

SAFETY DATA SHEET

Flammable Liquid Mixture: 1,3-Butadiene / Cis-2-Butene / Diisobutylene / Isobutane / Isobutylene / Isopentane / Methanol / Methyl Tert Butyl Ether / N-Butane / N-Pentane / Sec-Butyl Methyl Ether / Tert Amyl Methyl Ether / Tert Butanol

Section 1. Identification

GHS product identifier	: Flammable Liquid Mixture: 1,3-Butadiene / Cis-2-Butene / Diisobutylene / Isobutane / Isobutylene / Isopentane / Methanol / Methyl Tert Butyl Ether / N-Butane / N-Pentane / Sec-Butyl Methyl Ether / Tert Amyl Methyl Ether / Tert Butanol
Other means of identification	: Not available.
Product use	: Synthetic/Analytical chemistry.
SDS #	: 020640
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
24-hour telephone	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: FLAMMABLE LIQUIDS - Category 1 SKIN CORROSION/IRRITATION - Category 2 GERM CELL MUTAGENICITY - Category 1B CARCINOGENICITY - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3

GHS label elements

Hazard pictograms



Signal word

: Danger

Hazard statements

: Extremely flammable liquid and vapor.
May form explosive mixtures in Air.
Causes skin irritation.
May cause genetic defects.
Corrosive to respiratory tract.
May cause cancer.
May cause drowsiness and dizziness.

Precautionary statements

General

: Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Prevention

: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Wash hands thoroughly after handling.

Section 2. Hazards identification

- Response** : IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention.
- Storage** : Store locked up. Store in a well-ventilated place. Keep cool.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Hazards not otherwise classified** : None known.

Section 3. Composition/information on ingredients

- Substance/mixture** : Mixture
- Other means of identification** : Not available.

CAS number/other identifiers

- CAS number** : Not applicable.
- Product code** : 020640

Ingredient name	%	CAS number
tert-butyl methyl ether	50 - 95	1634-04-4
isobutane	0.0001 - 50	75-28-5
Cis-2-Butene	0.0001 - 50	590-18-1
N-Butane	0.0001 - 50	106-97-8
Isobutylene	0.0001 - 50	115-11-7
methanol	1 - 2	67-56-1
isopentane	1 - 1.1	78-78-4
n-pentane	1 - 1.1	109-66-0
1,3-butadiene	0.1 - 0.9999	106-99-0
tert Amyl Methyl Ether	0.6 - 0.7	994-05-8
tert butanol	0.5 - 0.7	75-65-0
sec-butyl methyl ether	0.5 - 0.6	6795-87-5
2,4,4-trimethylpent-1-ene	0.1 - 0.2	107-39-1

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Section 4. First aid measures

- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.
- Inhalation** : Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation.
- Skin contact** : Causes skin irritation.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Ingestion** : Can cause central nervous system (CNS) depression.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following: pain or irritation, watering, redness
- Inhalation** : Adverse symptoms may include the following: respiratory tract irritation, coughing, nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness
- Skin contact** : Adverse symptoms may include the following: irritation, redness
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use dry chemical, CO₂, water spray (fog) or foam.
- Unsuitable extinguishing media** : Do not use water jet.

- Specific hazards arising from the chemical** : Extremely flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Section 5. Fire-fighting measures

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Section 7. Handling and storage

Advice on general occupational hygiene

: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

: Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

tert-butyl methyl ether

isobutane

Cis-2-Butene

N-Butane

Isobutylene

methanol

ACGIH TLV (United States, 3/2016).

TWA: 50 ppm 8 hours.

NIOSH REL (United States, 4/2013).

TWA: 1900 mg/m³ 10 hours.

TWA: 800 ppm 10 hours.

ACGIH TLV (United States, 6/2013).

STEL: 1000 ppm 15 minutes.

ACGIH TLV (United States, 3/2016).

TWA: 250 ppm 8 hours.

NIOSH REL (United States, 10/2013).

TWA: 1900 mg/m³ 10 hours.

TWA: 800 ppm 10 hours.

OSHA PEL 1989 (United States, 3/1989).

TWA: 1900 mg/m³ 8 hours.

TWA: 800 ppm 8 hours.

ACGIH TLV (United States, 3/2015).

STEL: 1000 ppm 15 minutes.

ACGIH TLV (United States, 3/2016).

TWA: 250 ppm 8 hours.

