



## Material Safety Data Sheet

MSDS No.: BE2458  
Variant: Americas  
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# TERT BUTYL ACETATE

## SECTION 1: IDENTIFICATION

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Product Name: ~~TERT BUTYL ACETATE~~

Product Number: 00000000000499244

Internal ID: 353

Chemical Family: Organic Ester

CAS Number: 540-88-5

Chemical Name: Acetic Acid, tert-butyl ester

Synonyms: ~~Tertiary butyl Acetate~~; Acetic Acid, 1,1-Dimethylethyl ester; 1,1-Dimethyl acetate

### Company

Lyondell Chemical Company  
One Houston Center, Suite 700  
1221 McKinney St.  
P.O. Box 2583  
Houston Texas 77252-2583

### Business Contact

Customer Service 888 777-0232  
Product Safety 800 700-0946  
product.safety@lyondell.com

### 24 Hour Emergency Contact

LYONDELL 800-245-4532

## SECTION 2: HAZARD IDENTIFICATION

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### Emergency Overview

#### Physical State

Liquid.

#### Color

Clear, colorless.

#### Odor

Sweet odor.

#### Odor Threshold

No value available.

### Potential Health Effects



# TERT BUTYL ACETATE

**Routes of Exposure**

Eye. Inhalation. Skin.

**Signs and Symptoms of Acute Exposure**

See component summary.

- *Tert-Butyl Acetate 540-88-5*

Slight skin irritant. Moderate eye irritant. High vapor concentrations may cause CNS stimulation (increased activity, shaking, tremors) and/or depression (fatigue, dizziness, and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).

- *tert-Butyl Alcohol 75-65-0*

Moderate to severe eye irritant. Mildly irritating to the skin but not a skin sensitizer. Breathing mist or vapors may cause mucous membrane or upper respiratory tract irritation. Overexposure may cause coughing, shortness of breath, dizziness, central nervous system depression, intoxication and collapse. Ingestion would likely cause gastrointestinal tract irritation. May produce symptoms of nervous system depression including headache, dizziness, nausea, loss of sense of balance, drowsiness, and visual disturbances.

**Skin**

Contact may cause mild skin irritation. No significant signs or symptoms indicative of any health hazard are expected to occur as a result of skin absorption exposure.

**Inhalation**

High vapor concentrations may cause CNS stimulation (increased activity, shaking, tremors) and/or depression (fatigue, dizziness, and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).

**Eye**

Moderate eye irritant. Effects of eye irritation are reversible.

**Ingestion**

High doses may cause CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).

**Chronic Health Effects**

See component summary.

- *Tert-Butyl Acetate 540-88-5*

Prolonged or high exposures may cause CNS effects, liver, adrenal gland and kidney changes. The kidney findings are not likely relevant to humans.

- *tert-Butyl Alcohol 75-65-0*

## TERT BUTYL ACETATE

**Hazardous Combustion Products:** No Data Available.

### SECTION 6: ACCIDENTAL RELEASE MEASURES

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#### Release Response

Extremely flammable. Eliminate all sources of ignition. All equipment used when handling this product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Dike large spills and place materials in salvage containers. Water spray may reduce vapor; but may not prevent ignition in closed spaces.

### SECTION 7: HANDLING AND STORAGE

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#### Handling

Use only non-sparking tools. Extinguish all ignition sources. Carefully vent any internal pressure before removing closure. Containers must be properly grounded before beginning transfer. Handle empty containers with care; vapor/residue may be flammable. All equipment must conform to applicable electrical code. This material may attack some forms of plastics, rubbers, and coatings. Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair. Check atmosphere for explosiveness and oxygen deficiencies. Wear recommended personal protective equipment. Observe precautions pertaining to confined space entry.

#### Storage

Store closed drums with bung in up position. Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents. Containers must be properly grounded before beginning transfer. This material may attack some forms of plastics, rubbers, and coatings. Consult supplier(s) of these materials for specific recommendations. Steel drums are recommended for packaging.

### SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

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#### Engineering Controls

Both local exhaust and good general room ventilation must be provided not only to control exposure but also to prevent formation of flammable mixtures.

#### Personal Protection

Skin Wear chemical resistant gloves such as: Butyl rubber, Nitrile, or Teflon. Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn. The equipment must be cleaned thoroughly after each use.

Eye Use splash goggles when eye contact due to splashing or spraying liquid is possible.

## TERT BUTYL ACETATE

### Additional Remarks

Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Wash clothing frequently.

### Occupational Exposure Limits

Component Name	Source	Type	Value	Notation
Tert-Butyl Acetate	US (ACGIH)	TWA	200 ppm	None.
tert-Butyl Alcohol	US (ACGIH)	TWA	100 ppm	None.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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**Appearance:** Liquid. Clear, colorless.

**Odor:** Sweet odor.

**Odor Threshold:** No value available.

**pH:** 6 - 7

**Boiling Point/Boiling Range:** ~ 98 °C (208.4 °F) @ 760 mm Hg

**Freezing Point/Melting Point:** -62 °C (-79.6 °F)

**Flash Point:** ~ 4.4 °C (39.92 °F) (Closed Cup)

**Auto-ignition:** ~ 517.8 °C (964.04 °F)

**Flammability:**

**Lower Flammable Limit:** ~ 1.26 vol%

**Upper Flammable Limit:** ~ 6.88 vol%

**Explosive Properties:** No Data Available.

**TERT BUTYL ACETATE**

**Oxidizing Properties:** No Data Available.

**Vapor Pressure:** ~ 41.5 mm Hg @ 25 °C (77 °F)

**Evaporation Rate:** ~ 2.8 (butyl acetate = 1)

**Relative Density:** ~ 0.862 @ 25 °C (77 °F)

**Relative Vapor Density:** No Data Available.

**Viscosity:** < 1 mPa.s @ 25 °C (77 °F)

**Solubility (Water):** ~ 0.9% (at 77°F/25°C)

**Partition Coefficient (Kow):** No Data Available.

**Additional Physical and Chemical Properties:** Additional properties may be listed in Sections 2 and 5.

**SECTION 10: STABILITY AND REACTIVITY**

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**Chemical Stability**

Stable.

**Conditions to Avoid**

Heat, sparks, open flame, other ignition sources, and oxidizing conditions.

**Substances to Avoid**

Plastics. Acids. Alkalies. Nitrates. Strong oxidizing agents.

**Decomposition Products**

Carbon monoxide. Carbon dioxide and water.

**Hazardous Polymerization**

Not expected to occur.

**Reactions with Air and Water**

Not expected to occur.

**SECTION 11: TOXICOLOGICAL INFORMATION**

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**PRODUCT INFORMATION**

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## TERT BUTYL ACETATE

### Product Summary

t-Butyl acetate is only slightly toxic following acute inhalation, oral, or dermal exposure. Ingestion or inhalation of high doses may cause CNS depression. It is a very slight skin and moderate eye irritant. It is not a sensitizer, nor a genotoxic agent. Studies in animals indicate that t-butyl acetate is not a developmental or reproductive toxicant. Repeated inhalation exposure studies in animals indicate that t-butyl acetate may cause transient behavioral changes, increased liver, adrenal, and kidney weights, and possible kidney changes. However, the type of kidney changes observed are unique to the male rat kidney. There are no carcinogenicity data for t-butyl acetate. The primary metabolite of t-butyl acetate, t-butanol, is an animal carcinogen.

### COMPONENT INFORMATION

- *Tert-Butyl Acetate 540-88-5*

#### Acute Toxicity - Lethal Doses

<u>LC50 (Inhl)</u>	Rat	4211 PPM	6 HOURS
<u>LD50 (Oral)</u>	Rat	4500 MG/KG	
<u>LD50 (Skin)</u>	Rabbit	> 2000 MG/KG	

#### Acute Toxicity - Effects

Inhalation High vapor concentrations may cause CNS stimulation (increased activity, shaking, tremors) and/or depression (fatigue, dizziness, and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).

