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**1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : *tert*-Butyllithium solution

Product Number : 186198  
Brand : Aldrich

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

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation  
Product Safety - Americas Region  
1-800-521-8956

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**2. HAZARDS IDENTIFICATION****Emergency Overview****OSHA Hazards**

Flammable liquid, Pyrophoric, Target Organ Effect, Corrosive

**Target Organs**

Central nervous system, Heart, Lungs, Nerves.

**GHS Classification**

Flammable liquids (Category 2)

Pyrophoric liquids (Category 1)

Substances, which in contact with water, emit flammable gases (Category 1)

Acute toxicity, Dermal (Category 5)

Skin corrosion (Category 1B)

Serious eye damage (Category 1)

Specific target organ toxicity - single exposure (Category 3)

Aspiration hazard (Category 1)

Acute aquatic toxicity (Category 2)

**GHS Label elements, including precautionary statements**

Pictogram



Signal word

Danger

Hazard statement(s)

H225

Highly flammable liquid and vapour.

H250

Catches fire spontaneously if exposed to air.

H260

In contact with water releases flammable gases which may ignite spontaneously.

H304

May be fatal if swallowed and enters airways.

H313

May be harmful in contact with skin.

H314

Causes severe skin burns and eye damage.

H336

May cause drowsiness or dizziness.

H401

Toxic to aquatic life.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
P222 Do not allow contact with air.  
P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.  
  
P231 + P232 Handle under inert gas. Protect from moisture.  
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
  
P310 Immediately call a POISON CENTER or doctor/ physician.  
P331 Do NOT induce vomiting.  
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.  
P422 Store contents under inert gas.

**HMIS Classification**

**Health hazard:** 3  
**Chronic Health Hazard:** \*  
**Flammability:** 4  
**Physical hazards:** 3

**NFPA Rating**

**Health hazard:** 3  
**Fire:** 3  
**Reactivity Hazard:** 3

**Potential Health Effects**

**Inhalation** May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. Vapours may cause drowsiness and dizziness.  
**Skin** May be harmful if absorbed through skin. Causes skin burns.  
**Eyes** Causes eye burns.  
**Ingestion** May be harmful if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Synonyms : Lithium-2-methyl-2-propanide  
t-BuLi  
  
Formula : C<sub>4</sub>H<sub>9</sub>Li  
Molecular Weight : 64.06 g/mol

Component	Classification	Concentration
<b>n-Pentane</b>		
CAS-No. 109-66-0	Flam. Liq. 2; STOT SE 3; Asp. Tox. 1; Aquatic Chronic 2; H225, H304, H336, H411, EUH066	70 - 90 %
EC-No. 203-692-4		
Index-No. 601-006-00-1		
<b>tert-Butyllithium</b>		
CAS-No. 594-19-4	Pyr. Liq. 1; Water-react. 1; Skin Corr. 1B; H250, H260, H314	10 - 30 %
EC-No. 209-831-5		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

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**4. 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**

Take off contaminated clothing and shoes immediately. 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. Continue rinsing eyes during transport to hospital.

**If swallowed**

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

**5. FIREFIGHTING MEASURES****Suitable extinguishing media**

Dry powder Dry powder Carbon dioxide (CO<sub>2</sub>)

**Extinguishing media which shall not be used for safety reasons**

Water Carbon dioxide (CO<sub>2</sub>) Water

**Special protective equipment for firefighters**

Wear self contained breathing apparatus for fire fighting if necessary.

**Hazardous combustion products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Lithium oxides

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

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.

**Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

**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). Do not flush with water.

**7. HANDLING AND STORAGE****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.

**Conditions for safe storage**

Store in cool place. 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.

Never allow product to get in contact with water during storage.

Recommended storage temperature: 2 - 8 °C

Air and moisture sensitive. Handle and store under inert gas. Sensitive to carbon dioxide

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
n-Pentane	109-66-0	TWA	600 ppm 1,800 mg/m <sup>3</sup>	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	750 ppm 2,250 mg/m <sup>3</sup>	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1,000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1

			2,950 mg/m3	Limits for Air Contaminants
Remarks	The value in mg/m3 is approximate.			
		TWA	600 ppm	USA. ACGIH Threshold Limit Values (TLV)
		TWA	600 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Peripheral neuropathy			
		TWA	120 ppm 350 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	610 ppm 1,800 mg/m3	USA. NIOSH Recommended Exposure Limits
	15 minute ceiling value			

## Personal protective equipment

### 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).

### Hand 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.

Protective gloves against thermal risks

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: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, 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.

