

## 3.2.1 GUE Technical Fundamentals

### 3.2.1.1 Course Outcomes

The GUE Technical Fundamentals course is designed to cultivate the essential skills required for sound technical and cave diving practice. Included among its course outcomes are: to provide the advanced diver with an opportunity to enhance their diving skills in preparation for entering GUE technical and cave training; to train divers in the theory and practice of nitrox; to provide divers with aspirations for more advanced diver training with the tools that will contribute to a greater likelihood of success; and to provide non-GUE trained divers with a gateway into GUE technical and cave training.

### 3.2.1.2 Prerequisites

Applicants for a GUE Technical Fundamentals course must abide by [Training Prerequisites \(2.1.4.1\)](#), plus:

- a. Be a minimum of 16 years of age. Documented parental or legal guardian consent must be submitted to GUE HQ when the participant is a minor.
- b. Hold a certification from a recognized training agency to dive to 100 ft/30 m or a GUE Deep Primer certification.
- c. Have conducted at least 75 non-training dives following completion of autonomous scuba diver certification. At least 25 of these must have been at a depth of at least 70 ft/21 m.
- d. Have conducted at least 25 non-training dives in the GUE double tank configuration or have conducted 15 non-training dives utilizing doubles following completion of GUE Doubles Primer certification.
- e. If using a drysuit during the course, have conducted at least 15 non-training dives in a drysuit or have conducted 10 non-training dives utilizing a drysuit following completion of GUE Drysuit Primer certification.

### 3.2.1.3 Course Content

The GUE Technical Fundamentals course is normally conducted over four days. It requires a minimum of eight dives and at least thirty-two hours of in-person instruction, encompassing land drills and in-water work. Additional time is required for theory (conducted online and/or in-person).

At the instructor's discretion, GUE Performance Divers and GUE Basic Fundamentals divers may have a portion of their training counted toward GUE Technical Fundamentals qualification.

### 3.2.1.4 GUE Technical Fundamentals Specific Training Standards

- a. Student-to-instructor ratio is not to exceed 6:1 during land drill or surface exercises; it cannot exceed 3:1 during any in-water training.
- b. Two dives must be at a depth of at least 40 ft/12 m.
- c. Maximum depth of 100 ft/30 m.
- d. No overhead diving.
- e. All dives must be within minimum decompression limits (MDLs), i.e., no required stops.

### 3.2.1.5 Required Training Materials

GUE training materials and recommended study as determined by the course study packet available online or via download after GUE course registration.

### 3.2.1.6 Academic Topics

- a. Introduction: GUE organization and course overview (objectives, limits, expectations)
- b. Building a solid skill base: buoyancy, trim, balance, and propulsion
- c. Fundamental diving skills
- d. Streamlining and equipment configuration
- e. Situational awareness
- f. Dive planning and gas management
- g. Breathing gas overview
- h. Nitrox diving
- i. Decompression overview and minimum decompression procedures
- j. Diving safety and accident prevention
- k. The GUE system

### 3.2.1.7 Land Drills and Topics

- a. Equipment fit, assembly and disassembly
- b. Propulsion and maneuvering techniques
- c. Gas analysis
- d. GUE EDGE and pre-dive checks
- e. Basic 5 scuba skills
- f. Dive team protocols
- g. S-drill and valve drill
- h. Backup light deployment
- i. Surface marker buoy (SMB) deployment utilizing a spool
- j. Ascent protocols
- k. Diver rescue techniques, including unconscious diver lift

### 3.2.1.8 Required Dive Skills and Drills

Students must demonstrate competence in the following skills to attain GUE Technical Fundamentals certification:

- a. Must be able to swim at least 300 yds/275 m in less than 14 minutes without stopping. This test should be conducted in a swimsuit and, where necessary, appropriate thermal protection.
- b. Must be able to swim a distance of at least 50 ft/15 m on a breath hold while submerged.
- c. Demonstrate a safe and responsible demeanor throughout all training.
- d. Demonstrate basic equipment proficiency and an understanding of the GUE double tank configuration.
- e. Demonstrate proficiency in safe diving techniques, including pre-dive preparation, in-water activity, and post-dive assessment.
- f. Demonstrate awareness of team member location and a concern for safety, responding quickly to visual indications and dive partner needs.
- g. Demonstrate proficiency in underwater communication.

