

10. Extended Range Instructor

10.1 Introduction

This course provides the training and experience required to be certified to competently teach air dives to 55 Metres/180 Feet that require staged decompression, utilizing nitrox mixtures or oxygen (O₂) during decompression. The objective of this course is to train instructors in the proper techniques, equipment requirements, and hazards of deep air diving to a maximum of 55 Metres/180 Feet and utilizing nitrox mixtures or oxygen for staged decompression.

10.2 Qualifications of Graduates

Upon successful completion of this course, graduates may teach technical diving activities utilizing custom nitrox mixtures 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 Advanced Wreck Instructor course.
2. TDI Trimix Instructor course.

10.3 Who May Teach

Any active TDI Extended Range Instructor Trainer may teach the course.

10.4 Student to Instructor Ratio

Academic:

1. Unlimited, so long as adequate facilities, 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 4 students per instructor trainer.

2. It is the instructor trainer's discretion to reduce this number as conditions dictate.

10.5 Student Prerequisites

1. Minimum age 21.
2. Provide proof of 250 logged dives, 25 must be extended range dives.
3. Certification as a TDI Extended Range Diver or equivalent.
4. Certification as a TDI Advanced Nitrox and Decompression Procedures Instructor or equivalent.
5. Must have certified 10 students in advanced nitrox diver or decompression procedures diver, a minimum of 5 must be decompression procedures divers.

10.6 Course Structure and Duration

Open Water Execution:

1. Four dives with a minimum accumulated bottom time of 100 minutes.
2. All dives must be deeper than 30 Metres/100 Feet with 2 dives deeper than 40 Metres/130 Feet.

Course Structure:

1. TDI allows instructor trainers 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 8.

10.7 Administrative Requirements

Administrative Tasks:

1. Collect the course fees from all the students.
2. Ensure that the students have the required equipment.
3. Communicate the 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.

10.8 Training Material

Required Material:

1. *TDI Standards and Procedures Manual.*
2. *TDI Extended Range/Trimix Student Manual or eLearning.*
3. *TDI Extended Range/Trimix IG.*
4. *TDI Extended Range/Trimix PowerPoint Presentation.*

Optional Material:

1. *Deep Diving: An Advanced Guide to Physiology, Procedures and Systems, Revised 2nd edition 1995 by Bret Gilliam with John Crea.*

10.9 Required Equipment

The following equipment is required for each instructor candidate:

1. Bottom mix cylinder(s):
 - a. Cylinder volume appropriate for the planned dive and candidate gas consumption.
 - b. Dual outlet valve or manifold required.
 - c. Labeled in accordance with TDI Standards.
2. Travel mix cylinder (recommended, not required):
 - a. Cylinder volume appropriate for planned dive and student gas consumption.
 - b. Labeled in accordance with TDI Standards.
3. Decompression mix cylinder(s):
 - a. Cylinder volume appropriate for planned dive and student consumption b. Labeled in accordance with TDI Standards.
4. Regulator(s):
 - a. Primary and primary redundant required on all bottom mix cylinders.

- b. Submersible pressure gauges are required on all primary/bottom mix cylinders.
 - c. A contingency use long hose second stage should be designated and appropriately rigged to facilitate air sharing at depth if necessary.
5. Buoyancy compensator device(s) (BCD) adequate for equipment configuration.
6. Redundant depth and timing devices; air decompression computers allowed for use as depth and timing devices.
7. Redundant light system adequate for the open water environment.
8. Jon-lines and other lines as dictated by site conditions.
9. Ascent reel with lift bag/surface marker buoy:
 - a. Adequate for maximum planned depth.
 - b. Minimum of 23 kg/50 lbs. lift bag.
10. Exposure suit adequate for the open water environment.
11. Two line cutting devices.
12. Underwater slate.

10.10 Required Subject Areas

Instructor trainers must use the current TDI Standards and Procedures Manual. In addition, instructor trainers may use any text or materials they feel best presents these topics:

The following topics must be covered during this course:

1. History of Deep Air Diving.
2. Physics:
 - a. Pressure review.
 - b. Formulas for solving dive planning problems, maximum operating depth (MOD), best mix, etc.
3. Physiology:
 - a. Hypoxia.
 - b. Oxygen (O₂) toxicity:
 - i. Whole body.
 - ii. Central nervous system (CNS).
 - c. Nitrogen narcosis.

- d. Nitrogen absorption and elimination.
 - e. Carbon dioxide (CO₂) toxicity.
 - f. Carbon monoxide (CO) toxicity.
 - g. Hyperthermia.
 - h. Hypothermia.
4. Decompression Option:
- a. Air.
 - b. Nitrox.
 - c. Oxygen (O₂).
5. Equipment Requirements:
- a. Twin cylinder or single cylinder options.
 - b. Stage cylinder options.
 - c. Regulator options.
 - d. Harness/BCD options.
 - e. Computer/depth gauge/bottom timer options.
 - f. Ascent and navigation reels.
 - g. Lift bags 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, DCIEM, U.S. Navy recommended.
 - b. Introduction to computer generated tables.
7. Dive Computers:
- a. Mix adjustable.
 - b. Oxygen (O₂) integrated.
8. Dive Planning:
- a. Operational planning:
 - i. Support.
 - ii. Teams.

- b. Team planning:
 - i. Gas requirements.
 - ii. Oxygen limitations.
 - iii. Nitrogen limitations.
 - c. Emergency planning:
 - i. Omitted decompression.
 - ii. Oxygen (O₂) toxicity.
 - iii. Decompression sickness.
 - iv. General.
9. Procedures:
- a. Bottom, travel and decompression gas:
 - i. Normal operations.
 - ii. Failure, loss or inadequate emergency procedures
 - iii. Analyzing and logging.
 - b. Descent:
 - i. Methods of entry, down-lines or free descent.
 - ii. Recognizing narcosis.
 - iii. Breathing.
 - iv. Organization of equipment carried on diver.
 - c. Ascent:
 - i. Variable rates.
 - ii. Trim and compensation.
 - d. Support.
 - e. Navigation:
 - i. From shore.
 - ii. From the descent line.
 - iii. From live aboard boat.

10.11 Required Skill Performance and Graduation Requirements

The following skills must be completed by the instructor candidate. The maximum depth of 55 Metres/180 Feet should not be exceeded.

The following skills must be completed by the instructor candidate to demonstration level quality:

1. Properly analyze all gas mixtures to be used.
2. Demonstrate adequate pre-dive planning limits based on:
 - a. Personal and team gas consumption
 - b. Oxygen exposures at planned depths for actual mixes.
 - c. Nitrogen absorption at planned depth with actual mixes.
3. Demonstrate the proper procedures for switching and isolating a malfunctioning regulator.
4. Demonstrate the proper navigational techniques for the specific dive.
5. On 1 dive, demonstrate an ascent with the ascent reel and bag or a Jersey up-line and perform staged decompression.

In order to complete this course, students must:

1. Satisfactorily complete the TDI Extended Range course written examination and be able to adequately explain each answer to a prospective student.
2. Demonstrate mature, sound judgment concerning training, dive planning and execution.
3. Demonstrate proficiency in every skill required in the TDI Extended Range Diver course.
4. Demonstrate proficiency in teaching the TDI Extended Range Diver program.
5. Present at least 1 graded presentation on an extended range topic.