INTERNATIONAL STANDARD

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Recreational diving services — Requirements for the training of recreational scuba divers —

Part 2: Level 2 — Autonomous diver

Services relatifs à la plongée de loisirs — Exigences concernant la formation des plongeurs pratiquant la plongée de loisirs —

Partie 2: Niveau 2 — Plongeur autonome

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is Technical Committee ISO/TC 228, *Tourism and related services*.

This second edition of ISO 24801-2 cancels and replaces the first edition (ISO 24801-2:2007), which has been technically revised.

ISO 24801 consists of the following parts, under the general title *Recreational diving services — Requirements for the training of recreational scuba divers*:

— *Part 1: Level 1 — Supervised diver*

— *Part 2: Level 2 — Autonomous diver*

— *Part 3: Level 3 — Dive leader*

Introduction

This part of ISO 24801 is one of a series of International Standards relating to recreational diving services, which have been prepared with the aim of establishing a set of specifications for safety practices and the provision of services.

These International Standards specify:

— necessary levels of experience and competency of scuba divers and scuba instructors;

— safety practices and requirements for recreational scuba diving service providers appropriate to the different diving levels.

The requirements specified are minimal; they do not preclude the provision of additional training or the evaluation of additional competencies by a service provider. These International Standards represent a tool for comparison of existing (or future) qualifications of scuba divers. They do not represent a course programme, nor do they imply that course programmes and scuba diver qualifications issued by different nations or training organizations are required to correspond to these levels.

Recreational diving services — Requirements for the training of recreational scuba divers —

Part 2:
Level 2 — Autonomous diver

1 Scope

This part of ISO 24801 specifies the competencies required of a scuba diver in order to obtain a scuba diver qualification from a training organization attesting that he/she has met or exceeded scuba diver level 2 ("Autonomous diver"), and specifies evaluation criteria for these competencies.

It also specifies the conditions under which training is provided, in addition to the general requirements for recreational diving service provision in accordance with ISO 24803.

This part of ISO 24801 applies to training and evaluation in recreational scuba diving.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 24801-3, *Recreational diving services — Requirements for the training of recreational scuba divers — Part 3: Level 3 — Dive leader*

ISO 24802-1, *Recreational diving services — Requirements for the training of scuba instructors — Part 1: Level 1*

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 scuba diving service providers*

EN 250:2000, *Respiratory equipment — Open-circuit self-contained compressed air diving apparatus — Requirements, testing, marking*

EN 12628:1999, *Diving accessories — Combined buoyancy and rescue devices — Functional and safety requirements, test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 250:2000 and EN 12628:1999 and the following apply.

3.1
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.

3.2
scuba instructor
individual qualified in accordance with ISO 24802-1 or ISO 24802-2

3.3
dive leader
individual qualified in accordance with ISO 24801-3

3.4
breathing gas
mixture of oxygen and nitrogen with no less than 20 % oxygen

3.5
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

3.6
open water
body of water significantly larger than a swimming pool, offering conditions typical of a natural body of water

3.7
diving equipment
equipment consisting of fins, mask, snorkel, regulator, alternative breathing gas system, cylinder, cylinder-support-system, buoyancy compensator, a quick release weight system (if appropriate), submersible pressure gauge (breathing gas pressure monitor), means to measure depth and time and to safely limit exposure to inert gas, diving suit (if appropriate)

Note 1 to entry: An alternative breathing gas system could range from a simple octopus system to a duplicate breathing system with a separate breathing gas supply.

Note 2 to entry: Specific environments can require additional equipment (e.g. an underwater navigational aid, knife/cutting device, delayed surface marker buoy).

3.8
direct supervision
supervision of a group of divers by a scuba instructor or a dive leader who is in a position that allows rapid intervention on behalf of the divers

4 Competencies of a recreational scuba diver at level 2 (“Autonomous diver”)

Scuba divers at level 2 shall be trained such that when evaluated in accordance with Clause 10 they are deemed to have sufficient knowledge, skill and experience to dive with other scuba divers of at least the same level in open water without supervision of a scuba instructor.

