

PHYSICAL PROPERTIES of GASOLINE and PROPANE

NOTES

The purpose of this section is not to give a lot of meaningless data, but rather aid in the quick diagnosis of problems. It has been the experience of many technicians that they will diagnose the fuel or the fuel system as the cause of a machine failure, only to discover after much unsuccessful time and effort, that the failure lay in the electrical or mechanical systems and not the gasoline or propane system.

An understanding of the physical properties of propane and how they compare to gasoline will greatly assist the technician in making a quick and accurate diagnosis of a problem.

<u>PROPERTY</u>	<u>GASOLINE</u>	<u>PROPANE</u>	<u>OPERATIONAL DIFFERENCES</u>
FORMULA	C8 H18 (APPROX.)	C3 H8	High carbon fuels are better conductors of electrical energy. Thus propane demands more electrical energy to ignite the fuel / air mixture. Low carbon fuels have lower CO exhaust emissions.
OCTANE (R + M) / 2	82 – 93	95 – 104	With Octane rating being a measure of a fuel's resistance to knock, propane can stand higher compression pressures and more advanced ignition timing than gasoline.
ENERGY DENSITY (BTU / LB) LOWER HIGHER	19,000 20,360	19,920 21,650	High hydrogen to carbon ratio fuels produce more heat energy per pound, where as high carbon to hydrogen ratio fuels have more heat energy per gallon.
(BTU / GAL)	114,000	85,500	Fuel mileage on propane will be less than the mileage on gasoline.
LB / GAL	6.2	4.2	Although a propane tank is heavier than its gasoline counterpart, fully laden, total weights are similar.
SPECIFIC GRAVITY (AIR)	3.5	1.5	Both fuel vapors are heavier than air.
BOILING POINT	80 – 440 (F)	- 44 (F)	Above –44(F) propane becomes a vapor In open air.
NATURAL STATE	LIQUID	GAS	
STORED STATE	LIQUID	LIQUID	Propane, unlike gasoline, is stored under pressure. The pressure varies with temp. At 35 deg. (F), tank pressure is 58 PSIG; at 95 deg. (F) tank pressure will be 160 PSIG.
FLAMMABILITY LIMITS	1.4% - 7.6%	2.37%- 9.5%	
STOICHIOMETRIC COMBUSTION AIR REQ'D. by WEIGHT	14.7 : 1	15.5 : 1	