INTERNATIONAL STANDARD

ISO 11107

First edition
2009-06-15

Recreational diving services — Requirements for training programmes on enriched air nitrox (EAN) diving

Services relatifs à la plongée de loisirs — Exigences pour les programmes d'entraînement relatifs à l'air enrichi au nitrox

Reference number
ISO 11107:2009(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 11107 was prepared by Technical Committee ISO/TC 228, *Tourism and related services*.

Introduction

This International Standard specifies minimum requirements; it does not preclude the provision of additional training or the assessment by a service provider of additional competences. This International Standard represents a tool by which to compare existing (or future) qualifications of scuba divers who wish to dive with enriched air nitrox (EAN).

Recreational diving services — Requirements for training programmes on enriched air nitrox (EAN) diving

1 Scope

This International Standard specifies the level of competence required of a scuba diver in order to be awarded an enriched air nitrox (EAN) diver certification by a training organization.

This International Standard also specifies the conditions under which training is to be provided, which supplement the general requirements for recreational diving services specified in ISO 24803.

2 Normative references

The following referenced documents are indispensable for the application 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 24801-2, *Recreational diving services — Safety related minimum requirements for the training of recreational scuba divers — Part 2: Level 2 — Autonomous diver*

ISO 24802-1, *Recreational diving services — Safety related minimum requirements for the training of scuba instructors — Part 1: Level 1*

ISO 24802-2, *Recreational diving services — Safety related minimum requirements for the training of scuba instructors — Part 2: Level 2*

3 Terms and definitions

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

3.1
training organization
entity providing recreational scuba diving training systems and certification, and which is responsible for the implementation and quality management of scuba diver training

NOTE The entity can include scuba diving federations and scuba diver training agencies.

3.2
certification
confirmation that a student has completed scuba diver training that fulfils all requirements in accordance with this International Standard, as issued by training organizations

3.3
scuba instructor
individual qualified in accordance with ISO 24802-1 or ISO 24802-2, as appropriate

3.4
open water
body of water significantly larger than a swimming pool, which offers conditions typical of a natural body of water

3.5
enriched air nitrox
EAN
breathable mixture of nitrogen and oxygen with more than 21 % oxygen content, which may contain trace gases at levels no higher than those found in normal air

4 Competences of a certified enriched air nitrox diver

The training programme shall ensure that, when assessed in accordance with Clause 10, scuba divers are qualified to

— plan, conduct and log EAN open-water, no-decompression dives, when accompanied by another scuba diver of at least level 2 — "Autonomous diver", in accordance with ISO 24801-2;

— procure EAN mixes, EAN equipment and other services to engage in recreational EAN diving without supervision.

The training programme does not qualify divers to make dives which require mandatory in-water decompression stops or dives using more than one breathing gas and/or rebreathers. Such dives are beyond the scope of this International Standard and require additional training.

5 Prerequisites for training

5.1 Minors

Documented parental or legal guardian consent shall be obtained when the applicant is a minor.

5.2 Health requirements

If training dives are to be conducted as part of the training programme, 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. In case of doubt, or at the scuba instructor's discretion, students shall be referred to proper medical resources. If the student is not examined by a physician, the student shall be obliged to confirm by signature that he or she has understood written information given by the scuba instructor on diseases and physical conditions which may pose risks in relation to diving.

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

6 Required theoretical knowledge

6.1 Equipment

The training programme shall ensure that students have appropriate knowledge of the physical characteristics, operating principles, maintenance requirements and use of EAN diving equipment. This shall include at least the following:

— how EAN use impact diving equipment (e.g. increased oxidation and wear);

— the suitability of scuba equipment for use with EAN, including national and/or regional regulations;

— the suitability of scuba cylinders for EAN (e.g. when oxygen service may be required);

— EAN cylinder markings.

The students should be made aware of the importance of following the recommendations of equipment manufacturers regarding the use of their equipment with EAN.

6.2 Physics of diving with EAN

The training programme shall ensure that students have appropriate knowledge of the physical principles of EAN and its application to diving activities. This shall include at least the following:

— what EAN is;

— partial pressures;

— the benefits of reduced exposure to nitrogen on decompression, e.g. equivalent air depth (EAD);

— EAN use and bottom time.

6.3 EAN handling risks

The training programme shall ensure that students have appropriate knowledge of risks related to the handling of EAN mixtures with elevated oxygen levels. This shall include at least knowledge about factors likely to increase the risk of fire or explosion.

6.4 Medical issues

The training programme shall ensure that students have appropriate knowledge of the causes, symptoms, prevention, first-aid and proper handling of EAN-related diving medical problems. This shall include at least the following:

— EAN and narcosis;

— oxygen toxicity;

— decompression illness.

Instructions shall include why buddy teams must plan their dive in accordance with:

— the limits of the diver with the most conservative maximum operating depth,

— no decompression limit, or

— oxygen toxicity limit.

6.5 Use of dive tables and dive computers

The training programme shall ensure that students have an appropriate knowledge of using dive tables, dive computers and/or dive planning software, including:

— how to determine oxygen partial pressure (PO2);

— managing exposure to nitrogen, e.g. by using the equivalent air depth concept;

— how to determine the maximum operating depth for a particular EAN mixture, taking into consideration its oxygen content;

— how to use EAN dive tables and/or a EAN-programmable dive computer to plan and execute single and repetitive dives.

7 Practical skills

The training programme shall ensure that students are able to perform the following practical skills:

— how to use an oxygen analyzer to determine the oxygen content in an EAN blend;

— how to fill out cylinder content tags/stickers;

— how to complete and sign a filling station's EAN fill log, including maximum operating depth and oxygen content.

8 Practical training parameters

If the training programme includes open water dives using EAN as a breathing gas, the maximum PO2 shall not exceed 160 kPa (1,6 bar).

9 Scuba instructors

Scuba instructors teaching the training programme and assessing students in accordance with this International Standard shall have completed formal training for EAN training programmes.

10 Certification

The training programme may be conducted in conjunction with scuba diver training in accordance with ISO 24801-2, but the certification shall not be issued until such time as the student has finalized all certification requirements in accordance with ISO 24801-2.

The student shall demonstrate EAN knowledge to a scuba instructor by taking and passing an oral or written examination. This examination shall test EAN knowledge in accordance with Clause 6.

The scuba instructor shall ensure that the student has the ability to analyze EAN and plan dives using EAN, prior to certification in accordance with Clause 7.

NOTE Open water dives using EAN are not a requirement in order to complete the training programme in accordance with this International Standard, but they are encouraged.