MATERIAL SAFETY DATA SHEET

SECTION 1 ................................................................. PRODUCT IDENTIFICATION ..........................................................................................

Name: Tetrabutylammonium hydrogen sulfate  
Code: 680500

SECTION 2 ......................................... COMPOSITION, INFORMATION ON INGREDIENTS ..................................................................

Synonyms  
Tetrabutylammonium bisulfate; N,N,N-tributyl-1-butanimium sulfate (1:1); Tetrabutylammonium sulfate (1:1)  
CAS #: 32503-27-8  
MF : C\textsubscript{16}H\textsubscript{37}N\textsubscript{3}O\textsubscript{4}S or C\textsubscript{16}H\textsubscript{36}N\textsubscript{2}HO\textsubscript{4}S

Ingredients Concentration (%/wt)  
Tetrabutylammonium hydrogen sulfate (32503-27-8) ................................. NLT 98 %  
Manufacturing impurities ...........................................................................< 2 %

SECTION 3.................................................................. HAZARDS IDENTIFICATION..........................................................................................

Precautionary Statements  
The properties of this material have not been fully investigated. Use due caution in handling and use of this material.

Emergency Overview  
NFPA Ratings (Scale 0-4); Health = 1; Fire = 1; Reactivity = 0;

Solid: White crystals  
Harmful if ingested. May be harmful if inhaled or absorbed through the skin. May be irritating to eyes, skin, mucous membranes, and upper respiratory tract.  
The properties of this material have not been fully investigated. Use due caution in handling and use of this material.

May emit toxic fumes under fire conditions—potential chemical or thermal decomposition products: carbon monoxide, carbon dioxide, nitrogen oxides, sulfur oxides  
Standard chemical handling precautions: Avoid ingestion or breathing dust. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.

Target organs: Undetermined

See Sections 4, 5, 6, 8, 9, and 10.

Other Hazard Information  
This compound has not fully been tested for toxicological, irritation, or similar tendencies.  
Primary Route(s) of Entry: Ingestion, Eye or Skin contact, Dust inhalation  

Eye: \textit{May be irritating}.

Skin: \textit{May be harmful if absorbed through the skin. May be irritating}.

Inhalation: \textit{May be harmful if inhaled. May be irritating to mucous membranes and upper respiratory system}.

Ingestion: \textit{Harmful. May cause diarrhea}.

Acute: \textit{See above specific route}.

Chronic: \textit{Undetermined}.

Target Organs: Undetermined.

Symptoms: \textit{Diarrhea. Pre-existing conditions that may be aggravated: Skin conditions. See Section 11 for additional toxicological data}.
MATERIAL SAFETY DATA SHEET

Name: Tetrabutylammonium hydrogen sulfate
Code: 680500

SECTION 4 ............................................................................ FIRST AID MEASURES ........................................................................................................

Eye contact: Immediately flush eyes with copious amounts of water or eyewash solution for at least 15 minutes; lift eyelids occasionally. If irritation persists, consult physician.
Skin contact: Immediately remove contaminated clothing and shoes, then wash skin with soap and copious amounts of water. If irritation persists, consult physician.
Inhalation: Remove to fresh air. If not breathing, give artificial respiration and keep person warm and at rest. If breathing is difficult, give oxygen; consult physician.
Ingestion: Wash out mouth with water provided person is conscious; consult physician.
Wash contaminated clothing before reuse.

SECTION 5 .................................................................. FIRE FIGHTING MEASURES ..........................................................................................

Flash Point: NA Method: NA Autoignition: NE
OSHA Flammability Class: NA Explosion Limits: upper: NE
NFPA: See Section 3 Hazards Identification Emergency Overview above. lower: NE

Extinguishing Media
Water spray, carbon dioxide, dry chemical powder, or appropriate foam.

Special or Standard Fire Fighting Procedures
Standard precautions for fighting large fires involving chemicals: Wear self-contained breathing apparatus (SCBA) and protective clothing to prevent contact with skin and eyes.

