

## IANTD Normoxic Trimix Diver OC & Rebreather

### A. Purpose

1. This Program is designed to train those who wish to dive to depths between 130 fsw (39 msw) and 200 fsw (60 msw) on OC and to a maximum depth of 170 fsw (51 msw) on Rebreathers, but who do not wish to breathe air below 130 fsw (39 msw). Trimix affords a means of reducing narcosis on dives to such depths.

### B. Prerequisites

1. Must be qualified as an IANTD Advanced EANx Diver. Divers qualified as Technical Diver, see note below under Program Content section.
2. Must provide proof of a minimum of 100 logged dives, of which at least 30 were deeper than 90 fsw (27 msw). If doing the course on a Rebreather must have 20 dives and 25 hours on the Rebreather being used.
3. Must be a minimum of 18 years of age.

OR, if being accepted in the Program based on equivalent experience:

4. Must be a qualified IANTD EANx Diver or equivalent.
5. Must provide proof of a minimum of 150 logged dives, of which at least 50 were deeper than 90 fsw (27 msw). If doing the course on a Rebreather must have 20 dives and 25 hours on the Rebreather being used.
6. Must be a minimum of 18 years of age.

### C. Texts

1. IANTD *Technical Student Workbook* or equivalent text(s) approved in writing by the Board of Directors (written approval will be issued by IAND, Inc./IANTD World Headquarters). Rebreather specific materials.
2. IANTD *Technical Diving Encyclopedia* or equivalent text(s) approved in writing by the Board of Directors (written approval will be issued by IAND, Inc./IANTD World Headquarters).

### D. Program Content

1. All academic portions of the IANTD *Technical Diver Student Workbook* and appropriate specific Rebreather materials and reference text material from the IANTD *Technical Encyclopedia*.
2. This Program must include a minimum of two Air or EANx or Normoxic (or greater than 21% oxygen) Trimix gas or diluent dives in OW (or overhead environments if the diver is already qualified or if taking this Program in conjunction with a cave or wreck course) to depths not to exceed 130 fsw (39 msw). On all of the dives the student must manage one stage cylinder.
3. This Program must also include a minimum of three dives in OW (or overhead environments if the diver is already qualified or if taking this Program in conjunction with a cave or wreck course) on Trimix using one gas switch. These dives may be performed at depths between 130 fsw (39 msw) and 200 fsw (60 msw) on Rebreathers the maximum depth is 170 fsw (51 msw). All divers must make one dive to at least 170 fsw (51 msw) and no dives deeper than 200 fsw (60 msw) All dives must follow or use as backups, the IANTD Tables using one gas switch. One dive may be made on custom software (all dives may be backed up by custom software generated tables provided it is a Program approved by IANTD).

4. This Program must include a minimum of 280 minutes of run time, including Air, EANx and Trimix dives.
5. To complete the course within the minimum specified dives students must have an average of 8 points (out of 10) on the watermanship evaluations. With 2 or more additional dives the student may graduate from the course with an overall average score of 6 points.

*NOTE: Divers who are already qualified as Technical Divers or Cave or IANTD Wreck may have the 3 air or EANx dives credited and only need to do the 3 Trimix dives between depths of 130 fsw (39 msw) and 200 fsw (60 msw). Plus complete the lecture on Normoxic Trimix in the workbook.*

## **E. Equipment Requirements**

1. Fulfill all Equipment Requirements as specified in the general Technical Diver Programs overview. These courses may be taken with a student on a Rebreather.

## **F. Program Limits**

1. There may be no more than 4 students per Instructor. This ratio may be increased by 2 students (for a maximum of 6 students) with an assisting IANTD Trimix Diver Supervisor. If the course is conducted in conjunction with a Cave or Wreck Programs, the limits for those Programs will prevail.
2. No dives may be conducted to depths greater than 200 fsw (60 msw). Or no greater than 170 fsw (51 msw) on Rebreathers.
3. Oxygen partial pressure may not exceed 1.40 (1.3 on Rebreather) during the working portion of the dives, nor exceed 1.61 (1.4 on rebreather) ATA during the decompression portion of the dives.
4. Trimix dives must be conducted using a mixture containing at least 20% oxygen ( $\pm 1\%$ ), and no more than 30% helium ( $\pm 1\%$ ).
5. Equivalent Narcosis Depth (END) may not exceed 120 fsw (36 msw).
6. Surface oxygen must be available for use in the event of Decompression Illness (DCI).
7. All dives must be performed as a single dive team.
8. All appropriate safety or required decompression stops must be performed.

