



## NAUI TRIMIX I & II

**6 days + 6 days**

**Costs include:** Boat Trips, Deco mixes, Manual  
**Extra coasts:** Equipment, Helium, Certification

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### OVERVIEW

These courses are to provide the diver with the skills and knowledge needed to minimize the risks of utilizing helium-based tri-mix breathing gas mixes for dives to a maximum depth of 300 fsw (91 msw) requiring stage decompression and utilizing EANx mixtures and/or oxygen during decompression. There are two levels, called Tri-Mix Diver Level I and Tri-Mix Diver Level II.

### QUALIFICATIONS OF GRADUATES

Upon successful completion of the Level I course, graduates are considered competent to plan and execute technical dives that require stage decompression and utilize helium-based tri-mix breathing gas mixtures and EANx and/or oxygen for stage decompression without direct supervision to depths not to exceed 225 fsw (69msw) provided the diving activities and the areas dived approximate those of training. Level II graduates are considered competent to plan and execute technical dives that require stage decompression and utilize helium-based tri-mix breathing gas mixtures and EANx or oxygen for stage decompression without direct supervision to depths not to exceed 300 fsw (91 msw) provided the diving activities and the areas dived approximate those of training.

### WHO MAY TEACH

This course may be taught by active status NAUI Instructors who:

- are certified as NAUI Tri-mix I and II divers or equivalent, and
- have completed the NAUI Technical Diving Instructor application process and received written approval to teach this course(s) from the NAUI Training Department.

### RATIOS

Open water supervision

- A maximum of four students per active NAUI Instructor is allowed. Assistants with specific technical diving experience are strongly recommended but do not increase the student-to-instructor ratio.

### PREREQUISITES FOR ENTERING THE COURSE

- Minimum age of 21.
- Minimum certification as a NAUI Decompression Techniques, and Technical EANx Diver or equivalent.
- Minimum of 250 logged dives 75 of which must have been deeper than 130 fsw (40 msw) and 10 of which must have been on best mix EANx, utilizing stage decompression techniques.

### COURSE POLICIES

- Classroom hours – 18 are estimated
- Open water dives – six for level I and eight for level II

(No dives are to exceed 130 fsw (40 msw) until a student has satisfactorily demonstrated equipment configuration and management during open water assessment dive(s).

- For Level I at least two dives must be deeper than 190 fsw (58 msw) not to exceed 225 fsw (69 msw). For level II the additional two dives must exceed 225 fsw (69 msw) not to exceed 300 fsw (91 msw).
- Training and certification for Level II is to be mission based, i.e., only provided to meet divers' needs relative to a specific dive location and objective(s).

## EQUIPMENT

The following equipment is required for each student in addition to that required by "Policies Applying to All NAUI Diving Certification Courses – Equipment:"

- Depth gauge, compass and timing device or dive computer.
- Dive knife/tool, emergency signaling device, slate and pencil.
- Cylinders and regulators properly labeled and cleaned as required for breathing gas mixtures involved with a separate submersible pressure gauge for each cylinder used. Also, for primary cylinder(s), cylinder volumes appropriate for the planned dives and all students' breathing gas consumption rates. Cylinders are to be equipped with dual outlet valve or manifold; isolator valve is recommended. The decompression mix cylinders and cylinder volume must be appropriate for the planned dives and student breathing gas consumption rates and equipped with a submersible pressure gauge and prepared for back mount or for side- or front mounting to a harness using clips. Primary and primary redundant regulator(s) are required on all primary cylinders. A five foot (1.5 meter) or longer second stage hose should be designated and prepared for emergency air sharing. All decompression gas regulators will use a covering device, e.g. Dive Rite® oxygen regulator cover.
- Oxygen analyzer (may be provided or rented for use during the course).
- Redundant Depth and Timing Devices
- Air dive computers may be used as depth and timing devices. Helium-based computers and EANx computers may be used for dive planning as the technology becomes available. *Note: Because of a proliferation of decompression algorithms utilized in dive computers, the instructor's choice of a standard dive table profile, e.g. DCIEM, USN, Buhlmann or software-generated proprietary decompression table is preferred over the use of a particular dive computer for decompression.*
- Jon-lines and other rigging lines as dictated by conditions at the dive site.
- Ascent line reel and lift bag, with a minimum of 50 lb. (23 kg.) lift, biodegradable up line, Jersey up line or other up line that is adequate for maximum planned depth, and additional personal lines as needed.
- Redundant underwater lights if needed because of site conditions
- Suit inflation cylinder (required for dry suit divers in cold water only)
  - Cylinder volume appropriate for planned dive and suit inflation needs. Required for dives utilizing helium in bottom mix.

