OXYGEN PRECAUTIONS & NOTES FOR THE KF SERIES AIRCRAFT OXYGEN CYLINDERS

Oxygen: Aviators Breathing Oxygen SPEC. NO MIL-0-2721 0
Maximum Static Pressure: 127 bar @ 21° C (1850 Psig. @ 70°F)

Ambient Temperature F (C)	Filling Pressure psig. (bar)
0 (-17.78)	600 (110.32)
10 (-12.22)	1650 (113.76)
20 (-6.66)	1700 (117.21)
30(-1.11)	1725 (118.93)
40 (4.44)	1775 (122.38)
50 (1 0)	1825 (125.83)
60 (15.55)	1875 (129.28)
70 (21.11)	1925 (132.72)
80 (26.66)	1975 (132.72)
90 (32.22)	2000 (137.90)

NOTES ON OXYGEN:

There are no different grades of oxygen being produced or contained in cylinders under DOT regulations. Contrary to a common myth, medical oxygen contained in a medical cylinder is no different than that contained in a cylinder marked aviators oxygen or otherwise. Furthermore, because of the chemical nature of oxygen it must be as pure and dry from water as possible if stored under pressure. Oxygen is produced to be better than 99.9% pure, if not damage or contamination will result to equipment. Oxygen even holding the slightest amount of water moisture~ which is added during delivery for medical and industrial purposes may have helped to cause confusion in the industry. As far as the FDA is concerned any oxygen cylinder marked as USP or medical is a drug, and has to be held~ dispensed~ and used under strict medical protocols outlined by the FDA and cannot be lawfully used for aviation purposes. Oxygen cylinders labeled as AVO, which is aviator's oxygen, or otherwise is not under the auspices of the FDA and are lawfully used for aviation purposes.

OXYGEN SYSTEM SERVICING:

The KF series oxygen cylinders are fully charged of usable oxygen under a pressure of 1800 psig @70°F (124 bar @21°C). However due to ambient temperatures at the filling area and because trans filling oxygen causes the cylinder being filled to heat up and the one the cylinder your trans filling from to cool, merely filling to 1800 psig. (124 bar) will most likely result in a cylinder not to fill to capacity. After filling the cylinder it will cool back down to the ambient temperature where the indicated pressure will drop appreciably. Therefore, when possible fill the cylinder to the pressure indicated.

PILOT SAFETY & WARNING SUPPLEMENT FOR OXYGEN:

Before servicing any aircraft with oxygen consult the specific aircraft's service/maintenance manual to determine the proper type of servicing equipment to be used. Aircraft's should not be serviced with oxygen during refueling, de-fueling, or other maintenance work, which could provide fuel and a source of ignition. Also oxygen servicing of an aircraft should be accomplished outside not in the hangers. Oxygen is a very reactive material (element) combining with most of the other chemical elements. The union of oxygen with other substance is known as oxidation. Extremely rapid or spontaneous oxidation is known as combustion. While oxygen is non-combustible in itself, it strongly and rapidly accelerates the combustion of all flammable materials: some to an explosive state.

DO'S & DON'TS FOR HANDLING AND USING OXYGEN

1. Do check that only cylinders marked '~Aviators breathing oxygen~' are being used to fill the aircraft oxygen system.
2. Do reject any oxygen that has an abnormal odor (pure oxygen is completely odorless).
3. Do follow the published applicable instructions regarding charging, trans filling, purging and maintenance of aircraft oxygen systems.
4. Do wash your hands to free any type of oils, greases, and food residues before servicing the oxygen system in an aircraft.
5. Don't use oil or grease (including certain lipstick and lip balms) around the high pressure fittings of any oxygen system.

6. Don't expose oxygen containers (cylinders) to high temperatures, i.e. direct sunlight, space heaters or open fires.
7. Don't confuse breathing air mixtures (compressed air, medical, or otherwise) as a substitute for aviators breathing oxygen. The system will not provide the needed oxygen at altitudes and the mixture may have moisture added which could freeze and plug the lines, valves, and regulators of the system.

