr. Liq. 1 Skin Corr. 1B STOT SE 3 Carcinogenicity 2	H225 H250 H314 H335 H351	 Danger	H225 H250 H314	EUH019

2.2 Label elements

Hazard statement(s):

- H225 Highly flammable liquid and vapor.
H250 Catches fire spontaneously if exposed to air.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Precautionary statement(s):

- P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P222 Do not allow contact with air.
P381 Eliminate all ignition sources if safe to do so.
P231+P232 Handle under inert gas. Protect from moisture.
P262 Do not get in eyes, on skin, or on clothing.

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P314	Get medical attention/advice if you feel unwell.
Supplemental Hazard information (EU)	
EUH019	May form explosive peroxides.

3.0 Composition / information on ingredients

	Triethylborane	14 wt%	Tetrahydrofuran	86 wt%
Trade names/Synonyms	Triethylboron, Triethylborine, TEB		Oxacyclopentane; Oxolane	
CAS-No.	97-94-9		109-99-9	
EINECS	202-620-9		203-726-8	
RTECS	none		LU5950000	
Chemical formula	(C ₂ H ₅) ₃ B		C ₄ H ₈ O	
Molar mass	98.00 g/mol		72.11 g/mol	
Classification	Pyr. Liq. 1; Skin Corr. 1B H250, H314		Flam. Liq. 2; Eye Irrit. 2; Carc. 2; STOT SE 3; H225, H319, H335, H351, EUH019	

4.0 First Aid Measures

4.1 Description of first aid measures

After skin contact

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing and shoes.

After eyes contact

Immediately flush eyes with plenty of water for at least 15 minutes, holding eyes open.

After ingestion

Give two glasses of water and permit vomiting if nauseated. Never give anything by mouth to an unconscious person.

After inhalation

Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

4.2 Most important symptoms and effects, both acute and delayed

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

4.3 Indication of immediate medical attention and special treatment needed

no data available

5.0 Fire Fighting Measures

5.1 Extinguishing media

Suitable extinguishing media

If practical, allow fire to burn itself out. Temporary control may be obtained with foam, dry chemical, or carbon dioxide. Shut off source as soon as possible without risk. Control and confine fire. Use water spray to control heat and protect equipment.

Unsuitable extinguishing media

DO NOT use halogenated hydrocarbon fire extinguishers.

5.2 Special hazards arising from the substance or mixture

TEB can react violently or detonate when mixed with strong oxidizing agents or halogenated hydrocarbons. TEB solution burns with green and yellow flame and produces a dense black smoke. Work upwind if possible.

5.3 Precautions for fire-fighters

Wear full protective clothing, including protective gloves and boots. For respiratory protection, wear a NIOSH/MSHA approved self-contained breathing apparatus with full facepiece operated in a positive-pressure mode.

5.4 Further information - no data available

6.0 Accidental Release Measures**6.1 Personal precautions, protective equipment and emergency procedures**

See Section 5. FIRE FIGHTING MEASURES. Properly dispose of all residues immediately. Handle in compliance with all local, state and federal laws and regulations.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover with dry lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

6.4 Reference to other sections

For disposal see section 13.

7.0 Handling and Storage**7.1 Precautions for safe handling**

Use only with clean, completely enclosed systems that have been thoroughly purged with nitrogen or argon. Keep away from heat, sparks, and flame.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed and away from oxidizing agents, organic peroxides, and halogenated hydrocarbons. Use only with adequate ventilation. Do not get in eyes or on skin. Wash thoroughly after handling. Do not breathe vapor. Do not expose to air. Handle and store in a closed system under dry nitrogen or dry argon gas. Do not store residues. Properly dispose of all residues immediately.

7.3 Specific end uses - no data available**8.0 Exposure Control and Personal Protection****8.1 Control parameters****Components with workplace control parameters****8.2 Exposure controls****Normal use & handling**

When exposure to eyes or skin is possible, wear chemical protective goggles with faceshield, fire retardant protective clothing, and leather gloves. When inhalation of vapor is possible, wear a NIOSH/MSHA approved self-contained breathing apparatus with full-facepiece operated in a positive-pressure mode.

High volume safety showers and eye wash facility should be convenient to operating personnel.

Emergency handling

Wear full protective clothing, including protective gloves and boots. For respiratory protection, wear a NIOSH/MSHA approved self-contained breathing apparatus with full facepiece operated in a positive-pressure mode.

Exposure guidelines

None established for the triethylborane.

