

9. Decompression Procedures Instructor

9.1 Introduction

This course examines the theory, methods and procedures of planned stage decompression diving. This program is designed as a stand-alone course or it may be taught in conjunction with such TDI courses as TDI Advanced Nitrox Instructor, TDI Advanced Wreck Instructor, or TDI Extended Range Instructor. The objective of this course is to train instructors how to plan and conduct a standard decompression procedures course not to exceed a maximum depth of 45 Metres/150 Feet. The most common equipment requirements, equipment set-ups, decompression techniques and decompression mixtures are covered.

9.2 Qualifications of Graduates

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

1. TDI Extended Range Instructor course.
2. TDI Advanced Wreck Instructor course.
3. TDI Trimix Instructor course.

9.3 Who May Teach

Any active TDI Decompression Procedures Instructor Trainer may teach this course.

9.4 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.

9.5 Student Prerequisites

1. Minimum age 18.
2. Minimum certification of TDI Advanced Nitrox Instructor or equivalent (unless Advanced Nitrox Instructor course is taught in conjunction with Deco Procedures Instructor).
3. Minimum certification of TDI Decompression Procedures diver or equivalent.
4. Provide proof of 150 logged dives.
5. Have certified 10 students in SDI Deep Diver or TDI Advanced Nitrox diver or equivalent or 10 SDI Advanced Adventure Diver or equivalent.

9.6 Course Structure and Duration

Open Water Execution:

1. Four decompression dives with a minimum accumulated bottom time of 100 minutes.
2. If TDI Advanced Nitrox is taught in conjunction with decompression procedures a total of 6 dives are required.

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 6.

9.7 Administrative Requirements

Administrative Tasks:

2. Collect the course fees from all the students.
3. Ensure that the students have the required equipment.
4. Communicate the schedule to the students.
5. 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:

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

9.8 Training Material

Required Material:

1. *TDI Decompression Procedures* Instructor Guide.
2. *TDI Standard and Procedures Manual*.
3. *TDI Decompression Procedures* student manual or eLearning.
4. *TDI Decompression Procedures* PowerPoint.

9.9 Required Equipment

The following are required for this course:

1. Primary cylinder(s).
2. Cylinder volume appropriate for planned dive and student gas consumption.
3. Decompression mix cylinder(s):
 - a. Cylinder volume appropriate for the planned dive and student gas consumption with submersible pressure gauge.
 - b. Labeled in accordance with TDI Standards.
4. Regulator(s):
 - a. Primary and alternate 2nd stage required on all primary cylinders.
 - b. Submersible pressure gauges are required on all primary cylinders.
5. Buoyancy compensator device(s) (BCD) adequate for equipment configuration.
6. Jon-line and other rigging lines as dictated by site conditions.
7. Ascent reel with lift bag/surface marker buoy:
 - a. Adequate for maximum planned depth.
 - b. Minimum of 23 kg/50 lbs. lift bag.
8. Depth gauge and automatic bottom timer and/or dive computer.
9. Exposure suit adequate for the open water environment.
10. Oxygen (O₂) analyzer.

11. Underwater slate.
12. Submersible dive tables, if desired.

9.10 Required Subject Areas

Instructor trainers must use the TDI Decompression Procedures Instructor Guide and the current TDI Standards and Procedures Manual but may also use any additional text or materials that they feel help present these topics.

The following topics must be covered during this course:

1. Overview of Safety Stops Compared to Required Decompression Stops.
2. Physics:
 - a. Pressure review.
3. Physiology:
 - a. Mechanisms of bubble formation.
 - b. Advantage of hyperoxic mixes for decompression.
 - c. Nitrogen absorption and elimination.
 - d. Carbon dioxide (CO₂) toxicity.
 - e. Ascent/descent rates.
 - f. Hyperthermia.
 - g. Hypothermia.
 - h. Psychological aspects: task loading, stress, panic, time management.
4. Decompression Options:
 - a. Air.
 - b. Nitrox.
 - c. Oxygen (O₂).
5. Equipment Considerations:
 - a. Twin cylinders or single cylinder options, valve options.
 - b. Stage cylinder options.
 - c. Harness/BCD option.
 - d. Computer, depth gauge, bottom timer options.
 - e. Ascent and navigation reels.

