



Aeromedical Advisory

Flying High: Do You Have What it Takes?

No, we're not talking about Top Gun or the Right Stuff-type flying skills. We're talking about air to breathe and, more specifically, oxygen.

You know the rules: a pilot must use supplemental oxygen when flying at 12,500 feet MSL for more than 30 minutes and continuously above 14,000 feet MSL. The point is to prevent hypoxia, which can incapacitate the pilot first by impairing judgment and perception of danger and eventually by rendering the individual unconscious (or worse).

Knowing these rules is sufficient to pass a knowledge test, but the real-life test requires a solid understanding of how to use supplemental oxygen equipment correctly, effectively, and safely.

Know Your O₂ Systems

There are three basic components to any oxygen system. One is the storage system, or O₂ container. In most cases, small GA aircraft use canisters or bottles to store oxygen as a gas. These can be filled at high pressure (1,800-2,200 psi) or low pressure (400-450 psi). Though economical and easy to install, storage canisters or bottles can be bulky and heavy.

The delivery system is the second component. There are many options available for use in light GA aircraft, but the continuous flow system is one of the most common and least expensive. It provides a constant flow of oxygen at a fixed rate and therefore does not require the regulators and masks used in other delivery systems, such as diluter demand and pressure demand. Pulse demand, a new oxygen delivery option for light aircraft, combines aspects of continuous flow and diluter demand systems, thus conserving the oxygen supply while maintaining a safe level of oxygenation in the blood.

Think of the final component, the nasal cannula or face mask, as the way an oxygen system interfaces with the human occupants. The nasal cannula consists of small tubes that fit into the nostrils. Pilots generally find the cannula to be more comfortable than masks, but it can only be used up to 18,000 feet MSL because it doesn't provide oxygen to the mouth.

The PRICE is Right

PRICE is a handy memory aid that every pilot who uses an oxygen system should know. It's an easy way to remember what items you need to check before using a supplemental oxygen system for aviation purposes.

- **Pressure:** be sure you have enough oxygen pressure and quantity
- **Regulator:** inspect the regulator or outlet assembly
- **Indicator:** don the mask to verify that the flow indicator works
- **Connections:** ensure all the connections are secured
- **Emergency:** be sure to have oxygen ready for both emergency and normal situations and brief passengers on proper use of on-board oxygen systems.

For more information, check out some of the resources below. Also, consider an aviation physiology course or training that includes instruction on the operation and use of supplemental oxygen systems.

Good health and safe flying!

Frederick E. Tilton, M.D., M.P.H., received both an M.S. and a M.D. degree from the University of New Mexico and an M.P.H. from the University of Texas. During a 26-year career with the U.S. Air Force, Dr. Tilton logged more than 4,000 hours as a command pilot and senior flight surgeon flying a variety of aircraft. He currently flies the Cessna Citation 560 XL.

For More Information

Oxygen Equipment: Use in General Aviation Operations

www.faa.gov/pilots/safety/pilotsafetybrochures/media/Oxygen_Equipment.pdf

Physiology of Flight Videos

www.faa.gov/pilots/training/airman_education/physiologyvideos/

Aerospace Physiology Training

www.faa.gov/pilots/training/airman_education/aerospace_physiology/