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Recreational diving services — Requirements for rebreather instructor training

Services relatifs à la plongée de loisirs — Exigences concernant la formation des moniteurs recycleur

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Foreword

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This document was prepared by Technical Committee ISO/TC 228, *Tourism and related services*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 329, *Tourism services*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Rebreathers (i.e. breathing devices that recirculate some or all of the diver's exhaled breath and replenish any consumed oxygen to maintain a breathable mixture) are becoming much more widely available and popular among divers. The market for rebreather diving has been constantly growing in recent years and is now considered to be large enough that the need for standards on minimum training requirements for training organizations is evident. Rebreathers allow divers to dive for longer and to greater depths. Rebreathers can be hazardous if they are used improperly; divers have had fatal accidents due to incorrect use of these devices. It is therefore important to specify training for diving with such devices.

Training organizations offering training that conforms with this document may exceed any of the requirements in terms of the volume or complexity of training but should at least ensure the students master all the skills and knowledge defined in this document.

Recreational diving services — Requirements for rebreather instructor training

1 Scope

This document specifies requirements for rebreather instructor training programmes which provide the competencies required to be able to train rebreather divers.

This document specifies evaluation criteria for these competencies and specifies the requirements for four levels of rebreather instructors.

This document specifies the requirements under which training is provided, in addition to the general requirements for recreational diving service provision according to ISO 24803.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 24802-2, *Recreational diving services — Requirements for the training of scuba instructors — Part 2: Level 2*

ISO 24803, *Recreational diving services — Requirements for recreational diving providers*

ISO 24804, *Recreational diving services — Requirements for rebreather diver training — No-decompression diving*

ISO 24805, *Recreational diving services — Requirements for rebreather diver training — Decompression diving to 45 m*

ISO 24806, *Recreational diving services — Requirements for rebreather diver training — Decompression diving to 60 m*

ISO 24807, *Recreational diving services — Requirements for rebreather diver training — Decompression diving to 100 m*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
rebreather
apparatus that has a supply of gas carried by the diver, allowing the diver to breathe under water which enables the diver to inspire gas from a facepiece connected to a counterlung, and to pass exhaled gas through a carbon dioxide absorption material before it is re-breathed from the counterlung and inspired partial pressure of the gases within the apparatus remain within acceptable physiological limits so that gas is thus recirculated within the apparatus

Note 1 to entry: A rebreather can also be called a self-contained rebreathing diving apparatus.

Note 2 to entry: A facepiece can be a mouthpiece assembly, a half mask, a full-face mask or a helmet.

[SOURCE: EN 14143:2013, 3.1, modified — Note 1 to entry modified and Note 2 to entry added. This content has been reproduced with the permission of CEN. Copyright remains with CEN.]

3.2
rebreather type
primary rebreather design

EXAMPLE Closed-circuit rebreather (CCR), manually controlled closed-circuit rebreather (mCCR), electronically controlled closed-circuit rebreather (eCCR), semiclosed-circuit rebreather (SCR), manually controlled SCR (mSCR), electronically controlled SCR (eSCR), hybrid closed-circuit rebreather (hCCR).

3.3
rebreather unit
type of *rebreather* (3.1) having consistent controls, displays and configuration over several *rebreather models* (3.4), where the operation is essentially the same from *rebreather model* (3.4) to *rebreather model* (3.4)

3.4
rebreather model
specific individual design of *rebreather* (3.1) made by a manufacturer

3.5
breathing gas
gas present in the *breathing loop* (3.7) inspired by the diver

3.6
trimix
gas comprising a specified mixture of oxygen, helium and nitrogen, capable of supporting human life under appropriate diving or hyperbaric conditions

Note 1 to entry: This includes manufactured gas mixtures made up from combinations of pure oxygen, pure helium and pure nitrogen, with or without compressed air.

