

UNDERSTANDING LPG

- your guide to the LPG basics



LPG
EXCEPTIONAL
ENERGY



Kosan Crisplant®

UNDERSTANDING LPG



» WHAT IS LPG?

L = LIQUEFIED

LPG is stored and transported in a liquid state.

In a natural state under normal temperature and pressure conditions, the product is gaseous, but can be liquefied

- when put under moderate pressure, or
- when cooled down to temperatures below the gas boiling point.

A change in volume to 1/250 of the original gas volume is obtained as well.

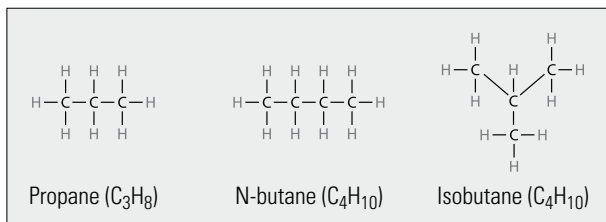
P = PETROLEUM

LPG is a petroleum product originating from two general sources:

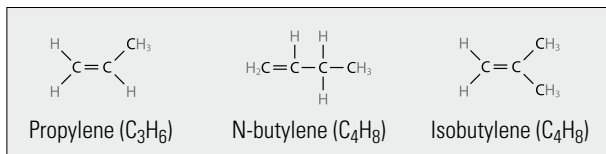
- gas and oil fields, where it is separated as a condensate from natural gas or crude oil during the process of stabilization.
- refineries, where it is produced during the refining of crude oil via the processes of distilling and cracking.

Chemically, the product is a hydrocarbon and consists mainly of:

- saturated hydrocarbons:
 - Propane (C₃H₈)
 - N-butane and isobutane (C₄H₁₀) (distilling process)



- unsaturated hydrocarbons:
 - Propylene (C₃H₆)
 - N-butylene and isobutylene (C₄H₈) (cracking process)



G = GAS

When pressure is reduced, the product changes from a liquid into a gaseous state.

» TECHNICAL DATA ON LPG

Product name	Propylene	Propane	Isobutane	N-butane
Chemical formula	C ₃ H ₆	C ₃ H ₈	C ₄ H ₁₀	C ₄ H ₁₀
Density, liquid at 15.6°C (kg/l)	0.522	0.508	0.563	0.584
Specific volume, liquid at 15.6°C (l/kg)	1.916	1.968	1.776	1.712
Specific gravity, relative at 15.6°C and 1 atm. (air = 1)	1.481	1.555	2.066	2.091
Boiling point at 1 atm. (°C)	-47.7	-42.1	-11.7	-0.5
Explosion limits in air at 1 atm. (vol %)	2.4 - 11.0	2.0 - 9.5	1.8 - 8.5	1.5 - 8.5
Change of volume, liquid – gaseous at 15.6°C and 1 atm. (l/l)	284	273	230	238
Vapour pressure (absolute) at temperature (bar)				
-10°C	3.9	3.3	1.1	-
0°C	5.7	4.8	1.6	1.1
15.6°C	8.8	7.4	2.7	1.8
30°C	13.0	10.6	4.0	2.8
40°C	17.0	13.8	5.5	3.9

The above data cover technically pure gases.

Commercial gases are a mix of the above products, and their technical data may be calculated on the basis of the partial value of each type of gas.

» LPG IN GENERAL

As LPG vapour is heavier than atmospheric air, it will spread close to the ground in case of leak, accumulating in hollow places, basement passages, etc., and with explosion limits between approx. 1.5% and 10%, LPG will constitute a risk of explosion when mixed with the atmosphere.

A mixed product consisting of approx. 30% commercial propane and approx. 70% commercial butane will have a change in volume, liquid gaseous at approx. 250, which means that one litre of liquid will, when evaporating under ambient temperatures and pressure, develop some 250 litres of gas, which at a 5% concentration in air will create approx. 5,000 litres of inflammable and potentially explosive mixture corresponding to approx. 6,945 litres of gas/air mixture under stoichiometric conditions.

Originally, LPG is an odourless gas, but in order to detect leakages by the sense of smell, a tracing agent, usually ethyl mercaptan or thiophene, is added to the gas in quantities permitting detection of gas concentrations in air of 20-25% of the lower explosion limit.

Generally, LPG does not constitute any risk of poisoning, but as it is a mild narcotic, inhaling LPG vapour should be avoided as it may cause nausea, headache and at worst it will have a drugging effect.

In high concentrations and where oxygen is displaced, the gas will cause suffocation.

In case a small amount of LPG vapour is inhaled by accident, take a break and get some fresh air immediately. At worst, consult a doctor.

Liquid gas will cause serious frost injuries to the skin, because of the heavy vaporization of the liquid. Consult a doctor immediately.

» SAFETY ASPECTS

When LPG is handled carefully and correctly, this fuel is as safe as any other fuel. If it is handled carelessly, however, it is very dangerous. The most difficult factor to control in that regard is the human element. Most mistakes happen either due to ignorance or simple lack of common sense. The purpose of this booklet is to educate readers on the LPG basics so they are conscious about the object at hand.





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