

Survival Medical Oxygen

By Allen Foley

In a life threatening medical situation, lack of oxygen can lead to death. Not having enough oxygen supplied to the body will cause tissue and organ damage. When this happens the brain will begin to die first, with other organs following. Additionally, low oxygen levels to the heart may lead to cardiac arrest. High flow oxygen is definitively indicated for use in resuscitation, major trauma, anaphylaxis, major hemorrhage, shock, active convulsions and hypothermia.

With this in mind, I thought that it would be a good idea to have oxygen available for an emergency if medical care would not be available. You can buy prefilled emergency oxygen cylinders but they are costly (several hundred dollars), small and have a limited amount of oxygen. That might be okay but what if someone had pneumonia or asthma and needed longer oxygen treatment without the possibility of professional medical care? The small cylinder would not last long enough in this scenario. I have seen used portable medical oxygen cylinders for sale on both Craig's List and at garage/estate sales. They are almost always empty or near empty and you would need to have them refilled. The problem is that medical oxygen is only available with a prescription. Your local gas supplier will not refill these cylinders. So I wondered if there was a way to refill these portable cylinders myself to have on hand.

I did some research on the welding vs. medical oxygen. Most of us have seen an oxygen/acetylene cutting torch set. Those oxygen cylinders can be refilled at your local gas supplier. I wondered what the difference was between that oxygen and the oxygen that is used in the medical cylinders. What I found out was that years ago, the gas supply vendors typically maintained two separate storage facilities for oxygen. The first type was for welding, industrial or technical use. The second type was gas intended for respirators or medical procedures. That was the old way but now most gas supply vendors have decided that it is simply not cost-effective to store separate types of oxygen. Almost all oxygen sold in the United States is now medical grade.

So how can I tell if the oxygen in the industrial cylinder is medical grade? If the oxygen cylinder has a USP label near the top it is medical grade. This sticker means that the oxygen meets USP requirements for human consumption. The United States Pharmacopoeia (USP) is a standard listing of drugs licensed for use in establishing purity suitable for human use. To have an USP label, the oxygen cylinder must contain a documented minimum of 99.0 percent oxygen by volume and must be odor free.

So the oxygen is the same but what about the cylinders? There are distinct differences in how the cylinders are filled and how they are lined. Prescription grade medical cylinders have a better lining to prevent corrosion. You may notice that many are constructed from stainless steel or aluminum. They are evacuated before they are refilled. There are also legal concerns about the filling of medical cylinders as regards to the chain of custody. Industrial or welding cylinders are not evacuated before they are refilled. They are made of steel. This could possibly cause issues if the industrial

cylinder's valve was left stored in the open valve position. If left open it could have contaminants that entered into the cylinder.

The standard for refilling medical cylinders is that they are required to always evacuate the cylinder, regardless of cylinder pressure. This step is intended to minimize contamination that might occur from "back-filling" of a cylinder. This back-filling contamination may be caused by improperly connecting it to a gas cascade system, or left open to the atmosphere for extended periods of time. By evacuating the cylinder it also prevents the accumulation of possible contaminants from repeated fills from a compromised source.

Now the question is how would I refill the portable medical cylinder from the full size industrial cylinder? The portable medical oxygen cylinder uses a yoke type connector and the industrial cylinder uses a screw type connector. The thread type on the industrial cylinders uses a CGA-540 (Compressed Gas Association) right hand fitting and the portable medical cylinder uses a CGA-870 yoke type fitting. I thought about building an adapter but I would also need a pressure regulator. I could build one but found a company called *Delta Oxygen Systems* on the web that has done the work for me. They sell the *Oxygen Cylinder Transfill Adapter w/Gauge CGA-540 To CGA-870*. The cost is \$195 plus \$15 shipping. This has the adapter fittings, regulator and connecting hose that is ready to use.

My neighbor has a large oxygen cylinder that he purchased new. It is nearly full and has not been refilled. I plan to buy the adapter along with a Craig's List used medical cylinder. I will then fill my medical cylinder using his industrial supply cylinder. I can now have personal emergency oxygen if the need arrives.

If you plan on filling your own cylinder, please follow all safety rules when attempting refilling the oxygen cylinder:

- Never use oil on the fittings.
- Do not overfill the small cylinder above maximum rated pressure.
- Fill slowly to avoid the valves from heating.
- Make sure valves are in closed position before removing them from the cylinders.
- Keep ignition sources away.

So to sum it up, the answer about oxygen is solved along with the storage device. If the oxygen cylinder has a USP label the oxygen should be safe in an emergency survival situation. The risk of having contaminants from the industrial cylinder to the smaller cylinder is probably small. Given the choice between having no oxygen or the homemade solution in an emergency, I will choose the later. With that in mind it comes down to a personal decision whether to use this oxygen delivery system for your family in an emergency medical situation.

