

TECHNICAL NITROX DIVER COURSE

INTRODUCTION

This course provides training and experience required to competently utilize air for dives up to 50msw that require staged decompression, utilizing Nitrox mixtures or oxygen during decompression

COURSE OBJECTIVES

The objective of this course is to train divers in the proper techniques, equipment requirements and hazards of deep air diving to a maximum of 50msw and utilizing Nitrox mixtures or oxygen for staged decompression

QUALIFICATIONS OF GRADUATES

Upon successful completion of this course, graduates may engage in technical extended range diving activities without direct supervision so long as:

1. The diving activities approximate those of training
2. The area 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. ITDA Trimix module 1 Course
2. ITDA Semi-Closed Circuit Rebreather Course
3. ITDA Closed Circuit Rebreather Course

WHO MAY TEACH

This course may be taught by any active ITDA Technical Nitrox Instructor or any ITDA Trimix Instructor

STUDENT / INSTRUCTOR RATIO

1. CLASSROOM
Unlimited, so long as adequate facility, supplies and additional time are provided to ensure comprehensive and complete training
2. OPEN-WATER
A maximum of 4 students per active Technical Nitrox Instructor is allowed. The ratio should be reduced as required due to environmental or operational constraints. All dives must be carried out in accordance with HSE ACOPS

STUDENT PRE-REQUISITES

1. Minimum age of 18
2. Minimum of 60 logged dives, of which 25 must be deeper than 30msw (25 dives must have been carried out using EAN)
3. Certification as an ITDA Decompression Nitrox Diver .

REQUIRED COURSE MINIMUMS

1. Classroom / briefing hours – 8
2. Open-water dives - 6 with a minimum accumulated bottom time of 120 minutes, 4 dives must be deeper than 30msw with 2 dives deeper than 40msw. It is recommended that one or two work up dives are carried out in the 15- 25 metre region to assess student competence. The dives deeper than 40 metres may only be carried out after the other 4 dives in the 15 –30 metre range.

REQUIRED EQUIPMENT

The following equipment is required for each student:

1. Bottom mix cylinder (s)

- a) Cylinder volume appropriate for planned dive and student gas consumption
- b) Dual outlet valve, double manifold or independent doubles
- c) Labeled in accordance with standards
- 2. Decompression mix cylinder (s)
 - a) Cylinder volume appropriate for planned dive and student gas consumption
 - b) Labeled in accordance with ITDA standards
- 3. Regulators (s)
 - a) Primary and primary redundant required on all bottom mix cylinders
 - b) Submersible pressure gauges are required on all primary/bottom mix cylinder (s)
 - c) A contingency use long hose second stage should be designated and appropriately rigged to facilitate air sharing at depth if necessary
- 4. Buoyancy compensator (s) adequate for equipment configuration
- 5. Redundant depth and timing devices
- 6. Air decompression computers allowed for use as depth and timing devices
- 7. Redundant light system (if needed for site conditions)
- 8. Jon-line and other rigging lines as dictated by site conditions
- 9. Ascent reel with lift bag/surface marker buoy
 - a) Adequate for maximum planned depth
 - b) Minimum of 15kg lift bag/surface marker buoy
- 10. Exposure suit adequate for the open-water environment
- 11. Line cutting devices (2)
- 12. Underwater slate (for decompression/contingency tables)

REQUIRED SUBJECT AREAS

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

- 1. HISTORY OF DEEP AIR DIVING
- 2. PHYSICS
 - a) Pressure review
 - b) Formulas for solving dive planning problems, MOD, best mix, etc.....
- 3. PHYSIOLOGY
 - a) Hypoxia
 - b) Oxygen toxicity
Central Nervous System
 - c) Nitrogen narcosis
 - d) Nitrogen absorption and elimination
 - e) Carbon dioxide toxicity
 - f) Carbon monoxide
 - g) Hyperthermia
 - h) Hypothermia
- 4. DECOMPRESSION OPTIONS
 - a) Air
 - b) Nitrox
 - c) Oxygen
- 5. EQUIPMENT CONSIDERATIONS
 - a) Twin cylinder or single cylinder options
 - b) Stage cylinder options
 - c) Regulator options
 - d) Harness/BC options
 - e) Computer/depth gauge/bottom timer options
 - f) Ascent and navigation reels
 - g) Lift bags/surface marker buoys for drifting or free decompression
 - h) Lights
 - i) Redundant mask and knife
 - j) Jon-line or Garvin clips
- 6. DIVE TABLES
 - a) Introduction and review of different models (buhlmann, DCIEM, U.S Navy recommended)
 - b) Introduction to computer generated tables

7. DIVE PLANNING
 - a) Operation planning
Support
Teams
 - b) Team planning
Gas requirements
Oxygen limitations
 - c) Emergency planning
Omitted decompression
Oxygen toxicity
Decompression sickness
General
8. PROCEDURES
 - a) Bottom, travel and decompression gas
Normal Operations
Failure, loss or inadequate emergency procedures
Analysis and logging
 - b) Descent
Methods of entry, down lines or free descent
Recognizing narcosis
Breathing
Organization of equipment
 - c) Ascent
Variable rates
Trim and compensation
 - d) Support
 - e) Navigation
From shore
From descent line
From live boat

REQUIRED OPEN WATER SKILLS

The following open-water skills must be completed by the student during open-water dives. The maximum depth for this course is 50 msw.

1. Properly analyze all gas mixtures to be used
2. Demonstrate adequate pre-dive planning
 - a) Limits base on personal and team gas consumption
 - b) Limits based on oxygen exposure at planned depths for actual mixes
 - c) Limits based on nitrogen absorption at planned depth for actual mixes
3. Properly execute the planned dive within all pre-determined limits
4. Demonstrate the proper procedures for switching and isolating a malfunctioning regulator. This skill is to be performed at a depth no deeper than 40 msw
5. Demonstrate the proper navigational techniques for the specific dive
6. On two dives, demonstrate an ascent with ascent reel and lift bag. Perform staged decompression
7. On one of the dives, tow a simulated unconscious diver while at depth, 9 meters to ascent line and simulate an emergency rescue ascent technique
8. Demonstrate correct gas switching techniques
9. Demonstrate correct stage bottle removal and replacement both on the bottom and in mid-water whilst maintaining depth. No more than three meters +/- variation is allowed
10. Demonstrate correct procedures for gas sharing using long hose both as a donor and recipient

GRADUATION REQUIREMENTS

In order to complete this course students must:

1. Satisfactorily complete the ITDA Extended Range Course written examination With a minimum mark of 80%
2. Complete all open-water requirements safely and efficiently
3. Demonstrate mature and sound judgement concerning dive planning and execution

SUPPORT MATERIALS

1. Student Registration
2. Extended Range Diver Manual
3. Recommended additional reading: **Deep Diving – An Advanced Guide to Physiology, Procedures and Systems** Revised 2nd edition 1995 by Bret Gillian
4. Doing It Right: **The fundamentals of better diving** by Jarrod Jablonski,
5. An introduction to technical diving by Rob Palmer