Liquid vs. Vapor Propane

Source: www.TurfMagazine.com

Which is better for your commercial mower?

If you are considering a propane mower, does it make a difference whether it is liquid or vapor? What is the truth about liquid propane and vapor propane?

Propane is a three-carbon alkane, normally a gas, but compressible to a transportable liquid. A byproduct of natural gas processing and petroleum refining, it is commonly used as a fuel for engines, oxy-gas torches, barbecues, portable stoves and residential central heating.

One Landscaper’s First-Hand Story With Propane

My name is Dirk Bakhuyzen III and our company is Procare Landscape Management, Inc. (www.procarelandscape.com), which has been in business since 1989.

Our company converted many of our commercial mowers to propane with the help of the Metro Lawn Program in the winter of 2009, and we have run them now for one full season. Besides all the benefits they provide the environment, we have noticed several other factors that have impacted our company, including the oil running very clean. We were amazed at how clean the oil was and even pushed the limits to see how it would be affected. We have also been impressed with how they run and how it has not cost the company more on fuel. They almost run one to one with regular gas. We have also capitalized in our sales efforts. We not only have received new sales from
telling our prospects about our propane mowers, but where even featured on our local news station about them in particular. We have been extremely pleased with them and plan on installing more of them as we get new mowers down the road.

A mixture of propane and butane that is used mainly as vehicle fuel is commonly known as liquefied petroleum gas (LPG or LP gas). It may also contain small amounts of propylene and/or butylene. LPG, when compressed to liquid, is odorless, colorless and nonflammable, because LPG is minus 44 degrees Fahrenheit in a liquid form. An odorant such as ethanethiol or thiophene is added so that people can easily smell the gas in case of a leak.

Propane is a liquefied petroleum gas that comes out of both oil and gas wells. It does not occur naturally though. Instead, raw crude oil or raw natural gas is refined to make different types of petroleum products, one of which is propane. Following its refinement, propane is stored as a liquid under pressure until utilized, at which point it becomes a gas.

Before propane is used, it exists in one of two forms: liquid or vapor. Both liquid propane and vapor are usable, but cannot be used interchangeably. In other words, a propane system designed to use vapor can’t utilize propane in its liquid form, and vice versa. Additionally, the characteristics of propane liquid and propane vapor are so different that the primary properties we are concerned with are as different as night and day. With propane liquid, temperature is the primary factor whereas weight is the main concern regarding propane vapor. Think of it this way, water is liquid and steam is water vapor. The same holds true for propane.

**Vapor service vs. liquid service**

Propane vapor service and propane liquid service are completely different from one another. Most all propane
applications use vapor for service for obvious reasons. It must be heated to convert to vapor for combustibility. Propane forklifts have been around for 75-plus years and are operated with liquid withdrawal cylinders. Therefore, a vaporizer is heated by fluids used in the forklift to change the liquid propane into vapor.

**Propane Properties**

The molecular makeup of propane (C3H8) consists of three carbon molecules and eight hydrogen molecules.

Boiling point of propane: minus 44 degrees Fahrenheit

Weight of 1 gallon of propane: 4.24 pounds

Specific gravity of propane gas: 1.52

Specific gravity of liquid propane: .51

[www.propane101.com](http://www.propane101.com)

Since the majority of commercial mowers are air-cooled and run outside in all types of climates and all types of terrain, liquid withdrawal cylinders have not proven to be the best choice for commercial mowers for obvious reasons.

In 2005, Onyx Environmental Solutions approached Manchester Tank to provide vapor withdrawal cylinders especially for the commercial mower market. This eliminated having to heat the fuel, and provided better starting (especially in colder climates) and better fuel economy. Because of confusion, the standard became left-hand threads on the vapor cylinders compared to right-hand threads on the liquid cylinders and all vapor cylinders, have a green ring on the top. Manchester Tank ([www.mantank.com](http://www.mantank.com)) and Worthington Tank ([www.worthingtonindustries.com](http://www.worthingtonindustries.com)) both carry the vapor withdrawal cylinders for the commercial mowing market.