1 Identification

- **Product name**
  - Trade name: tri-sec-butoxytriethyldialuminum
- **Item number:** 13-1900
- **Details of the supplier of the safety data sheet**
  - **Manufacturer/Supplier:** Strem Chemicals, Inc.
    - 7 Mulliken Way
    - NEWBURYPORT, MA 01950
    - USA
    - info@strem.com
  - **Information department:** Technical Department
  - **Emergency telephone number:**
    - EMERGENCY: CHEMTREC: + 1 (800) 424-9300
    - During normal opening times: +1 (978) 499-1600

2 Hazard(s) identification

- **Classification of the substance or mixture**
  - GHS02 Flame
  - Flam. Liq. 2  H225  Highly flammable liquid and vapor.
- **Label elements**
  - **GHS label elements**
    - The substance is classified and labeled according to the Globally Harmonized System (GHS).
  - **Hazard pictograms**
    - GHS02
- **Signal word** Danger
- **Hazard statements**
  - H225 Highly flammable liquid and vapor.
- **Precautionary statements**
  - P231 Handle under inert gas.
  - P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  - P262 Do not get in eyes, on skin, or on clothing.
  - P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
  - P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  - P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
- **Classification system:**
- **NFPA ratings (scale 0 - 4)**
  - Health = 0
  - Fire = 2
  - Reactivity = 0
Trade name: tri-sec-butoxytriethyldialuminum

- HMIS-ratings (scale 0 - 4)
  - Health = 0
  - Fire = 0
  - Reactivity = 0

- Other hazards
- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Substances
- CAS No. Description
  Triethyl(tri-sec-butoxy)dialuminum (contains diethyl(tetra-sec-butoxy)dialuminum and tetraethyl(di-sec-butoxy)dialuminum)

4 First-aid measures

- Description of first aid measures
  - General information: Immediately remove any clothing soiled by the product.
  - After inhalation: Supply fresh air; consult doctor in case of complaints.
  - After skin contact: Immediately rinse with water.
  - After eye contact: Rinse opened eye for several minutes under running water.
  - After swallowing: If symptoms persist consult doctor.
  - Information for doctor:
    - Most important symptoms and effects, both acute and delayed No further relevant information available.
    - Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

- Extinguishing media
- Suitable extinguishing agents:
  - CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
  - For safety reasons unsuitable extinguishing agents: Water with full jet
  - Special hazards arising from the substance or mixture No further relevant information available.
- Advice for firefighters
  - Protective equipment: No special measures required.

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  - Wear protective equipment. Keep unprotected persons away.
- Environmental precautions: Do not allow to enter sewers/ surface or ground water.
- Methods and material for containment and cleaning up:
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  - Dispose contaminated material as waste according to item 13.
  - Ensure adequate ventilation.
Trade name: tri-sec-butoxytriethyldialuminum

- 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 disposal information.

7 Handling and storage

- Handling: Handle under inert gas.
- Precautions for safe handling: No special precautions are necessary if used correctly.
- Information about protection against explosions and fires:
  Keep ignition sources away - Do not smoke.
  Protect against electrostatic charges.
- Conditions for safe storage, including any incompatibilities
- Storage: Store contents under inert gas.
- Requirements to be met by storerooms and receptacles: Store in a cool location.
- Information about storage in one common storage facility: Not required.
- Further information about storage conditions:
  Keep receptacle tightly sealed.
  Store in cool, dry conditions in well sealed receptacles.
- Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

- Additional information about design of technical systems: No further data; see item 7.
- Control parameters
- Components with limit values that require monitoring at the workplace: Not required.
- Additional information: The lists that were valid during the creation were used as basis.
- Exposure controls
- Personal protective equipment:
  - General protective and hygienic measures:
    Immediately remove all soiled and contaminated clothing.
    Wash hands before breaks and at the end of work.
  - Breathing equipment: Not required.
  - Protection of hands:

  Protective gloves

  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture. Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
  - Material of gloves
    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.
  - Penetration time of glove material
    The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