- h. Demonstrate safe ascent and descent procedures from a depth greater than 40 ft/12 m.
- i. Demonstrate good buoyancy and trim, i.e., approximate reference is a maximum of 20 degrees off horizontal while remaining within a range of 3 ft/1 m from target depth.
- j. Comfortably demonstrate at least four propulsion techniques that would be appropriate in a delicate and/or silty environment, including competence in the backward kick and helicopter turn.
- k. Demonstrate proficiency in two power kicks by swimming without stopping and while maintaining proper technique for at least 50 ft/15 m.
- l. Demonstrate aptitude in the following open water skills: regulator removal, regulator exchange, long hose deployment, mask clearing, mask removal and replacement.
- m. Demonstrate proficiency in the ability to deploy a surface marker buoy (SMB) while using a spool.
- n. Efficiently and comfortably demonstrate how to donate gas to an out-of-gas diver in multiple gas-sharing scenarios.
- o. Efficiently and comfortably demonstrate how to donate gas to an out-of-gas diver followed by swimming in touch contact.
- p. Efficiently and comfortably demonstrate how to donate gas to an out-of-gas diver followed by an ascent with at least two stops to the surface utilizing minimum decompression while using a surface marker buoy and spool.
- q. Demonstrate a comfortable demeanor while swimming without a mask in touch contact, followed by a switch to the backup mask.
- r. Demonstrate an efficient valve drill with double tanks.
- s. Demonstrate proficiency with a primary corded light by handling it during all skills.
- t. Demonstrate proficiency with backup light deployment.
- u. Demonstrate proficiency with diver rescue techniques, including effective management of an unconscious diver underwater.

### 3.2.1.9 Equipment Requirements

GUE double tank configuration as outlined in Appendix A, plus:

- a. One corded primary light and two backup lights

Prior to the commencement of the class, students should consult with a GUE representative to verify equipment requirements and the appropriateness of any selected equipment.

## Appendix A - GUE Equipment Configuration

The GUE base equipment configuration is comprised of:

- a. Tanks/cylinders: Students may use a single tank/cylinder with a single- or dual-outlet valve. Students may also use dual tanks/cylinders connected with a dual-outlet isolator manifold, which allows for the use of two first stages. Dual tanks/cylinders connected with a dual-outlet, non-isolator manifold can be used, but only in recreational (minimum decompression) diving, and are considered an alternative for a single tank/cylinder. Consult course-specific standards and your instructor to verify size requirements.
- b. Regulators:

- i. Single tank: The first stage must supply a primary second stage via a 5 to 7 ft/1.5 to 2 m hose. A backup second stage must be necklaced and supplied via a short hose. The first stage must also supply an analog pressure gauge, inflation for the buoyancy compensator (BC), and (when applicable) inflation for a drysuit.
    - ii. Double tank: One first stage must supply a primary second stage via a 5 to 7 ft/1.5 to 2 m hose (7 ft/2 m hose is required for all cave classes), and inflation for the buoyancy compensator (BC). The other first stage must supply a necklaced backup second stage via a short hose, an analog pressure gauge, and (when applicable) inflation for a drysuit.
  - c. Backplate system:
    - i. Is held to the diver by one continuous piece of webbing. This webbing is adjustable and uses a buckle to secure the system at the waist.
    - ii. A crotch strap is attached and looped through the waistband to prevent the system from riding up a diver's back.
    - iii. The continuous webbing must support five D-rings;
      - 1. The first placed at the left hip
      - 2. The second placed in line with a diver's right collarbone
      - 3. The third placed in line with the diver's left collarbone
      - 4. The fourth and fifth are placed on the front and back of the crotch strap when divers plan to use advanced equipment such as DPVs.
    - iv. The harness below the diver's arms has small restrictive bands to allow for the placement of backup lights. The webbing and system retains a minimalist approach.
  - d. Buoyancy compensation device (BC):
    - i. A diver's BC is back-mounted and minimalist in nature.
    - ii. It is free of extraneous strings, tabs, or other material.
    - iii. There are no restrictive bands or restrictive elastic affixed to the buoyancy cell.
    - iv. Wing size and shape is appropriate to the cylinder size(s) employed for training.
  - e. At least one time/depth measuring device
  - f. Wrist-mounted compass
  - g. Mask and fins: Mask is low-volume; fins are rigid, non-split.
  - h. Backup mask
  - i. At least one cutting device
  - j. Wetnotes with at least one pencil
  - k. Exposure suit appropriate for the duration of exposure
  - l. Surface marker buoy (SMB) with spool: Where required, the SMB should be appropriate for environmental conditions and deployed using a spool with at least 100 ft/30 m of line.