HAZARDS OF HIGH PRESSURE OXYGEN AND TRANS FILLING:

Trans filling of gaseous oxygen from one cylinder to another involves hazards associated with the handling of oxygen under pressure. A hazardous condition does exist if high-pressure oxygen equipment becomes contaminated with hydrocarbons such as oil, grease, or other combustible materials, which may include oil from a persons hands, or contaminated tools. A cylinder will heat as it is filled from a high-pressure source. The more rapidly the cylinder is filled the higher the temperature rise in the cylinder resulting from the heat of compression of the gas. Excessive temperature may result in the ignition of any combustible materials that may be present in the system. Refill the cylinder at a flow rate that reduces heating of the cylinder. Use only equipment designed for refilling and trans filling. Although oxygen itself is nonflammable, materials that burn in oxygen rich environments will burn much more vigorously and at higher temperatures. If ignited some combustible materials such as oil will bum in oxygen with explosive violence. Many other materials, which do not burn in air, will burn vigorously in oxygen enriched atmospheres. Ignition temperatures are reduced in oxygen-enriched atmospheres. **Compressed oxygen presents a hazard in the form of stored energy.**

Open the cylinder valve slowly. The rapid release of high pressure oxygen through orifices, control valves, etc. If in the presence of foreign particles can cause friction or impact resulting in temperatures which may be sufficient to ignite combustible materials present in the system.

CLEANING THE ADAPTER, SERVICE LINE, AND VALVE OF OIL GREASES.

If any part of the system should become contaminated or you suspect so, you can clean it with hot water and detergent. Do not use the system if it has become contaminated with oil or grease. If the contamination is mild a liquid form of automatic dishwasher detergent or cleaning product "Formula 409" has shown to work best for the purpose. This type of detergent is able to cut and remove almost all types of oils or greases and will rinse off without any detectable residue. To test for contamination, take a clean cotton swab "Q-Tip" and wipe the suspected area with it. Next place the tip of the cotton swab into the surface of a pan of CLEAN water while you are observing a clear reflection of light that shows the waters surface. You should not detect any oil what so ever bleeding from the cotton tip over the water surface. This is an accepted method for oil contamination detection. An oil clean surface will pass this test without any doubt. If the service line should become contaminated internally by oil or grease it can be cleaned by soaking the entire line in a vat of hot water and a liquid form of automatic dishwasher detergent. Rinse the line in hot water and inspect. If contaminates are still present repeat soaking. Dry the line by hanging it vertically in hot air or direct sunlight environment. However, if the contamination is more severe you may have to perform the cleaning process several times or use a solvent such as "Trichloroethane".

REFILLING THE CYLINDER:

A word about oxygen: Oxygen is oxygen. There are no specific grades or purity with oxygen under pressure. Oxygen is produced by a process known as liquefaction. Therefore, oxygen under pressure regardless of the cylinders claim, must be 99.9% pure or the cylinder will be damaged by rust or corrosion prematurely. In the USA all utility oxygen cylinders for welding and aviation will have a service fitting of type CGA-540. Oxygen specifically intended for medical purposes will most likely have a service valve fitting of type CGA-870 sometime referred as a post valve to help make distinction with a hygiene protocol, but still the oxygen is no different. Oxygen for medical purposes does have a specific protocol for hygiene and transport. However, various mixtures of air that may be used strictly for medical purposes or industrial are not interchangeable, and this may be the reason many think that there are different grades of oxygen purity. Vessels holding these air mixtures will have a CGA-346 type service fitting that is not compatible with the CGA-540 fitting for oxygen. Once again oxygen is oxygen. It can't be under pressure without any adverse reaction if it is not as pure and dry as possible. CGA stands for the Compressed Gas Association. The CGA has developed almost all the standards for compressed gasses used in the USA and adopted by the FDA, DOT and other government agencies as well as many' foreign governments. They have a variety of documents about compressed gases, vessels, and fitting.

TO RECEIVE SPECIFIC INFORMATION CONTACT:

Compressed Gas Association
1235 Jefferson Davis Highway
Arlington, VA 22202