Ingestion High doses may cause CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).

Skin Contact No systemic toxicity is expected from acute dermal exposure. There is no data to indicate whether this substance is absorbed through the skin.

#### Irritation

Skin Slight skin irritant.

Eye Moderate eye irritant. Effects of eye irritation are reversible.

#### Sensitization

Not expected to cause sensitization by skin contact.

#### Repeated Dose Toxicity

## TERT BUTYL ACETATE

May be toxic following repeated exposure to high doses. Repeated inhalation exposures to high vapor concentrations (1600 ppm) of t-butyl acetate resulted in increased liver, adrenal, and kidney weights in male and female rats while male rats also exhibited transient reductions in body weight gains and higher motor activity counts. In addition, systemic toxicity as evidenced by  $\alpha$ -2u-globulin nephropathy (a type of kidney toxicity unique to male rodents) was observed in male rats at all exposure levels ( $\geq$ 100 ppm). The only treatment-related effects observed in mice were transient behavioral changes observed immediately after exposure ( $\geq$ 400 ppm).

### Reproductive Effects

This substance is not toxic to reproduction. The reproductive toxicity of t-butyl acetate has been investigated in rats via the inhalation route. There were no adverse effects on reproductive performance or sperm number or quality at 1600 ppm, the highest exposure level tested. In addition, no gross or histopathologic effects were observed in the reproductive organs of male and female rats or mice exposed at 1600 ppm for 90 days in a repeat-exposure toxicity study conducted via inhalation and there was no adverse effect on estrous cycle length in mice.

### Developmental Effects

This substance is not a developmental toxicant. It did not cause maternal toxicity and no embryo/fetal toxicity or developmental abnormalities were observed in the offspring of animals following inhalation exposures of 1600 ppm.

### Genetic Toxicity

Negative for genotoxicity both in vitro and in vivo tests.

### Carcinogenicity

Specific data not available. t-Butanol, the primary metabolite of t-butyl acetate, is an animal carcinogen. In a drinking water study, t-butanol induced benign kidney tumors in male rats via an  $\alpha$ -2u-globulin mode of action, a tumor mechanism not relevant to humans. In female mice, there was an increased incidence of benign thyroid tumors, a tumor mechanism that most likely is not relevant to humans. This substance is not classified for carcinogenicity by IARC, OSHA, NTP, or the EPA.

- *tert-Butyl Alcohol* 75-65-0

### Acute Toxicity - Lethal Doses

<u>LC50 (Inhl)</u>	Rat	> 14,100 PPM	4 HOURS
<u>LD50 (Oral)</u>	Rat	2,733 MG/KG BWT	
<u>LD50 (Skin)</u>	Rabbit	> 2000 MG/KG BWT	

### Acute Toxicity - Effects

Inhalation Vapors may cause irritation of the eyes, nose and throat as well as CNS depression (fatigue, dizziness, loss of concentration, with collapse, coma and death possible in cases of severe overexposure). High vapor concentrations may be irritating to the upper respiratory tract.

## TERT BUTYL ACETATE

**Ingestion** High doses may cause CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).

**Skin Contact** While skin absorption is a potential route of exposure, no adverse health effects are anticipated following accidental or incidental contact. May produce skin irritation.

### **Irritation**

**Skin** Slight skin irritant.

**Eye** Lyondell has conducted primary eye irritation studies in rabbits with tertiary-butyl alcohol (TBA). A single dose of 0.1 ml TBA was instilled into the right eye of albino rabbits (6/group) and scored by the Draize method at subsequent time points. Scores indicated moderate to severe eye irritation. Some rabbits had corneal injury 34 days following treatment.

### **Sensitization**

Not expected to cause sensitization by skin contact.

### **Target Organ Effects**

Skin. Eye. Respiratory system. Central nervous system. Kidneys. Thyroid. Liver. Blood. Thymus.