**The GUE PSCR configuration is comprised of:**

- a. GUE base equipment configuration (except Tanks/Cylinder)
- b. One primary and two backup lights
- c. A GUE-approved passive semi-closed circuit rebreather
- d. Modified tank configuration as appropriate for use with a GUE-approved passive semi-closed circuit rebreather
- e. Modified regulator configuration as appropriate for use with a GUE-approved passive semi-closed circuit rebreather

### **The GUE CCR configurations are comprised of:**

- a. GUE base equipment configuration (except Tanks/Cylinder, where relevant)
- b. One primary and two backup lights
- c. A GUE-approved closed-circuit rebreather
  - i. Where required, students must own a GUE-approved closed-circuit rebreather before attending the course; they can, however, use a rented or borrowed unit during the course.
  - ii. The closed-circuit rebreather used by the student, with all associated components, must be fully functional (pass all tests on the rebreather pre-dive checklist) and serviced according to manufacturer specifications.
  - iii. All analog oxygen sensors must be less than one year from manufacturing date.
  - iv. All electronic components, including but not limited to the rebreather controller unit and monitoring systems, must be updated with the latest software and firmware versions published by the manufacturer.
- d. Modified tank configuration as appropriate for use with a GUE-approved closed-circuit rebreather
- e. Modified regulator configuration as appropriate for use with a GUE-approved closed-circuit rebreather
- f. Spare parts and consumables, including one set of appropriate batteries; one oxygen sensor; and one DSV/BOV mouthpiece.
- g. If using a drysuit inflation cylinder attached to the backplate, extended inflation cylinder straps need to be used to ensure that it does not interfere with or restrict the counterlung's function.

### **The GUE Sidemount configuration is comprised of:**

- a. GUE base equipment configuration (except Tank/cylinders, Regulators, Backplate, BC)
- b. One primary and two backup lights
- c. Tanks/cylinders: Students are required to use independent cylinders with single valves and without manifolds, which allow for the use of one first stage each. Stage cylinders with proper cylinder marking (2.2, e) will also be utilized.
- d. Regulators: One of the second stages must be on a 7 ft/2 m hose. Both first stages must supply a pressure gauge and provide inflation for a drysuit (where applicable) and a wing.
- e. Sidemount harness: A diver's sidemount setup should be back-mounted and minimalist in nature. Wing size and shape should be appropriate to the cylinder size(s) employed for training.

### **Additional Course-Specific Equipment**

- a. Where required, back gas and stage cylinders with proper cylinder marking (2.2, e) will also be utilized in accordance with the GUE General Training Standards, Policies, and Procedures document and configured in line with GUE protocols.
- b. When drysuit inflation systems are applicable, they should be sized appropriately for the environment; small tanks are placed on the left side of the backplate with larger supplies affixed to the diver's left back gas tank.
- c. Underwater lights:

- i. When required, backup lights should be powered by alkaline batteries (not rechargeable) and stowed on the D-rings at a diver's chest (except when diving sidemount).
  - ii. Backup lights should have a minimal amount of protrusions and a single attachment at the rear.
  - iii. Backup lights should feature a twist-on/off switch for operation
  - iv. The primary light should consist of a rechargeable battery pack and be fitted with a Goodman-style light handle.
  - v. When burn time requirements create the need for an external battery pack, it should reside in a canister mounted on the diver's right hip.
- d. Guideline devices, as required during cave diving activities:
- i. A primary reel is required for all cave diving and provides a minimalist form factor with a handle designed to support a Goodman or "hands free" handle operation. The primary reel must contain at least 150 ft/45 m of line.
  - ii. A safety spool is required for each diver while cave diving and must contain at least 150 ft/45 m of line.
  - iii. A jump or gap spool is required during Cave 2 diving and must contain at least 75 ft/23 m of line.
- e. Where required, GUE-approved DPV must:
- i. Be a tow-behind style with adjustable speed and clutch mechanism.
  - ii. Include an attached cord at the back with bolt snap to be clipped on the front crotch strap D-ring.
  - iii. Include a leash attached to the front to be used for towing.