

# **TDI – Basic Closed Circuit Rebreather Diver Course, Unit Specific - Ambient Pressure Inspiration (“INSPIRATION”)**

## **1.1 Introduction**

This is the entry-level certification course for recreational divers wishing to utilize the Inspiration Closed Circuit Rebreather (CCR). The objectives of the course is to train recreational divers in the benefits, hazards and proper procedures for rebreather diving on the Inspiration CCR and to develop basic rebreather diving skills appropriate to diving within the normal recreational depth limits of one hundred thirty (130) fsw / forty (40) msw using an air diluent for minimal decompression diving.

## **1.2 Qualifications of Graduates**

Upon successful completion of this course, graduates may engage in diving activities utilizing the Inspiration rebreather to a maximum depth of one hundred thirty (130) fsw / forty (40) msw), utilizing an air diluent (twenty to twenty one (20-21)) % Oxygen) with decompression stops at twenty (20) fsw / six (6) msw to a maximum of five 5 minutes duration.

## **1.3 Who May Teach**

Who may teach this course:

1. An active TDI Closed Circuit Rebreather Instructor with an Inspiration Instructor rating may teach this course.

## **1.4 Student – Instructor Ratio**

Academic:

1. Unlimited, so long as adequate facility, supplies and time are provided to insure comprehensive and complete training.

Confined Water (Swimming pool-like conditions):

1. N/A.

Open Water (Ocean, lake, quarry, spring, river or estuary):

1. A maximum of two (2) students per active TDI Instructor is allowed or four (4) with a certified assistant.
2. The ratio should be reduced as required due to environmental or operational constraints.

## **1.5 Student Pre-Requisites**

The student must:

1. Be a minimum age of eighteen (18).
2. Verified log of seventy (70) dives.
3. Minimum certification level of Advanced Nitrox Diver (may be combined with the program) or equivalent.

## **1.6 Course Structure and Duration**

Confined Water Execution:

1. Minimum of one hundred twenty (120) minutes training in confined water to a maximum of thirty three (33) fsw / ten (10) msw.

Open Water Execution:

1. Minimum of three hundred sixty (360) minutes in water time to be completed over a minimum of six (6) dives with a maximum of ten (10) dives graduated increase in depth each day.

Course Structure:

1. TDI allows instructors to structure courses according to the number of students participating and their skill level.
2. The exam may be given orally if not available in a language the student understands.

Duration:

1. Minimum of six (6) hours for academic development and a further two (2) hours for equipment maintenance workshop.

## **1.7 Administrative Requirements**

The following is 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 Liability Release and Medical history forms.
5. The Instructor should review the Liability Release and Medical Forms before starting on the course.

Upon successful completion of the course the Instructor must:

1. Complete the Student Registration Form and send the Registration Form to TDI HQ.
2. Award card and certificate.

## **1.8 Required Equipment**

The following are required for this course:

1. TDI Inspiration Rebreather Manual.
2. Manufacturer Specific OHP/PC Slide Set.
3. Richard Pyle's – A Learners Guide to Closed Circuit Rebreather Operations.
4. Ambient Pressure Manufactures' Manual & Updates.

The following equipment is required for each student:

1. A complete Inspiration rebreather.
2. Depth gauge and automatic bottom timer and / or dive computer.
3. Mask, fins and a suitable line-cutting device.
4. Slate & pencil.
5. Ascent Reel with Lift Bag / Surface Marker Buoy.
  - A. Adequate for maximum planned depth.
  - B. Minimum of twenty five (25) lb / twelve (12) kg lift bag (a dump valve highly recommended).
6. Exposure suit adequate for the open water environment where training will be conducted.
7. Access to an oxygen analyzer.
8. Adequate weight.
9. Bailout gas supply (may be the on-board diluent supply or an externally carried redundant air source). In addition the Instructor will also carry a redundant air source for the student/s.

## **1.9 Required Subject Areas**

The TDI Rebreather 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 the course.

1. History and evolution of Rebreathers.
2. Comparison of Open Circuit, Closed Circuit and Semi Closed Circuit Rebreather systems and the benefits/problems with each.
3. Practical Mechanics of the System.
  - A. Assembly and disassembly of the Inspiration.
  - B. Layout and design of the unit.
  - C. Absorbent canister design and maintenance.
  - D. Breathing loop de-contamination procedures.
4. Gas Physiology.
  - A. Oxygen toxicity.
  - B. Nitrogen absorption.
  - C. CO<sub>2</sub> toxicity.
  - D. Gas consumption.
5. Electronic Systems Design and Maintenance.
  - A. O<sub>2</sub> metabolizing calculations.
  - B. Equivalent Air Depth theory revision.
  - C. Fuel Cells.
  - D. System electronics functionality and calibration procedures.
6. Dive Tables.
  - A. Equivalent Air Depth operation.
  - B. Constant PPO<sub>2</sub> theory.
  - C. CNS and OTU tracking.
7. Dive Computers.

- A. Mix adjustable.
  - B. Constant PO<sub>2</sub>.
  - C. O<sub>2</sub> integrated.
8. Dive Planning.
- A. Operational Planning.
  - B. Gas requirements including bailout scenarios.
  - C. Oxygen limitations.
  - D. Nitrogen limitations.

## **1.10 Required Skill Performance And Graduation Requirements**

The following open water skills must be completed by the student during open-water dives with the following course limits:

1. All open water dives must be between twenty (20) fsw / six (6) msw to one hundred thirty (130) fsw / forty (40) msw).
2. Dive PO<sub>2</sub> not to exceed manufacturer default set point of 1.3 or a training limit of 1.4 bar.
3. All dives to be completed within CNS% limits with a recommend maximum of 80% of the total PO<sub>2</sub> CNS limit.
4. All appropriate safety stops to be conducted with a minimum three (3) minutes at twenty (20) fsw / six (6) msw to be conducted.

### Open Water Skills:

1. Pre dive checks.
2. Verify diluent and O<sub>2</sub> cylinder contents using O<sub>2</sub> analyzer where appropriate.
3. Demonstrate correct pre dive planning procedures including
  - A. Limits based on system performance.
  - B. Limits based on oxygen exposures at chosen PPO<sub>2</sub> levels.
  - C. Limits based on nitrogen absorption at planned depth and PO<sub>2</sub> setpoint.
4. Bailout procedures.
  - A. Mouthpiece familiarity drills.
  - B. Gas shutdowns and loss of gas.
  - C. Broken hoses.
  - D. Flooded absorbent canister.
  - E. CO<sub>2</sub> breakthrough.
  - F. Semi-closed mode.
  - G. Flooding Loop.
5. Use of BC/suit and effective management of loop breathing volume for buoyancy control.
6. Stop at ten to sixteen (10 – 16) fsw / three to five (3-5) msw on descent for leak bubble check.
7. Electronics systems monitoring for PO<sub>2</sub> levels (SETPOINT).
8. Proper execution of the dive within all pre-determined dive limits.
  - A. Demonstration of safety stops at pre-determined depths.
9. Post dive clean of unit to avoid contamination and spread of disease.

In order to complete the course and achieve the Basic Inspiration Rebreather rating the student must:

1. Satisfactorily complete the written examination with a pass mark of greater than eighty (80) %.
2. Complete to the Instructors satisfaction all confined and open water skill development sessions.
3. Demonstrate mature, sound judgment concerning dive planning and execution.
4. Course must be completed within 4 weeks from the starting date.

5. Complete a CCR refresher Course if there has been a period of three (3) months diving inactivity following certification as a Basic Inspiration diver.