

What are you breathing?

For the majority of the recreational diving world the answer to the question “What are you breathing?” is usually simply: it’s Air. However an increasing number of recreational divers are using alternative breathing mixtures.

If you are a recreational diver reading the Analox site then the chances are that you are familiar with Nitrox. As we know, Nitrox is any mixture of nitrogen and oxygen. That means that Air, which is a mixture of 79% nitrogen and 21% oxygen could be called Nitrox. In fact, if we wanted to be very pretentious, we could call it Normoxic Nitrox. Equally a mixture of 85% nitrogen and 15% oxygen would also be Nitrox, although it wouldn’t be much good for diving as the whole point of diving Nitrox is to reduce the amount of nitrogen rather than increase it. So on the whole, when we refer to Nitrox we usually mean a mixture with more oxygen (and hence less nitrogen) than normal air. This is also referred to as Enriched Air Nitrox or EANx where the ‘x’ represents the oxygen content of a specific mix. It’s not always as simple as that though. In some dive centres, especially on live-aboards, molecular filters are used to filter out nitrogen from the air in order to produce Nitrox. Although still Nitrox, this is sometimes called De-Nitrogenised Air or DNAX.

When we add helium into our breathing mix we can get a different set of gases. Helium is introduced in deeper diving to reduce the amount of oxygen and nitrogen in order to reduce the risk of narcosis and oxygen toxicity. Commercial divers sometimes use a mixture of helium and oxygen which is known as Heliox. However, cost considerations mean that, outside of the commercial world, divers will usually use a combination of oxygen, nitrogen and helium, known as Trimix. In the same way that the general name Nitrox can be used to describe any mixture of nitrogen and oxygen, the term Trimix is used to describe any combination of oxygen, nitrogen and helium. Specific types of mixes are also given names as the characteristics of each are very different.

A Trimix which has between 18 and 21% oxygen is referred to as Normoxic Trimix. The term Normoxic refers to ‘normal’ levels of oxygen. In other words, a similar level of oxygen to normal Air. The helium content in Normoxic Trimix is likely to be between 25-45%. This type of Trimix is used to reduce narcosis in the 45-60m depth but does not change the oxygen levels significantly and so is limited to 60m by oxygen toxicity considerations.

For deeper dives the amount of oxygen in the mixture needs to be reduced and for this a Hypoxic mixture is used. Hypoxic means a reduced level of oxygen such that the mixture will not sustain consciousness at the surface. Oxygen levels below 18% are usually considered Hypoxic for diving. The helium levels in a Hypoxic Trimix will be much higher as it is being used to

reduce the amount of oxygen as well as being used to reduce the amount of nitrogen and so helium levels between 40-60% are common.

In recent years it has become increasingly popular to add helium to the breathing mix for dives between 30-45m. In this case it is possible to use a weak Normoxic Trimix but it is also possible to have a higher level of oxygen, just as if diving Nitrox, but with the addition of some helium. This would be called Hyperoxic Trimix, due to the higher than normal levels of oxygen, but this name is not commonly used in order to avoid confusion with Hypoxic Trimix. Hyper means high levels and Hypo means low levels. Any Trimix with a higher level of oxygen than air was originally called Helitrox when NAUI launched the first training course into its use and TDI has stuck with this name. Other training agencies have used the term Triox or Recreational Trimix to refer to the same thing. Helitrox will typically contain between 10-30% helium.

Irrespective of the breathing gases we use, or the names we give them, all agencies agree that it is essential that we analyse and correctly mark up every cylinder before diving it.

Common Name	Alternatives	Description
n/a	Hypoxic Nitrox	Nitrox with less than 21% oxygen. Of no practical use in diving
Air	Normoxic Nitrox	Normal air with 21% oxygen and 79% nitrogen
Nitrox	EANx, DNx, Hyperoxic Nitrox	Any mixture of nitrogen and oxygen
Heliox	n/a	Any mixture of helium and oxygen
Trimix	n/a	Any mixture of helium, nitrogen and oxygen
Trimix	Normoxic Trimix	Trimix with between 18-21% oxygen content
Trimix	Hypoxic Trimix	Trimix with less than 18% oxygen content
Helitrox	Triox, Recreational Trimix, Hyperoxic Trimix	Trimix with greater than 21% oxygen content