1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name: tert-Butanol

Product Number: 360538
Brand: Sigma-Aldrich
Index-No.: 603-005-00-1

CAS-No.: 75-65-0

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

Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103 USA

Telephone: +1 800-325-5832
Fax: +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #: (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H225: Highly flammable liquid and vapour.
H319: Causes serious eye irritation.
H335: May cause respiratory irritation.

Precautionary statement(s)
P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233: Keep container tightly closed.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge.
P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Butyl alcohol</td>
<td>Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H335</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11
4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Flash back possible over considerable distance.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

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
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

8. EXPOSURE CONTROLS/PERSOAL PROTECTION

8.1 Control parameters
Components with workplace control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Butyl alcohol</td>
<td>75-65-0</td>
<td>TWA</td>
<td>100.000000 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td>Central Nervous System impairment Not classifiable as a human carcinogen</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>100.000000 ppm 300.000000 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST</td>
<td>150.000000 ppm 450.000000 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>100.000000 ppm 300.000000 mg/m³</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
<td></td>
</tr>
</tbody>
</table>

The value in mg/m³ is approximate.

8.2 Exposure controls

**Appropriate engineering controls**
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**Personal protective equipment**

- **Eye/face protection**
  - Face shield and safety glasses
  - Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

- **Skin protection**
  - Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

  - **Full contact**
    - Material: Nitrile rubber
    - Minimum layer thickness: 0.4 mm
    - Break through time: 480 min
    - Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

  - **Splash contact**
    - Material: Nitrile rubber
    - Minimum layer thickness: 0.2 mm
    - Break through time: 30 min
    - Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

- **Body Protection**
  - Impervious clothing, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

- **Respiratory protection**
  - Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls.
  - If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

- **Control of environmental exposure**
  - Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid
   Colour: colourless

b) Odour No data available

c) Odour Threshold No data available

d) pH No data available

e) Melting point/freezing point Melting point/range: 23 - 26 °C (73 - 79 °F)

f) Initial boiling point and boiling range 83 °C (181 °F)

g) Flash point 11 °C (52 °F) - closed cup

h) Evaporation rate No data available

i) Flammability (solid, gas) No data available

j) Upper/lower flammability or explosive limits
   Upper explosion limit: 8 %(V)
   Lower explosion limit: 2.4 %(V)

k) Vapour pressure
   41 hPa (31 mmHg) at 20 °C (68 °F)
   59 hPa (44 mmHg) at 26 °C (79 °F)

l) Vapour density 2.56 - (Air = 1.0)

m) Relative density 0.775 g/mL at 25 °C (77 °F)

n) Water solubility completely miscible

o) Partition coefficient: n-octanol/water No data available

p) Auto-ignition temperature No data available

q) Decomposition temperature No data available

r) Viscosity No data available

s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information

Relative vapour density 2.56 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Strong oxidizing agents, Copper, Alkali metals, Aluminum
10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2,743 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Lacrimation. Respiratory disorder
Gastrointestinal: Other changes.

Inhalation: No data available

LD50 Dermal - Rabbit - > 2,000 mg/kg
Remarks: Prolonged skin contact may cause skin irritation and/or dermatitis.

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH,
NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as
probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a
known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a
carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: EO1925000

drying, cracking of the skin, Skin irritation
Liver - Irregularities - Based on Human Evidence
12. ECOLOGICAL INFORMATION

12.1 Toxicity
Toxicity to fish: LC50 - Pimephales promelas (fathead minnow) - 6,140 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna (Water flea) - 933 mg/l - 48 h

12.2 Persistence and degradability
Biodegradability: Zahn-Wellens Test - Exposure time 19 d
Result: > 99.9% - Readily biodegradable

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 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. TRANSPORT INFORMATION

DOT (US)
UN number: 1120 Class: 3
Proper shipping name: Butanols
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 1120 Class: 3
Proper shipping name: BUTANOLS
EMS-No: F-E, S-D

IATA
UN number: 1120 Class: 3
Proper shipping name: Butanols

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Butyl alcohol</td>
<td>75-65-0</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>
SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
- tert-Butyl alcohol
  - CAS-No.: 75-65-0
  - Revision Date: 2007-07-01

Pennsylvania Right To Know Components
- tert-Butyl alcohol
  - CAS-No.: 75-65-0
  - Revision Date: 2007-07-01

New Jersey Right To Know Components
- tert-Butyl alcohol
  - CAS-No.: 75-65-0
  - Revision Date: 2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.  Eye irritation
Flam. Liq.  Flammable liquids
H225  Highly flammable liquid and vapour.
H319  Causes serious eye irritation.
H335  May cause respiratory irritation.
STOT SE  Specific target organ toxicity - single exposure

HMIS Rating
- Health hazard: 2
- Chronic Health Hazard: *
- Flammability: 3
- Physical Hazard: 0

NFPA Rating
- Health hazard: 2
- Fire Hazard: 3
- Reactivity Hazard: 0

Further information
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Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3  Revision Date: 02/26/2015  Print Date: 06/02/2015