

SAFETY DATA SHEET

(according to (EC) 1907/2006)

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

1.1. Product identifier

Tetrabutylammonium Bromide (TBAB)

Synonyms:

TBAB, N,N,N-Tributyl-1-butanaminium bromide

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

chemical intermediate

1.3. Details of the supplier of the safety data sheet

Vertellus LLC
201 North Illinois Street, Suite 1800,
Indianapolis, IN 46204
800-223-0453

e-mail Address: msds@vertellus.com

1.4. Emergency telephone number

Vertellus: 1-800-223-0453

CHEMTREC (USA): 1-800-424-9300 (collect calls accepted); (Int'l): 1-703-527-3887 (collect calls accepted; 011 prefix not needed)

SECTION 2: Hazards identification

HMIS Rating	
HEALTH	2
FLAMMABILITY	1
REACTIVITY	0

2.1. Classification of the substance or mixture

(According to Regulation (EC) No 1272/2008)

Skin Corrosion/Irritation Category 2

Serious Eye Damage/Eye Irritation Category 2

Specific Target Organ Systemic Toxicity Single Exposure Category 3

(According to Directive 67/548/EEC)

Symbol: Xi

Risk Phrases: R52: Harmful to aquatic organisms.

R36/37/38: Irritating to eyes, respiratory system and skin.

Safety Phrases: S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S36/37/39: Wear suitable protective clothing, gloves and eye/face protection.

S61: Avoid release to the environment. Refer to special instructions/safety data sheet.

SAFETY DATA SHEET

2.2. Label elements

Hazard Symbols (Pictogram):



Signal Word:

Warning

Hazard Precautions:

H315 - Causes skin irritation.

H319 - Causes serious eye irritation.

H335 - May cause respiratory irritation.

Prevention Precautionary Statements:

P261 - Avoid breathing dust/fume/gas/mist/vapours/spray.

P264 - Wash hands thoroughly after handling.

P271 - Use only outdoors or in a well-ventilated area.

P280 - Wear protective gloves/protective clothing/eye protection/face protection.

First Aid Precautionary Statements:

P302+P352 - IF ON SKIN: Wash with plenty of soap and water.

P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P312 - Call a POISON CENTER or doctor/physician if you feel unwell.

P321 - Specific treatment (see supplemental information on this label).

P332+P313 - If skin irritation occurs: Get medical advice/attention.

P337+P313 - If eye irritation persists: Get medical advice/attention.

P362 - Take off contaminated clothing and wash before reuse.

Storage Precautionary Statements:

P403+P233 - Store in a well-ventilated place. Keep container tightly closed.

P405 - Store locked up.

Disposal Precautionary Statements:

P501 - Dispose of contents/container in accordance with local/regional/national/international regulation for hazardous wastes.

2.3. Other hazards

Signs and Symptoms of Potential Overexposure:

Dust may be irritating to the respiratory tract. Direct contact causes eye irritation. Direct contact causes skin irritation. May cause gastrointestinal tract irritation with nausea and vomiting. The toxicological properties of this substance/mixture have not

SAFETY DATA SHEET

Primary Route(s) of Exposure: been fully investigated.
 Skin contact and absorption, eye contact, ingestion, inhalation.
 Medical Conditions Aggravated by Exposure: No data found

SECTION 3: Composition/information on ingredients

3.1. Substances or 3.2. Mixtures

Ingredient	CAS Number	Concentration (%)	EINECS / ELINCS	CLP Inventory/ Annex VI	EU DSD Classification (67/548/EEC)	EU CLP Classification (1272/2008)
Tetrabutylammonium Bromide	1643-19-2	~ 100	216-699-2	Not listed.	Xi R52- R36/37/38	Eye Irrit. 2; H319 Skin Irrit. 2; H315 STOT SE 3; H335

NOTE: See Section 8 of this MSDS for exposure limit data for these ingredients.
 See Section 15 of this MSDS for trade secret information (where applicable).
 See Section 16 of this MSDS for the full text of the R-phrases above.

SECTION 4: First aid measures

4.1. Description of first aid measures

Skin Contact: Immediately flush with water for 15 minutes. Wash the contaminated skin with soap and water. If irritation develops, call a physician. Thoroughly wash or discard clothing and shoes before reuse.

Eye Contact: Hold the eyelids open. Take care not to rinse contaminated water into the unaffected eye or onto face. Obtain medical attention immediately.

Inhalation: If symptoms of respiratory irritation are experienced remove source of contamination or move victim to fresh air and obtain medical advice

Ingestion: If irritation or discomfort occurs, obtain medical advice immediately

4.2. Most important symptoms and effects, both acute and delayed

Acute: Dust may be irritating to the respiratory tract. Direct contact causes eye irritation. Direct contact causes skin irritation. May cause gastrointestinal tract irritation with nausea and vomiting. The toxicological properties of this substance/mixture have not been fully investigated.

Delayed Effects: None known.

4.3. Indication of any immediate medical attention and special treatment needed

Thermal Exposure: Not applicable.