Scuba divers at level 2 are qualified to dive within the following parameters unless they have additional training or are accompanied by a dive leader:

— dive to a recommended maximum depth of 20 m with other scuba divers of the same level;

— make dives, which do not require in-water decompression stops;

— dive only when appropriate support (e.g. first aid kit, a dive leader, support vessel; as appropriate to the dive site and the divers’ experience) is available at the surface;

— dive under conditions that are equal or better than the conditions where they were trained.

If diving conditions are significantly different from those previously experienced, a scuba diver at level 2 requires an appropriate orientation from a dive leader.

Where further instruction is required this may only be provided by a suitably qualified scuba instructor of level 2. If accompanied by a scuba instructor, a scuba diver at level 2 may gain progressive experience beyond these parameters and develop competency in managing more challenging diving conditions (e.g. increased depth and current, reduced visibility, extreme temperatures) designed to lead to higher qualifications.

5 Prerequisites for training

5.1 General

The service provider shall ensure that the client fulfils the following prerequisites to take part in the training course envisaged.

5.2 Minors

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

5.3 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 (see Annex A for an example of a medical sheet). In any 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 he or she has understood written information given by the scuba instructor on diseases and physical conditions which can pose diving related risks.

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

6 Introductory information

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

7 Required theoretical knowledge

7.1 Equipment

Students shall have an appropriate knowledge concerning the physical characteristics, operating principles, maintenance and use of the following equipment items:

— mask;

— fins;

— snorkel;

— diving suits;

— quick release weight systems;

— float, flag and marker buoy;

— cylinders;

— cylinder valves;

— regulators;

— submersible pressure gauge (breathing gas pressure monitor);

— alternative breathing gas source;

— cylinder-support systems;

— buoyancy control devices;

— timing devices;

— under-water navigational aids;

— depth gauge/depth monitor;

— dive tables;

— dive computers;

— knife/cutting devices;

— lights;

— emergency signalling device (acoustical, optical);

— first aid and oxygen kit;

— personal diving log.

NOTE Where additional equipment is required, relevant training needs to be provided (e.g. an underwater navigational aid, knife/cutting device). In environments where surface marker buoys or delayed surface marker buoys are commonly used, divers need to be instructed in their use.

7.2 Physics of diving

Students shall have an appropriate knowledge concerning the physical principles and their application to diving activities, equipment and hazards relating to:

— sound;

— light;

— buoyancy;

— pressure/gas laws;

— temperature.

7.3 Decompression management

Students shall have an appropriate knowledge of decompression management using dive tables, dive computers and/or dive planning software, including:

— how to determine dive profiles which do not require in-water decompression stops for single and repetitive dives;

— be able to determine required stage decompression.

7.4 Dive planning

Students shall have appropriate knowledge concerning dive planning issues:

— planning and preparation, with emphasis on the prevention of out-of-breathing-gas situations and emergencies;

— emergency procedures;

— accident management/prevention;

— communications, both under-water and on the surface;

— diver assistance (self/buddy);

— recommended diving practices (e.g. separation procedures, safety stops);

— procedures for diving from boats;

— proper use of personal diving log.

7.5 Medical problems related to diving

7.5.1 General

Students shall have an appropriate knowledge concerning the causes, symptoms, prevention, first-aid and treatment of diving medical problems.

7.5.2 Direct effects of pressure

7.5.2.1 Increasing pressure (descent phase):

— gas compression (e.g. ears, sinuses, masks, lungs, suits, teeth).

7.5.2.2 Decreasing pressure (ascent phase):

— gas expansion (e.g. ears, sinuses, lungs, stomach, intestines, teeth);

— forms of decompression illness (DCI) (e.g. decompression sickness, arterial gas embolism).

7.5.2.3 Other pressure related conditions:

— decompression illness (DCI) (including on-gassing, post-dive effects);

— nitrogen narcosis;

— hypercapnia (excess carbon dioxide);

— oxygen toxicity;

— contaminated breathing gas.

