



9. TDI – Trimix Instructor Course

9.1 Introduction

The TDI Trimix Instructor Course provides the training required to competently and safely teach breathing gases containing helium with no less than 18% Oxygen for dives that require staged decompression to a maximum depth of 60 msw/200 fsw.

9.2 Qualifications of Graduates

Upon completion of this course, graduates may engage in teaching activities utilizing custom Trimix mixtures 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

9.3 Who May Teach

Any active TDI Trimix Instructor Trainer may teach this course

9.4 Student – Instructor Ratio

Academic:

Unlimited, so long as adequate facility, supplies and additional time are provided to ensure comprehensive and complete training

Open water:

A maximum of four Instructor candidates per active TDI Instructor Trainer are allowed. However, it is the instructor's discretion to reduce this number as conditions dictate.

9.5 Student Pre-Requisites

1. Minimum age of 21
2. Minimum certification as a TDI Advanced Trimix Diver and a TDI Advanced Nitrox and Decompression Procedures Instructor (or equivalent)
3. Proof of 15 certified Advanced Nitrox or Decompression Procedures divers with a minimum of 10 Decompression Procedures divers.
4. Minimum 250 logged dives with a minimum of 20 logged Trimix dives outside of training 10 of these dives must be in the last 12 months.



9.6 Course Structure and Duration

Open Water Execution:

1. Four (4) Dives with a minimum accumulated bottom time of one hundred twenty (100) minutes.
2. Two (2) of the dives must be deeper than forty five (45) msw/one hundred fifty (150) fsw

Course Structure:

1. TDI allows instructor trainers to structure courses according to the number of students participating and their skill level.

Duration:

1. The recommended number of classroom and briefing hours is eight (8).

9.7 Administrative Requirements

The following is 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 Liability Release and Medical history forms.
5. The instructor must review the liability Release and Medical Forms before starting on the course.

Upon successful completion of the course the Instructor must:

1. Complete the Student Registration Form and send the Registration Form to TDI HQ.
2. Award card.

9.8 Required Materials

1. Extended Range & Entry Level Trimix Manual
2. Advanced Trimix Diver Manual
3. Trimix Instructor Manual
4. TDI Standards & Procedures Manual

9.9 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 Cylinder(s) labeled in accordance with TDI standards
2. Decompression mix cylinder(s)
 - A Cylinder volume appropriate for planned dive and candidate gas consumption
 - B Cylinder(s) labeled in accordance with TDI standards
3. Suit inflation cylinder (required for dry-suit divers only)
4. Regulators
 - A Primary and secondary first stages required on all back cylinder(s)
 - B Submersible pressure gauges are required on all primary/bottom mix cylinders
 - C One primary regulator must have a sufficient length hose for air sharing



- D All 4 regulators must be interchangeable (possible separate primary and deco regulators to match)
- 5. Buoyancy compensator (s) as appropriate for equipment configuration
- 6. Redundant depth and timing devices such as:
 - A Air decompression computers allowed for use as depth and timing devices if in gauge mode.
 - B Trimix computers.
 - C Electronic bottom timer.
- 7. Redundant light system (if required by site)
- 8. Ascent reel with lift bag
 - A appropriate for planned maximum depth
 - B Minimum 25 KG/50 lb delayed surface marker buoy or lift bag (a dump valve highly recommended)
- 9. Exposure suit appropriate for the open water environment
- 10. Line cutting device(s)
- 11. Underwater slate and writing device

9.10 Required Subject Areas

The following topics must be covered in this course. Instructor Trainers must use the TDI Trimix Instructor Guide and current TDI Standards & Procedures Instructor Manual, but may also use any additional text or materials they feel help present these topics.

- 1. Physics
- 2. Pressure review
- 3. Physiology
 - A Hypoxia
 - B Oxygen Toxicity
 - I. Whole Body
 - II. Central Nervous System (CNS)
 - C Nitrogen narcosis
 - D Nitrogen and helium absorption and elimination
 - E Carbon monoxide toxicity
 - F Carbon dioxide toxicity
 - G Helium
 - I. HPNS
 - II. Effects on respiration
 - III. Effects as an insulator
 - H Counter diffusion
 - I Hyperthermia
 - J Hypothermia
- 4. Decompression Options
 - A Air
 - B Nitrox
 - C Helium.
- 5. Equipment Options
 - A Twin tank options



- B Stage tank options
- C Suit inflation options
- D Regulator options
- E Harness / BC options
- F Computer / depth gauge / bottom timer options
- G Ascent and navigation reels
- H Lift bags
- I Lights
- J Redundant mask and knife
- K Jon-line
- 6. Dive Tables
 - A Computer generated tables
 - B DCIEM Heliox Tables and / or other published tables
- 7. Dive Planning
 - A Operation Planning
 - I. Support
 - II. Teams
 - B Individual and Team Planning
 - I. Gas requirements
 - II. Oxygen limitations
 - III. Inert gas limitations
- 8. Proper gas switches
 - A Emergency Planning
 - I. Omitted deco
 - II. Oxygen toxicity
 - III. Decompression sickness
 - IV. General
- 9. Procedures
 - A Bottom, Travel and Decompression Gas
 - B Normal operations
 - C Establish appropriate emergency procedures
 - D Analyzing and logging

9.11 Required Skill Performance and Graduation Requirements

The following skills must be completed by the Instructor Candidate to demonstration quality (it is recommended that a minimum of four (4) dives be conducted between 130 fsw /40 msw and 200 fsw / 60msw.)

1. Properly demonstrate analysis of all gas mixtures to be used
2. Demonstrate appropriate pre-dive planning
 - A Limits based on personal and team gas consumption.
 - B Limits based on oxygen exposures at planned depths for actual mixes
 - C Limits based on inert gas absorption at planned depth with actual mixes
3. Properly execute the planned dive within all pre-determined limits
4. Demonstrate the proper navigational techniques for the specific dive
5. On two of the dives, demonstrate an ascent with reel and bag, while performing staged decompression



6. Demonstrate the proper procedures for switching and isolating malfunctioning manifold or primary regulators

Land Drills

1. Demonstrate familiarity with basic and intermediate hand signals
2. Select and prepare equipment suitable for soft overhead environment with long decompression obligations
3. Conduct team oriented drills for lift bag deployment and gas switching procedure
4. Drills for buddy rescue

Pre-dive Drills

1. Use START* before every dive
2. Stress analysis and mitigation

In-water Drills

1. Demonstrate buoyancy control
2. Show good awareness of buddy and other team members through communications, proximity and team oriented dive practices
3. Demonstrate competence managing two stage cylinders including drop and recovery while maintaining position in the water column
4. Demonstrate ability to confirm gas switches at depth with buddy/team members
5. Demonstrate lift bag deployment from depth and use of bag as back-up buoyancy device
6. Demonstrate air-sharing ascent from depth, no greater than 30 metres/100 feet, while one member of buddy team is without mask or blacked out mask.
7. Create contingency decompression schedule after simulated loss of decompression gas
8. Demonstrate controlled ascent with simulated toxed diver, including surface tow at least 30 meters, with simulated gear removal on surface (in water too deep to stand in) from victim.

In order to complete this course, students must:

1. Satisfactorily complete the TDI Trimix 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 Trimix Diver course.
4. Demonstrate proficiency in teaching the TDI Trimix Diver course.
5. One (1) graded presentation on a Trimix topic.