(Contd. on page 4)
9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
  - **Appearance:**
    - **Form:** Liquid
    - **Color:** Colorless
    - **Odor:** Odorless
    - **Odor threshold:** Not determined.
  - **pH-value:** Not determined.
- **Change in condition**
  - **Melting point/Melting range:** Undetermined.
  - **Boiling point/Boiling range:** 184/40mm °C (363/104mm °F)
- **Flash point:** Not applicable.
- **Flammability (solid, gaseous):** Not determined.
- **Ignition temperature:**
  - **Decomposition temperature:** Not determined.
- **Auto igniting:** Not determined.
- **Danger of explosion:** Not determined.
- **Explosion limits:**
  - **Lower:** Not determined.
  - **Upper:** Not determined.
- **Vapor pressure:** Not determined.
- **Density:** Not determined.
  - **Relative density:** Not determined.
  - **Vapor 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:** 0.0 %
  - **VOC content:** 0.0 g/l / 0.00 lb/gl
10 Stability and reactivity

- Reactivity: No further relevant information available.
- Chemical stability:
  - Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
  - Possibility of hazardous reactions: No dangerous reactions known.
  - Conditions to avoid: No further relevant information available.
- Incompatible materials: No further relevant information available.
- Hazardous decomposition products: No dangerous decomposition products known.

11 Toxicological information

- Information on toxicological effects
  - Acute toxicity:
    - Primary irritant effect:
      - on the skin: No irritant effect.
      - on the eye: No irritating effect.
    - Sensitization: No sensitizing effects known.
  - Additional toxicological information:
    - Carcinogenic categories
      - IARC (International Agency for Research on Cancer)
        Substance is not listed.
      - NTP (National Toxicology Program)
        Substance is not listed.
      - OSHA-Ca (Occupational Safety & Health Administration)
        Substance is not listed.

12 Ecological information

- Toxicity
  - Aquatic toxicity: No further relevant information available.
  - Persistence and degradability: No further relevant information available.
  - Behavior in environmental systems:
    - Bioaccumulative potential: No further relevant information available.
    - Mobility in soil: No further ecological information available.
  - Additional ecological information:
    - General notes:
      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 course or sewage system.
    - Results of PBT and vPvB assessment
      - PBT: Not applicable.
      - vPvB: Not applicable.
  - Other adverse effects: No further relevant information available.
### 13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:** Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

### 14 Transport information

<table>
<thead>
<tr>
<th>Category</th>
<th>DOT</th>
<th>IMDG, IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UN-Number</strong></td>
<td></td>
<td>UN1993</td>
</tr>
<tr>
<td><strong>DOT, IMDG, IATA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td></td>
<td>FLAMMABLE LIQUID, N.O.S. (Triethyl(tri-sec-butoxy)dialuminum (contains diethyl(tetra-sec-butoxy)dialuminum and tetraethyl(di-sec-butoxy)dialuminum))</td>
</tr>
<tr>
<td><strong>DOT</strong></td>
<td></td>
<td>Flammable liquids, n.o.s. (Triethyl(tri-sec-butoxy)dialuminum (contains diethyl(tetra-sec-butoxy)dialuminum and tetraethyl(di-sec-butoxy)dialuminum))</td>
</tr>
<tr>
<td><strong>IMDG</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IATA</strong></td>
<td></td>
<td>Flammable liquid, n.o.s. (Triethyl(tri-sec-butoxy)dialuminum (contains diethyl(tetra-sec-butoxy)dialuminum and tetraethyl(di-sec-butoxy)dialuminum))</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DOT</strong></td>
<td></td>
<td>Class 3 Flammable liquids</td>
</tr>
<tr>
<td><strong>Label</strong></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>IMDG, IATA</strong></td>
<td></td>
<td>Class 3 Flammable liquids</td>
</tr>
<tr>
<td><strong>Label</strong></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
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<td>II</td>
</tr>
<tr>
<td><strong>DOT, IMDG, IATA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental hazards:</strong></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td><strong>Marine pollutant:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Special precautions for user</strong></td>
<td></td>
<td>Warning: Flammable liquids</td>
</tr>
<tr>
<td><strong>EMS Number:</strong></td>
<td></td>
<td>F-E,S-E</td>
</tr>
<tr>
<td><strong>Stowage Category</strong></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td><strong>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</strong></td>
<td></td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>
### Trade name: tri-sec-butoxytriethyldialuminum