ACGIH TLV (United States, 3/2016).

Absorbed through skin.

STEL: 328 mg/m³ 15 minutes.

STEL: 250 ppm 15 minutes.

TWA: 262 mg/m³ 8 hours.

TWA: 200 ppm 8 hours.

NIOSH REL (United States, 10/2013).

Absorbed through skin.

STEL: 325 mg/m³ 15 minutes.

STEL: 250 ppm 15 minutes.

TWA: 260 mg/m³ 10 hours.

TWA: 200 ppm 10 hours.

OSHA PEL (United States, 6/2016).

TWA: 260 mg/m³ 8 hours.

TWA: 200 ppm 8 hours.

OSHA PEL 1989 (United States, 3/1989).

Absorbed through skin.

STEL: 325 mg/m³ 15 minutes.

STEL: 250 ppm 15 minutes.

TWA: 260 mg/m³ 8 hours.

TWA: 200 ppm 8 hours.

ACGIH TLV (United States, 3/2016).

TWA: 1000 ppm 8 hours.

isopentane

n-pentane

Section 8. Exposure controls/personal protection

1,3-butadiene

ACGIH TLV (United States, 3/2016).

TWA: 1000 ppm 8 hours.

NIOSH REL (United States, 10/2013).

CEIL: 1800 mg/m³ 15 minutes.

CEIL: 610 ppm 15 minutes.

TWA: 350 mg/m³ 10 hours.

TWA: 120 ppm 10 hours.

OSHA PEL (United States, 6/2016).

TWA: 2950 mg/m³ 8 hours.

TWA: 1000 ppm 8 hours.

OSHA PEL 1989 (United States, 3/1989).

STEL: 2250 mg/m³ 15 minutes.

STEL: 750 ppm 15 minutes.

TWA: 1800 mg/m³ 8 hours.

TWA: 600 ppm 8 hours.

ACGIH TLV (United States, 3/2016).

TWA: 4.4 mg/m³ 8 hours.

TWA: 2 ppm 8 hours.

OSHA PEL (United States, 6/2016).

STEL: 5 ppm 15 minutes.

TWA: 1 ppm 8 hours.

OSHA PEL 1989 (United States, 3/1989).

STEL: 5 ppm 15 minutes.

TWA: 1 ppm 8 hours.

ACGIH TLV (United States, 3/2016).

TWA: 20 ppm 8 hours.

OSHA PEL 1989 (United States, 3/1989).

TWA: 100 ppm 8 hours.

TWA: 300 mg/m³ 8 hours.

STEL: 150 ppm 15 minutes.

STEL: 450 mg/m³ 15 minutes.

ACGIH TLV (United States, 3/2016).

TWA: 100 ppm 8 hours.

TWA: 303 mg/m³ 8 hours.

NIOSH REL (United States, 10/2013).

TWA: 100 ppm 10 hours.

TWA: 300 mg/m³ 10 hours.

STEL: 150 ppm 15 minutes.

STEL: 450 mg/m³ 15 minutes.

OSHA PEL (United States, 6/2016).

TWA: 100 ppm 8 hours.

TWA: 300 mg/m³ 8 hours.

None.

None.

tert Amyl Methyl Ether

tert butanol

sec-butyl methyl ether

2,4,4-trimethylpent-1-ene

Appropriate engineering controls

- : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls

- : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls/personal protection

- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Liquid.
- Color** : Not available.
- Boiling/condensation point** : Lowest known value: 27.8°C (82°F) (Isopentane (2-Methylbutane)). Weighted average: 54.68°C (130.4°F)
- Melting/freezing point** : May start to solidify at the following temperature: -97.8°C (-144°F) This is based on data for the following ingredient: methanol. Weighted average: -109.57°C (-165.2°F)
- Critical temperature** : Lowest known value: 187.25°C (369.1°F) (Isopentane (2-Methylbutane)).
- Odor** : Not available.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : Not available.
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : Highest known value: 3 (Air = 1) (tert-butyl methyl ether). Weighted average: 2.95 (Air = 1)
- Gas Density (lb/ft³)** : Weighted average: 0.24
- Relative density** : Not available.
- Solubility** : Not available.
- Solubility in water** : Not available.
- Partition coefficient: n-octanol/water** : Not available.