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3.7
breathing loop
portion of a *rebreather* (3.1) through which gas circulates, usually consisting of a mouthpiece, breathing hose(s), counterlung(s), non-return valves and a CO_2 absorbent canister

3.8
confined water
swimming pool with a depth appropriate to the activity or body of water offering similar conditions with regard to visibility, depth, water movement and access

[SOURCE: ISO 24801-2:2014, 3.5]

3.9
open water
body of water significantly larger than a swimming pool, offering conditions typical of a natural body of water

[SOURCE: ISO 24801-2:2014, 3.6]

3.10
limited open water
open water (3.9) no deeper than 20 metres with no appreciable water movement and visibility that is sufficient to allow effective instructor candidate supervision and skill development

3.11
service provider
entity (individual or organization), including any individual acting on behalf of such an entity, which offers one or more of the following services:

— introductory diving activities,

— snorkelling excursions;

— provision of training and education;

— organized and guided diving for qualified divers;

— rental of diving equipment

[SOURCE: ISO 24803:2017, 3.1]

3.12
decompression stop
mandatory stop during ascent from depth prior to surfacing

3.13
decompression diving
diving with mandatory decompression stops

3.14
training organization
entity providing training systems and issuing qualifications for recreational diving, and which is responsible for the implementation and quality management of training

Note 1 to entry: Entity can include scuba diving federations and scuba diver training agencies.

3.15
instructor trainer
individual appointed by a *training organization* (3.14) able to train and assess instructor candidates according to this document to a specified level of competency

3.16
hard overhead environment
environment which does not allow direct vertical ascent to the surface due to a physical barrier

4 Competencies

The training programme shall ensure that instructor candidates are qualified to conduct the training and qualification of rebreather divers for a specific rebreather unit to one or more of four levels as follows:

— rebreather instructor level 1: shall be competent to train and qualify rebreather divers in accordance with ISO 24804 (No-decompression diving);

— rebreather instructor level 2: shall be competent to train and qualify rebreather divers in accordance with ISO 24805 (Decompression diving to 45 m);

— rebreather instructor level 3: shall be competent to train and qualify rebreather divers in accordance with ISO 24806 (Decompression diving to 60 m);

— rebreather instructor level 4: shall be competent to train and qualify rebreather divers in accordance with ISO 24807 (Decompression diving to 100 m).

After qualification, instructors will need further unit-specific rebreather diver and instructor training to be qualified to provide instruction for a different rebreather unit.

5 Prerequisites for training

5.1 General

Subclauses 5.2 to 5.5 apply to instructor candidates on all the levels specified in accordance with Clause 4. Additional specific prerequisites are specified in sublauses 5.6 to 5.9 for each level of competency.

5.2 Common prerequisites

The service provider shall ensure that instructor candidates fulfil the following prerequisites in order to participate in the training programme:

— be qualified in accordance with ISO 24802-2;

— be qualified at the unit-specific rebreather diver level corresponding to the unit-specific instructor level being undertaken.

NOTE The service provider can consult with the manufacturer of the rebreather prior to commencement of training of the instructor candidate, so that the manufacturer can raise any safety-related concerns to the training of the instructor candidate, unless the manufacturer does not require such consultation.

5.3 Minimum age

The minimum age to participate in an instructor training programme in accordance with this document shall be 18 years.

5.4 Health requirements

Documented evidence shall be obtained that the student has been medically screened as suitable for recreational diving by means of an appropriate questionnaire or medical examination.

NOTE See Reference [3] for an example of a medical questionnaire and accompanying guidance to physicians.

In case of doubt, the training service provider shall refer students to proper medical resources. If the student is not examined by a physician, the student shall be obliged to confirm by signature that they have understood written information given by the instructor trainer on diseases and physical conditions which can pose diving-related risks.

Students shall be advised of the importance of appropriate regular medical examinations.

5.5 Preassessment

The instructor trainer shall assess the instructor candidate's knowledge and skills at the start of the training programme to ensure that:

— they have the competencies expected of a rebreather diver at the applicable level for which the instructor training is being undertaken;

— they have the competencies expected of an instructor holding their existing instructor qualification.

5.6 Rebreather instructor level 1

In order to participate in a training programme for rebreather instructor level 1, candidates shall:

— be qualified as a rebreather diver in accordance with ISO 24804 for the same specific rebreather unit they will use during the training programme;

— have a minimum of 150 logged dives, of which at least 75 dives and 75 h were made on a rebreather, with at least 50 dives and 50 h on the specific rebreather unit to be used during the training programme.