Standard Fire and Explosion Hazards
Slight fire hazard--As with most organic compounds, fire is possible at elevated temperatures or from contact with an ignition source.
Explosion potential unknown--If a substance is an organic solid, fine dust dispersed in air in sufficient concentrations in the presence of an ignition source is a potential for a dust explosion. Avoid inhalation of material or combustion by-products.

Unusual Fire and Explosion Hazards
None

Hazardous Combustion or Decomposition Products
May emit carbon monoxide, carbon dioxide, nitrogen oxides, sulfur oxides

SECTION 6 ......................................................... ACCIDENTAL RELEASE MEASURES ..................................................................................

Eliminate all ignition sources/ slight fire hazard.
Evacuate unnecessary people from area. Isolate spilled material.
Ventilate area.
Wear protective clothing to prevent contact with skin and eyes (lab coat, gloves, safety glasses).
Wear NIOSH/ MSHA approved respirator for dust to prevent potential inhalation irritation.
If in solution, mix with sand or similar adsorbent material.
Sweep up, seal in appropriate hazardous waste container, and hold for proper waste disposal.
Avoid raising dust as it is a powdered material.
Wash spill site after material pickup is complete.
Standard chemical precautions: Keep out of water supplies and sewers.

SECTION 7.................................................................. HANDLING AND STORAGE ...........................................................................................

General Handling Measures
Tetrabutylammonium hydrogen sulfate

See Section 8 Below.

General Storage Measures
- Store in a cool, dry place with adequate ventilation.
- Minimize dust.
- Avoid ignition and heat sources.

Special Storage Instructions
- Store under nitrogen in a tightly closed container, as material is hygroscopic.

Special Handling Instructions
- None

Airborne Exposure Limits

<table>
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<th>TW A</th>
<th>STEL</th>
<th>Ceiling</th>
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<tbody>
<tr>
<td></td>
<td>Ppm</td>
<td>mg/ m³</td>
<td>ppm</td>
<td>mg/ m³</td>
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<td>NE</td>
<td>NE</td>
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<tr>
<td>ACGIH - TLV</td>
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NE = Not established

Special/ Other Control Measures
- Odor threshold: NE

Personal Protective Equipment (PPE)
- Chemical safety eyewear
- Compatible chemical-resistant gloves
- NIOSH/ MSHA approved respirator with appropriate protections to prevent dust inhalation
- Protective Clothing (e.g., lab coat)

Other Standard Safety Equipment and Engineering Preventive Measures
- Safety shower and eye wash
- Mechanical exhaust

General Precautions and Handling Measures
- Avoid ingestion
- Avoid inhalation
- Avoid contact with eyes, skin, and clothing
- Avoid prolonged or repeated exposure
- Wash thoroughly after handling

Chemical Family: Ammonium sulfate salt
Use: GC Derivatization Alkylation Reagent; Ion Pairing Reagent

Appearance, Odor, and Other Properties
- Appearance: White crystals
- Odor: NE
- MP: 171-175°C (339-346°F)
- bp: NA
- pH: NE
- Vapor Density: NA
- % Volatiles: NE
- Evap. Rate: NA
- Viscosity: NA
- Water Reactive: No
- Specific Gravity (H₂O = 1.0): NE
- Refractive Index: NA
- Octanol/ Water (Kow): NE

Some standard abbreviations used throughout this MSDS: NAC = not applicable; NEC = not established; UC = unknown/ not available; NLC = not listed; NC = no; Y = yes.
Tetrabutylammonium hydrogen sulfate

Solubility in Organic Solvents: NE

SECTION 10: STABILITY AND REACTIVITY

Stability
Stable

Incompatibilities
Stray Oxidizers
Aluminum
Magnesium

Precautions
Avoid incompatibilities.
Avoid generating dust.
Keep out of water supplies and sewers.