- f. Lift bags/surface marker buoys for drifting or free decompression.
 - g. Jon-line or Garvin clips.
 - h. Proper weighting and buoyancy control during dive phase and deco.
- 6. Dive Tables:
 - a. Introduction and review of different models (DCIEM, U.S. Navy, etc).
- 7. Dive Computers:
 - a. Mix adjustable.
 - b. Oxygen (O₂) integrated.
- 8. Dive Planning:
 - a. Standard operation:
 - i. Gas requirements.
 - ii. Oxygen (O₂) limitations.
 - iii. Nitrogen limitations.
 - b. Emergency planning:
 - i. Omitted decompression.
 - ii. Decompression sickness.
 - iii. Equipment failure.
- 9. Procedures:
 - a. Primary and decompression gas:
 - i. Normal operations.
 - ii. Failure, loss or inadequate emergency procedures.
 - iii. Analysis and logging.
 - iv. Safeguards on deco supply regulators.
 - v. Rigging and deployment of decompression equipment.
 - b. Descent:
 - i. Methods of entry, down lines or free decent.
 - ii. Organization of equipment carried on diver.
 - c. Ascent:
 - i. Variable rates.
 - ii. Trim and compensation.

- d. Fixed or Drifting Deco methods:
 - i. Up lines fixed to bottom.
 - ii. Reels and lift bags/surface marker buoys.
 - iii. Free drifting stages or boat supply.
 - iv. Self-contained versus surface supply/rendezvous gas cylinders.
 - e. Support:
 - i. From shore.
 - ii. From descent line or fixed platform.
 - iii. From live aboard boat.
10. Administration Procedures:
- a. Medical form.
 - b. Waiver forms.
 - c. Risk management.
 - d. Registration forms.
 - e. Standards and procedures.

9.11 Required Skill Performance and Graduation Requirements

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

1. Prior to the dive, analyze the gas mixture in each cylinder, fill out the contents tag and facility nitrox log.
2. Perform an advanced pre-dive plan and dive analysis (including risk assessment):
 - a. Predetermine the appropriate depth and time limits for the dive based upon personal ability, environmental conditions, and gas consumptions (personal and team).
 - b. Predetermine the limits associated with nitrogen, including no decompression limits (NDLs) and equivalent air depth (EAD).
 - c. Assembly of diver carried equipment.
3. Properly execute the planned dive within all predetermined limits:
 - a. Proper descent and ascent rates.

- b. Proper staged decompression stop procedures.
 - c. Monitoring the status of staged decompression equipment, (tables, computers, cylinders, regulators, etc).
4. Contingency situations and problems solving (as appropriate by instructor trainer):
 - a. Omitted decompression.
 - b. Extended bottom time profile with increased decompression and recalculation.
 - c. Failure to deploy lift bag/surface marker buoy and reel.
 - d. Missed up-line or missed boat anchor.
 - e. Loss of decompression gas.
5. A proper stop of at least 3 minutes shall be conducted on all dives and properly staged decompression stops wherever required.
6. Demonstrate the correct deployment of a lift a bag/surface marker buoy using a dive reel and/or up-line.
7. Demonstrate a simulated emergency gas sharing at a stationary depth not to exceed 30 Metres/100 Feet.
8. Demonstrate emergency deployment of a backup regulator or bail-out scuba system containing bottom mix at a depth not exceeding 30 Metres/100 Feet.
9. Demonstrate the proper deployment, management and use of the bottom mix, deco-mix and travel mix (if used), including but not limited to:
 - a. Conservative gas management.
 - b. Depth control to avoid descending too deep for mix.
 - c. Demonstrate buoyancy control and awareness throughout the dive.

In order to complete this course, students must:

1. Satisfactorily complete the TDI Decompression Procedures 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 Decompression Procedures course.
4. Demonstrate proficiency in teaching staged decompression.
5. Present at least 1 graded presentation on TDI Decompression Procedures topic.