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## **10. TDI – Advanced Trimix Instructor Course**

### ***10.1 Introduction***

The TDI Advanced Trimix Instructor Course provides the training required to competently and safely teach breathing gases containing helium for dives that require staged decompression to a maximum depth of three hundred thirty (330) fsw / one hundred (100) msw. The objective of this course is to train Instructors to teach the benefits, hazards and proper procedures of utilizing custom oxygen/helium/nitrogen mixtures as breathing gases.

### ***10.2 Qualifications of Graduates***

Graduates may engage in teaching activities utilizing custom Trimix mixtures as long as:

1. The diving activities approximate those of training.
2. The areas of activities approximate those of training.
3. Environmental conditions approximate those of training.
4. May teach Entry level Trimix or Advanced Trimix.

### ***10.3 Who May Teach***

Who may teach this course:

1. Any active TDI Trimix Instructor Trainer may teach this course.

### ***10.4 Student – Instructor Ratio***

Academic:

1. Unlimited, so long as adequate facility, supplies and time are provided to insure comprehensive and complete training.

Confined Water (Swimming pool-like conditions):

1. N/A

Open Water (Ocean, lake, quarry, spring, river or estuary):

1. A maximum of four (4) students per Instructor Trainer. However, it is the Instructor Trainer's discretion to reduce this number as conditions dictate.



## **10.5 Student Pre-Requisites**

The student must:

1. Be a minimum age of twenty one (21).
  2. Show proof of minimum certification as a TDI Advanced Trimix Diver or equivalent.
  3. Show proof of minimum certification as a TDI Extended Range Instructor or TDI Trimix Instructor equivalent.
  4. Show proof of minimum two hundred fifty (250) logged dives.
  9. Show proof of minimum of thirty (30) logged Trimix dives.
  10. Show proof of 20 dives deeper than one hundred and eighty (180) feet/ Fifty five (55) meters.
- And meet one of the following experience requirements
11. Certify at least 10 Extended Range Divers or Trimix Divers to depths of at least 150 feet/Forty Five (45) meters.
  12. Assist with at least 2 complete Advanced TRIMIX classes taught by a TDI Advanced Trimix Instructor and provide a letter of recommendation from the assisted instructor(s).

## **10.6 Course Structure and Duration**

Open Water Execution:

1. Four (4) Dives with a minimum accumulated bottom time of one hundred (100) minutes.
2. Two (2) of the dives must be deeper than two hundred thirty (230) / seventy (70) meters

Course Structure:

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

Duration:

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

## **10.7 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.
6. Upon successful completion of the course the Instructor must:
7. Complete the Student Registration Form and send the Registration Form to TDI HQ.
8. Award card.

## **10.8 Required Equipment**

1. TDI Standards and Procedures Instructor Manual.

The following equipment is required for each student:



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(s)
  - A. Cylinder volume appropriate for planned dive and candidate consumption.
  - B. Labeled in accordance with TDI standards.
3. Decompression mix cylinder(s)
  - A. Cylinder volume appropriate for planned dive and candidate gas consumption.
  - B. Labeled in accordance with TDI standards.
4. Suit inflation cylinder (required for dry-suit divers only).
5. Regulators
  - A. Primary and primary redundant required on all bottom mix 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. It is strongly recommended that **all** 4 required regulators be DIN or **all** 4 regulators be yoke.
6. Buoyancy compensators as appropriate for equipment configuration.
7. Redundant depth and timing devices. Air decompression computers allowed for use as depth and timing devices.
8. Redundant light system (if required by site).
9. Ascent reel with lift bag
10. Adequate for planned maximum depth.
11. Minimum fifty (50) lb lift bag / surface marker buoy ( a dump valve highly recommended).
12. Exposure suit adequate for the open water environment.
13. Line cutting device.
14. Underwater slate.

## **10.9 Required Subject Areas**

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

1. Physics
  - A. Pressure review.
2. 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.
- 3. Decompression Options
  - A Air.
  - B Nitrox.
  - C Helium.
- 4. Equipment Options
  - A Twin cylinder options.
  - B Stage cylinder option.
  - 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.
- 5. Dive Tables
  - A Computer generated tables.
  - B DCIEM Heliox Tables and / or other published tables.
- 6. Dive Planning
  - A Operation Planning
    - I Support.
    - II. Teams.
  - B Team Planning
    - I. Gas requirements.
    - II. Oxygen limitations.
    - III. Inert gas limitations.
  - C Emergency Planning
    - I. Omitted deco.
    - II. Oxygen toxicity.
    - III. Decompression sickness.
- 7. General Procedures
  - A Bottom, Travel and Decompression Gas.
    - I. Normal operations.
    - II. Failure, loss or inadequate emergency procedures.
    - III. Analyzing and logging.



## **10.10 Required Skill Performance and Graduation Requirements**

The following skills must be completed by the Instructor candidate. It is recommended that all dives be conducted between one hundred eighty (180) fsw / fifty five (55) msw and three hundred thirty (330) fsw / one hundred (100) msw.

1. Properly demonstrate analysis of all gas mixtures to be used.
2. Demonstrate adequate 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 (2) of the dives, demonstrate an ascent with ascent reel and bag. Perform staged decompression.
6. Demonstrate the proper procedures for switching and isolating a malfunctioning primary regulator.

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