

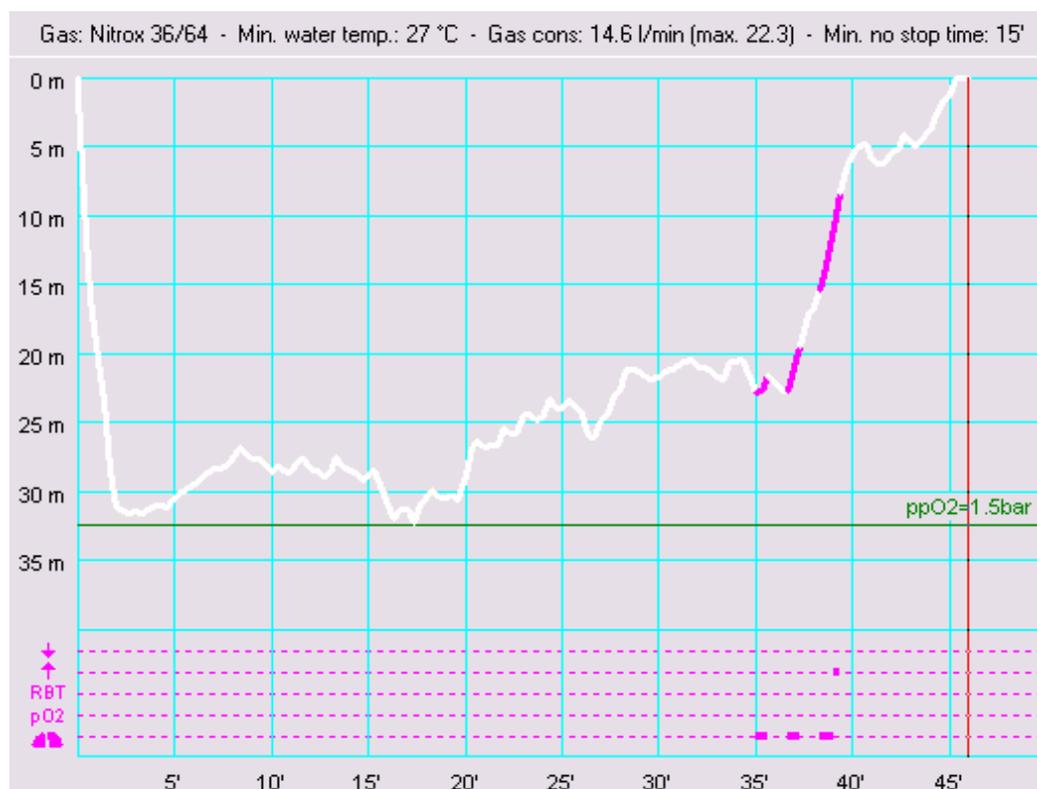
Nitrox vs. Air Comparison

In order to better understand the advantages that nitrox can give a diver with respect to longer bottom times, it is sometimes helpful to see the practical difference this may have on an actual dive.

Two different dive computers - an Aladin Air X, and an Aladin Air Z 02 were taken on the same dive, and their data compared after the dive. The Air X is not capable of calculating using an enriched air blend; therefore it assumed that the dive was done on air. The Air Z 02 was aware of the fact that the dive was completed with an enriched air blend using 36% oxygen.

The Air X, calculating much shorter NDL's (No Decompression Limits) was therefore far more conservative. It was stowed in a BCD pocket and was not consulted at all during the dive. The Air Z 02 was attached to the wrist; therefore small variances in depth are expected when comparing the readings from the computers.

The dive was executed to a depth of approximately 32 meters for 47 minutes. This dive was completed on the wreck of the El Nina in the Red Sea. Therefore the dive profile was a classic "U" shape typical of wrecks, and also perfect to demonstrate the advantages of nitrox.



The profile of the dive according to the Air Z 02 is shown above for reference.