Section 9. Physical and chemical properties

Auto-ignition temperature : Not available.
Decomposition temperature : Not available.
SADT : Not available.
Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
tert-butyl methyl ether	LC50 Inhalation Gas.	Rat	47152 ppm	1 hours
	LC50 Inhalation Gas.	Rat	23576 ppm	4 hours
	LC50 Inhalation Vapor	Rat	41000 mg/m ³	4 hours
	LD50 Oral	Rat	4 g/kg	-
isobutane	LC50 Inhalation Vapor	Rat	658000 mg/m ³	4 hours
N-Butane	LC50 Inhalation Vapor	Rat	658000 mg/m ³	4 hours
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m ³	4 hours
methanol	LC50 Inhalation Gas.	Rat	145000 ppm	1 hours
	LC50 Inhalation Gas.	Rat	64000 ppm	4 hours
isopentane	LC50 Inhalation Vapor	Rat	280000 mg/m ³	4 hours
n-pentane	LC50 Inhalation Vapor	Rat	364 g/m ³	4 hours
1,3-butadiene	LC50 Inhalation Gas.	Rat	128000 ppm	4 hours
tert Amyl Methyl Ether	LD50 Oral	Rat	1602 mg/kg	-
tert butanol	LC50 Inhalation Gas.	Rat	20000 ppm	1 hours
	LC50 Inhalation Gas.	Rat	14100 ppm	4 hours
	LD50 Oral	Rat	2733 mg/kg	-

Irritation/Corrosion

Section 11. Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
methanol	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	40 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
tert Amyl Methyl Ether	Eyes - Severe irritant	Rabbit	-	24 hours 100 microliters	-
	Skin - Severe irritant	Rabbit	-	4 hours 500 microliters	-
	Eyes - Severe irritant	Rabbit	-	24 hours 100 microliters	-
tert butanol	Skin - Mild irritant	Rabbit	-	24 hours 500 microliters	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
tert-butyl methyl ether	-	3	-
1,3-butadiene	-	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
methanol	Category 1	Not determined	respiratory tract
isopentane	Category 3	Not applicable.	Narcotic effects
n-pentane	Category 3	Not applicable.	Narcotic effects
tert Amyl Methyl Ether	Category 3	Not applicable.	Narcotic effects
tert butanol	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Name	Result
isopentane	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation.

Section 11. Toxicological information

- Skin contact** : Causes skin irritation.
- Ingestion** : Can cause central nervous system (CNS) depression.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following: pain or irritation, watering, redness
- Inhalation** : Adverse symptoms may include the following: respiratory tract irritation, coughing, nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness
- Skin contact** : Adverse symptoms may include the following: irritation, redness
- Ingestion** : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Potential chronic health effects

Not available.

- General** : No known significant effects or critical hazards.
- Carcinogenicity** : May cause cancer. Risk of cancer depends on duration and level of exposure.
- Mutagenicity** : May cause genetic defects.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	10627.4 mg/kg

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
tert-butyl methyl ether methanol	Acute LC50 672000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Acute EC50 16.912 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Acute LC50 2500000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
tert Amyl Methyl Ether	Acute LC50 3289 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 290 mg/l Fresh water	Fish - Danio rerio - Egg	96 hours
	Chronic NOEC 9.96 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Acute EC50 >100000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 >100000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 >100000 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Chronic NOEC >100000 µg/l Fresh water	Algae - Pseudokirchneriella	72 hours

Section 12. Ecological information

tert butanol	Acute EC50 5504000 µg/l Fresh water Acute LC50 6410000 µg/l Fresh water	subcapitata Daphnia - Daphnia magna Fish - Pimephales promelas	48 hours 96 hours
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Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
tert-butyl methyl ether	1.04	1.5	low
isobutane	2.8	-	low
Cis-2-Butene	2.33	-	low
N-Butane	2.89	-	low
Isobutylene	2.34	-	low
methanol	-0.77	<10	low
isopentane	3	171	low
n-pentane	3.45	171	low
1,3-butadiene	1.99	10	low
tert Amyl Methyl Ether	1.55	-	low
tert butanol	0.4	5.01	low
2,4,4-trimethylpent-1-ene	4.55	602.56	high

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.






Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Methanol (I); Methyl alcohol (I)	67-56-1	Listed	U154

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN3161	UN3161	UN3161	UN3161	UN3161
UN proper shipping name	Liquefied gas, flammable n.o.s. (tert-butyl methyl ether, Isobutane)	Liquefied gas, flammable n.o.s. (tert-butyl methyl ether, Isobutane)	Liquefied gas, flammable n.o.s. (tert-butyl methyl ether, Isobutane)	Liquefied gas, flammable n.o.s. (tert-butyl methyl ether, Isobutane)	Liquefied gas, flammable n.o.s. (tert-butyl methyl ether, Isobutane)
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	Reportable quantity 1000.1 lbs / 454.05 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2). Explosive Limit and Limited Quantity Index 0.125 ERAP Index 3000 Passenger Carrying Ship Index Forbidden Passenger Carrying Road or Rail Index Forbidden	-	-	-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) PAIR:** pentane; Tert Butanol; tert amyl methyl ether; 2,4,4-trimethylpent-1-ene
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): Not determined.
Clean Air Act (CAA) 112 regulated flammable substances: Isopentane (2-Methylbutane); Isobutane; Cis-2-Butene; pentane; N-Butane; isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Section 15. Regulatory information

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	tert-butyl methyl ether	1634-04-4	50 - 95
	methanol	67-56-1	1 - 2
	1,3-butadiene	106-99-0	0.1 - 0.9999
Supplier notification	tert-butyl methyl ether	1634-04-4	50 - 95
	methanol	67-56-1	1 - 2
	1,3-butadiene	106-99-0	0.1 - 0.9999

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

- Massachusetts** : The following components are listed: METHYL TERT-BUTYL ETHER; METHANOL; METHYL ALCOHOL; ISOPENTANE; ISOBUTANE; 2-BUTENE-CIS; PENTANE; BUTANE; 2-METHYLPROPENE
- New York** : The following components are listed: Methyl tert-butyl ether; Methanol
- New Jersey** : The following components are listed: METHYL-tert-BUTYL ETHER; PROPANE, 2-METHOXY-2-METHYL-; METHYL ALCOHOL; METHANOL; ISOPENTANE; BUTANE, 2-METHYL-; Isobutane; PROPANE, 2-METHYL-; 2-BUTENE-cis; 2-BUTENE, (2Z)-; PENTANE; BUTANE; ISOBUTYLENE; 1-PROPENE, 2-METHYL-; 1,3-BUTADIENE; BIETHYLENE
- Pennsylvania** : The following components are listed: METHYL TERT-BUTYL ETHER; METHANOL; BUTANE, 2-METHYL-; PROPANE, 2-METHYL-; 2-BUTENE, (Z)-; PENTANE; BUTANE; 1-PROPENE, 2-METHYL-; 1,3-BUTADIENE

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
methanol	No.	Yes.	No.	23000 µg/day (ingestion) 47000 µg/day (inhalation)
1,3-butadiene	Yes.	Yes.	Yes.	No.
tert amyl methyl ether	No.	Yes.	No.	No.

International regulations

International lists

National inventory

Australia : Not determined.

Canada : Not determined.

Section 15. Regulatory information

China	: Not determined.
Europe	: Not determined.
Japan	: Not determined.
Malaysia	: Not determined.
New Zealand	: Not determined.
Philippines	: Not determined.
Republic of Korea	: Not determined.
Taiwan	: Not determined.

Canada

WHMIS (Canada)	: Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic). CEPA Toxic substances: The following components are listed: 1,3-Butadiene Canadian ARET: None of the components are listed. Canadian NPRI: The following components are listed: Methyl tert-butyl ether; Methanol; Pentane (all isomers); Butane (all isomers); Butene (all isomers); Pentane (all isomers); Butane (all isomers); Butene (all isomers) Alberta Designated Substances: None of the components are listed. Ontario Designated Substances: None of the components are listed. Quebec Designated Substances: None of the components are listed.
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Section 16. Other information

Canada Label requirements	: Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).
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Hazardous Material Information System (U.S.A.)

Health	*	1
Flammability		4
Physical hazards		3

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Section 16. Other information

Classification	Justification
Flam. Liq. 1, H224 Skin Irrit. 2, H315 Muta. 1B, H340 Carc. 1, H350 STOT SE 3, H335 STOT SE 3, H336	Expert judgment Calculation method Calculation method Calculation method Expert judgment Expert judgment

History

Date of printing : 5/2/2017

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Version : 2

Key to abbreviations : ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 IATA = International Air Transport Association
 IBC = Intermediate Bulk Container
 IMDG = International Maritime Dangerous Goods
 LogPow = logarithm of the octanol/water partition coefficient
 MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.