

U.S. Fire Administration / National Fire Academy

Warning: Hot Coffee!

Topic: Liquefied Petroleum Gas Hazards

Learning objective: The student shall be able to identify some of the chemical and physical characteristics of liquefied petroleum gases (LPG) that create hazardous conditions.

The recent tragic explosion in Ghent, West Virginia, is a sad reminder of some of the hazardous properties of LPG and the danger that may occur when investigating reported leaks.

Liquefied petroleum gases make up a family of hydrocarbon products that includes propane, butane, isobutane, propylene, and butylenes. Most commercial applications employ propane or butane. Commercial grades are not chemically pure, and can contain small percentages of other constituents. The following table illustrates some of their properties:

Physical Property	Commercial Propane	Commercial Butane
Specific gravity of liquid at 60 °F (15.6 °C) (Water = 1)	0.504	0.582
Specific gravity of vapor at 60 °F (15.6 °C) (Air = 1)	1.50	2.01
Ignition temperature in air, °F (°C)	920-1,120 (493-604)	900-1,000 (482-538)
Maximum flame temperature in air, °F (°C)	3,595 (1,979)	3,615 (1,990)
Btu per pound	184	167
Btu per gallon	773	808
Kilojoule per kilogram	428	388
Kilojoule per liter	216	226
Lower flammable limits (% vapor in air)	2.15	1.55
Upper flammable limits (% vapor in air)	9.60	8.60

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Highly flammable ethyl mercaptan is added to odorless LPG to give it that distinctive “rotten egg” odor for detection purposes.

When investigating reported LPG leaks, always follow recommended safety precautions. Refer to the U.S. Department of Transportation Emergency Response Guidebook (Guide No. 115) for protective clothing, fire, emergency response, and evacuation recommendations.

For additional information, refer to NFPA 58, LP Gas Code™, or visit <http://hazmat.dot.gov/pubs/erg/gydebook.htm> or www.propanesafety.com for training and safety materials.