5.7 Rebreather instructor level 2

In order to participate in a training programme for rebreather instructor level 2, candidates shall:

— be qualified as a rebreather diver in accordance with ISO 24805 for the same specific rebreather unit they will use during the training programme;

— have a minimum of 150 logged dives, of which at least 100 dives and 100 h were made on a rebreather, with at least 50 dives and 50 h on the specific rebreather unit to be used during the training programme, including at least 10 rebreather dives requiring mandatory stage decompression.

5.8 Rebreather instructor level 3

In order to participate in a training programme for rebreather instructor level 3, candidates shall:

— be qualified as a rebreather diver in accordance with ISO 24806 for the same specific rebreather unit they will use during the training programme;

— be qualified as a rebreather instructor level 2 in accordance with this document;

— have conducted at least five courses for rebreather diver training in accordance with ISO 24805;

— have a minimum of 25 logged dives deeper than 45 m using trimix with the rebreather unit to be used during this programme.

5.9 Rebreather instructor level 4

In order to participate in a training programme for rebreather instructor level 4, candidates shall:

— be qualified as a rebreather diver in accordance with ISO 24807 for the same specific rebreather unit they will use during the training programme;

— be qualified as a rebreather instructor level 3 in accordance with this document;

— have conducted at least five courses for rebreather diver training in accordance with ISO 24806;

— have a minimum of 25 logged dives deeper than 60 m using trimix with the rebreather unit to be used during this programme.

6 Introductory information

Information in accordance with ISO 24803 shall be made available to the instructor candidates prior to or during the first class or meeting.

In particular, the instructor candidates shall be informed of the limits of their training and qualification.

7 Theoretical knowledge

The training programme shall ensure that instructor candidates:

— demonstrate that they are competent to deliver theory presentations to explain the knowledge and skills in accordance with ISO 24804, ISO 24805, ISO 24806 or ISO 24807, as applicable;

— are competent to respond correctly to questions that students at the applicable level of training would be likely to pose;

— can assess students' knowledge to ensure that they meet the requirements of the applicable rebreather diver training programme;

— can provide appropriate remedial training for students where required;

— can explain the requirements and limitations of the standard for the applicable rebreather diver training programme;

— can explain the design philosophy for the specific rebreather unit that the student will learn on.

These competencies shall be demonstrated by the candidates instructing either real or simulated students in the class.

8 Practical skills

8.1 General skills

The training programme shall ensure that instructor candidates:

— are competent to plan and organise in-water teaching presentations;

— are able to provide an effective pre-dive briefing;

— are able to properly demonstrate skills appropriate to the applicable level of training;

— can identify and correct student errors;

— can assess students' abilities to ensure that they meet the requirements of the rebreather diver training programme;

— ensure the safety of students at all times and use proper control techniques;

— are able to provide an effective dive debriefing;

— ensure that dive logs and other required teaching records are properly completed.

These requirements shall be demonstrated by the candidates instructing either real or simulated students in the class.

8.2 Rescue skills

This clause applies to training programmes for rebreather instructor level 1 and rebreather instructor level 2.

The training programme shall ensure that instructor candidates are competent to perform a simulated rescue to the surface of a non-responsive rebreather diver from a depth not deeper than 15 m, including a surface tow and subsequent removal of both rescuer and casualty's rebreathers.

9 Training equipment and training materials

The instructor candidate and instructor trainer shall have available the equipment and materials specified for the applicable level of rebreather diver training in accordance with ISO 24804, ISO 24805, ISO 24806 or ISO 24807. The instructor candidate shall either own or have unlimited access to the rebreather unit they will use during the training programme.

The rebreather shall be in good working order and shall allow open-circuit bailout and, where applicable, decompression diving. The rebreather shall be configured and used in accordance with the manufacturer's instructions.

10 Practical training parameters

10.1 Training dives or in-water sessions

The maximum depth for open water dives shall meet the requirements for the corresponding level of the rebreather diver training programmes in accordance with ISO 24804, ISO 24805, ISO 25806 or ISO 24807.

