1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

- **Product name**: tert-Butanol
- **Product Number**: 471712
- **Brand**: Sigma-Aldrich
- **Index-No.**: 603-005-00-1
- **REACH No.**: A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
- **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**: 
  ![Flammable and Poisonous Symbol]
- **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.
2.3 **Hazards not otherwise classified (HNOC) or not covered by GHS** - none

3. **COMPOSITION/INFORMATION ON INGREDIENTS**

3.1 **Substances**

| Synonyms | 2-Methyl-2-propanol  
|          | Trimethyl carbinol  
|          | tert-Butyl alcohol |
| Formula  | C₄H₁₀O |
| Molecular Weight | 74.12 g/mol |
| CAS-No. | 75-65-0 |
| EC-No. | 200-889-7 |
| Index-No. | 603-005-00-1 |

**Hazardous components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
</table>
| tert-Butyl alcohol | Flam. Liq. 2; Eye Irrit. 2A;  
|                 | STOT SE 3; H225, H319, H335 | -             |

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 fire fighting 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/PERSONAL PROTECTION
8.1 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 ppm</td>
<td>USA, ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Remarks Central Nervous System impairment
Not classifiable as a human carcinogen

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td>100 ppm</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
<tr>
<td></td>
<td>300 mg/m³</td>
<td></td>
</tr>
<tr>
<td>ST</td>
<td>150 ppm</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
<tr>
<td></td>
<td>450 mg/m³</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>100 ppm</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td>300 mg/m³</td>
<td></td>
</tr>
<tr>
<td>The value in mg/m³ is approximate.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>100 ppm</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
<tr>
<td></td>
<td>300 mg/m³</td>
<td></td>
</tr>
<tr>
<td>STEL</td>
<td>150 ppm</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
<tr>
<td></td>
<td>450 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

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)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

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
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  Packing group: II
   Proper shipping name: Butanols
   Reportable Quantity (RQ):
   Marine pollutant: No
   Poison Inhalation Hazard: No

IMDG
   UN number: 1120  Class: 3  Packing group: II
   EMS-No: F-E, S-D
   Proper shipping name: BUTANOLS
   Marine pollutant: No

IATA
   UN number: 1120  Class: 3  Packing group: II
   Proper shipping name: Butanols

15. REGULATORY INFORMATION

REACH No.
   A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

SARA 302 Components
   SARA 302: 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:

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<td>75-65-0</td>
<td>2007-07-01</td>
</tr>
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</table>

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

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Pennsylvania Right To Know Components

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New Jersey Right To Know Components

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</tr>
</tbody>
</table>

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: 5.1   Revision Date: 02/26/2014   Print Date: 03/20/2014