### **Repeated Dose Toxicity**

May be toxic following repeated exposure to high doses. Subchronic and chronic administration of t-butanol in the drinking water of male rats at concentrations of 1.25 mg/ml (estimated at 90 mg/kg bwt and higher) resulted in kidney pathology. The kidney pathology is mediated through the  $\alpha$ -2u-globulin mode of action. In male and female rats that received 90 mg/kg bwt and higher t-butanol, there was an increase in the severity of chronic progressive nephropathy, a disease not relevant for humans. In male and female mice at concentrations in drinking water of 10 mg/ml (~1000 mg/kg bwt), an increased incidence of thyroid follicular cell hyperplasia was observed, and at ~2000 mg/kg bwt, the mice exhibited an increased inflammation of the urinary bladder resulting in hyperplasia. Repeated inhalation exposure of rats and mice to t-butanol produced the following target organ effects, which demonstrated sex and species differences in the concentrations causing effects: central nervous system effects at  $\geq 2728$  mg/m<sup>3</sup> (900 ppm); decreases in body weight/weight gain, increases in liver weight, and minimal changes in hematological parameters at  $\geq 3274$  mg/m<sup>3</sup> (1080 ppm); and decreases in thymus weights at 10,610 mg/m<sup>3</sup> (3500 ppm). Increased kidney weights were found in rats at 1080 ppm. In male rats, chronic nephropathy, without accumulation of protein droplets, was noted at  $\geq 409$  mg/m<sup>3</sup> (135 ppm).

### **Reproductive Effects**

t-Butanol had no effect on fertility in a one-generation screening study in rats. At maternally toxic doses (1000 mg/kg bwt/day), there were fewer live pups per litter and lower pup body weights which continued through lactation. No adverse effects on testes and ovary structure, or on sperm motility or morphology, were seen in rats or mice that received repeated high oral doses (up to approx. 3600 mg/kg bwt/day in rats, 8210 mg/kg bwt/day in male mice and 11,620 mg/kg bwt/day in female mice).

### **Developmental Effects**



## TERT BUTYL ACETATE

Results from studies in pregnant rats and mice indicate that t-butanol is not teratogenic but at high oral doses (1000 mg/kg bwt) produces embryo/fetotoxicity and developmental delay. Developmental delay was also observed in rats exposed by inhalation during gestation to t-butanol at  $\geq 2000$  ppm (6063 mg/m<sup>3</sup>), in the presence of maternal toxicity (reduction in body weight, CNS effects).

### Genetic Toxicity

Negative for genotoxicity both in vitro and in vivo tests.

### Carcinogenicity

t-Butanol is an animal carcinogen. In a drinking water study, t-butanol induced benign kidney tumors in male rats via an  $\alpha$ -2uglobulin mode of action, a tumor mechanism not relevant to humans. In female mice, there was an increased incidence of benign thyroid tumors, a tumor mechanism that most likely is not relevant to humans. t-Butanol is not classified as to carcinogenicity by EPA, OSHA, NTP or IARC.

## SECTION 12: ECOLOGICAL INFORMATION

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### PRODUCT INFORMATION

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#### Ecotoxicity

See component summary.

#### Environmental Fate and Pathway

See component summary.

### COMPONENT INFORMATION

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- *Tert-Butyl Acetate* 540-88-5

#### Ecotoxicity

##### Acute toxicity to fish

Summary: No Data Available.

##### Acute toxicity to aquatic invertebrates

Summary: No Data Available.

## TERT BUTYL ACETATE

### Toxicity to aquatic plants

EC0 / 8 d algae 420 mg/l

EC0 / 7 d algae 3,700 mg/l

### Toxicity to microorganisms

EC0 / 16 HOURS Pseudomonas putida cell growth 78 mg/l

EC0 / 72 HOURS Protozoa 970 mg/l

### Chronic toxicity to fish

Summary: No Data Available.

### Chronic toxicity to aquatic invertebrates

Summary: No Data Available.

## Environmental Fate and Pathway

No data available.

