

## Your Main Life Support

*... The Compressed Air You Breathe ...*

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You went through extensive training to become certified. You then probably spent much time and thought choosing equipment. Your mask must be comfortable, fins must fit well, and your tank, buoyancy compensator and regulator are the best your budget allows. You are also becoming more aware of the importance of exercise and good nutrition to safe diving and trying to make healthy changes in fitness and diet.

But how much thought do you give to filling your tank with compressed air? Compressed air is your main life support ingredient.

### CONTAMINANTS IN YOUR AIR?

Air by nature, is composed of about 20.9 percent Oxygen and 78 percent Nitrogen; the balance of about 1 1/10 percent is traces of Argon, Carbon Dioxide, Neon, Helium, Methane, Krypton, Hydrogen, Nitrous Oxide and Xenon. Isn't the air in your scuba tanks the same air you're breathing right now? Well, yes and then some. Mother nature's air has been somewhat altered by substances introduced by industrial contaminants. You'll find some levels of Carbon Monoxide and Dioxide, Acetylene, Sulfur Dioxide, Solvents and depending on your location, other substances we'll call smog. The "brew" is drawn into the compressor and concentrated at up to 3500 psi on an average. This processing adds by-products, for example, lubricating oils and Carbon Dioxide. Contaminants greatly increase as compressor equipment begins to wear and operate outside of normal parameters. Just like water at your kitchen tap, dangerous substances can be removed by a properly designed and maintained purification system, part of any good air fill station.

### DANGEROUS AND NOT ALWAYS DETECTABLE

Some of the major contaminants concerning the diver are Carbon Monoxide, Carbon Dioxide, condensed oil and particulate matter and even water vapor. Some of these can be detected by taste and odor, others not. Some can cause health problems slowly over the long term without your knowing about it. Others occur during a dive where results can be suddenly dangerous or lethal.

The most harmful and immediate danger is from Carbon Monoxide (CO) whose safe limit is set at 10 parts per million (ppm). When CO combines with hemoglobin in red blood cells, it prevents blood from taking up oxygen. In other words, it suffocates you. Levels of 400 ppm result, at the very least, in headache and discomfort. Levels approaching 4000 ppm will prove fatal, subject to a range, because everybody is different and every dive is different. This can mean no repetitive dives,

ever.

Carbon Dioxide (CO<sub>2</sub>) is found in air at various levels and is a byproduct of animal (including human) metabolism. High levels are usually due to combustion/cooking exhaust or local atmospheric conditions. Problems from higher levels can range from hyperventilation to suffocation, which can also mean no more repetitive dives.

Another high-risk contaminant is oil vapor. Although effects are not as immediate or extreme as Carbon Monoxide, breathing oil-tainted air can land you a case of pneumonia.

Moisture in the air is a double-edged sword. While extremely dry air is good because it preserves your diving equipment and prevents regulator freeze-up in cold water, the discomfort it can cause may not be so nice. Air that is more humid is good for respiratory tract comfort, but bad for your equipment.

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and then entering the undersea world  
where your air supply is rather important"**

### BREATHING AIR STANDARDS

Several agencies set standards for breathing air. The Compressed Gas Association (CGA), the Occupational Safety and Health Administration (OSHA), the National Fire Protection Association (NFPA) and the United States Navy are just four. Contrary to the sometimes popular belief, OSHA regulates commercial dive operations but not recreational divers.

Diving industry standards dictate that breathing air suppliers subscribe to one of the major standards. PADI for example, requires their five star facilities to test air quarterly. Most recreational scuba applications use the Grade E standard, described by the CGA as the minimum grade for recreational diving.

Limits for Grade E are: 10 ppm Carbon Monoxide; 500 ppm Carbon Dioxide; total hydrocarbon (methane gas) no more than 25 ppm; oil 5mg/m<sub>3</sub> (five milligrams of oil and particulate together in a cubic meter of air). Water vapor content may vary with intended use, however, most recreational diving purposes usually allow 67 ppm, or air that is 10 degrees lower in dew point than the worst local weather conditions. Oxygen in the mix must be between 20 and 22 percent. Most industry standards call for testing every three months.

### BECOME "AIR AWARE"

Remember, you are breathing compressed air and then entering the undersea world where your air supply is rather important. Consequences of poor breathing air include both short and long term effects. Just as exposure to second hand cigarette smoke has become an important health issue, so too is the air you breathe from your scuba tanks.