Hazardous Combustion or Decomposition Products
May emit carbon monoxide, carbon dioxide, nitrogen oxides, sulfur oxides

Hazardous Polymerization
None

SECTION 11: TOXICOLOGICAL INFORMATION

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

RTECS #: not assigned

Irritation Data
No data available.

Toxicity Data
Orl mus LD50 555 mg/ kg

Carcinogenicity

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</table>

NL = Not Listed as a carcinogen;

Teratogenicity
No data available.

Reproductive Effects
No data available.

Mutagenicity
No data available.

Miscellaneous
Some sulfate salts can cause diarrhea when ingested.

Acute Effects
See specific route responses in Section 3 Hazards Identification above.

Symptoms:
See Section 3 Hazards Identification above.

Chronic Effects
See Section 3 Hazards Identification above.

Target organs: undetermined.

SECTION 12: ECOLOGICAL INFORMATION
Name: Tetrabutylammonium hydrogen sulfate
Code: 680500

No data available.

Standard Chemical Precautions
Keep out of water, air, and soil.

SECTION 13............................................................ DISPOSAL CONSIDERATIONS ...............................................................

That which cannot be recovered or recycled, should be disposed of in accordance with all applicable Federal, State, and local environmental regulations.

RCRA waste code(s): None

RCRA Hazard Class (40CFR 261): None

SECTION 14............................................................. TRANSPORT INFORMATION ..........................................................

Ship in accordance with all applicable local, State, Federal, and International transportation regulations.
The following is a summary only. Check regulations for complete information:

U. S. Department of Transportation (49CFR171.101)
Hazard Class or Division: Not regulated.
Land Transport ADR/ RID: Not regulated.
Air Transport IATA/ ICAO: Not regulated.
Maritime Transport IMDG: Not regulated.

SECTION 15............................................................ REGULATORY INFORMATION ..........................................................

Reviews, Standards, and Regulations

Tetrabutylammonium hydrogen sulfate
CAS Number: 32503-27-8
TSCA: Y
EINECS: 251-038-5
CERCLA [Section 103 (40 CFR 302.4)]: NL
RCRA Waste Code: NA
Clean Air Act
[Section 103 (40 CFR 302.4)]: NL
[Section 112r (40 CFR 68)]: NL
TO (lbs): NA
Contains Ozone Depleters (Class I or Class II): NL
State Lists: NL
States: NL on CA
CA No Significant Risk Level: NL
Tetrabutylammonium hydrogen sulfate
CAS Number: 32503-27-8
SARA Title III Notification [40 CFR 302.4]:
Section 302/304 (EHS) Ingredient [40 CFR 355.3]: NL
TPQ (lbs): NA
RQ (lbs): NA
Section 313 Ingredient [40 CFR 372.65]: NL

Hazard Classes

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Some standard abbreviations used throughout this MSDS: NAC not applicable; NEC not established; UC unknown/ not available; NLC not listed; NC no; Y yes.
### MATERIAL SAFETY DATA SHEET

**Name:** Tetrabutylammonium hydrogen sulfate  
**Code:** 680500

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</tbody>
</table>

**Risk Phrases:**
- Caution: The properties of this material have not been fully investigated.
- R22  Harmful if swallowed

**Safety Phrases:**
- S3/7/9/14 Keep container tightly closed in a cool, well-ventilated place, away from strong oxidizers.
- S22/24/25 Do not breathe dust. Avoid contact with skin and eyes.
- S36 Wear suitable protective clothing.
- S46 If swallowed, seek medical advice immediately and show this container or label.

**SECTION 16...............................................................OTHER INFORMATION ...............................................................**

**Miscellaneous**
The health and toxicological hazards of this compound have not been fully investigated; therefore, this substance must be handled only by, or under close supervision of those qualified in the handling and use of potentially hazardous substances.

This MSDS was revised as follows:
- This MSDS was revised in all sections to a new format. Consider all sections to be new information to be reviewed.

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Approved of by: MBF  
This is the last page of this MSDS.