



Oxy-Fuel Gas Cutting Torch

Safety Reminders

Fuel gas cutting tools are some of the most common tools used on our job sites, however at times, they are also some of the most *misused* tools. They are often found with leaking hoses, incorrect repairs, broken glass, non-functioning regulators, clogged tips, cracked barrels, or what have you. The work that these tools allow the employee to perform can often be quite dangerous. Thermal and UV burns to the skin and eyes, exposure to toxic fumes, fire or explosions, are just a few of the many hazards associated with oxy-fuel gas cutting. Here are a few facts and tips to keep our employees safe when using an oxy-fuel gas cutting torch.

- Compressed gas cylinders themselves are potential hazards if they are improperly handled. A full size (244 cu. ft.) oxygen cylinder is about 57 inches tall, and when full, weighs approximately 155 pounds. The cylinder color is NOT an indication of the contents (i.e. not all oxygen cylinders are green). Only the label will correctly identify the contents of a compressed gas cylinder.
- The gas inside an oxygen cylinder is compressed to 2,200 pounds per square inch (psi), yet the wall thickness of this cylinder is only 1/4". If the cylinder was to fall over and the valve at the top was broken off, the gas will escape through an opening about the size of a pencil. This will turn this innocent looking cylinder into a rocket, that will crash through block and brick walls, ricochet, spin, and slash its way through anything in its path.
- Oxygen is not the fuel. It is what chemically combines with the fuel gas (Acetylene, Propane, MAPP, or Propylene) to produce the heat for welding or cutting operations.
- Acetylene is a by-product of evaporating acetone. Acetylene is stored in a cylinder that contains a filler substance such as lime silica, charcoal, or fuller's earth and *liquid* acetone that has been pumped into the cylinder. The acetylene molecules are drawn off by the difference in atmospheric pressure and the pressure inside the cylinder (approx. 250 psi). Because there is liquid acetone inside the cylinder, the cylinder must always be kept secured in the vertical position while in use, and never laid on its side.
- All compressed gas cylinders must be stored upright and secured. Stored oxygen and fuel gas cylinders must be separated by 20 feet, or by a noncombustible barrier of five feet high with a one-half hour fire-resistance rating.
- The regulator ensures that pressure of the gas from the tanks matches the required pressure in the hose. The flow rate is then adjusted by the operator using needle valves on the torch. Accurate flow control with a needle valve relies on a constant inlet pressure. The gas regulators and gauges take quite a beating from careless handling while taking them in and out of the tool box, or if they ride around unprotected in the back of pickup trucks. Exercise caution when handling a torch set, and store it correctly.
- The hoses are color-coded for visual identification. The color of the hoses varies between countries. In the United States, the oxygen hose is green, and the fuel hose is red. LPG will

damage an incompatible hose, including most acetylene hoses, so ensure the hose is compatible with the gas used.

- The threaded connectors on the hoses are handed to avoid accidental miss-connection: the thread on the oxygen hose is right-handed, while the fuel gas hose has a left-handed thread. The left-handed threads also have an identifying groove cut into the nut. The threads on an acetylene cylinder valve where the regulator attaches can be male or female. Adapters may be necessary to attach a like threaded regulator. **NEVER use any oil, grease or any other type of petroleum product to lubricate the threads of any regulator or valve, especially on an oxygen cylinder.** A fire or explosion could result when the gas contacts the lubrication medium. Keep the regulators clean, and be careful how they are stored in the gang box, so no contaminants can get on the threads.
- A check valve lets gas flow in one direction only. It is usually a chamber containing a ball that is pressed against one end by a spring. Gas flow one way pushes the ball out of the way, and a lack of flow or a reverse flow allows the spring to push the ball into the inlet, blocking it. Not to be confused with a flashback arrestor, a check valve is not designed to block a shock wave. The shock wave could occur while the ball is so far from the inlet that the wave will get past the ball before it can reach its off position.
- **Flashback** is the condition of the flame propagating (spreading) through the hoses of an oxy-fuel welding and cutting system. The flame burns backwards into the hose, causing a popping or squealing noise. It can cause an explosion in the hose with the potential to injure or kill the operator. Using a lower pressure than recommended can cause a flashback. To prevent such a situation a flashback arrestor is usually employed. Best practice is to fit flashback arrestors at the regulator and check valves at the torch.
- Read the SDS information on acetylene. You will see that if acetylene is released to the atmosphere at greater than 15 psi, it becomes unstable and can explode without the aid of any spark or other heat sources. It is important that the tools and equipment associated with oxy-fuel gas cutting operations, especially the regulators, be inspected and maintained on a regular basis.
- Be sure to inspect the environment where you will be using the oxy-fuel cutting torch. Remove all flammable and combustible material in the area. Have a charged fire extinguisher nearby, in case of a fire. Hot work permits and a fire watch may also be necessary for your work area.
- Proper personal protection such as burning goggles and a face shield should always be worn, to protect the eyes and face against glare and flying sparks. Make sure the lenses are shade 5 or darker – not simple tinted safety glasses. Additionally, you must have long pants, long sleeve shirt, welder's sleeves or jacket, or some other form of protection for protection of your body. Even for a simple 30 second job.
- Do not ignite the torch with anything other than a friction striker. The use of matches, lighters, welding arc, and re-lighting from hot work, is prohibited

These are some simple reminders of oxy-fuel gas cutting safety. These words alone will not protect you from the hazards associated with this task. You must make the conscious decision to inspect and then use this type of equipment correctly – every time. Your life or your co-worker may depend on it!