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

1.1 Product identifiers

Product name: tert-Butyl hydroperoxide solution
Product Number: 19999
Brand: Aldrich

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

Identified uses: Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO  63103
UNITED STATES
Telephone: +1 314 771-5765
Fax: +1 800 325-5052

1.4 Emergency telephone

Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

- Flammable liquids (Category 3), H226
- Organic peroxides (Type F), H242
- Acute toxicity, Oral (Category 4), H302
- Acute toxicity, Inhalation (Category 2), H330
- Acute toxicity, Dermal (Category 3), H311
- Skin corrosion (Category 1C), H314
- Serious eye damage (Category 1), H318
- Skin sensitization (Category 1), H317
- Germ cell mutagenicity (Category 2), H341
- Specific target organ toxicity - single exposure (Category 3), Respiratory system, Central nervous system, H335, H336
- Aspiration hazard (Category 1), H304
- Short-term (acute) aquatic hazard (Category 2), H401
- Long-term (chronic) aquatic hazard (Category 1), H410
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 liquid and vapor.
- Heating may cause a fire.
- Harmful if swallowed.
- May be fatal if swallowed and enters airways.
- Toxic in contact with skin.
- Causes severe skin burns and eye damage.
- May cause an allergic skin reaction.
- Fatal if inhaled.
- May cause respiratory irritation.
- May cause drowsiness or dizziness.
- Suspected of causing genetic defects.
- Toxic to aquatic life.
- Very toxic to aquatic life with long lasting effects.

### Signal Word

Danger

### Hazard statement(s)

- **H226** Flammable liquid and vapor.
- **H242** Heating may cause a fire.
- **H302** Harmful if swallowed.
- **H304** May be fatal if swallowed and enters airways.
- **H311** Toxic in contact with skin.
- **H314** Causes severe skin burns and eye damage.
- **H317** May cause an allergic skin reaction.
- **H330** Fatal if inhaled.
- **H335** May cause respiratory irritation.
- **H336** May cause drowsiness or dizziness.
- **H341** Suspected of causing genetic defects.
- **H401** Toxic to aquatic life.
- **H410** Very toxic to aquatic life with long lasting effects.

### Precautionary statement(s)

- **P201** Obtain special instructions before use.
- **P202** Do not handle until all safety precautions have been read and understood.
- **P210** Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
- **P220** Keep/Store away from clothing/ combustible materials.
- **P233** Keep container tightly closed.
- **P234** Keep only in original container.
- **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.
- **P260** Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
- **P264** Wash skin thoroughly after handling.
- **P270** Do not eat, drink or smoke when using this product.
- **P271** Use only outdoors or in a well-ventilated area.
- **P272** Contaminated work clothing must not be allowed out of the workplace.
- **P273** Avoid release to the environment.
- **P280** Wear protective gloves/ protective clothing/ eye protection/ face protection.
- **P284** Wear respiratory protection.
- **P301 + P310** IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
- **P301 + P330 + P331** IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- **P303 + P361 + P353** IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- **P304 + P340 + P310** IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
- **P305 + P351 + P338 +** IF IN EYES: Rinse cautiously with water for several minutes.
- **P310** Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
- **P308 + P313** IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391 Collect spillage.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P410 Protect from sunlight.
P420 Store away from other materials.
P501 Dispose of contents/container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures
Synonyms: TBHP

Molecular weight: 90.12 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>nonane</td>
<td>Flam. Liq. 3; Skin Irrit. 2; STOT SE 3; Asp. Tox. 1; Aquatic Chronic 1; H226, H315, H336, H304, H410 M-Factor - Aquatic Acute: 1</td>
<td>&gt;= 50 - &lt; 70 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Butyl hydroperoxide</td>
<td>Flam. Liq. 3; Org. Perox. A; Acute Tox. 4; Acute Tox. 2; Acute Tox. 3; Skin Corr. 1C; Eye Dam. 1; Skin Sens. 1; Muta. 2; STOT SE 3; Aquatic Acute 2; Aquatic Chronic 2; H226, H240, H302, H330, H311, H314, H318, H317, H341, H335, H401, H411</td>
<td>&gt;= 50 - &lt; 70 %</td>
</tr>
</tbody>
</table>

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

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.
**If inhaled**
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

**If swallowed**
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Pulmonary failure possible after aspiration of vomit. Call a physician immediately. Do not attempt to neutralise.