### Mobility

Transport between environmental compartments: Expected to exist solely as a vapor in the ambient atmosphere.

### Persistence and Degradability

Stability in Water: Expected to volatilize from surface waters. Not likely to adsorb to suspended solids and sediment in water.

Stability in Soil: Moderately mobile in soil and likely to volatilize from moist or dry soil surfaces.

Biodegradation: Degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals with an estimated half life of about 29 days. Hydrolysis is expected to occur slowly in the aquatic environment with an estimated half life ranging from 1.5 to 14.6 years. Undergoes biodegradation in the presences of waste water treatment facility microbes.

Bioaccumulation: This material is not expected to bioaccumulate.

- *tert-Butyl Alcohol* 75-65-0

### **Ecotoxicity**

This material is expected to be non-hazardous to aquatic species.

## TERT BUTYL ACETATE

### Acute toxicity to fish

LC50 / 96 HOUR fathead minnow > 961 mg/l

Summary: This material is not harmful or toxic to fish.

### Acute toxicity to aquatic invertebrates

EC50 / 48 HOURS waterflea. 5,504 mg/l

Summary: This material is not harmful or toxic to aquatic invertebrates.

### Toxicity to aquatic plants

EC50 / green algae (Selenastrum). > 976 mg/l

Summary: This material is not harmful or toxic to algae or higher aquatic plants.

### Toxicity to microorganisms

EC50 / bacteria. 11,263 mg/l

EC10 / 18 HOUR bacteria. 2,050 mg/l

EC0 / bacteria. 13,560 mg/l

Summary: This material is not toxic or harmful to bacteria.

### Chronic toxicity to fish

Summary: No Data Available.

### Chronic toxicity to aquatic invertebrates

Summary: No Data Available.

### Other Adverse Effects

Raphanus sativus, 50% reduction in seedling length, 160 ppm

## Environmental Fate and Pathway

### Mobility

Transport between environmental compartments: Highly mobile in soil and likely to volatilize from moist or dry soil surfaces. Expected to volatilize from surface waters and not likely to adsorb to suspended solids and sediment in water.

### Persistence and Degradability

Biodegradation: This material is expected to be inherently biodegradable.

Bioaccumulation: This material is not expected to bioaccumulate. Degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals with an estimated half life ranging from 2.5 days to 25 days.

**TERT BUTYL ACETATE****SECTION 13: DISPOSAL CONSIDERATIONS**

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**SECTION 14: TRANSPORT INFORMATION**

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**Special Requirements**

If you reformulate or further process this material, you should consider re-evaluation of the regulatory status of the components listed in the composition section of this sheet, based on final composition of your product.

Proper Shipping Name BUTYL ACETATES

ID No. UN1123

Hazard Class 3

PG II

**SECTION 15: REGULATORY INFORMATION**

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**Regulatory Status**

Country	Inventory		
Australia	AICS	X	X = All components are included or are otherwise exempt from inclusion on this inventory.  C = Contact Lyondell/Equistar by e-mail at <a href="mailto:product.safety@lyondell.com">product.safety@lyondell.com</a> or <a href="mailto:product.safety@equistarchem.com">product.safety@equistarchem.com</a> for additional information.
Canada	DSL	X	
Canada	NDSL		
China	IECS	C	
European Union	EINECS	X	
European Union	ELINCS		
European Union	NLP		
Japan	ENCS	X	
Korea	ECL	X	
Philippines	PICCS	X	
United States	TSCA	X	

**SECTION 16: OTHER INFORMATION**

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**Latest Revision(s)**

Revised Section(s): 2 3 9 11 12 13 Date of Revision: May 1 2007

## TERT BUTYL ACETATE

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#### Numerical Data Presentation

The presentation of numerical data, such as that used for physical and chemical properties and toxicological values, is expressed using a comma (,) to separate digits into groups of three and a period (.) as the decimal marker. For example, 1,234.56 mg/kg = 1 234,56 mg/kg

#### Language Translations

This document may be available in languages other than English.

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