

# DIVE ALASKA!

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## Technical Diver Level 1

### Purpose

GUE's Technical Diver Level 1 (Tech 1) course is structured to prepare divers for the rigors of technical diving and to familiarize them with the use of different breathing and decompression mixtures. Tech 1 training focuses on expanding the fundamental skills learned in the GUE Fundamentals course (or elsewhere), and is designed to cultivate, integrate, and expand the essential skills required for safe technical diving. This will include problem identification and resolution, and building the capacity for progressively more challenging diving. In this class, students will be trained in: a) the use of double tanks/cylinders and in the potential failure problems associated with them; b) the use of Nitrox for accelerated and general decompression strategies; c) the use of Helium to minimize narcosis; and d) the applications of single decompression stage diving, with respect to decompression procedures.

The class will focus on nitrox and Trimix as breathing gases for dives down to 170 feet/51 meters, and provides an excellent foundation on which divers can build their technical diving experience and prepare for GUE's Technical Diver 2 course (Tech 2).

### Prerequisites

1. Must meet GUE General Course Prerequisites as outlined in [Section 1.6](#)
2. Must be a minimum of 18 years of age
3. Must be GUE Fundamentals qualified with the Tech-rating
4. Must have a minimum of 100 dives beyond open water qualification
5. Students participating in a Tech class conducted in a cave must be at least GUE Level 2 Cave divers

### Duration

The Tech 1 class is normally conducted over a five-day period. It involves a minimum of forty hours of instruction, encompassing both classroom and in-water work.

### Course Limits

1. General Training Limits as outlined in [Section 1.4](#)
2. Student-to-instructor ratio is not to exceed 6:1 during land drill or surface exercises, but cannot exceed 3:1 during any direct in-water training.

3. Maximum depth 170 feet / 51 meters
4. Dives should not be planned to incur more than 30 minutes of Unadjusted Decompression (see section 1.4.10 in Standards Document)
5. No overhead diving except by active GUE Cave 2 Level instructors while teaching in the cave environment

## **Course Content**

The GUE Tech 1 course involves a minimum of forty hours of instruction designed to provide a working knowledge of nitrox, normoxic and hyperoxic Trimix and decompression mixtures, including history, physics, physiology, tables, and operational considerations.

Course requirements include ten hours of academics and eight dives, six of which will be critical-skill dives and two will be experience dives. Initial dives will be conducted in shallow water to test diver ability and to fill in any deficits in skill levels. The last two dives are to be Trimix dives at depth for experience.

## **Required Training Materials**

1. *Doing it Right: The Fundamentals of Better Diving*. Jarrod Jablonski, GUE, 2001, High Springs, Florida.
2. *Getting Clear on the Basics: The Fundamentals of Technical Diving*. Jarrod Jablonski, GUE, 2001, High Springs, Florida.

## **Academic Topics**

1. Physics
2. Pressure and gas-law review
3. Equations relevant for planning, mixing, and using enriched air
4. Physiology
5. Hypoxia
6. Hyperoxia
7. Oxygen toxicity
8. CNS
9. Pulmonary toxicity
10. Tracking multilevel, multi-dive, and multi-day exposures
11. Inert gas narcosis
12. Inert gas absorption and elimination
13. Carbon dioxide toxicity
14. Carbon monoxide toxicity
15. Hyperthermia

16. Hypothermia
17. Decompression illness
18. Accelerated and general decompression strategies
19. Decompression practices on air, enriched air, and Oxygen
20. Generic tables, computers, and custom tables
21. Introduction to normoxic and hyperoxic Trimix
22. Advantages over deep air
23. Equipment considerations
24. Stage cylinders
25. Doubles
26. Decompression stage cylinders
27. BC/harness
28. Regulators, depth gauges, pressure gauges, and hose routing
29. Manifolds
30. Surface-marker buoys and spools (for deco platforms)
31. Computers and bottom timers
32. Exposure suit appropriate for the environment
33. Dive planning
34. Operational planning
35. Support
36. Teams
37. Team planning
38. Gas matching
39. Oxygen limits
40. Nitrogen limits
41. Emergency procedures
42. Omitted decompression procedures
43. Miscellaneous issues, including limited deco gas, out of gas, team separation, etc.
44. Procedures
45. Bottom and deco gas

46. Normal operations
47. Procedures for failure, loss, or inadequate supply
48. Gas mixing
49. Analyzing and labeling gas supplies
50. Line following

