

# PROPANE

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## Synonyms

Liquefied petroleum gas (LPG or LP-gas), dimethyl methane, propyl hydride

## Description

An aliphatic hydrocarbon. Commercial propane may contain approximately 10% other low molecular weight hydrocarbons (ethane, propylene, butane). A colourless, flammable gas, usually supplied as a pressurized liquid in tanks. Has a faint petroleum odour. Mercaptans, which smell like rotten eggs, may be added in low concentrations to provide an odour for leak detection. Used as fuel, refrigerant and propellant.

## Toxicity

### Mechanism of Toxicity

Uncombusted gas is a simple asphyxiant (displaces oxygen from breathing air) resulting in hypoxia. Exhaust from propane-fueled engines contains significant concentrations of carbon monoxide.

**See CARBON MONOXIDE.**

Boiling point of propane is -42 degrees C. Exposure to liquid may cause severe frostbite.

### Toxic Dose

Deaths from anoxia have occurred from exposure to high concentrations in poorly ventilated areas. Threshold limit value (TLV-TWA, ACGIH) of propane is 1000 ppm.

### Case Reports

A 2-year-old developed seizures and cardiac dysrhythmias after breathing an aerosol product containing isobutane, n-butane and propane as propellants.

A 15-year-old collapsed and died following inhalation of propane gas from a plastic bag.

Carbon monoxide poisoning has occurred following indoor use of propane-fueled equipment (e.g. forklift in warehouse, ice resurfacing equipment in ice rink) and from incomplete combustion in poorly ventilated areas.

Severe frostbite occurred following topical exposure to an aerosol product containing propane/butane propellant.

Temperature of spray was later measured as -40 degrees C.

### Clinical Effects

- **Topical:** Application of liquid (e.g. from aerosol container) may cause severe frostbite. Initial appearance of wound may look like a superficial burn and may not reflect degree of injury to underlying tissues. Injury to fat and muscle may be more severe. Possible vascular thrombosis and necrosis. Gangrene has been reported (rare).
- **Inhalation:** High concentrations of uncombusted gas in confined spaces may result in hypoxia. Symptoms include fatigue, air hunger, impaired vision, headache, confusion, poor coordination, impaired judgment, seizures, cyanosis, coma and death from anoxia. Cardiac dysrhythmias may be secondary to hypoxia or due to sensitization of the myocardium to endogenous catecholamines. Exposure to equipment exhaust or incomplete combustion may cause carbon monoxide poisoning. **See CARBON MONOXIDE.**

## Treatment

1. **Topical:** In case of frostbite, immediately place affected area in lukewarm water and keep at this temperature until circulation returns. Dermal freezing may not respond to rewarming procedures used for ordinary frostbite, due to the extremely rapid freezing of skin caused by pressurized liquid. Partial rewarming may lead to refreezing of thawed tissue and increased tissue damage.
2. Dress as for thermal burn. Monitor distal perfusion if injury occurs in an extremity. Monitor for infection. Reconstructive surgery may be required.
3. **Inhalation:** Remove from exposure. Give oxygen. Provide respiratory support as required.
4. **See CARBON MONOXIDE** for treatment of toxic effects of equipment exhaust or incomplete combustion.