### Eye protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

### Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place., Flame retardant protective clothing. Antistatic safety boots. Complete suit protecting against chemicals, 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.

### Hygiene measures

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

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

Form	liquid
Colour	light yellow

### Safety data

pH	no data available
Melting point/freezing point	no data available
Boiling point	no data available
Flash point	-49 °C (-56 °F) - closed cup
Ignition temperature	no data available
Auto-ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	0.652 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

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## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

Vapours may form explosive mixture with air.  
Reacts violently with water.

### Conditions to avoid

Heat, flames and sparks. Extremes of temperature and direct sunlight. Exposure to moisture.

### Materials to avoid

acids, Water, Alcohols, Carbon dioxide (CO<sub>2</sub>), Humid air, Halogenated hydrocarbon, Amines

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Lithium oxides  
Other decomposition products - no data available

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## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

**Oral LD50**  
no data available

**Inhalation LC50**  
**Dermal LD50**

**Other information on acute toxicity**

no data available

**Skin corrosion/irritation**

no data available

**Serious eye damage/eye irritation**

Eyes: no data available

**Respiratory or skin sensitisation**

no data available

**Germ cell mutagenicity**

no data available

**Carcinogenicity**

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.

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

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

**Teratogenicity**

no data available

**Specific target organ toxicity - single exposure (Globally Harmonized System)**

no data available

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

no data available

**Aspiration hazard**

no data available

**Potential health effects****Inhalation**

May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. Vapours may cause drowsiness and dizziness.

**Ingestion**

May be harmful if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.

**Skin**

May be harmful if absorbed through skin. Causes skin burns.

**Eyes**

Causes eye burns.

**Synergistic effects**

no data available

**Additional Information**

RTECS: Not available

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**12. ECOLOGICAL INFORMATION**

**Toxicity**

no data available

**Persistence and degradability**

no data available

**Bioaccumulative potential**

no data available

**Mobility in soil**

no data available

**PBT and vPvB assessment**

no data available

**Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

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**13. DISPOSAL CONSIDERATIONS****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.

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**14. TRANSPORT INFORMATION****DOT (US)**

UN number: 3394 Class: 4.2 (4.3) Packing group: I  
Proper shipping name: Organometallic substance, liquid, pyrophoric, water-reactive (tert-Butyllithium)  
Marine pollutant: No  
Poison Inhalation Hazard: No

**IMDG**

UN number: 3394 Class: 4.2 (4.3) Packing group: I EMS-No: F-G, S-M  
Proper shipping name: ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE (tert-Butyllithium)  
Marine pollutant: No

**IATA**

UN number: 3394 Class: 4.2 (4.3)  
Proper shipping name: Organometallic substance, liquid, pyrophoric, water-reactive (tert-Butyllithium)  
IATA Passenger: Not permitted for transport  
IATA Cargo: Not permitted for transport

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**15. REGULATORY INFORMATION****OSHA Hazards**

Flammable liquid, Pyrophoric, Target Organ Effect, Corrosive

**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**

SARA 313: 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**

n-Pentane	CAS-No. 109-66-0	Revision Date 2007-03-01
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#### **Pennsylvania Right To Know Components**

n-Pentane	CAS-No. 109-66-0	Revision Date 2007-03-01
tert-Butyllithium	594-19-4	

#### **New Jersey Right To Know Components**

n-Pentane	CAS-No. 109-66-0	Revision Date 2007-03-01
tert-Butyllithium	594-19-4	

#### **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.

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## **16. OTHER INFORMATION**

### **Text of H-code(s) and R-phrase(s) mentioned in Section 3**

Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
EUH066	Repeated exposure may cause skin dryness or cracking.
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H250	Catches fire spontaneously if exposed to air.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H304	May be fatal if swallowed and enters airways.
H314	Causes severe skin burns and eye damage.
H336	May cause drowsiness or dizziness.
H411	Toxic to aquatic life with long lasting effects.
Pyr. Liq.	Pyrophoric liquids
Skin Corr.	Skin corrosion
STOT SE	Specific target organ toxicity - single exposure
Water-react.	Substances, which in contact with water, emit flammable gases

### **Further information**

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