

TDI EXTENDED RANGE DIVER COURSE

I. INTRODUCTION

This course provides training and experience required to competently utilize air for dives up to 180 fsw / 55 msw that require staged decompression, utilizing nitrox mixtures or oxygen during decompression.

II. 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 180 fsw / 55 msw and utilizing nitrox mixtures or oxygen for staged decompression.

III. QUALIFICATIONS OF GRADUATES

- A. 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
- B. Upon successful completion of this course, graduates are qualified to enroll in:
 - 1. TDI Advanced Wreck Course
 - 2. TDI Entry Trimix Gas Course
 - 3. TDI Advanced Trimix Gas Course

IV. WHO MAY TEACH

This course may be taught by any active TDI Extended Range Instructor

V. STUDENT - INSTRUCTOR RATIO

- A. Classroom
Unlimited, so long as adequate facility, supplies and additional time are provided to insure comprehensive and complete training.
- B. Openwater
A maximum of four students per active TDI Extended Range Instructor are allowed. The ratio should be reduced as required due to environmental or operational constraints.

VI. STUDENT PRE-REQUISITES

- A. Minimum age of 18
- B. Minimum of 100 logged dives, of which 25 must be deeper than 100 fsw / 30 msw, or the equivalent at the discretion of the instructor.
- C. Certification as a TDI Advanced Nitrox Diver and TDI Decompression Procedures Diver (or equivalents) are required.

VII. REQUIRED COURSE MINIMUMS

- A. Classroom / Briefing Hours .8
- B. Openwater Dives .6 with a minimum accumulated bottom time of 100 minutes. All dives must be deeper than 100 fsw / 30 msw with four dives deeper than 130 fsw / 40 msw. (No more than 2 dives may be credited from previous training)

VIII. REQUIRED EQUIPMENT

The following equipment is required for each student

- A. Bottom Mix Cylinder(s)
 - 1. Cylinder volume appropriate for planned dive and student gas consumption
 - 2. Dual outlet valve, double manifold or independent doubles
 - 3. Labeled in accordance with TDI Standards
- B. Travel Mix Cylinder(s) if used
 - 1. Cylinder volume appropriate for planned dive and student gas consumption
 - 2. Labeled in accordance with TDI Standards
- C. Decompression Mix Cylinder(s)
 - 1. Cylinder volume appropriate for planned dive and student gas consumption
 - 2. Labeled in accordance with TDI Standards
- D. Regulator(s)
 - 1. Primary and primary redundant required on all bottom mix cylinders
 - 2. Submersible pressure gauges are required on all primary / bottom mix cylinder(s)
 - 3. A contingency use long hose second stage should be designated and appropriately rigged to facilitate air sharing at depth
if necessary
- E. Buoyancy Compensator(s) adequate for equipment configuration
- F. Redundant Depth and Timing Devices
Air decompression computers allowed for use as depth and timing devices.
- G. Redundant Light System *if needed for site conditions*
- H. Jon-line and other rigging lines as dictated by site conditions
- I. Ascent Reel with Lift Bag/Surface Marker Buoy
 - 1. Adequate for maximum planned depth
 - 2. Minimum of 25 lb. lift bag/surface marker buoy
- J. Exposure Suit adequate for the open water environment
- K. Line Cutting Device (2)
- L. Underwater Slate (for decompression/contingency tables)

IX. REQUIRED SUBJECT AREAS

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

- A. History of Deep Air Diving
- B. Physics
 - 1. Pressure Review
 - 2. Formulas for solving dive planning problems, MOD, best mix, etc.
- C. Physiology
 - 1. Hypoxia
 - 2. Oxygen toxicity
 - a. Whole body (OTUs)
 - b. Central Nervous System
 - 3. Nitrogen Narcosis
 - 4. Nitrogen Absorption and Elimination
 - 5. Carbon Dioxide Toxicity
 - 6. Carbon Monoxide
 - 7. Hyperthermia
 - 8. Hypothermia
- D. Decompression Options
 - 1. Air
 - 2. Nitrox
 - 3. Oxygen
- E. Equipment Considerations
 - 1. Twin cylinder or single cylinder option
 - 2. Stage cylinder options
 - 3. Regulator options
 - 4. Harness / BC options
 - 5. Computer / depth gauge / bottom timer options
 - 6. Ascent and navigation reels
 - 7. Lift Bags/surface marker buoys for drifting or free decompression
 - 8. Lights
 - 9. Redundant mask and knife
 - 10. Jon-line or Garvin clips
- F. Dive Tables
 - 1. Introduction and review of different models (Buhlmann, DCIEM, U.S. Navy recommended)
 - 2. Introduction to computer generated tables
- G. Dive planning
 - 1. Operation Planning
 - a. Support
 - b. Teams
 - 2. Team planning
 - a. Gas requirements

- b. Oxygen limitations
 - c. Nitrogen limitations
 - 3. Emergency Planning
 - a. Omitted decompression
 - b. Oxygen toxicity
 - c. Decompression sickness
 - d. General
- H. Procedures
 - 1. Bottom, Travel and Decompression Gas
 - a. Normal Operations
 - b. Failure, loss or inadequate emergency procedures
 - c. Analysis and logging
 - 2. Descent
 - a. Methods of entry, down lines or free descent
 - b. Recognizing narcosis
 - c. Breathing
 - d. Organization of equipment carried on diver
 - 3. Ascent
 - a. Variable rates
 - b. Trim and compensation
 - 4. Support
 - 5. Navigation
 - a. From shore
 - b. From descent Line
 - c. From liveboard vessel

X. REQUIRED OPEN WATER SKILLS

The following openwater skills must be completed by the student during open-water dives. The maximum depth for this course is 180 fsw /55 msw.

- A. Properly analyze all gas mixtures to be used
- B. Demonstrate adequate pre-dive planning
 - 1. Limits base on personal and team gas consumption
 - 2. Limits based on oxygen exposures at planned depths for actual mixes
 - 3. Limits based on nitrogen absorption at planned depths for actual mixes
- C. Properly execute the planned dive within all pre-determined limits
- D. Demonstrate the proper procedures for switching and isolating a malfunctioning regulator. This skill is to be performed at a depth no deeper than 130 fsw/40 msw
- E. Demonstrate the proper navigational techniques for the specific dive
- F. On two dives, demonstrate an ascent with ascent reel and lift bag. Perform staged decompression

- G. On one of the dives, tow a simulated unconscious diver, while at depth, 30 ft to ascent line and simulate an emergency rescue ascent technique

XI. GRADUATION REQUIREMENTS

In order to complete this course, students must:

- A. Satisfactorily complete the TDI Extended Range Course written examination
- B. Complete all openwater requirements safely and efficiently
- C. Demonstrate mature and sound judgement concerning dive planning and execution

XII. SUPPORT MATERIALS

- A. TDI Student Record Folder
- B. TDI Extended Range Diver Manual

Recommended additional reading: ***Deep Diving; An Advanced Guide to Physiology, Procedures and Systems, Revised 2nd edition 1995, by Bret Gilliam***



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