Confined water and limited open water sessions shall not be conducted in a hard overhead environment.

Open water dives may be conducted in hard overhead environments under the following conditions:

— the instructor candidate is able to remain in the daylight zone where there is no need for the use of a dive light;

— the instructor candidate is never further than a distance of 40 m (sum of horizontal and vertical distance) from a point where they are able to breathe at the surface of the water.

Open water dives may only be conducted in hard overhead environments that exceed these specifications provided that:

— the instructor trainer has proof of qualifications to instruct rebreather diving in hard overhead environments to the planned maximum depth of the dive;

— all instructor candidates have proof of rebreather diving qualifications in hard overhead environments to the planned maximum depth of the dive.

There shall be no more than three in-water sessions per day and no more than two open water dives per day if any of these open water dives require mandatory decompression stops.

10.2 Instructor trainer responsibilities

All in-water skills shall be taught, directly supervised and evaluated by an instructor trainer, who shall be in the water during each session.

The maximum number of instructor candidates on in-water sessions that may be accompanied by a single instructor trainer shall be at the same ratio as the student to instructor ratio specified for the applicable level of rebreather diver training.

The instructor trainer shall ensure that all open water dives are logged by the instructor candidates at the end of each diving day.

10.3 Breathing gas limits

The breathing gas limits for each level of instructor training programme shall meet the requirements of ISO 24804, ISO 24805, ISO 24806 or ISO 24807, as applicable.

11 Qualification

11.1 Knowledge

The training programme shall ensure that in order to be qualified, instructor candidates demonstrate to an instructor trainer knowledge of how to provide rebreather diver training by passing an oral or written examination.

The examination shall test theoretical knowledge in accordance with Clause 7, knowledge of skills in accordance with Clause 8 and an understanding of the requirements of the applicable rebreather diver training programme in accordance with ISO 24804, ISO 24805, ISO 24806 or ISO 24807.

11.2 Skill evaluation

To be qualified, the training programme shall ensure that instructor candidates demonstrate to an instructor trainer the skills in accordance with Clause 8.

11.3 Course assistance

This clause applies to candidates for rebreather instructor level 1 or rebreather instructor level 2.

Prior to qualification, instructor candidates shall:

— either assist in an entire rebreather diver course in accordance with ISO 24804 or ISO 24805 (as applicable) as an instructor trainee under the supervision of an instructor or instructor trainer; or

— participate in a simulated rebreather diver course conducted by an instructor trainer, including at least 50 % of the water sessions required for the full rebreather diver course, and including at least one confined water session.

The courses shall be conducted using the same rebreather unit that the candidate seeks qualification for.

If the rebreather diver course assistance is carried out as part of the instructor course, then these dives shall be carried out in addition to the required in-water sessions for the instructor course.

11.4 In-water sessions

The instructor training programme shall ensure that the instructor trainer evaluates teaching skills of the candidates in at least four in-water sessions, at least three of which shall be conducted in open water.

11.5 Crossover requirements

11.5.1 General

In order to cross over from one unit-specific qualification to a different unit-specific qualification, the following crossover requirements apply.

11.5.2 Prerequisites

11.5.2.1 Level 1 instructors

In order to cross over from one unit-specific qualification to a different unit-specific qualification, candidates at level 1 instructor qualification in accordance with Clause 4 shall meet the following prerequisites:

— they shall have a qualification as a unit-specific rebreather diver of at least level 1 on the specific rebreather unit which the instructor intends to use;

— they shall have a minimum of 30 logged dives and 30 h on the specific rebreather unit which the instructor intends to use.

11.5.2.2 Level 2, level 3 or level 4 instructors

In order to cross over from one unit-specific qualification to a different unit-specific qualification, candidates at level 2, level 3 or level 4 instructor qualification in accordance with Clause 4 shall meet the following prerequisites:

— they shall have a qualification as a unit-specific rebreather diver of at least level 2 on the specific rebreather unit which the instructor intends to use;

— they shall have a minimum of 50 logged dives and 50 h on the specific rebreather unit which the instructor intends to use.