Engineering controls

Maintain a leakproof system. Use packless valves, welded piping, and other leakproof construction. Provide adequate local exhaust ventilation to minimize worker exposure. Maintain a nitrogen blanket on vessels containing TEB.

9.0 Physical and Chemical Properties**9.1 Information on basic physical and chemical properties**

Form/Colour : water-white to pale yellow liquid

Odour : none

pH : N/A

BP/BP Range : N/A

MP/MP Range : N/A

Flash Point (closed cup) : - 18 °C

Flammability	: N/A
Autoignition Temp.	: N/A
Oxidizing Properties	: N/A
Explosive Properties	: N/A
Explosion Limits Lower	: N/A
Vapor Pressure	: 58.2 kPa at 50 °C (or 17.1 kPa at 20 °C)
Density	: 0.865 g/ml at 20 °C
Partition Coefficient	: N/A
Viscosity	: N/A
Vapor Density	: N/A
Saturated Vapor Conc.	: N/A
Evaporation Rate	: N/A
Decomposition Temp.	: N/A
Solvent Content	: N/A
Water Content	: reacts very slowly
Air reactivity	: oxidizes if exposed to air
Surface Tension	: N/A
Conductivity	: N/A
Miscellaneous Data	: N/A
Solubility	: N/A
9.2 Other safety information	
Bulk Density	: N/A

10.0 Stability and Reactivity

10.1 Reactivity	no data available
10.2 Chemical stability	Stable if stored and handled as recommended. Keep away from heat, sparks, and flame.
10.3 Possibility of hazardous reactions	no data available
10.4 Conditions to avoid	Exposure to moisture.
10.5 Incompatible materials	Oxidizing agents, organic peroxides, halogenated hydrocarbons.
10.6 Hazardous decomposition products	Carbon monoxide, carbon dioxide, boron oxides

11.0 Toxicological Information

11.1 Information on toxicological effects	
No information for triethylborane solution. The toxicological properties of TEB solution are under study at this time.	
Acute toxicity	: no data available
Irritation and corrosion	: no data available
Skin corrosion/ irritation	: no data available
Serious eye damage/ eye irritation	: no data available
Respiratory or skin sensitization	: may cause sensitization by skin contact
Germ cell mutagenicity	: no data available
Carcinogenicity	
IARC: No component of this product contains at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC.	
Reproductive toxicity	: no data available
Specific target organ toxicity – single exposure	: no data available
Specific target organ toxicity – repeated exposure	: no data available
Aspiration hazard	: no data available
Route of exposure	
- After skin contact	: harmful

- After eye contact	: causes eye burns
- After inhalation	: harmful
- After ingestion	: harmful
Additional information	
RTECS	: no data available

12.0 Ecological Information

- 12.1 Toxicity**
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**
no data available
- 12.6 Other adverse effects**
no data available

13.0 Disposal Consideration

Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14.0 Transport Information

- 14.1 UN-Number**
1993
- 14.2 UN proper shipping name**
Flammable liquid, n.o.s (Triethylborane, 1.0 M solution in THF)
- 14.3 Transport hazard class(es)**
GGVS/GGVE/ADR/RID: 3, Hazard Identification: 33, Classification: F1, Tunnel code: (D/E)
IMDG/GGVSee-class: 3, MFAG: 340, EmS: F-E, S-E, Stowage category: B
ICAO/IATA-class: 3, PAX: 353, CAO: 364
- 14.4 Packaging group**
GGVS/GGVE/ADR/RID: II IMO/GGVSee: II ICAO/IATA: II
- 14.5 Environmental hazards**
GGVS/GGVE/ADR/RID: No IMO/GGVSee: No ICAO/IATA: No
- 14.6 Special precautions for user**
See section 7.0
- 14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**
The substance is not intended to be transported in bulk.

15.0 Regulatory Information

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
no data available

15.2 Chemical Safety Assessment
no data available

16.0 Other Information

WARNING: This is a Dangerous chemical product. By following the directions and warnings on this material safety data sheet, product label and any publication referred to thereon, the danger can be greatly reduced, but never entirely eliminated. JSC AVIABOR makes no warranties, expressed or implied, with respect to this product and expressly disclaims the warranty of merchantability and any warranty of fitness for a particular purpose. Users assume all risk in handling, using or storing this product, even if they do so in accordance with the information and instructions given.

This information is to the best of Aviabor's current knowledge and is intended to describe the product only in terms of health and safety and environmental requirements. Since the conditions of use are outside our control, any recommendations or suggestions are made without guarantee and we disclaim any liability for loss or damage suffered from use of this information. Customers must satisfy themselves that the product is suitable for a particular purpose. Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents.