

Decompression Techniques Diver Course

OVERVIEW

- This course is to provide the diver with a working knowledge of the theory, methods and procedures of planned stage decompression diving. As a part of the course students will plan and conduct a standard stage decompression dive not exceeding a maximum depth of 130 fsw (40 msw). Equipment requirements, team requirements, and NTEC configurations, decompression breathing gas mixtures (including oxygen, NAUI Helitrox, and EANx) and decompression techniques are to be presented.

QUALIFICATIONS OF GRADUATES

- Upon successful completion of this course, graduates are considered competent to plan and execute dives that require stage decompression utilizing air and EANx 28%+ to 100% oxygen for decompression without direct supervision provided the diving activities and the areas dived approximate those of training.

PREREQUISITES FOR ENTERING THE COURSE

- Minimum age is 18.
- Minimum certification of NAUI Master Scuba Diver and Deep Diver Specialty (or the equivalent) and Technical EANx Diver.
- Proof of 75 logged dives.

COURSE POLICIES

- Classroom hours- eight are estimated
- Open water dives- six No dives are to exceed 130 fsw (40msw) until a student has satisfactorily demonstrated equipment configuration and management, completed the technical skills required in the technical diver skills check off list and is using a helium based mix (such as NAUI helitrox) during open water assessment dive(s).
- Maximum training depths shall not exceed 130 fsw (40 msw) unless the course is combined with another course involving deeper water diving as an integral part of the combined course.

EQUIPMENT

- NTEC Gear Configuration
- Oxygen analyzer (may be provided or rented for use during the course).
- Redundant Depth and Timing Devices
- Air and EANx dive computers are allowed for use as depth and timing devices and for dive planning.
- Jon-lines and other rigging lines as dictated by conditions at the dive site.
- Ascent line reel and life bag, with a minimum of 50 lb. (23 kg) lift.
- Up line that is adequate for maximum planned depth, and additional personal lines as needed.
- Redundant underwater lights if needed because of site conditions.

SKILL REQUIREMENTS

- At least four of the six required dives are to be made using oxygen or EANx as a decompression gas. 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 toxicity exposures and inert gas absorption for each dive and breathing gas mixture. If simulated or actual planned decompression stops are intended on any dive, divers will demonstrate simulated or actual stops and use an up line or lift bag and reel. Contingency dive planning and problem solving situations are to include omitted decompression, altered bottom time profile with increased or decreased decompression requirement and recalculation, loss of ascent equipment, i.e., lift bag and reel, stage cylinders, ascent line, loss of decompression breathing gas and gas supply loss with emergency ascent and decompression gas supplied by dive partner. Students shall participate in a diver rescue simulation to include management of a diver experiencing underwater convulsions. 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 (20 msw). Each diver is to demonstrate underwater navigation appropriate to the dive plan. On at least two of the required dives, is to ascend with ascent reel and bag and perform necessary or simulated stage decompression

ACADEMIC REQUIREMENTS

- **Applied Sciences.** This is a review and continuation of the material covered in the NAUI Master Scuba Diver and Technical EANx Diver courses. Included are NAUI Reduced Gradient Bubble Model theory and tables physics, physiology and medical aspects as applied to planned decompression diving, with special emphasis on mechanisms of bubble formation, a review of deep stop models and theory, inert gas perfusion and diffusion, equivalent narcosis depth (END), advantages of oxygen enriched air mixes for decompression, oxygen toxicity (whole body and CNS toxicity, 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, carbon monoxide toxicity, hyperthermia, hypothermia, 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 using EANx and oxygen and the need for five minute air breaks every 20 minutes during stage decompression as well as the off-phenomenon when using 100% oxygen.
- **Decompression Diving Equipment.** Provides the diver with the knowledge necessary for selecting and configuring diving equipment for stage decompression diving. Included is information about the NAUI Technical Equipment Configuration (NTEC) using single and twin cylinders, valves, regulators, soft-harness or backplates with wing style back-mounted buoyancy compensator systems, dive computers/depth gauges/bottom timers, ascent and navigation line reels, lift bags for drifting or untethered decompression, preparation of 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, RGBM, U.S. Navy, Buhlmann,

- etc.) proprietary computer general algorithms, correct use of electronic, multilevel dive computers for dive planning and decompression.
- **Decompression Dive Planning.** This area provides the diver with the knowledge necessary to plan and safely execute stage decompression dives. Included is information regarding standard operations, i.e., gas needs and requirements, oxygen toxicity limitations, nitrogen narcosis limitations, emergency planning including omitted decompression, oxygen toxicity, decompression sickness and equipment failure. Also included are the following procedures: utilizing primary and decompression gas, 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, oxygen toxicity, recognizing breathing pattern fluctuations, options for configuring diver carried equipment, variable ascent-rate techniques and applying deep stop models and theory, diver trim, ballasting and buoyancy compensation, tethered or untethered decompression methods, use of up-lines, 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.