<table>
<thead>
<tr>
<th>Transport/Additional information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT</td>
</tr>
<tr>
<td><strong>Quantity limitations</strong></td>
</tr>
<tr>
<td>On passenger aircraft/rail: 5 L</td>
</tr>
<tr>
<td>On cargo aircraft only: 60 L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMDG</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limited quantities (LQ)</strong></td>
</tr>
<tr>
<td>1L</td>
</tr>
<tr>
<td>Code: E2</td>
</tr>
<tr>
<td><strong>Excepted quantities (EQ)</strong></td>
</tr>
<tr>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td>Maximum net quantity per outer packaging: 500 ml</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UN &quot;Model Regulation&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN 1993 FLAMMABLE LIQUIDS, N.O.S. (TRIETHYL(TRI-SEC-BUTOXY)DIALUMINUM (CONTAINS DIETHYL(TETRA-SEC-BUTOXY)DIALUMINUM AND TETRAETHYL(DI-SEC-BUTOXY)DIALUMINUM), 3, II</td>
</tr>
</tbody>
</table>

### 15 Regulatory information

<table>
<thead>
<tr>
<th>Safety, health and environmental regulations/legislation specific for the substance or mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sara</td>
</tr>
<tr>
<td><strong>Section 355 (extremely hazardous substances):</strong></td>
</tr>
<tr>
<td>Substance is not listed.</td>
</tr>
<tr>
<td><strong>Section 313 (Specific toxic chemical listings):</strong></td>
</tr>
<tr>
<td>Substance is not listed.</td>
</tr>
<tr>
<td><strong>TSCA (Toxic Substances Control Act):</strong></td>
</tr>
<tr>
<td>Substance is not listed.</td>
</tr>
<tr>
<td><strong>Proposition 65</strong></td>
</tr>
<tr>
<td><strong>Chemicals known to cause cancer:</strong></td>
</tr>
<tr>
<td>Substance is not listed.</td>
</tr>
<tr>
<td><strong>Chemicals known to cause reproductive toxicity for females:</strong></td>
</tr>
<tr>
<td>Substance is not listed.</td>
</tr>
<tr>
<td><strong>Chemicals known to cause reproductive toxicity for males:</strong></td>
</tr>
<tr>
<td>Substance is not listed.</td>
</tr>
<tr>
<td><strong>Chemicals known to cause developmental toxicity:</strong></td>
</tr>
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<td>Substance is not listed.</td>
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<thead>
<tr>
<th>Carcinogenic categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EPA (Environmental Protection Agency)</strong></td>
</tr>
<tr>
<td>Substance is not listed.</td>
</tr>
<tr>
<td><strong>TLV (Threshold Limit Value established by ACGIH)</strong></td>
</tr>
<tr>
<td>Substance is not listed.</td>
</tr>
<tr>
<td><strong>NIOSH-Ca (National Institute for Occupational Safety and Health)</strong></td>
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<td>Substance is not listed.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>GHS label elements</th>
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<td>The substance is classified and labeled according to the Globally Harmonized System (GHS).</td>
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</tbody>
</table>
Trade name: tri-sec-butoxytriethyldialuminum

- **Hazard pictograms**

  GHS02

- **Signal word** Danger

- **Hazard statements**
  
  H225 Highly flammable liquid and vapor.

- **Precautionary statements**
  
  P231 Handle under inert gas.
  P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
  P262 Do not get in eyes, on skin, or on clothing.
  P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
  P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **National regulations:**

- **Water hazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.

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

### 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Department issuing SDS:** Technical Department.

- **Contact:** Technical Director

- **Date of preparation / last revision** 07/29/2016 / -

- **Abbreviations and acronyms:**
  
  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
  DOT: US Department of Transportation
  IATA: International Air Transport Association
  ACGIH: American Conference of Governmental Industrial Hygienists
  CAS: Chemical Abstracts Service (division of the American Chemical Society)
  NFPA: National Fire Protection Association (USA)
  HMIS: Hazardous Materials Identification System (USA)
  VOC: Volatile Organic Compounds (USA, EU)
  PBT: Persistent, Bioaccumulative and Toxic
  vPvB: very Persistent and very Bioaccumulative
  NIOSH: National Institute for Occupational Safety
  OSHA: Occupational Safety & Health
  TLV: Threshold Limit Value
  PEL: Permissible Exposure Limit
  REL: Recommended Exposure Limit
  Flam. Liq. 2: Flammable liquids, Hazard Category 2