While the Air Z 02 stayed at all times at least 15 minutes away from the NDL, the Air X crossed the NDL and started to indicate that decompression stops were required. A normal safety stop was completed, however as far as the Air X was concerned this

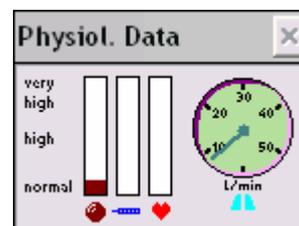
was not sufficient, and as soon as the depth became shallower than 3 meters, it started to beep loudly and continuously, requesting that the decompression stop be respected. On the surface it indicated “SOS” and continued to beep for a further 5 minutes, giving the diver the chance to re-enter the water the complete the decompression stop. After 5 minutes the stop was considered missed and the computer then became locked for 24 hours displaying “SOS”, in accordance with the manufactures documentation.

After the dive the data from both computers was loaded first into a Palm Pilot and then later transferred to a PC for analysis with Uwatec’s Datatrack for Windows software.

As expected, the profile information from both computers looked almost identical, but by stepping through the dive itself, differences could be seen on the dive computer display and the tissue saturation data display. Put simply, higher levels of nitrogen were recorded in each theoretical tissue compartment for the dive calculated with Air. At the end of the dive, due to the missed decompression stop, the display for the 3rd and 4th compartment turned from green to purple, indicating that the levels of nitrogen in these compartments had exceeded their safe limit, and the diver was now at risk. The dive calculated with nitrox showed no such problem, with all tissue compartments remaining within safe limits.

The comparison of the dive computer display and tissue data follows on the next page. The most obvious difference can be found by comparing the “no stop” time between the computers at the various stages of the dive. For example, at 16 minutes into the dive the nitrox computer indicated 16 minutes NDL at 32 meters. The air computer indicated just 2 minutes.

In addition to the data shown on the next page, another difference was observed and that was that the microbubble level indicator increased at the very end of the dive for the air dive. The nitrox dive showed no increase of microbubble levels at any stage. The increased levels of microbubbles for air dive occurred only in the last 3 minutes.



The actual data file (NITROX.LOG) is also included alongside this explanation, and the reader is invited to examine it himself using the Datatrack for Windows software which can be downloaded from the following location:

<http://www.uwatec.com/zips/DataTrak.zip>

To download the NITROX.LOG file, or to find links to other diving related resources such as information about transferring data from an Aladin to a PC or Palm Pilot, please check <http://www.fyvie.net/diving>

Mark Fyvie, 23.09.2002
mark @ fyvie.net

Comparison of Dive Data

Min	Nitrox (O2 = 36%)	Air (O2% = 21%)		
3	<p>Dive computer <input type="button" value="x"/></p> <p>31.4 <input type="button" value="CNSO<sub>2</sub>%"/> 3: 0%</p> <p>32.2 <input type="button" value="Nostop"/> 28:</p> <p>O2: 36% 1.46bar</p>	<p>Tissue Data <input type="button" value="x"/></p>	<p>Dive computer <input type="button" value="x"/></p> <p>30.8 <input type="button" value="CNSO<sub>2</sub>%"/> 3:</p> <p>31.5 <input type="button" value="Nostop"/> 14:</p> <p>O2: 21% 1.01bar</p>	<p>Tissue Data <input type="button" value="x"/></p>
16	<p>Dive computer <input type="button" value="x"/></p> <p>32.0 <input type="button" value="CNSO<sub>2</sub>%"/> 16: 10%</p> <p>32.2 <input type="button" value="Nostop"/> 16:</p> <p>O2: 36% 1.49bar</p>	<p>Tissue Data <input type="button" value="x"/></p>	<p>Dive computer <input type="button" value="x"/></p> <p>31.3 <input type="button" value="CNSO<sub>2</sub>%"/> 16:</p> <p>31.5 <input type="button" value="Nostop"/> 2:</p> <p>O2: 21% 1.01bar</p>	<p>Tissue Data <input type="button" value="x"/></p>
26	<p>Dive computer <input type="button" value="x"/></p> <p>26.1 <input type="button" value="CNSO<sub>2</sub>%"/> 26: 15%</p> <p>32.2 <input type="button" value="Nostop"/> 18:</p> <p>O2: 36% 1.27bar</p>	<p>Tissue Data <input type="button" value="x"/></p>	<p>Dive computer <input type="button" value="x"/></p> <p>25.6 <input type="button" value="CNSO<sub>2</sub>%"/> 26: 5%</p> <p>31.5 <input type="button" value="Decostop"/> 3 m 3:</p> <p>O2: 21% 1.01bar</p>	<p>Tissue Data <input type="button" value="x"/></p>
37	<p>Dive computer <input type="button" value="x"/></p> <p>20.9 <input type="button" value="CNSO<sub>2</sub>%"/> 37: 20%</p> <p>32.2 <input type="button" value="Nostop"/> 19:</p> <p>O2: 36% 1.09bar</p>	<p>Tissue Data <input type="button" value="x"/></p>	<p>Dive computer <input type="button" value="x"/></p> <p>20.6 <input type="button" value="CNSO<sub>2</sub>%"/> 37: 11%</p> <p>31.5 <input type="button" value="Decostop"/> 3 m 9:</p> <p>O2: 21% 1.01bar</p>	<p>Tissue Data <input type="button" value="x"/></p>
40	<p>Dive computer <input type="button" value="x"/></p> <p>5.6 <input type="button" value="CNSO<sub>2</sub>%"/> 40: 20%</p> <p>32.2 <input type="button" value="Nostop"/> 99:</p> <p>O2: 36% 0.53bar</p>	<p>Tissue Data <input type="button" value="x"/></p>	<p>Dive computer <input type="button" value="x"/></p> <p>4.8 <input type="button" value="CNSO<sub>2</sub>%"/> 40: 9%</p> <p>31.5 <input type="button" value="Decostop"/> 3 m 9:</p> <p>O2: 21% 1.01bar</p>	<p>Tissue Data <input type="button" value="x"/></p>
44	<p>Dive computer <input type="button" value="x"/></p> <p>2.7 <input type="button" value="CNSO<sub>2</sub>%"/> 44: 20%</p> <p>32.2 <input type="button" value="Nostop"/> 99:</p> <p>O2: 36% 0.43bar</p>	<p>Tissue Data <input type="button" value="x"/></p>	<p>Dive computer <input type="button" value="x"/></p> <p>2.3 <input type="button" value="CNSO<sub>2</sub>%"/> 44: 6%</p> <p>31.5 <input type="button" value="Decostop"/> 3 m 6:</p> <p>O2: 21% 1.01bar</p>	<p>Tissue Data <input type="button" value="x"/></p>
47	<p>Dive computer <input type="button" value="x"/></p> <p>0.0 <input type="button" value="CNSO<sub>2</sub>%"/> 46: 20%</p> <p>32.2 <input type="button" value="Nostop"/> 99:</p> <p>O2: 36% 0.33bar</p>	<p>Tissue Data <input type="button" value="x"/></p>	<p>Dive computer <input type="button" value="x"/></p> <p>0.0 <input type="button" value="CNSO<sub>2</sub>%"/> 47: 6%</p> <p>31.5 <input type="button" value="Decostop"/> 3 m 6:</p> <p>O2: 21% 1.01bar</p>	<p>Tissue Data <input type="button" value="x"/></p>

Date:	Fri, 13.09.2002	Location:	Red Sea
Time:	09:31	Site:	El Nina Wreck
Altitude range:	0 m... 900 m	Interval:	19:02
Weather:	clear	Air temperature:	30 °C
Dive suit:	one pc. wetsuit	Tank size:	12.0 l
Maximum depth:	31.5 m	Dive time:	00:44
Min. temperature:	26 °C	Air consumption:	169 bar
Dive type:	Decompression, Single ascent, Sea water		
Activities:	Sightseeing		
Alarms:	Ascent, Decompression, SOS		
Buddies:			
Remarks:	This dive was completed in parallel with an Aladin Air Z 02, using EAN36. See dive 2 for comparison.		
Signature(s):			
Dive # 1		NITROX.LOG	

Date:	Fri, 13.09.2002	Location:	Red Sea
Time:	09:32	Site:	El Nina Wreck
Altitude range:	0 m... 900 m	Interval:	19:01
Weather:	clear	Air temperature:	30 °C
Dive suit:	one pc. wetsuit	Tank size:	12.0 l
Maximum depth:	32.2 m	Dive time:	00:44
Min. temperature:	27 °C	Air consumption:	168 bar
Dive type:	Nitrox, No stop, Single ascent, Sea water		
Activities:	Sightseeing, Wreck-dive		
Alarms:			
Buddies:	Steve and Elisabeth		
Remarks:	Explored outer section of wreck with limited penetration. Returned from wreck directly to boat. EAN36		
Signature(s):			
Dive # 2		NITROX.LOG	

