

## 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 a 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 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 configuration is comprised of:

- a. GUE base equipment configuration (except Tanks/Cylinder)
- 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 oxygen sensors must be less than one year from manufacturing date.
  - iv. Both the rebreather controller and SOLO board 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 controller, HUD, and solenoid 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.
  - i. Include a leash attached to the front to be used for towing.