## SKILL REQUIREMENTS

The students are to analyze their own breathing gas mixture and to plan and safely execute each dive. Dive planning shall include limits based on gas consumption, oxygen exposures and inert gas loading for each stage of the dive and breathing gas mixture. Each diver is to demonstrate switching and isolating a malfunctioning regulator, first in confined water, and following adequate practice, at a depth between 33 fsw (10 msw) and 66 fsw (20msw) and underwater navigation appropriate to the dive plan. Students shall participate in a diver rescue simulation to include management of a diver experiencing underwater convulsions. On at least two of the required dives ascend with ascent reel and line bag and perform stage decompression.

## ACADEMIC REQUIREMENTS

• **Applied Sciences** – This area is a review and continuation of the material covered in the NAUI Master Scuba Diver, Technical EANx Diver and Decompression Procedures. Included are physics, physiology and medical aspects as applied to planned decompression diving, with special emphasis on mechanisms of bubble formation, advantages of oxygen enriched air mixes for decompression, oxygen toxicity (whole body and CNS otu's/uptd's), hypoxia, nitrogen narcosis, tissue inert gas tension, inspired inert gas tension, "precautionary stops" compared to required stops, rates for ascent/descent, carbon dioxide toxicity, dysbaric counterdiffusion, helium-based DCI, high pressure nervous syndrome (HPNS), symptoms of vestibular DCI event, hyperthermia, hypothermia, heat loss dynamics regarding helium in a breathing mixture, advantages and disadvantage of heliox, hydrox, hydrolox, trimix, travel mix vs. bottom mix, psychological considerations: task loading, stress, perceptual narrowing, dive time management, panic (remediation of specific subject knowledge as needed). Also to be covered are best mix and maximum operating depth mixture computations plus decompression options on air, EANx, oxygen and the need for five minute air breaks every 20 minutes during stage decompression and the off-phenomenon when using 100% oxygen.

• **Helium-Based Tri-mix Diving Equipment** – This area provides the diver with the knowledge necessary for selecting and configuring diving equipment for helium-based diving. Included is information about single and twin cylinders, valves, regulators, harness/BC, dive computers/depth gauges/bottom timers, ascent and navigation line reels, lift bags for drifting or untethered decompression, preparing surface-supplied decompression equipment, Jon-line and clips, appropriate ballast and buoyancy control during dive and stage decompression stops, a comparison of dive tables and computers, introduction and review of different decompression table models (DCIEM, U.S. Navy, Buhlmann, etc.), correct use of electronic multilevel dive computers for dive planning and decompression.

• **Helium-Based Tri-mix Dive Planning** – This area provides the diver with the knowledge necessary to plan and safely execute helium-based dives. Included is information regarding standard operations, *i.e.*, gas needs and requirements, oxygen toxicity limitations, nitrogen narcosis limitations, tissue helium tension and inspired helium tension; emergency planning including omitted decompression, oxygen toxicity, decompression sickness, and equipment failure. Also, the following procedures shall be covered: utilizing primary and decompression as, normal operations, plan failure, emergency procedure contingencies for failure or inadequacies of procedure, analyzing and logging all breathing gasses, safeguards to prevent misuse of decompression supply regulators, preparation and deployment of decompression gear; descent – various methods of entry, use of descent lines or other descent technique decisions, recognizing the signs and symptoms of inert gas narcosis, recognizing breathing pattern fluctuations, options for configuring diver carried equipment; ascent – variable rate techniques and applying deep stop models and theory, diver trim, ballasting and buoyancy compensation; tethered or untethered decompression methods, use of Jersey uplines, loop lines, Jon-lines, line reels and lift bags, decompression bars and platforms, free drifting stage decompression or boat based decompression station, a comparison of diver carried decompression gasses versus surface supplied or rendezvous gas cylinder; shore based dive team support, plus contingency planning, chamber locations, evacuation procedures, communications and emergency breathing gases.

## EXAMINATIONS

See "Policies Applying to All Courses; Evaluation and Documentation."