

## **7. Advanced Nitrox Diver**

### **7.1 Introduction**

This course examines the use of EAN-21 through 100 percent oxygen for optimal mixes to a depth of 40 metres / 130 feet. The objective of this course is to train divers in the benefits, hazards and proper procedures for utilizing EAN-21 through 100 percent oxygen for dives not requiring staged decompression. TDI Decompression Procedures or the Intro to Tech may be combined with this course at the discretion of the instructor.

### **7.2 Qualifications of Graduates**

Upon successful completion of this course, graduates may engage in diving activities utilizing EAN-21 through 100 percent oxygen without direct supervision provided:

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

### **7.3 Who May Teach**

Any active TDI Advanced Nitrox Instructor

### **7.4 Student to Instructor Ratio**

#### **Academic**

1. Unlimited, so long as adequate facility, supplies and time are provided to ensure comprehensive and complete training of subject matter

#### **Confined Water (swimming pool-like conditions)**

1. N/A

#### **Open Water (ocean, lake, quarry, spring, river or estuary)**

1. A maximum of 8 students per instructor; it is the instructor's discretion to reduce this number as conditions dictate

### **7.5 Student Prerequisites**

1. Minimum age 18, 15 with parental consent
2. Minimum certification of TDI Nitrox Diver, or equivalent
3. Show proof of 25 logged open water dives
4. If this course is taught in conjunction with the TDI Decompression Procedures course, the minimum age is 18

## **7.6 Course Structure and Duration**

### **Open Water Execution**

1. Four dives are required with a minimum accumulated bottom time of 100 minutes
2. If advanced nitrox is taught in conjunction with decompression procedures\*, only a total of 6 dives are required, more may be conducted at the discretion of the instructor, with a maximum depth of 45 metres / 150 feet
3. If Advanced Nitrox is taught in conjunction with Intro to Tech or TDI Sidemount\*, only a total of four (4) dives are required, more may be conducted at the discretion of the instructor, but all dives must be conducted at depths within the diver's current level of certification and no dives should exceed 23 metres / 75 feet
4. Only 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 6

\*A 3-way combination of TDI Intro to Tech or TDI Sidemount, Advanced Nitrox and Decompression Procedures is permitted with a minimum of 8 dives required. The prerequisites for advanced nitrox and decompression procedures diver must be met for this combination before starting the program.

## **7.7 Administrative Requirements**

### **The following are 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:
  - a. *TDI Liability Release and Express Assumption of Risk Form*
  - b. *TDI Medical Statement Form*

### **Upon successful completion of the course the instructor must:**

1. Issue the appropriate TDI certification by submitting the TDI Diver Registration Form to TDI Headquarters or registering the students online through member's area of the TDI website

## **7.8 Training Material**

### **Required material**

1. *TDI Advanced Nitrox Student Manual* or eLearning course

### **Optional Material**

1. TDI EAD I PO<sub>2</sub> Tables



2. *TDI Advanced Nitrox* PowerPoint Presentation
3. TDI Advanced Nitrox Cue Cards
4. *TDI Advanced Nitrox Evaluation Slate*

## **7.9 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; 1.9 litre / 13 cu ft minimum
2. A submersible pressure gauge
3. Depth gauge and automatic bottom timer and/or dive computer
4. Buoyancy compensator device (BCD) with power inflator
5. Line cutting device
6. Exposure suit adequate for the open water environment
7. Cylinder and regulator properly labeled and cleaned as required for EAN mixtures
8. Access to oxygen analyzer, may be supplied by instructor

## **7.10 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 oxygen toxicity units (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 (MOD) of mixture computations
4. Equipment Considerations
  - a. Less than 40 percent oxygen content
  - b. More than 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. Oxygen (O<sub>2</sub>) integrated
- 7. Dive Planning
  - a. Operation planning
    - i. Gas requirements
    - ii. Oxygen limitations
    - iii. Nitrogen limitations
- 8. Common Mixing Procedures (instructor to demonstrate one method)
  - a. Partial pressure blending
  - b. Continuous blending
  - c. Membrane separation system
- 9. Decompression
  - a. Enriched air nitrox (EAN) usage as a decompression gas i.e. 50/50, 80/20 etc
  - b. Oxygen (O<sub>2</sub>) for decompression
  - c. Advantages / disadvantages of multiple gas switches

## **7.11 Required Skill Performance and Graduation Requirements**

**Maximum training depths shall not exceed 40 metres / 130 feet. 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 (O<sub>2</sub>) service
- 7. Program nitrox computer with appropriate oxygen percentage if used
- 8. Properly execute the planned dive within all predetermined 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**

- 1. Use START\* before every dive



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2. Stress analysis and mitigation

**\*START is S-drill (OOA drill and Bubble Check), Team (buddy equipment checks), Air (gas matching), Route (entry/exit and planned path underwater), 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 free flow 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 dive buddy