

ABSTRACT: Compressed breathing air - the potential for evil from within

There have been many discussions on contaminated breathing gas over the years. Last year, Drs. Millar and Mouldey published an extensive review in **Diving and Hyperbaric Medicine** on breathing gases and the potential problems associated with breathing gas production and storage.

Diving and Hyperbaric Medicine is the journal of the South Pacific Underwater Medicine Society (<http://www.spums.org.au/>) and European Underwater and Baromedical Society (<http://www.eubs.org/>). Our agreement with SPUMS includes a three year embargo on the journal for their members. Yesterday, the journal granted a waiver for this article due to the impact this information could have on divers worldwide. I HIGHLY encourage you to download this article and pass the link along to other divers as this is an often overlooked topic that impacts all of us. Instructors, please consider adding this to your training materials for 'Gas Mixing and Blending' courses as well as sending an email to your former students.

This is an exceptional review and I hope that you learn as much from it as I did.

Millar and Mouldey abstract:

Human underwater activities rely on an adequate supply of breathable compressed gas, usually air, free from contaminants that could cause incapacitation underwater or post-dive or longer-term health effects. Potentially fatal but well-known hazards are hypoxia secondary to steel cylinder corrosion and carbon monoxide (CO) poisoning due to contaminated intake air. Another phenomenon may be behind some previously unexplained episodes of underwater incapacitation and perhaps death: low-level CO poisoning and/or the effects of gaseous contaminants generated within the compressor, including toluene and other volatile compounds. Many low molecular weight volatile contaminants are anaesthetic and will be potentiated by pressure and nitrogen narcosis. In sub-anaesthetic doses, impaired judgement, lowered seizure threshold and sensitisation of the heart to arrhythmias may occur. Toxic compounds can be volatilised from some compressor oils, especially mineral oils, in overheated compressors, or be created de novo under certain combinations of temperature, humidity and pressure, perhaps catalysed by metal traces from compressor wear and tear. Most volatiles can be removed by activated carbon filtration but many filters are undersized and may overload in hot, moist conditions and with short dwell times. A compressor that passes normal testing could contaminate one or more cylinders after heating up and then return to producing clean air as the filters dry and the systems cool. The scope of this problem is very unclear as air quality is tested infrequently and often inadequately, even after fatalities. More research is needed as well as better education regarding the safe operation and limitations of high-pressure breathing air compressors.

From:

Millar IL, Mouldey PG. Compressed breathing air - the potential for evil from within. **Diving and Hyperbaric Medicine.** 2008; 38: 145-51.

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