

35. Explorer Rebreather Diver

35.1 Introduction

This is the entry-level certification course for recreational divers wishing to utilize the Explorer rebreather. The objective of this course is to train recreational divers in the benefits, hazards and proper procedures for using the Explorer rebreather.

35.2 Qualifications of Graduates

Upon successful completion of this course, graduates may engage in non decompression diving activities utilizing the Explorer to a maximum depth of 40 metres / 130 feet, not to exceed the maximum depth of the diver's current certification, without decompression, utilizing nitrox mixes of 32 – 40%

35.3 Who May Teach

Any active Hollis Explorer Sport Rebreather Instructor may teach this course.

35.4 Student to Instructor Ratio

Academic

1. Unlimited, so long as adequate facility, supplies and time are provided to ensure comprehensive and complete training of subject matter

Confined Water (swimming pool-like conditions)

1. A maximum of 6 students per instructor; it is the instructor's discretion to reduce this number as conditions dictate

Open Water (ocean, lake, quarry, spring, river or estuary)

1. A maximum of 6 students per instructor; it is the instructor's discretion to reduce this number as conditions dictate

35.5 Student Prerequisites

1. Minimum age 18, 15 with parental consent
2. Minimum certification of TDI Nitrox Diver, or equivalent, may be combined in program at the discretion of the instructor
3. If student has less than 25 logged dives, a mandatory one hour confined session is required

35.6 Course Structure and Duration

Confined Water

1. For divers requiring a one hour confined water session, they must perform each of the required open water skills a minimum of one time and demonstrate an ability to control buoyancy while maintaining loop volume control.

Open Water Execution

1. A minimum of 4 dives with a minimum of 100 accumulated minutes

Course Structure

1. TDI allows instructors to structure courses according to the number of students participating and their skill level
2. Dives conducted to a maximum depth of 40 metres / 130 feet, not to exceed the maximum depth of the diver's current certification

Duration

1. The minimum number of classroom and briefing hours is 6
2. The Minimum course duration is 2 days

35.7 Administrative Requirements

The following are the administrative tasks:

1. Collect the course fees from all the students
2. Ensure that the students have the required equipment
3. Communicate the training schedule to the students
4. Have the students complete the:
 - a. *TDI Liability Release and Express Assumption of Risk Form*
 - b. TDI Medical Statement Form
 - c. Other Manufacturer forms as required by the manufacturer

Upon successful completion of the course the instructor must:

1. Issue the appropriate certification by submitting the Diver Registration Form to TDI or registering the students online through the TDI member's area of the website

35.8 Training Material

Required Material

1. *TDI Diving Rebreathers* Student Manual
2. Hollis Explorer user's manual

Optional Material

1. TDI plastic EAD and PO₂ tables
2. *TDI Diving Rebreathers* PowerPoint Presentation
3. Nitrox and rebreather equations software
4. Other manufacturer support materials

35.9 Required Equipment

The following equipment is required for each student:

1. A complete Explorer rebreather
2. Printed checklists from the owner's manual
3. Access to oxygen analyzer (instructor may supply)
4. Appropriate CO₂ absorbent for the dives to be conducted
5. Underwater slate
6. Toolkit with appropriate spares (instructor may supply)
7. Disinfectant (instructor may supply)
8. One line cutting device
9. Mask and fins
10. Exposure suit appropriate for the open water environment
11. Weight / weight system
12. Appropriately sized gas cylinder with mix appropriate for the depth of the dive
13. Off board bailout required for dives deeper than 18 metres / 60 ft. with appropriate volume for maximum planned depth

35.10 Required Subject Areas

The *TDI Diving Rebreathers* Student Manual and the manufacturer's manual are mandatory for use during this course but instructors may use any additional text or materials that they feel help present these topics. The following topics must be covered during this course:

1. History and Evolution of Rebreathers
2. Comparison of Open Circuit, Closed Circuit, and Semi-closed Circuit Units

3. Practical Mechanics of the Explorer Rebreather System
 - a. Assembly and disassembly of the Explorer rebreather
 - b. Layout and design
 - c. Scrubber replacement
 - d. Pre-dive safety check sequence
 - e. System maintenance and storage
 - f. Breathing loop decontamination procedures
4. Review of Nitrox
 - a. Dalton's Law (triangle)
 - b. Optimum nitrox mix
 - c. Oxygen tracking
 - d. Gas preparation and analysis
5. Gas Physiology
 - a. Oxygen toxicity
 - b. Hyperoxia
 - c. Hypoxia
 - d. Asphyxia
 - e. Hypercapnia
 - f. Nitrogen absorption
 - g. CO₂ toxicity
 - h. Gas consumption
 - i. Cylinder sizes
6. Formula Work
 - a. Cylinder size/duration equation
 - b. Equivalent air depth
7. Dive Tables
 - a. Equivalent air depth
 - b. CNS toxicity tables
 - c. NDL tables
8. Dive Computers
 - a. Mix adjustable
 - b. Oxygen integrated
 - c. PO₂ monitoring devices
9. Dive Planning
 - a. Operational planning
 - b. Gas requirements including bailout scenarios
 - c. Oxygen limitations
 - d. Nitrogen limitations
 - e. PSCR and FO₂ drop

10. Problem Solving
 - a. Unit flooding
 - b. Mouthpiece loss
 - c. Scrubber exhaustion
 - d. Battery or sensor failure
 - e. Resource alarms
 - f. Open circuit bailout
 - g. Hyperoxia scenario
 - h. Hypoxia scenario
 - i. Hypercapnia scenario
 - j. Post problem maintenance of equipment

35.11 Required Skill Performance and Graduation Requirements

The dive depth shall not exceed 1.4 ATM PO₂. The following skills must be completed by the student during open water dives:

1. 1 dry setup and breakdown during lecture
2. Properly analyze gas mixture
3. Perform all pre dive checks, a minimum of 4 times
4. Complete pre-dive checklist
5. Demonstrate a leak check and repair scenario
6. Properly packing a scrubber canister a minimum of 2 times
7. Properly execute set-up and breakdown; a minimum of 2 times
8. Demonstrate adequate pre-dive planning
 - a. Limits based on system performance
 - b. Limits based upon oxygen exposures at planned depth with mix
 - c. Limits based upon nitrogen absorption at planned depth with mix
9. Properly execute the planned dives within all pre-determined limits
10. Properly execute a recovery from a system failure and switch to bail-out stationary a minimum of 2 times
11. Properly execute two bailout scenarios due to a simulated system failure. From 18 metres / 60 feet or shallower, bailout to BOV and execute proper safety stop and ascent. For dives deeper than 18 metres / 60 feet, one bailout scenario must be conducted on off board bailout, but executed no deeper than 30 metres / 100 feet. Properly demonstrate hose clearing technique after each bail-out scenario

12. Proper PO₂ monitoring on all dives
13. Perform adjustments to the wrist unit during a dive a minimum of 2 times
14. Properly execute a mask clearing exercise with emphasis on minimal gas loss
15. Safely and properly execute a buddy out of air scenario, it is preferable the buddy is on a SCR unit also
16. Diver will demonstrate actual safety stops at pre-determined depths
17. Properly execute cleaning and maintenance of the rebreather, including breathing loop decontamination

In order to complete this course, students must:

1. Satisfactorily complete the *TDI Diving Rebreathers* course written examination
2. Complete all open water requirements safely and efficiently
3. Demonstrate mature, sound judgment concerning dive planning and execution