4. TDI – Advanced Nitrox Diver Course

4.1 Introduction

This course examines the use of EAN-21 through one hundred (100) percent oxygen for optimal mixes to a depth of forty (40) msw / one hundred thirty (130) fsw. The objective of this course is to train divers in the benefits, hazards and proper procedures for utilizing EAN-21 through one hundred (100) percent oxygen for dives not requiring staged decompression. Decompression techniques may be combined with this course at the discretion of the instructor.

4.2 Qualifications of Graduates

Upon successful completion of this course, graduates may engage in diving activities utilizing EAN-21 through one hundred (100) percent oxygen without direct supervision so long as:

1. The diving activities approximate those of training.
2. The areas of activities approximate those of training.
3. Environmental conditions approximate those of training.

Upon successful completion of this course, graduates are qualified to enroll in:

1. TDI Decompression Procedures Course.
2. TDI Extended Range Course.

4.3 Who May Teach

Who may teach this course:

1. Any active TDI Advanced Nitrox Instructor.

4.4 Student – Instructor Ratio

Academic:

1. Unlimited, so long as adequate facility, supplies and time are provided to insure comprehensive and complete training.

Confined Water (Swimming pool-like conditions):

1. N/A.

Open Water (Ocean, lake, quarry, spring, river or estuary):

1. A maximum of eight (8) students per Instructor. However, it is the instructor's discretion to reduce this number as conditions dictate.

4.5 Student Pre-Requisites

The student must:

1. Be a minimum age of fifteen (15).
2. Have a minimum certification of TDI Nitrox Diver (or equivalent).
3. Show poof of twenty-five (25) logged open water dives.
4. If this course is taught in conjunction with the TDI Decompression Procedures Course, then the minimum age is eighteen (18).

4.6 Course Structure and Duration

Open Water Execution:

1. Four (4) dives are required with a minimum accumulated bottom time of one hundred (100) minutes.
2. If Advanced Nitrox is taught in conjunction with Decompression Procedures only a total of six (6) dives are required with a maximum depth of forty five (45) meters / one hundred fifty (150) feet.
3. Only two (2) dives from Advanced Wreck course may be credited towards the total dives required.

Course Structure:

1. TDI allows instructors to structure courses according to the number of students participating and their skill level.

Duration:

1. The minimum number of classroom and briefing hours is six (6).

4.7 Administrative Requirements

The following is the administrative tasks:

1. Collect the course fees from all the students.
2. Ensure that the students have the required equipment.
3. Communicate the training schedule to the students.
4. Have the students complete the Liability Release and Medical history forms.
5. The instructor must review the liability Release and Medical Forms before starting on the course.

Upon successful completion of the course the Instructor must:

1. Complete the Student Registration Form and send the Registration Form to TDI HQ.
2. Award Card.

4.8 Training Material

Required material

1. TDI Advanced Nitrox Student Manual.

Optional Material

7. TDI EAD I $P0_2$ Tables.
8. TDI Advanced Nitrox Power Point Presentation.

4.9 Required Equipment

The following equipment is required for each student:

1. Alternative second stage octopus attached to a primary regulator ***or*** a redundant scuba unit (three hundred and seventy (370) liter / thirteen (13) Cu. ft. minimum).
2. A submersible pressure gauge.
3. Depth gauge and automatic bottom timer ***and/or*** dive computer.
4. Buoyancy Compensator with power inflator.
5. Exposure suit adequate for the open water environment.
6. Cylinder and Regulator properly labeled and cleaned as required for EAN mixtures.
7. Access to oxygen analyzer (Instructor may supply).

4.10 Required Subject Areas

The TDI Advanced Nitrox Manual is mandatory for use during this course but instructors may use any additional text or materials that they feel help present these topics. The following topics must be covered during this course:

1. Physics
   - A. Pressure review.
2. Physiology
   - A. Hypoxia.
   - B. Oxygen Toxicity
     - I. Whole body (OTU's).
     - II. Central Nervous System (CNS).
   - C. Nitrogen Narcosis.
   - D. Nitrogen Absorption and Elimination.
   - E. Carbon Dioxide Toxicity.
   - F. Carbon Monoxide Toxicity.
3. Formula Work
   - A. Best mix computations.
   - B. Maximum Operating Depth of mixture computations.
4. Equipment Considerations
   - A. Up to forty (40) percent oxygen content.
   - B. Above forty (40) percent oxygen content.
5. Dive Tables
   - A. Equivalent air depth with any table.

B. Computer generated tables.

6. Dive Computers
   A. Mix adjustable.
   B. 0_2 integrated.
7. Dive Planning
   A. Operation Planning
      I. Gas requirements.
      II. Oxygen limitations.
      III. Nitrogen limitations.
8. Common Mixing Procedures (demonstrate one method)
   A. Partial pressure blending.
   B. Continuous blending.
   C. Membrane separation system.
9. Decompression
   A. EAN usage as a decompression gas i.e. 50/50, 80/20 etc.
   B. Oxygen for decompression.
   C. Advantages / disadvantages of multiple gas switches.

4.11 Required Skill Performance and Graduation Requirements

Maximum training depths shall not exceed forty (40) msw / one hundred thirty (130) fsw. The following open water skills must be completed by the student during all open water dives:

Land Drills

1. Review of Nitrox Skills
2. Demonstrate correct use of oxygen analyzer including optimal procedure for calibration
3. Demonstrate adequate pre-dive planning
   A. Limits based on personal gas consumption.
   B. Limits based on oxygen exposures at planned depth with actual mix.
   C. Limits based on nitrogen absorption at planned depth with actual mix.
4. Calculate and Log CNS loading for each dive including cumulative exposure where appropriate
5. Demonstrate understanding of gas labeling
6. Demonstrate adherence to conventions regarding prep of equipment for Oxygen service
7. Program nitrox computer with appropriate oxygen percentage if used
8. Properly execute the planned dive within all pre-determined limits.

In order to complete this course, students must:

1. Satisfactorily complete the TDI Advanced Nitrox Course written examination.
2. Complete all open water requirements safely and efficiently.
3. Demonstrate mature, sound judgment concerning dive planning and execution.

Pre-dive Drills

Use START* before every dive

Stress analysis and mitigation

START is Sdrill (OOA drill and Bubble Check), Team (buddy equipment checks), Air (gas matching), Route (entry/exit and planned path underwate)r, Tables (depth, duration, waypoints and schedule)

In-water Drills

1. Demonstrate buoyancy control (ability to hover at fixed position in water column without moving hands or feet)
2. Show good awareness of buddy and other team members through communications, proximity and team oriented dive practices
3. Demonstrate ability to manage freeflow from primary regulator in controlled fashion (shutdown cycle), and switch to back-up regulator.
4. Conduct appropriate safety stop while maintaining neutral buoyancy
5. Demonstrate ability to share “air” with buddy as both recipient and donor in a controlled manner while maintaining position in water column.
6. Demonstrate correct body position (appropriate trim, such as horizontal / streamlined when moving forward)
7. Demonstrate proper stress analysis with self and team mates