

Smart Guide How To Avoid Running Out of Air





DAN'S SMART GUIDE TO AIR CONSUMPTION

Our self-contained underwater breathing apparatuses are only useful as long as the cylinder contains sufficient breathing gas. Scuba equipment allows us to breathe underwater, extending our ability to explore. Without breathing gas, our time is limited by the dangers of asphyxia and drowning.

During dive training you learned how to:

- Understand breathing-gas needs
- Calculate the limits of available gas
- Monitor the remaining gas pressure
- Return to the surface in a timely manner with enough gas to inflate your BCD

Even so, running out of breathing gas is the most common dive incident and the number-one cause of diving fatalities. Even the most skilled divers can make mistakes and run out of gas. In this guide, we will cover the 13 most common errors that lead to out-of-air emergencies and how to avoid these situations.

Understanding Breathing Gas Needs

Your breathing rate depends on your level of exercise and depth. The higher your level of exercise, the more oxygen you need and the more CO₂ you will produce. In order to flush the CO₂ from your lungs while diving, you must inhale breathing gas. The chart below shows the relationship between depth, pressure, exercise and breathing-gas requirements. The deeper the depth and the higher the level of exercise, the greater the demand for breathing gas.

Breathing Gas Needs: How Much Air is Required to Ventilate Lungs?				
Depth (Metres)	Environmental pressure (Atmospheres)	Breathing-gas needs (Litres per minute)		
		At rest	Light to moderate activity	Vigorous exercise
0 m (Surface)	1 ATM	8 lpm	20 lpm	70 lpm
9 m	2 ATM	16 lpm	40 lpm	140 lpm
30 m	4 ATM	24 lpm	80 lpm	280 lpm

By the Numbers

The Aluminum 80 is the most commonly used cylinder.

Specifications:

- Internal tank volume: 11 litres (0.39 cubic feet)
- Maximum pressure allowed: 207 bar
- 80 cubic feet = 2 265 litres (1 cubic foot = 28.317 litres)

How Long Will My Breathing Gas Last in an Aluminum 80?				
Depth (Metres)	Environmental pressure (Atmospheres)	Breathing-gas needs (Litres per minute)		
		At rest	Light to moderate activity	Vigorous exercise
0 m (Surface)	1 ATM	215 minutes	70 minutes	20 minutes
9 m	2 ATM	107 minutes	35 minutes	10 minutes
30 m	4 ATM	53 minutes	17 minutes	5 minutes

THE MOST COMMON CAUSES OF OUT-OF-AIR EMERGENCIES

Lack of Awareness

1. Diving too Deep

Gas consumption increases dramatically with depth. Your decompression obligation builds quickly and you may need more gas for decompression stops. An Aluminum 80 is not meant for deco dives. Running out of gas at depth puts you at risk of a long, hazardous emergency ascent. You can maximise your time at shallower depths and easily reach the surface in the event of an emergency.

2. Staying too Long

Sooner or later, you will consume your gas reserves. Determine the cylinder pressure at which you will need to turn back and start your ascent in advance. During the dive, actively monitor your cylinder pressure and turn back on time.

3. Working too Hard

Fighting a strong current, hunting or lacking buoyancy control can affect air consumption. Exertion at depth may speed up depletion of your cylinder by up to twenty times. If you are not accustomed to diving in strong currents or surf, seek training prior to diving in these environments.

4. Not Monitoring Your Pressure Gauge

Be air aware: Monitor your air supply. Check your pressure gauge regularly and communicate your supplies with your buddy.

5. Ignoring Anxiety as a Factor

Anxiety changes all calculations and may deplete tank reserves faster than vigorous exercise. Try to maintain normal breathing but if you do feel anxious, keep a closer eye on your gas supplies; they may dwindle more rapidly than usual.



Procedural Problems

6. Starting With Less Than a Full Cylinder

Regardless of how short an immersion you may contemplate, do not start your dive on less than a full cylinder. Never descend to retrieve a lost piece of equipment or anchor if the cylinder is nearly empty.

7. Not Opening the Cylinder Valve All the Way

Open the cylinder valve all the way and check that breathing through the regulator does not cause the pressure indicator to swing with each breath.

8. Frequent Depth Changes and BCD Adjustments

Yo-yo diving (using your BCD frequently to move up and down in the water column) can quickly deplete your gas supply. Yo-yo diving also increases risk of pulmonary barotrauma and decompression sickness (DCS).

9. Omitting Pre-dive Check and Buddy Checks

Use a printed pre-dive checklist to prevent mental lapses - the mental checklist is an oxymoron.





Equipment issues

10. Regulator

Your gas consumption can be affected if

- Your regulator is difficult to breathe from
- Your secondary regulator has a slow leak
- Your regulator starts to free-flow due to freezing or debris
- Your mouthpiece decouples from your regulator
- Your dive buddy accidentally knocks your regulator out of your mouth

Take preventative steps

- Rinse your regulator after diving
- Conduct regular maintenance on your regulator and have all parts replaced that may have been worn off or are out of date
- Secure your spare regulator - do not let it drag on the bottom

If your regulator starts to free flow, attempt to flush it; this may help if debris is to blame. Remember, you can still breathe from a free-flowing regulator, but the gas will not last long, so you have to initiate the ascent.

11. BCD

Inflator leaks or tears in your BCD can deplete your air. Rinse your BCD after diving and conduct regular maintenance to prevent leaks.

12. Pressure Gauge

If your pressure gauge is integrated with your computer, a computer error may also affect the gauge. If your cylinder pressure does not decrease with time of dive, you have a problem and should safely terminate the dive. Make sure that your gauge is calibrated properly. Some gauges will not indicate zero, even when the tank is empty. To avoid this problem, make sure you return to the surface with the gauge indicating 35 bar or greater.

13. Burst O-ring or Hose

O-rings should be replaced regularly. Carry your own with you and if you have a minor leak, replace the O-ring in question. Do not open your regulator on your own; this should only be done by a certified maintenance professional.

SAFETY TIPS

1. Maintain your equipment regularly and inspect any rental equipment carefully.
2. Use a written pre-dive checklist, and plan the maximum depth and duration of your dive that can be safely achieved with the available supply.
3. Open the cylinder valve all the way (consider buying a cylinder with an open/close valve indicator).
4. Conduct a pre-dive test breath on your regulator and make sure your cylinder is full before the dive. Also check the gas line and complete an in-water buddy check before descending.
5. Carry an independent emergency gas reserve. Two independent gas sources are better than one. It may help you in your own emergency or if another diver requests your breathing gas.
6. Monitor your cylinder pressure at regular intervals.
7. Stay within your dive-training limits.
8. Turn back when you exhaust half of your available gas supply and make sure you conserve enough air for floatation on the surface.
9. Adjust your buoyancy in protected, shallow water. If you find you have buoyancy problems, abort the dive and fix the problem.

Before the
Dive

210 bar

Turn Back

105 bar

Bring to the
Surface


35 bar

Signalling

The universal signal for running low on air is a fist held close to the chest.

SAFETY STARTS WITH YOU

This is a mistake that has serious repercussions but it is easily avoidable. The best strategy is not to run out of gas. If you run out of your gas toward the end of dive, your buddies are probably also low on gas and there may not be enough supply to manage two stressed divers. Monitoring your gas supply is a simple step to preventing a serious situation. Dive safely.



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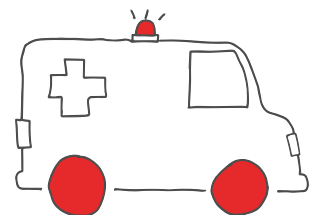
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