Note to Physician: No specific indications. Treatment should be based on the judgment of the physician in response to the reactions of the patient.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Appropriate Extinguishing Media: Water spray, carbon dioxide, dry chemical. Alcohol foam

SAFETY DATA SHEET

5.2. Special hazards arising from the substance or mixture

Hazardous Products of Combustion: During a fire, irritating and toxic gases, fumes and vapors may be generated. Combustion will produce carbon monoxide, carbon dioxide and oxides of nitrogen. Hydrogen Bromide. Amines

Potential for Dust Explosion: Tetrabutylammonium bromide (TBAB) was tested for dust explosion characteristics and the following results were obtained:

- minimum ignition energy (MIE): > 500 mJ
- minimum ignition temperature of dispersed dust: 240-250°C
- volume resistivity: 3.8×10^7 ohm.m
- charge decay time: < 1 second
- chargeability as average values at 40% relative humidity:
 - stainless steel tube = $+3.4 \times 10^{-6}$
 - plastic tube = $+2.0 \times 10^{-5}$
 - glass tube = $+1.9 \times 10^{-5}$

Follow good engineering practice, such as NFPA 69 and NFPA 77, for the design, construction and operation of solids handling equipment, and for protection against static electricity. Material may burn, but does not ignite readily. Avoid high temperature.

Special Flammability Hazards:

5.3. Advice for firefighters

Basic Fire Fighting Guidance: As for any fire, evacuate the area and fight the fire from a safe distance

Flammability Classification (OSHA): Not applicable.

NFPA Rating



SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuation Procedures: Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Special Instructions: Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.

6.2. Environmental precautions

Prevent releases to soils, drains, sewers, and waterways.

6.3. Methods and material for containment and cleaning up

Containment Techniques and Clean-up Procedures: Ensure clean-up measures are in compliance with OSHA (29 CFR 1910.120). Isolate the spill area. Stop the leak if it is safe to do so. Vacuum, scrape or scoop the material into a chemical waste container. Avoid raising dust into the air. Scrub the area with detergent and water. Prevent runoff from entering drains, sewers, and streams. Do not allow the spilled product to enter public drainage system or open waterways.



SAFETY DATA SHEET

Special Reporting Requirements: Not applicable.

6.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for Unique Hazards: Not applicable.

Practices to Minimize Risk: Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material.

Special Handling Equipment: Not applicable.

7.2. Conditions for safe storage, including any incompatibilities

Storage Precautions & Recommendations: Store in a cool, dry area. Do not store in direct sunlight. Keep container closed when not in use. Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

Dangerous Incompatibility Reactions: Strong oxidizing agents

Incompatibilities with Materials of Construction: none known

7.3. Specific end use(s)

If a chemical safety assessment has been completed an exposure scenario is attached as an annex to this Safety Data Sheet. Refer to this annex for the specific exposure scenario control parameters for uses identified in subsection 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure Limits (United States): OSHA PEL: Not established ACGIH TLV: Not established

8.2. Exposure controls

Also see the annex to this SDS (if applicable) for specific exposure scenario controls.

Personal Protective Equipment: Impervious gloves, boots, and clothing, chemical goggles or face shield where necessary, and a NIOSH approved chemical cartridge respirator or supplied air breathing apparatus. Do not smoke or eat in areas where this material is handled. Wash hands thoroughly before eating or smoking. Have a safety shower available. An eye wash station should be available where this product is used.

Respirator Caution: Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.

Ventilation: All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.

Other Engineering Controls: All appropriate engineering controls should be used to minimize exposure potential. Use exhaust ventilation to keep airborne concentrations below exposure limits. Use only appropriately classified



SAFETY DATA SHEET

electrical equipment and powered industrial trucks.

Thermal Hazards: Not applicable.

Additive or Synergistic Effects: None known.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance, State & Odor (ambient temperature):	White to off-white solid with a characteristic odor.		
Molecular Formula:	C16H36NBr	Molecular Weight:	322.36 g/mol
Vapor Pressure:	No data available.	Evaporation Rate:	Not determined
Specific Gravity or Density:	1.000	Vapor Density (air = 1):	No data available.
Boiling Point:	No data available.	Freezing / Melting Point:	> 100 °C
Solubility in Water:	Soluble	Octanol / Water Coefficient:	No data available.
pH:	No data available.	Odor Threshold:	No data available.
Viscosity:	No data available.	Autoignition Temperature:	No data available.
Flash Point and Method:	No data available. (No data available.)	Flammable Limits:	No data available. (LEL) – No data available. (UEL)

9.2. Other information

Not applicable.

SECTION 10: Stability and reactivity

<u>10.1. Reactivity</u>	Not classified as dangerously reactive.
<u>10.2. Chemical stability</u>	Stable under normal temperatures and pressures.
<u>10.3. Possibility of hazardous reactions</u>	Not expected to occur.
<u>10.4. Conditions to avoid</u>	Avoid contact with incompatible materials, dust generation, and sources of heat
<u>10.5. Incompatible materials</u>	Strong oxidizing agents
<u>10.6. Hazardous decomposition products</u>	Hydrogen bromide; Amines; Nitrogen oxides; carbon monoxide

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute Oral LD ₅₀ :	No data available.
Acute Dermal LD ₅₀ :	No data available.
Acute Inhalation LC ₅₀ :	No data available.



