

Acetylene Encyclopedia Article

Acetylene

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Acetylene

Acetylene is a highly flammable artificial gas used in welding and cutting metal. In its pure form, it is colorless and odorless, but in its most common form it is mixed with traces of phosphene that give it a garlic-like odor. Originally, discovered in 1836 by English chemist Edmund Day, acetylene was first synthetically produced by French chemist Marcelin Berthelot in 1862.

Mass quantities of acetylene are most commonly produced for commercial use from a reaction of calcium carbide with water. It can also be produced by passing hydrocarbon gas through an electric arc and by the partial decomposition of methane in air or oxygen at high temperatures. As an extremely unstable gas, acetylene may explode if a 2.5 percent mixture of air in acetylene, or a 25 percent mixture of acetylene in air occurs or if it is subject to pressure exceeding fifteen pounds per square inch (6.81 kg psi). In addition, acetylene is highly poisonous when inhaled. Thus, as a safety measure acetylene is stored and transported in cylinders. Acetone is added to prevent the acetylene from breaking down and exploding.

Acetylene is one of two gasses used in welding torches. The acetylene torch was developed in 1903 by the French inventors, Fouch and Picard. Acetylene is combined with oxygen from a separate tank at the torch tip, where a high-temperature flame, or oxyacetylene flame, of about 6000° F (3315° C) softens the edges of pieces of metal so they can be fused together.

The acetylene torch is also used for cutting metal. In this process, a pure acetylene flame is first used to heat the metal and then an oxygen flame is applied separately to cut the heated metal.

Acetylene has other industrial uses, mainly in the production of synthetic compounds such as vinyl chloride, synthetic rubber (neoprene) and solvents.