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

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**SECTION 5: Firefighting measures**

5.1 **Extinguishing media**

**Suitable extinguishing media**
Foam Carbon dioxide (CO2) Dry powder

**Unsuitable extinguishing media**
For this substance/mixture no limitations of extinguishing agents are given.

5.2 **Special hazards arising from the substance or mixture**
Carbon oxides
Mixture with combustible ingredients.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 **Advice for firefighters**
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 **Further information**
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

---

**SECTION 6: Accidental release measures**

6.1 **Personal precautions, protective equipment and emergency procedures**
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.
6.2 **Environmental precautions**  
Do not let product enter drains. Risk of explosion.

6.3 **Methods and materials for containment and cleaning up**  
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 **Reference to other sections**  
For disposal see section 13.

---

**SECTION 7: Handling and storage**

7.1 **Precautions for safe handling**

**Advice on safe handling**  
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

**Advice on protection against fire and explosion**  
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

**Hygiene measures**  
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.  
For precautions see section 2.2.

7.2 **Conditions for safe storage, including any incompatibilities**

**Storage conditions**  
Tightly closed. Keep locked up or in an area accessible only to qualified or authorized persons. Separately or together with other organic peroxides only and away from sources of ignition and heat.

**Storage stability**  
Recommended storage temperature  
2 - 8 °C  

**Storage class**  
Storage class (TRGS 510): 5.2: Organic peroxides and self-reacting hazardous materials

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

---

**SECTION 8: Exposure controls/personal protection**

8.1 **Control parameters**

**Ingredients with workplace control parameters**
### 8.2 Exposure controls

**Appropriate engineering controls**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

**Personal protective equipment**

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

**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 EC 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**
Flame retardant antistatic protective clothing.
Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- **Appearance**: Form: liquid
- **Odor**: No data available
- **Odor Threshold**: No data available
- **pH**: No data available
- **Melting point/freezing point**: No data available
- **Initial boiling point and boiling range**: No data available
- **Flash point**: 29 °C (84 °F) - closed cup
- **Evaporation rate**: No data available
- **Flammability (solid, gas)**: No data available
- **Upper/lower flammability or explosive limits**: No data available
- **Vapor pressure**: No data available
- **Vapor density**: No data available
- **Density**: 0.82 g/mL at 20 °C (68 °F)
- **Relative density**: No data available
- **Water solubility**: No data available
- **Partition coefficient: n-octanol/water**: No data available
- **Autoignition temperature**: No data available
- **Decomposition temperature**: No data available
- **Viscosity**: No data available
- **Explosive properties**: Not classified as explosive.
- **Oxidizing properties**: none

9.2 Other safety information
No data available
SECTION 10: Stability and reactivity

10.1 Reactivity
  Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability
  The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
  No data available

10.4 Conditions to avoid
  Heating.

10.5 Incompatible materials
  Strong acids, Strong bases

10.6 Hazardous decomposition products
  In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

  Mixture

  Acute toxicity
  Oral: No data available
  Acute toxicity estimate Oral - 1,120 mg/kg
  (Calculation method)
  Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

  Inhalation: No data available
  Acute toxicity estimate Inhalation - 4 h - 1.68 mg/l - vapor (Calculation method)
  Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract
  Dermal: No data available
  Acute toxicity estimate Dermal - 737.27 mg/kg
  (Calculation method)

  Skin corrosion/irritation
  Mixture causes burns.

  Serious eye damage/eye irritation
  Mixture causes serious eye damage. Risk of blindness!

  Respiratory or skin sensitization
  Mixture may cause an allergic skin reaction.

  Germ cell mutagenicity
  Evidence of genetic defects.

  Carcinogenicity
IARC: No ingredient 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 ingredient 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 on OSHA’s list of regulated carcinogens.

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
Mixture may cause respiratory irritation.
Mixture may cause drowsiness or dizziness.

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
Aspiration hazard, Aspiration may cause pulmonary edema and pneumonitis.