SAFETY DATA SHEET

Skin Irritation:	Irritating to the skin.
Skin Sensitization:	No data available.
Eye Irritation:	Moderately irritating to eyes.
Target Organs:	No data available.
Carcinogenicity:	No data available.
Teratogenicity:	No data available.
Reproduction:	No data available.
Neurotoxicity:	No data available.
Mutagenicity:	No data available.

SECTION 12: Ecological information

<u>12.1. Toxicity</u>	Aquatic LC50 (48h) Ceriodaphnia dubia 9.4 mg/L	Tetrabutylammonium Bromide
<u>12.2. Persistence and degradability</u>	No data	
<u>12.3. Bioaccumulative potential</u>	No data	
<u>12.4. Mobility in soil</u>	No data	
<u>12.5. Results of PBT and vPvB assessment</u>	No data available.	
<u>12.6. Other adverse effects</u>	No data available.	

German Water Hazard Classification: ID Number 985, hazard class 3 - severe hazard to waters

Component Name:
Tetrabutylammoniumbromid

SECTION 13: Disposal considerations

13.1. Waste treatment methods

US EPA Waste Number: Non-Hazardous

Waste Disposal: Dispose of this material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable international, national, regional, state or local laws. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

SECTION 14: Transport information

<u>14.1. UN number</u>	Not applicable
<u>14.2. UN proper shipping name</u>	Chemicals, n.o.s. (Tetrabutylammonium Bromide)
<u>14.3. Transport hazard class(es)</u>	Not applicable



SAFETY DATA SHEET

<u>14.4. Packing group</u>	Not applicable
<u>14.5. Environmental hazards</u>	Not applicable
<u>14.6. Special precautions for user</u>	No data available.
NA Emergency Guidebook Numbers:	Not applicable
	IMDG EMS: Not applicable
<u>14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</u>	Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

OSHA Hazards: Health: Irritant. Physical: Not applicable.

WHMIS Classification: Class D, Division 2, Subdivision B: Irritant.

Chemical Inventory Lists:	Status
TSCA:	Present
EINECS:	216-699-2
Canada(DSL/NDL):	DSL
Japan:	(2)-186
Korea:	KE-33272
Australia:	Present
New Zealand:	Present
China:	Present
Philippines:	Present
Switzerland:	Not listed.

New Zealand GHS Classification: Acute toxicity - Oral - Category 4: H302 Harmful if swallowed. (Approval: HSR003319); Acute toxicity - Inhalation - Category 4: H332 Harmful if inhaled. (Approval: HSR003319); Skin corrosion/irritation - Category 2: H315 Causes skin irritation. (Approval: HSR003319); Serious eye damage/eye Irritation - Category 2A: H319 Causes serious eye irritation. (Approval: HSR003319)

Japan GHS Classification: Not classified by this country.

Korea (MOL) GHS Classification: Not classified by this country.

Australia GHS Classification: Not classified by this country.

Taiwan GHS Classification: Not classified by this country.

Indonesia GHS Classification: Not classified by this country.

SARA 313: Not listed.

Component Name:
Not listed.



SAFETY DATA SHEET

15.2. Chemical safety assessment

Not applicable.

SECTION 16: Other information

Full text of R phrases in Section 3:

R52: Harmful to aquatic organisms.
R36/37/38: Irritating to eyes, respiratory system and skin.

Legend of abbreviations:

ACGIH = American Conference on Governmental Industrial Hygienists.
CAS = Chemical Abstracts Service.
CERCLA = Comprehensive Environmental, Response, Compensation and Liability Act (1990).
CFR = Code of Federal Regulations.
DSL/NDSL = Domestic Substances List/Non-Domestic Substances List.
EC = European Community.
EEC = European Economic Community.
EINECS = European Inventory of Existing Commercial chemical Substances.
ELINCS = European List of Notified Chemical Substances.
EU = European Union.
GHS = Globally Harmonized System.
LC = Lethal concentration.
LD = Lethal dose.
MOL = Ministry of Labor.
NEMA = National Emergency Management Agency.
NFPA = National Fire Protection Association.
NIOSH = National Institute of Occupational Safety and Health.
NTP = National Toxicological Program.
OSHA = Occupational Safety and Health Administration
PEL = Permissible exposure limit.
RQ = Reportable quantity.
SARA = Superfund Amendments and Reauthorization Act of 1986.
TLV = Threshold limit value.
WHMIS = Workplace Hazardous Materials Information System.

Important Note: Please note that the information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. The information contained herein may change without prior notice. THIS SAFETY DATA SHEET SUPERSEDES ALL PREVIOUS EDITIONS.

Revision Date: Jul 06, 2012

Original Date of Issue: Not known or provided.

Issued By: Regulatory Management Department

Revision Details: Added dust handling information and precautions in sections 5, 7, and 8.



Tetrabutylammonium Bromide (TBAB)
Revision: Jul 06, 2012
RUZ025
page 10 of 10

SAFETY DATA SHEET