

28. Explorer Rebreather Instructor

28.1 Introduction

This is the instructor level certification course for instructors wishing to teach the TDI Explorer rebreather course. The objective of this course is to train instructors to teach recreational rebreather diving, and to develop basic rebreather diving teaching skills appropriate to diving within the normal recreational depth limits for no decompression diving to 40 metres / 130 feet using between 32-40% Nitrox mixes.

28.2 Qualifications of Graduates

Upon successful completion of this course, graduates may teach the TDI Explorer Rebreather course not to exceed the depth maximum of 40 metres / 130 feet with Nitrox mixes.

28.3 Who May Teach

Any active TDI Explorer Instructor Trainer may teach this course.

28.4 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. N/A

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

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

28.5 Student Prerequisites

1. Minimum age 18
2. Provide proof of:
 - a. Certified TDI EXPLORER Diver
 - b. Certified TDI Nitrox Instructor, or equivalent
 - c. 100 verified logged dives, 50 using nitrox

3. Assist with at least one complete TDI Explorer Rebreather Diver course to the satisfaction of the TDI instructor trainer
4. Provide proof of a minimum of 25 logged rebreather dives on a Explorer Rebreather, with a minimum of 30 accumulated hours

Or

5. If the candidate is already a certified TDI SCR or CCR instructor, in place of #4 above, provide proof of a minimum 10 verified logged Explorer Rebreather dives with a minimum of 15 accumulated hours

28.6 Course Structure and Duration

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

Duration

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

28.7 Administrative Requirements

The following are the administrative tasks:

1. Collect the course fees from all the instructor candidates
2. Ensure that the instructor candidates have the required equipment
3. Communicate the training schedule to the instructor candidates
4. Have the instructor candidates complete:
 - a. The *TDI Liability Release and Express Assumption of Risk form*
 - b. The *TDI Medical Statement Form*

Note: Manufacturers may require additional forms

Upon successful completion of the course the instructor trainer must:

1. Issue the appropriate TDI certification by submitting the appropriate TDI Dive Leader Registration form to TDI

Note: Register Instructor with Manufacturer

28.8 Training Material

Required Material

1. *TDI Diving Rebreathers* Student Manual
2. Hollis Explorer owner's manual
3. *TDI Standards and Procedures* Manual

Optional Material

1. Explorer PowerPoint Slides
2. Richard Pyle - *A Learners Guide to Closed Circuit Rebreather Operations*
3. Kenneth Donald - *Oxygen & The Diver*
4. John Lamb – *Oxygen Measurement for Divers*
5. Barsky, Thurlow & Ward - *The Simple Guide to Rebreather Diving*
6. Bob Cole – *Rebreather Diving*
7. Jeffrey Bozanic – *Mastering Rebreathers*

Instructor trainers must use the *TDI Diving Rebreathers* Student Manual, instructor guide, manufacturer's manual and the current *TDI Standards and Procedures* Manual, but may also use any additional text or materials that they feel help present these topics.

28.9 Required Equipment

The following equipment is required for each student and instructor:

1. A complete Explorer rebreather, the instructor candidate must own or have access to their own Explorer unit, in order to take the course, and to teach it in the future
2. Printed checklists from the owner's manual
3. Access to oxygen analyzer Appropriate CO₂ absorbent for the dives to be conducted
4. Underwater slate
5. Toolkit with appropriate spares (instructor may supply)
6. Disinfectant (instructor may supply)
7. One line cutting device
8. Mask and fins
9. Exposure suit appropriate for the open water environment
10. Weight / weight system
11. Appropriately sized gas cylinder with mix appropriate for the depth of the dive
12. Off Board Bailout

28.10 Required Subject Areas

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. Canister flooding
 - b. Mouthpiece loss
 - c. Scrubber exhaustion
 - d. Battery or sensor failure
 - e. Breathing bag rupture
 - f. Open circuit bailout
 - g. Hyperoxia scenario
 - h. Hypoxia scenario
 - i. Hypercapnia scenario
 - j. Post problem maintenance of equipment

28.11 Required Skill Performance and Graduation Requirements

The dive depth shall not exceed 1.4 ATM PO₂. The following skills must be demonstrated to instructor quality by all instructor candidates.

Open Water Skills

1. Properly analyze gas mixture
2. Perform pre-dive check sequence with use of manufacturer's checklist
3. Demonstrate a leak check and repair scenario
4. Properly inserting a scrubber cartridge
5. Properly execute set-up and breakdown of the HOLLIS EXPLORER
6. 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
7. Properly execute the planned dives within all pre-determined limits
8. Demonstrate the proper adjustment of the rebreather

9. Properly execute a recovery from a system failure and switch to bail-out stationary
10. Properly execute two bailout scenarios due to a simulated system failure. From 18 meters / 60 feet or shallower, bailout to BOV and execute proper safety stop and ascent. For dives deeper than 18 meters / 60 feet, one bailout scenario must be conducted on off board bailout, but executed no deeper than 30 meters / 100 feet. Properly demonstrate hose clearing technique after each bail-out scenario
11. Instructor candidates must complete this skill both on onboard and off board bailout.
12. Properly demonstrate hose clearing technique after each bail-out scenario
13. Proper PO₂ monitoring on all dives
14. Properly execute a mask clearing exercise with emphasis on minimal gas loss
15. Demonstrate comfort setting up and diving the unit
16. Demonstrate good buoyancy control during the dive
17. Safely and properly execute a buddy out of air scenario, it is preferable the buddy be on a SCR unit also
18. Diver will demonstrate actual safety stops at pre-determined depths
19. Properly execute cleaning and maintenance of the rebreather, including breathing loop decontamination

In order to complete this course, instructors must:

1. Complete all open water requirements safely and efficiently
2. Demonstrate mature, sound judgment concerning dive planning and execution
3. Pass the TDI and Hollis diver exams with 85% answered correctly and be able to adequately explain each answer to a prospective student
4. Satisfactorily complete the Hollis EXPLORER Instructor course written examination with a minimum score of 85% and 100% remediation,
5. Demonstrate proficiency in teaching the TDI EXPLORER Diver Program by presenting a minimum of 1 graded presentation earning a minimum of a 4 on the presentation.