

Fuel Properties Comparison Results

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ABOUT THE DATA
(/FUELS/PROPERTIES_NOTES.HTML)

Property	Fuels							
	Gasoline/E10	Low Sulfur Diesel	Biodiesel (biodiesel.html)	Compressed Natural Gas (CNG) (natural_gas.html)	Ethanol/E100 (ethanol.html)	Liquefied Natural Gas (LNG) (natural_gas.html)	Methanol (emerging_methanol.html)	Propane (LPG) (propane.html)
Chemical Structure [1] (properties_notes.html#1)	C ₄ to C ₁₂ and Ethanol ≤ to 10%	C ₈ to C ₂₅	Methyl esters of C ₁₂ to C ₂₂ fatty acids	CH ₄ (majority), C ₂ H ₆ and inert gases	CH ₃ CH ₂ OH	CH ₄ same as CNG with inert gasses <0.5% [1] (properties_notes.html#1r)	CH ₃ OH	C ₃ H ₈ (majority) and C ₄ H ₁₀ (minority)
Fuel Material (feedstocks (glossary.html#Feedstocks))	Crude Oil	Crude Oil	Fats and oils from sources such as soy beans, waste cooking oil, animal fats, and rapeseed	Underground reserves and renewable biogas	Corn, grains, or agricultural waste (cellulose)	Underground reserves and renewable biogas	Natural gas, coal, or, woody biomass	A by-product of petroleum refining or natural gas processing
Gasoline Gallon Equivalent (glossary.html#GasolineGallonEquivalent) [4] (properties_notes.html#4)	97% - 100%	1 gallon of diesel has 113% of the energy of one gallon of gasoline.	B100 has 103% of the energy in one gallon of gasoline or 93% of the energy of one gallon of diesel. B20 has 109% of the energy of one gallon of gasoline or 99% of the energy of one gallon of diesel.	5.66 pounds or 123.57 cu ft. of CNG has 100% of the energy of one gallon of gasoline. [2] (properties_notes.html#2) [5] (properties_notes.html#5) (g) (properties_notes.html#g) 6.38 pounds or 139.30 cu ft. of CNG has 100% of the energy content of one gallon of diesel [2] (properties_notes.html#2) [5] (properties_notes.html#5) (g) (properties_notes.html#g)	1 gallon of E85 has 73% to 83% of the energy of one gallon gasoline (variation due to ethanol content in E85). 1 gallon of E10 has 96.7% of the energy of one gallon of gasoline. [3] (properties_notes.html#3)	5.38 pounds of LNG has 100% of one gallon of gasoline and 6.06 pounds of LNG has 100% of the energy of one gallon of diesel [1] (properties_notes.html#1r)	1 gallon of methanol has 49% of the energy of one gallon of gasoline.	1 gallon of propane has 73% of the energy of one gallon of gasoline.
Energy Content (lower heating value (glossary.html#LowerHeatingValue))	112,114 - 116,090 Btu/gal (g) (properties_notes.html#g)	128,488 Btu/gal (g) (properties_notes.html#g)	119,550 Btu/gal for B100 (g) (properties_notes.html#g)	20,160 Btu/lb [2] (properties_notes.html#2) (g) (properties_notes.html#g)	76,330 Btu/gal for E100 (g) (properties_notes.html#g)	21,240 Btu/lb [1] (properties_notes.html#1r)	57,250 Btu/gal (g) (properties_notes.html#g)	84,250 Btu/gal (g) (properties_notes.html#g)
Energy Content (higher heating value (glossary.html#HigherHeatingValue))	120,388 - 124,340 Btu/gal (g) (properties_notes.html#g)	138,490 Btu/gal (g) (properties_notes.html#g)	127,960 Btu/gal for B100 (g) (properties_notes.html#g)	22,453 Btu/lb [1] (properties_notes.html#1) (g) (properties_notes.html#g)	84,530 Btu/gal for E100 (g) (properties_notes.html#g)	23,726 Btu/lb (g) (properties_notes.html#g)	65,200 Btu/gal (g) (properties_notes.html#g)	91,420 Btu/gal (g) (properties_notes.html#g)
Physical State	Liquid	Liquid	Liquid	Compressed Gas	Liquid	Cryogenic Liquid	Liquid	Pressurized Liquid
Cetane Number	N/A	40-55 (a) (properties_notes.html#a)	48-65 (a) (properties_notes.html#a)	N/A	0-54 (b) (properties_notes.html#b)	N/A	N/A	N/A
Pump Octane Number	84-93 (c) (properties_notes.html#c)	N/A	N/A	120+ (d) (properties_notes.html#d)	110 (e) (properties_notes.html#e)	120+ (d) (properties_notes.html#d)	112 (e) (properties_notes.html#e)	105 (f) (properties_notes.html#f)
Flash Point (glossary.html#FlashPoint)	-45 °F (q) (properties_notes.html#q)	165 °F (q) (properties_notes.html#q)	212 to 338 °F (a) (properties_notes.html#a)	-300 °F (q) (properties_notes.html#q)	55 °F (q) (properties_notes.html#q)	-306 °F (p) (properties_notes.html#p)	52 °F (q) (properties_notes.html#q)	-100 to -150 °F (q) (properties_notes.html#q)
Autoignition Temperature (glossary.html#AutoignitionTemperature)	495 °F (q) (properties_notes.html#q)	~600 °F (q) (properties_notes.html#q)	~300 °F (a) (properties_notes.html#a)	1,004 °F (q) (properties_notes.html#q)	793 °F (q) (properties_notes.html#q)	1,004 °F (p) (properties_notes.html#p)	897 °F (q) (properties_notes.html#q)	850 to 950 °F (q) (properties_notes.html#q)
Maintenance Issues			Hoses and seals may be affected by higher-percent blends, lubricity is improved over that of conventional diesel fuel.	High-pressure tanks require periodic inspection and certification.	Special lubricants may be required. Practices are very similar, if not identical, to those for conventionally fueled operations.	LNG is stored in cryogenic tanks with a specific hold time before the pressure build is relieved, the vehicle should be operated on a schedule to maintain a lower pressure in the tank.	Special lubricants must be used as directed by the supplier and M-85-compatible replacement parts must be used.	
Energy Security Impacts	Manufactured using oil, of which nearly 1/2 is imported (d) (properties_notes.html#d)).	Manufactured using oil, of which nearly 1/2 is imported (d) (properties_notes.html#d)).	Biodiesel is domestically produced, renewable, and reduces petroleum use 95% throughout its lifecycle (l) (properties_notes.html#l)).	CNG is domestically produced from natural gas and renewable biogas. The United States has vast natural gas reserves.	Ethanol is produced domestically. E85 reduces lifecycle petroleum use by 70% and E10 reduces petroleum use by 6.3% (l) (properties_notes.html#l)).	LNG is domestically produced from natural gas and renewable biogas.	Methanol is domestically produced, sometimes from renewable resources.	Approximately half of the LPG in the U.S. is derived from oil, but no oil is imported specifically for LPG production.



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