Material Safety Data Sheet
tert-Butyllithium, 1.5M solution in pentane

ACC# 11482

Section 1 - Chemical Product and Company Identification

MSDS Name: tert-Butyllithium, 1.5M solution in pentane
Catalog Numbers: AC181280000, AC181280100, AC181280900, AC181281000, AC181288000
Synonyms: None.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
109-66-0	Pentane		203-692-4
594-19-4	tert-Butyllithium		209-831-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: Clear solid/liquid mixture. Flash Point: -30 deg C.
Danger! Toxic. Causes digestive and respiratory tract burns. Extremely flammable liquid and vapor. Vapor may cause flash fire. Water-reactive. Corrosive. Causes severe eye and skin burns. Pyrophoric. Spontaneously flammable in air. Harmful if inhaled. Harmful if absorbed through the skin. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause central nervous system depression. May cause kidney damage. Air sensitive.
Target Organs: Kidneys, central nervous system.

Potential Health Effects

Eye: Causes severe eye burns. May cause irreversible eye injury.
Skin: Harmful if absorbed through the skin. Contact with liquid is corrosive and causes severe burns and ulceration.
Ingestion: Aspiration hazard. May cause central nervous system depression, kidney damage, and liver damage. Causes digestive tract burns with immediate pain, swelling of the throat, convulsions, and possible coma. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract. May cause ear ringing, blurred vision, thyroid abnormalities, photophobia, coma, and seizures. The characteristics of lithium toxicity include: tremors, nausea, slurred speech, sluggishness, vertigo, thirst, and increased urine output. Effects from continued exposure include apathy, anorexia, fatigue, lethargy, muscular weakness, and cardiac changes. Long term exposure may lead to hypothroidism, leukocytosis, edema, weight gain, memory impairment, seizures, kidney damage, shock, hypotennsion, cardiac arrhythmias, coma, and death. Lithium has been implicated in the development of aplastic anemia.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Irritation may lead to chemical pneumonitis and pulmonary edema. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. May cause effects similar to those described for ingestion.
Chronic: Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.
Skin: Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: Evacuate area and fight fire from a safe distance. Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Combustion generates toxic fumes. Material is easily ignited if allowed to dry. Extremely flammable. Material will readily ignite at room temperature. Water Reactive. Material will react with water and may release a flammable and/or toxic gas. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Can form explosive mixtures at temperatures above the flashpoint.
Extinguishing Media: Do NOT use water directly on fire. Water may be ineffective. Use water spray, dry chemical, carbon dioxide, or chemical foam.

Flash Point: -30 deg C (-22.00 deg F)
Autoignition Temperature: 285 deg C (545.00 deg F)
Explosion Limits, Lower:1.40 vol %
Upper: 8.30 vol %
NFPA Rating: (estimated) Health: ; Flammability: ; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not ingest or inhale. Do not allow contact with water. Use only in a chemical fume hood. Store and handle protected from air. Do not use if the material has evaporated to dryness. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep container closed to prevent drying out. Keep under a nitrogen blanket. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from water. Keep away from organic halogens. Refrigerator/flammables. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Pentane	600 ppm TWA	120 ppm TWA; 350 mg/m3 TWA 1500 ppm IDLH	1000 ppm TWA; 2950 mg/m3 TWA
tert-Butyllithium	none listed	none listed	none listed

OSHA Vacated PELs: Pentane: 600 ppm TWA; 1800 mg/m3 TWA tert-Butyllithium: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid/Liquid Mixture
Appearance: Clear
Odor: None reported.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 36 - 40 deg C @ 760.00mm Hg
Freezing/Melting Point: Not available.
Decomposition Temperature:30 deg C
Solubility: reacts
Specific Gravity/Density:.6600g/cm3
Molecular Formula:C4H9Li
Molecular Weight:64.06

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, exposure to air, contact with water, organic materials, strong oxidants, exposure to moist air or water, dehydrating agents.
Incompatibilities with Other Materials: Lithium is incompatible with acetonitrile + sulfur dioxide, bromine pentafluoride, bromobenzene, carbon + lithium tetrachloroaluminate + sulfunyl chloride, carbon + sulfunyl chloride, chlorine tri or pentafluoride, diazomethane, diborane, ethylene, halocarbbons, halogens, hydrogen, mercury, metal chlorides + nitrogen, metal oxides and chalcogenides, metals, nitric acid, nitryly fluoride, non-metal oxides, platinum, pol(1,1-difluoroethylene-hexafluoropropylene) (viton), sodium carbonate, sulfur, sulfinyl chloride, sulfur dioxide, trifluoromethyl hypofluorite, halocarbons, halogens, iron(II) sulfide, manganese telluride, arsenic, beryllium, maleic anhydride, carbides, carbon dioxide, + water, chlorine, chromium, chromium trichloride, cobalt alloys, nickel alloys, nitrogen, organic matter, oxygen, phosphorus, rubber, silicates, sodium nitrite, tantalum (V) oxide, vanadium, zirconium tetrachloride, iodoform, nitrogen +

metal chlorides, fluorine, magnesium perchlorate. Butyl lithium above 20% in air can ignite spontaneously if the humidity exceeds 70%. Concentrations above 25% are pyrophoric at any humidity. Hexane is incompatible with dinitrogen tetraoxide.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, lithium hydroxide, oxides of lithium.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 109-66-0: RZ9450000
CAS# 594-19-4 unlisted.
LD50/LC50:
CAS# 109-66-0:
Inhalation, rat: LC50 = 364 gm/m3/4H;
Oral, rat: LD50 = >2000 mg/kg;
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CAS# 594-19-4:
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Carcinogenicity:
CAS# 109-66-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 594-19-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. Do not empty into drains.
Environmental: No information available.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	LITHIUM ALKYLS	LITHIUM ALKYLS
Hazard Class:	4.2	4.2(4.3)
UN Number:	UN2445	UN2445
Packing Group:	I	I

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 109-66-0 is listed on the TSCA inventory.
CAS# 594-19-4 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
CAS# 109-66-0: Testing required by manufacturers, processors
Section 12b
CAS# 109-66-0: Section 4
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.

SARA Codes
CAS # 109-66-0: immediate, delayed, fire.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 109-66-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 594-19-4 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:
F C
Risk Phrases:
R 11 Highly flammable.
R 14/15 Reacts violently with water liberating extremely flammable gases.
R 17 Spontaneously flammable in air.
R 34 Causes burns.

Safety Phrases:
S 16 Keep away from sources of ignition - No smoking.
S 33 Take precautionary measures against static discharges.
S 6A Keep under nitrogen.
S 43B In case of fire, use fire-fighting equipment on basis of sodium chloride, sodium bicarbonate (never use water).

WGK (Water Danger/Protection)
CAS# 109-66-0: 1
CAS# 594-19-4: No information available.
Canada - DSL/NDSL
CAS# 109-66-0 is listed on Canada's DSL List.
CAS# 594-19-4 is listed on Canada's NDSL List.
Canada - WHMIS
not available.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 109-66-0 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #4 Date: 2/08/2006