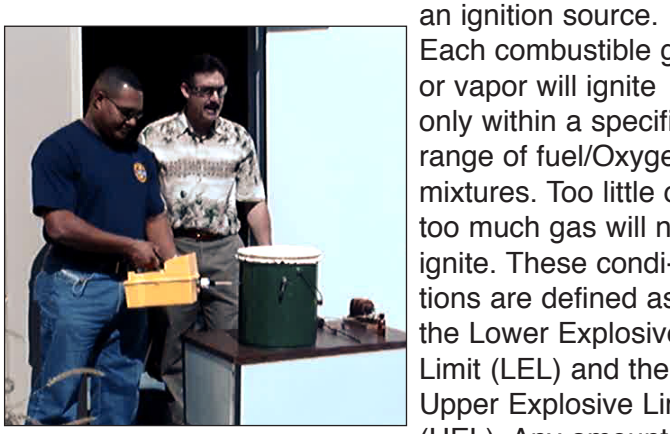
WHAT IS %LEL AND %UEL

The primary risk associated with combustible gases and vapors is the possibility of explosions. Explosion, like fire, requires three elements: fuel, Oxygen, and an ignition source. Each combustible gas or vapor will ignite only within a specific range of fuel/Oxygen mixtures. Too little or too much gas will not ignite. These conditions are defined as the Lower Explosive Limit (LEL) and the Upper Explosive Limit (UEL). Any amount of gas between the two limits is explosive. It is important to note that each gas has its own LEL and UEL, as shown in the chart below. The gas concentrations are shown by percent of total volume, with the balance as normal air.



Between these two limits explosions can occur under some conditions, with the maximum explosive energy available at approximately the midpoint. Note that these limits are sometimes referred to as LFL (Lower Flammable Limit) and UFL (Upper Flammable Limit). These limits are empirically determined, and various authorities sometimes quote slightly different figures, based on slightly different experimental procedures.

Common Combustible Gas LEL's and UEL's

		LEL	UEL
Acetone	(CH3)2CO	2.15%	13.0%
Acetylene	C2H2	2.5%	100%
Benzene	C6H6	1.2%	8.0%
Butadiene	C4H6	1.1%	12.5%
Ethane	C2H6	3.0%	15.5%
Ethyl Alcohol	CH2H5OH	3.3%	19.0%
Ethyl Ether	(C2H5)2O	1.7%	36.0%
Ethylene	C2H4	2.7%	36.0%
Hexane	C6H14	1.1%	7.5%
Hydrogen	H2	4.0%	75.6
IsoButane	C4H10	1.8%	8.5%
Isopropyl Alcohol (IPA)	(CH3)2CHOH	2.0%	12.7%
Methane	CH4	5.0%	15.0%
Methanol	CH3OH	6.0%	36.0%
Pentane	C5H12	1.5%	7.8%
Propylene	C3H6	2.0%	11.1%
Toluene	C7H8	1.2%	7.0%

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