POINT OF VIEW

Nitrox diving courses: a must?

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During training, we were repeatedly told in the air we breathe is bad,if with it. This otherwise very useful gas then becomes toxic. Afterwards we were given at which the oxygenis not more our friend.Weare also a little sad about the examination question on stay on the reef of the critical depth for O,-toxicity. we had to learn the partial impressions. I just say: Dalton. We realized that we were on the safe side as long as the pO was less than 1.7 bar, i.e. as long as we did not dive deeper than about 70 m (Table 1).

Table 1: Permissible pO values according to various sources

Source	Permissible pO_2 [bar]
Lambertsen (**Physiologist, 1972**)	2,0
Edmonds, Lowry, Pennefather, Walker, **Textbook 2002**	1,8 - 2,0
Combat swimmer, Germany	1,7
US Navy	1,6
National Oceanographic and Atmospheric Administration (NOAA, USA)	1,6
Various diving associations, normal dives	1,6
Various diving associations, strenuous dives	1,4

Then came the all-clear. We weren't allowed to dive to 70 m because we had a problem with the nitrogen. This became unpleasantly noticeable even at shallower depths. And so responsible diving associations rightly say: 40 m is enough. Below this depth, it is increasingly likely that the depth intoxication will develop. So we could safely forget the pO, the pN was now the bad guy. But that was not enough. Not only did nitrogen acutely trigger the narcosis-like depth intoxication, but nitrogen was also resentful. It accumulated in organic tissue. The deeper and the longer the dive, the more. I'm just saying: Henry. In order to escape the malevolence of nitrogen, zero-time dives were established. If we exceeded these no-decompression times, the nitrogen forced us to make some very complicated dive profiles. So that we don't run into trouble here, today the computer tells us how to get rid of the nitrogen in an orderly fashion. So how do we create a decompressor?

can be avoided.Despite the compu- says: oxygen we are a little tired after the dive. we dive too deep , perhaps a little depth intoxication, an anesthetic anesthesia? Or was it the loss of heat? the depth Or both? On the other hand, we are sometimes because we can no longer

It was therefore obvious to add more oxygen to the air we breathe. This gas mixture could be called oxygen-enriched air. The abbreviation nitrox also makes a lot of sense: from nitrogenium and oxygenium. In normal breathing air, we would then be dealing with Nitrox21.
Before every dive, however, we need to know how much oxygen is contained in the breathing gas. Mixtures such as Nitrox32, Nitrox36 or Nitrox40 can be found all over the world. The Americans surprise us with their own abbreviation. For example, EAN36. However, the simple European does not immediately understand the underlying vocabulary: Enriched Air Nitrox 36; enriched air...

If nitrogen causes us problems with depth noise and decompression, then Nitrox50 would also be something nice. Not necessarily. As a reminder: O,-toxicity. If the pO must not exceed 1.7 bar, then Nitrox50 can only be used at a depth of just under 25 meters.
m. And sometimes the wreck lies deeper. Some associations consider a pO of 1.7 bar to be too unsafe. They therefore suggest using 1.6 bar for normal dives and 1.4 bar for strenuous dives.

What is important for the scuba diver? They need to know what nitrox they are diving with so that they can adjust their diving depth accordingly and avoid getting into trouble with an excessive pO. He must therefore know his maximum 'working depth'. Acutely, the attack would start in the central nervous system. The diver could develop seizures that cannot be controlled and are therefore life-threatening. Paul Bert was the first to describe these effects (Table 2). The computer helps again. Just as we can derive laws for our normal Nitrox21 , we can also let the computer calculate how to dive with the various mixtures. Incidentally, the long-term effects of increased oxygen partial pressures were first described by Lorraine Smith (Table 3).

The advantages of Nitrox diving are clear. The no-decompression times are longer. An example: When diving with Nitrox36 to 30 m, the bottom time can be doubled from 25 min to 50 min. Once on the surface, the diver can report on his experiences in a completely relaxed manner. He is not tired, he is alert.

Table 2: Paul Bert effect: Short-term effects of

This effect describes damage to the central nervous system (CNS), which is caused relatively quickly at a high pO^2. Typical pO^2 values are 2 bar and a duration of 1 h to several hours. No pathological changes in the CNS directly attributable to O^2 toxicity have been observed in humans. The mechanism is therefore not well understood. Symptoms range from twitching of the facial muscles, nausea, fatigue, tinnitus, tunnel vision, depression to convulsions resembling violent epileptic seizures.

With Nitrox, we should also think in particular of the reduced nitrogen load during multiple dives and of flying after diving.

And now comes the money. A basic Nitrox course, for example, takes one day at a base in the south of France and costs €150. The advanced diver has to invest 3 days and €350. At the end of the course you will receive a CMAS certificate. At PADI the

Table 3: Lorraine-Smith effect. Long-term effects

It is about damage to the lungs that occurs with long-term exposure to increased pO^2. Typical pO^2 values are between 0.5 and 1.3 bar with an exposure time of = 8 hours. The damage to the lungs can be well documented by the reduction in vital capacity. At a high pO^2, alveolar edema occurs and the membranes of endothelial cells swell and are destroyed. The alveolar gas exchange is impaired. The diver's symptoms are chest tightness, coughing, shortness of breath and chest pain, but also fatigue and dizziness.

looks very similar. This allows you to dive with 'Nitrox for free'. Both major associations emphasize the increased safety. Not so much the additional income from the courses.

We receive a cheerful question from the German base manager at a Maldives base just in time: Why does an experienced diver have to learn all the theory again? Why should he bother with formulas that are calculated by the computer during the actual dive?

Our heart rate continues to rise with joy when we learn that no course is required before nitrox dives at three bases on the Red Sea for about a year now. A briefing is enough. The breathing mixture there is not called Nitrox28 but air28. What were the 'inventors' thinking when they developed air28? They had the tried and tested '40 m is enough' rule in mind and also took into account that nobody is allowed to dive deeper than 40 m in Egypt anyway.

With this mixture, a maximum pO of 1.4 bar is achieved. We are therefore in the green range. And the range becomes even greener when diving according to the deco rules for normal air.

The Swiss management team at the three Egyptian bases are visibly proud to say that no deco incidents have occurred since the introduction of air28. What more could a base management want than safe dives and happy, headache-free diving customers who do not feel cheated and who fly home healthy and think about where they want to go next time.

Diving with nitrox has no secure future in quarry ponds. For the frequent diver, however, nitrox offers clear advantages. Diving with air28 seems to be a very attractive option for frequent vacationers in the future.