### 11.2 Additional Information

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting
Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

**Components**

nonane

**Acute toxicity**
LD50 Oral - Rat - male and female - > 5,000 mg/kg
(OECD Test Guideline 401)
Remarks: (in analogy to similar compounds)
The value is given in analogy to the following substances: isooctane
Inhalation: No data available
Symptoms: mucosal irritations, Lung edema
LD50 Dermal - Rabbit - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: isooctane
No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: Irritating to skin. - 24 h
(OECD Test Guideline 404)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: isooctane
Drying-out effect resulting in rough and chapped skin. Dermatitis
Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: isooctane

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)
Remarks: (in analogy to similar products)

Germ cell mutagenicity
Test Type: Ames test
Test system: S. typhimurium
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause drowsiness or dizziness. - Central nervous system
Acute inhalation toxicity - mucosal irritations, Lung edema

Specific target organ toxicity - repeated exposure
Aspiration hazard
Aspiration may cause pulmonary edema and pneumonitis.

tert-Butyl hydroperoxide

Acute toxicity
LD50 Oral - Rat - male and female - 560 mg/kg
Remarks: Aqueous solution
(ECHA)
LC50 Inhalation - Rat - male and female - 4 h - 0.84 mg/l - vapor
(OECD Test Guideline 403)
LD50 Dermal - Rabbit - male and female - 440 mg/kg
(OECD Test Guideline 402)
Remarks: Aqueous solution
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Corrosive, category 1C - where responses occur after exposures between 1 hour and 4 hours and observations up to 14 days. - 24 h
Remarks: Aqueous solution

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive - 21 d
Remarks: Aqueous solution

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: positive
(OECD Test Guideline 406)
Remarks: Aqueous solution

**Germ cell mutagenicity**
Suspected of causing genetic defects.
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster cells
Result: positive
Remarks: (in analogy to similar products)
Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test
Result: positive
Remarks: (in analogy to similar products)
Test Type: Ames test
Test system: S. typhimurium
Result: positive
Remarks: (in analogy to similar products)
Species: Mouse - male and female
Result: negative
Remarks: (in analogy to similar products)
Species: Mouse - male
Result: positive
Remarks: (in analogy to similar products)
Species: Rat - male
Result: negative
Remarks: (in analogy to similar products)
(ECHA)

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

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

**Specific target organ toxicity - repeated exposure**

**Aspiration hazard**
No data available

---

**SECTION 12: Ecological information**

**12.1 Toxicity**
**Mixture**
No data available

**12.2 Persistence and degradability**
No data available

**12.3 Bioaccumulative potential**
No data available
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 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

Components

nonane
Toxicity to daphnia and other aquatic invertebrates static test EC50 - Daphnia magna (Water flea) - 0.2 mg/l - 48 h
Remarks: (ECHA)

tert-Butyl hydroperoxide
Toxicity to fish semi-static test LC50 - Pimephales promelas (fathead minnow) - 29.61 mg/l - 96 h
(OECD Test Guideline 203)
Remarks: Aqueous solution

Toxicity to daphnia and other aquatic invertebrates static test EC50 - Daphnia magna (Water flea) - 14.1 mg/l - 48 h
(OECD Test Guideline 202)
Remarks: Aqueous solution

Toxicity to algae static test ErC50 - Pseudokirchneriella subcapitata - 1.5 mg/l - 72 h
(OECD Test Guideline 201)
Remarks: Aqueous solution

Toxicity to bacteria Growth inhibition EC50 - activated sludge - 17 mg/l - 30 h
(OECD Test Guideline 209)
Remarks: Aqueous solution

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.
SECTION 14: Transport information

**DOT (US)**
UN number: 3105  Class: 5.2 (8)
Proper shipping name: Organic peroxide type D, liquid (tert-Butyl hydroperoxide, ≤80%)
Reportable Quantity (RQ): 
Poison Inhalation Hazard: No

**IMDG**
UN number: 3105  Class: 5.2 (8)
Proper shipping name: ORGANIC PEROXIDE TYPE D, LIQUID (tert-BUTYL HYDROPEROXIDE)

**IATA**
UN number: 3105  Class: 5.2 (8, HEAT)
Proper shipping name: Organic peroxide type D, liquid (tert-Butyl hydroperoxide)
Special Provisions: "Keep away from heat" label required.

SECTION 15: Regulatory information

**SARA 302 Components**
This material does not contain any components with a section 302 EHS TPQ.

**SARA 313 Components**
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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

**Massachusetts Right To Know Components**
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

**Further information**
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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