## **G. Waterskills Development**

1. A confined water session must be completed before conducting any OW dives.
2. Swim with full underwater equipment (except stage cylinders) for at least 5 minutes.
3. Become proficient in the following propulsion techniques: modified flutter, modified frog, modified dolphin and standard shuffle kicks.
4. Deploy lift bag in less than 1½ minutes, and repeat at least 5 times during the Program.
5. Swim a distance of at least 75 feet (23 meters) without wearing a mask.
6. Practice removing and replacing a stage cylinder both at rest and while swimming.
7. Have 2 divers swim side-by-side, in full equipment, simulating an out-of-gas situation (without breathing, and exhaling slowly), for a distance of 60 feet (18 meters), then stop and begin breathing with one diver handing-off the long second stage hose to the other diver. Divers should remain a rest for 3 breaths, then swim at an average

pace for at least 10 minutes. On Rebreathers this drill should be done with the diver breathing from the stage cylinder.

8. Remove the harness and cylinders from a simulated unconscious diver in less than 1½ minutes. (Students who exceed the time limit on this skill must have a quick-release added to their harness).
9. Divers using a quick-release on their harness or backpack must, in confined water, swim the system while the instructor disconnects the quick-release to simulate a failure. The student is to swim the system demonstrating control of buoyancy and body positioning with the quick disconnect released for sufficient duration to satisfy the instructor that this type failure may be managed by the student.
10. Demonstrate an ability to respond to a single-bladder BCD failure by the two methods listed below. (Students using gear configurations that prevent accomplishment of these two skills will be required to wear a redundant BCD. Students who already have a redundant BCD or dry suit may use one of these alternates after attempting perform the methods without the use of the alternative.)
  - a. Completely deflate BCD and swim while maintaining buoyancy control for at least two minutes.
  - b. Completely deflate BCD, ascend safely to the surface, and remain afloat for at least 3 minutes.

*NOTE: If at any time the student starts to over-exert, or if it is obvious that the skill cannot be accomplished, the instructor is to ensure that the BCD is inflated.*

11. In confined water, have a student lose buoyancy by deflation of the BCD and then attempt to utilize a lift bag or other secondary buoyant device as a BCD.

*NOTE: This skill is to demonstrate how effective these devices are and to reinforce that even if not suitable for a redundant BCD they still provide an option for self rescue in an emergency situation.*

12. Following a means of reference (pool wall, guide line, ship railing, etc.) with eyes closed, remove stage cylinder and swim a distance of at least 15 feet (4.5 meters). Reverse direction, return to stage cylinder and replace it on correct side.
13. Two divers approximately 60 feet (18 meters) apart, with blacked-out masks or eyes closed, and while simulating an out of air situation, locate each other (using side of pool, rail on wreck, guide line, etc. for orientation) and begin gas sharing via long hose. On Rebreathers this drill should be done with the diver breathing from the stage cylinder
14. Prior to dives, students must use IANTD Gas Management Charts to match gas turn points. (Open Circuit only).
15. Open and close tank valves at least once on all dives.
16. Remove and replace stage cylinder(s) on each dive.
17. At least once on each dive, Instructor is to signal to student(s) that one of their regulators is malfunctioning and the student is to take the corrective action (Open Circuit only).
18. Perform gas sharing in one form or another on at least 3 of the air dives. It is recommended that the Instructor do this at times when it surprises at least one of the divers, and at a point when there is a reasonable distance between the divers. On Rebreathers this drill should be done with the diver breathing from the stage cylinder
19. Determine RMV and demonstrate ability to calculate and perform gas matching. (Open Circuit only)

**Rebreather specific skills:**

- 22. 22. FLAGS**
- 23. 23. The Three H's (Hypoxia, Hyperoxia, and Hypercapnia)**
- 24. 24. Solenoid failures (CCR)**
- 25. 25. Diluent switches (CCR)**
- 26. 26. Manual operation**
- 27. 27. Floods**
- 28. 28. Open Circuit Bailout**
- 29. 29. Minimum loop volume diving**
- 30. 30. SCR Bailout (CCR)**
- 31. 31. Pre and post dive checks**