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HEALTH & DIVING REFERENCE SERIES

# BREATHING GAS CONTAMINATION

BREATHING GAS  
CONTAMINATION CAN  
NEGATIVELY AFFECT  
A DIVER'S HEALTH  
AND SAFETY.

## **CONFIRM CONTAMINATION**

Identifying contamination cases based on symptoms alone can prove difficult. The symptoms are often vague and are similar to other illnesses.

If divers suspect exposure to bad breathing gas, they should seek a medical evaluation and analyze the gas in their tank.

Symptoms need to be evaluated in the context of the dive exposure. Typically, a group of divers will have their tanks filled from the same source. Monitoring fellow divers who had their tank filled by the same source can help determine whether symptoms are related to gas contamination.

## **CONTAMINATION SOURCES**

Sources of contamination vary, but include impurities existing in the surrounding environment (engine exhaust, carbon dioxide, dust particles) and/or by-products of the compression process (carbon monoxide or hydrocarbons from compressor lubricants).

**REPORT DIVING INCIDENTS ONLINE AT  
[DAN.ORG/INCIDENTREPORT](http://DAN.ORG/INCIDENTREPORT).**

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## HEALTH CONCERNS

Health effects on divers vary depending on the contaminant. The most severe symptoms of breathing contaminated gas are impaired judgment and loss of consciousness, both of which may be deadly underwater.

### CONTAMINANT/SYMPTOMS CHART

CARBON MONOXIDE (CO)	Headache, dizziness, weakness, nausea, vomiting, shortness of breath, impaired judgment, confusion, unconsciousness
CARBON DIOXIDE (CO <sub>2</sub> )	Hyperventilation, dizziness, confusion, unconsciousness
VOLATILE HYDROCARBONS	Fatigue, headache, confusion, impaired judgment, numbness, cardiac arrhythmias, loss of consciousness
OIL (CONDENSED)	Headache, nausea, impaired respiratory function
DUST (PARTICLES)	Impaired respiratory function

### EQUIPMENT HAZARDS

Some contaminants may not cause direct harm to the diver's health; rather, they cause equipment damage increasing the diver's risk for accident and injury.

Excessive moisture may cause:

- + Regulators to freeze or malfunction
- + Corrosion and oxidation of scuba tanks
- + Reduce the efficiency of compressor filtration



### INCIDENT PREVENTION

## COMPRESSOR OPERATORS...

- + Be attentive to compressor maintenance to ensure quality compressed breathing gas and extend the life of the compressor.
- + Perform safe air fill procedures. Before filling tanks, inspect the compressor filters for damage and contaminants or engine exhaust near the intake. Filling should stop immediately if chemical or oily odors are detected. Keep records of air fills, maintenance and operator qualifications; use proper oil and filters; and maintain a clean and organized tank-filling room.
- + Air quality testing. Several methods of testing are available varying in price and complexity. Continuous CO and moisture monitoring devices are available. Sending a breathing-gas sample to an accredited laboratory for analysis is recommended on a quarterly basis.

### INCIDENT PREVENTION

## DIVERS...

- + Get air fills from a reputable dive shop or club.
- + Ask questions and be observant of compressor maintenance, fill procedures, breathing gas analysis, and records.
- + Conduct a pre-dive gas check. If your breathing gas has an unusual odor or taste, do not dive with it.
- + Check your cylinder for carbon monoxide (CO)—an odorless, tasteless and colorless gas. Electronic CO detectors or color indicating devices can detect the presence of CO in breathing gas.

## DAN CAN HELP

DAN is offering gas analysis assistance. If you were involved in an incident possibly related to breathing contaminated gas and you have lawful control of the tank, preserve the tank and contact DAN Research at **919-684-2948** or via email at **Research@DAN.org**.