

Acetylene

Approximately 20% of acetylene is supplied by the industrial gases industry for oxyacetylene gas welding and cutting due to the high temperature of the flame. Combustion of acetylene with oxygen produces a flame of over 3,600 K (6,020 °F). Oxyacetylene is the hottest burning common fuel gas. Acetylene is the third-hottest natural chemical flame after dicyanoacetylene's 5,260 K (9,010 °F) and cyanogen at 4,798 K (8,177 °F). Oxy-acetylene welding was a popular welding process in previous decades. The development and advantages of arc-based welding processes have made oxy-fuel welding nearly extinct for many applications. Acetylene usage for welding has dropped significantly.

On the other hand, oxy-acetylene welding *equipment* is quite versatile – not only because the torch is preferred for some sorts of iron or steel welding (as in certain artistic applications), but also because it lends itself easily to brazing, braze-welding, metal heating (for annealing or tempering, bending or forming), the loosening of corroded nuts and bolts, and other applications.

Bell Canada cable-repair technicians still use portable acetylene-fueled torch kits as a soldering tool for sealing lead sleeve splices in manholes and in some aerial locations. Oxyacetylene welding may also be used in areas where electricity is not readily accessible. As well, oxy-fuel cutting is still popular, and oxy-acetylene cutting is used in many metal fabrication shops. For use in welding and cutting, the working pressures must be controlled by a regulator, since above 15 psi (100 kPa), if subjected to a shockwave (caused, for example, by a flashback), acetylene decomposes explosively into hydrogen and carbon.

When acetylene must be pressurized and stored for use in oxy-acetylene welding and metal cutting operations, special storage cylinders are used. The cylinders are filled with an absorbent material, like diatomaceous earth, and a small amount of acetone. The acetylene is pumped into the cylinders at a pressure of about 300 psi (2,070 kPa), where it is dissolved in the acetone. Once dissolved, it loses its explosive capability, making it safe to transport. When the cylinder valve is opened, the pressure drop causes some of the acetylene to vaporize into gas again and flow through the connecting hose to the welding or cutting torch.