3.2.10 Cave Diver Level 1

3.2.10.1 Course Outcomes

GUE's Cave Diver Level 1 course is designed to prepare divers for the rigors of the underwater cave environment and to establish an appreciation of its subtle dangers. Among its other outcomes: introduce divers to the principles of cave diving and the skills and knowledge required for limited penetration into underwater caves; increase environmental awareness; cultivate proficiency in dive planning; cultivate teamwork; promote an understanding of cave environments; teach stress management, navigation, conservation, standard and emergency procedures, and cave diving techniques; and instill an appreciation of the hazards of cave diving.

3.2.10.2 Prerequisites

Applicants for a Cave 1 course must abide by Training Prerequisites (2.1.4.1), plus:

a. Be a minimum of 18 years of age. Documented parental or legal guardian consent must be submitted to GUE HQ when the participant is a minor.
b. Hold a GUE Technical Fundamentals[1] certification.
c. Have conducted at least 100 non-training dives following completion of autonomous scuba diver certification.
d. If using a drysuit during the course, have conducted at least 25 non-training dives in a drysuit or have conducted 15 non-training dives utilizing a drysuit following completion of GUE Drysuit Primer certification.

3.2.10.3 Course Content

The Cave Diver Level 1 course is normally conducted over six days. It requires a minimum of twelve dives (including ten cave dives that are conducted in at least three different cave systems) and at least forty-eight hours of instruction, encompassing lectures, land drills, and in-water work.

Divers wishing to use triox as a breathing gas are required to review all Deep Primer academics, including the exam, with their instructor and conduct at least two dives using triox. Successful completion of these objectives results in the addition of triox to the allowed post-certification breathing gases and will be noted on the GUE Cave Diver Level 1 certification card.

3.2.10.4 Cave Diver Level 1 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. Maximum of 1/3 of 2/3 of the total gas supply can be used for penetration.
c. Maximum depth of 100 ft/30 m.
d. Minimum 100 ft^3/2800 L of gas is required to begin a Cave 1 dive.
e. No passages may be used in which divers are forced to travel single file for a prolonged distance (i.e., approximately 10 ft/3 m).
f. No complex navigation (jumps, traverses, circuits).
g. Navigation beyond one permanent intersection (also known as a "T" or "Y") and an unlimited number of temporary intersections is permitted. Permanent intersections are

[1] Including GUE Fundamentals with Technical rating issued under past versions of Standards.

identified by the lack of a visible jump spool; temporary intersections provide visual access to a diver's jump spool. All intersections that appear permanent should be marked with non-directional markers.

h. Trainees may navigate gaps; a gap occurs where the main line ends and begins again a short distance later. Normally this occurs where the line has reached another entrance/exit point.
i. All dives must be within minimum decompression limits (MDLs), i.e., no required stops.
j. No DPV diving.
k. No exploration.
l. No stage cylinders.
m. Students must complete GUE Rescue Primer or equivalent from a recognized training agency prior to certification.

3.2.10.5 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.

Divers wishing to use triox as a breathing gas must be familiar with all academic materials included in Deep Primer.

3.2.10.6 Academic Topics

a. Introduction: GUE organization and course overview (objectives, limits, expectations)
b. Environmental and cave conservation
c. Guideline use and cave etiquette
d. Dive team order and protocols
e. Touch contact
f. Basic navigation skills
g. Dive planning
h. Decompression theory
i. Gas management
j. Accident analysis
k. Stress
l. Environment
m. Communication
n. Deep Primer academic topics, when relevant

3.2.10.7 Land Drills and Topics

a. Guideline use and cave etiquette
b. Guideline use during emergency scenarios, including touch contact and gas-sharing emergencies
c. Back gas regulators and valve failure modes and management
d. Lost diver procedures
e. Lost guideline procedures
f. Unconscious diver recovery
g. Basic navigation skills

3.2.10.8 Required Dive Skills and Drills

Students must demonstrate competence in the following skills to attain GUE Cave Diver Level 1 certification:

a. Must be able to swim at least 400 yds/375 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 60 ft/18 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 equipment 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.
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 cave navigation, including visual references, guideline use, limited and simulated zero visibility, and the use of a penetration reel for a prolonged distance from open water until the team ties into the main line.
l. Demonstrate proficiency in gas failure procedures, including valve manipulation (fixable, non-fixable, and erroneous failures), gas sharing, and regulator switching as appropriate.
m. Demonstrate proficiency in managing gas-sharing scenarios in limited and/or simulated zero visibility, over a distance of at least 300 ft/90 m.
n. Demonstrate proficiency in the use of touch contact for limited and simulated zero visibility situations.
o. Demonstrate the ability to mentally record depth, time, and gas consumption during a dive and apply these parameters to future dive planning.
p. Demonstrate the efficient deployment of a backup light.
q. Demonstrate the ability to search for a missing diver while performing a simulated missing diver drill.
r. Demonstrate the skills needed to locate a lost line while performing a simulated lost line drill.
s. Demonstrate diver rescue techniques, including effective management of an unconscious diver.
t. Demonstrate proficiency in switching to a backup mask.
u. Divers wishing to use triox as a breathing gas must successfully conduct at least two dives while using triox.

3.2.10.9 Equipment Requirements

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

a. One primary and two backup lights
b. One safety spool
c. One primary reel per team
d. At least six line markers; three directional and three non-directional
e. Drysuit inflation system independent from back gas cylinders (while breathing a helium mixture, if using a drysuit)

Excluding:

a. Surface marker buoy with spool

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.