### **Land Drills and Topics**

1. Reel and guideline use
2. Dive team order and protocols
3. Touch contact
4. Manifold operation and failures
5. Use of safety spools and reels
6. Basic navigation skills
7. Pre-dive drills

### **Required Dive Skills & Drills**

1. All skills and drills as outlined in General Diving Skills, [Section 1.5](#).
2. Must be able to swim at least 400 yards/375 meters in under fourteen minutes without stopping (This test should be conducted in a swimsuit and, where necessary, appropriate thermal protection)
3. Must be able to swim a distance of at least 20 yards/18 meters on a breath hold
4. Procedures for gas failures, including valve manipulation, gas-sharing, and regulator switching as appropriate.
5. Surface-marker buoy deployment.
6. Use of touch contact for limited and simulated zero-visibility situations.
7. Reel and guideline use.
8. Demonstrate familiarity with required course equipment.
9. Gas-sharing scenarios, to include a prolonged gas-sharing event.
10. Demonstrate the effective deployment of a reserve light in under thirty seconds.
11. Comfortably demonstrate at least three propulsion techniques that would be appropriate in delicate and/or silty environments; one of these kicks must include the backward kick.
12. Demonstrate effective valve management by switching regulators, shutting down a valve in under fifteen seconds and returning the valve to the open position again in under fifteen seconds.
13. Demonstrate reasonable proficiency with a single decompression cylinder.

14. Demonstrate proficiency with effective decompression techniques, including depth and time management.
15. Demonstrate a comfortable demeanor while sharing gas without a mask.
16. Demonstrate dive-rescue techniques, including effective management of unconscious diver. Differences between the management of unconscious and toxing diver should be noted.
17. Demonstrate good buoyancy and trim, i.e. approximate reference maximum of 20 degrees off horizontal while remaining within 3 feet/1 meter of a target depth. Frequency of buoyancy variation and the divers control of their buoyancy and trim are important evaluation criteria.

## **Equipment Requirements**

Each student should have, and be familiar with, all of the following required equipment.

1. Tanks/Cylinders: Students are required to use dual tanks/cylinders connected with a dual-outlet isolator manifold, which allows the use of two first-stages. Divers must also have access to one deco tank/cylinder of 50-percent Nitrox.
2. Regulators: Two first-stages, each supplying a single second-stage. One of the second-stages must be on a 7-foot/2-meter hose. One of the first-stages must supply a pressure gauge and provide inflation for a dry suit (where applicable). One first-stage regulator for shallow decompression gas, supplying a single second-stage and pressure gauge.
3. Backplate System: A rigid and flat platform, of metal construction with minimal padding, held to a diver by one continuous piece of nylon webbing. This webbing should be adjustable through the plate and should use a buckle to secure the system at the waist. A crotch strap attached to the lower end of this platform and looped through the waistband would prevent the system from riding up a diver's back. A knife should be secured to the waist on the left webbing tab. This webbing should support five D-rings; the first should be placed at the left hip, the second should be placed in line with a diver's right collarbone, the third should be placed in line with the diver's left collarbone, the fourth and fifth should be affixed to the crotch strap to use while scootering or towing/stowing gear. The harness below the diver's arms should have small restrictive bands to allow for the placement of reserve light powered by three in-line c-cell batteries (where necessary). The system should retain a minimalist approach with no unnecessary components.
4. Buoyancy Compensation Device: A diver's buoyancy compensation device should be backmounted and minimalist in nature. It should come free of extraneous strings, tabs, or other material. There should be no restrictive bands or "bungee" of any sort affixed to the buoyancy cell. In addition, diver lift should not exceed 80 lbs / 40kgs. Wing size and shape should be appropriate to the cylinder size(s) employed for training.
5. At least one time/depth-measuring device
6. Decompression tables
7. Mask and fins: Mask should be low volume; fins should be rigid, non-split
8. At least one cutting device
9. Wet Notes
10. One spool with 100 feet/30 meters line per diver
11. One primary reel per team, with a minimum of 300 feet/90 meters of line

12. One primary light: A primary light should be minimalist in design; its power source should consist of a rechargeable battery pack residing in a canister powering an external light head via a light cord. Primary lights should produce the equivalent output of 50 watt halogen/10 watt HID lighting or greater.
13. Two reserve lights: Reserve lights should be non-rechargeable in-line three c-cell battery lights with a minimum of protrusions and a single attachment at its rear. The light should be activated by twisting the front bezel towards the body, deactivated by turning it away from the body.
14. Exposure suit appropriate for the duration of exposure
15. At least one surface marker buoy per diver
16. One wrist compass
17. One reserve mask