7.5.3 Other hazards:

— physical stress (incl. fatigue and exhaustion);

— exposure/hypothermia/hyperthermia;

— in-water injuries;

— drowning;

— hyperventilation;

— airway control and related problems;

— medication, drugs, alcohol.

7.5.4 First aid after diving incidents:

— cardio-pulmonary resuscitation (CPR);

— normobaric oxygen first aid.

7.6 Psychological problems related to diving

Students shall have an appropriate knowledge concerning causes, symptoms, prevention and management of:

— mental stress;

— panic;

— overconfidence.

7.7 Diving environment

7.7.1 General

Students shall have appropriate knowledge concerning the local and general conditions of the diving environment and their possible effects on the scuba diver and the scuba divers' impact on the environment.

7.7.2 Water:

— temperature/thermoclines;

— visibility;

— movement (surface action, currents, tides, etc.);

— density (fresh and salt water).

7.7.3 Topography:

— bottoms;

— shorelines.

7.7.4 Aquatic life:

— animal;

— plant.

7.7.5 Environmental awareness:

— preventive behaviour;

— conservation;

— preservation.

7.7.6 Other topics:

— weather conditions;

— precautions for diving in new diving environments;

— surface hazards;

— overhead environments;

— entanglement.

7.8 Use of breathing gases other than air

Where a breathing gas other than air is used during the training course, the student shall be made aware of any depth limits, oxygen exposure management issues and equipment considerations relevant to the dives planned.

8 Required scuba skills

8.1 Confined water scuba skills

Students shall be able to demonstrate capability in the following skills; each skill shall be satisfactorily practised in confined water before that skill is performed in open water:

— use of mask, fins and snorkel;

— diving equipment assembly and disassembly (at water's edge);

— pre-dive inspection of diving equipment and in and out of water buddy checks;

— entries and exits;

— proper weighting;

— mouthpiece clearing both snorkel and regulator;

— regulator/snorkel exchanges while summing at the surface;

— proper descent and ascent procedures (e.g. equalising pressure in ears and mask);

— swim under-water efficiently with appropriate buoyancy and attitude control (trim);

— mask-clearing, including removal and replacement;

— controlled breathing under-water without mask;

— buddy-system techniques (e.g. appropriate hand signals, staying close, monitoring the buddy);

— under-water and surface buoyancy control;

— under-water problem solving (e.g. regulator recovery);

— monitoring instruments;

— surface snorkel swimming with full diving equipment;

— surface operation of the quick release of the weight ballast system;

— removal and replacement of weight ballast system;

— removal and replacement of scuba system;

— procedures allowing a scuba diver to ascend to the surface in the event of an out-of-breathing gas situation, acting as both receiver and donor: this may include emergency ascents and the use of alternative breathing gas supply (own and buddy's);

— equipment care and maintenance.

8.2 Open water scuba skills

Students shall be able to demonstrate the following skills in a comfortable and relaxed manner. Students shall satisfactorily practise each skill using appropriate equipment and techniques for the local environment. They shall be capable of performing each skill in conditions typical of the local environment. Skills involving swimming shall be conducted over distances appropriate to local conditions and diving techniques:

— use of mask, fins and snorkel;

— diving equipment assembly and disassembly (at water's edge);

— pre-dive inspection of diving equipment and in and out of water buddy checks;

— entries and exits;

— proper weighting;

— mouthpiece clearing both snorkel and regulator;

— regulator/snorkel exchanges while summing at the surface;

— proper descent and ascent procedures (e.g. equalising pressure in ears and mask);

— swim under water efficiently with appropriate buoyancy and attitude control;

— mask-clearing, including removal and replacement;

— controlled breathing under water without mask;

— buddy-system techniques (e.g. appropriate hand signals, staying close, monitoring the buddy);

— under-water and surface buoyancy control;

— under-water problem-solving (e.g. regulator recovery);

— monitoring instruments including the means to measure depth and time and to safely limit exposure to inert gas;

— surface-snorkel swimming with full diving equipment; the student shall be able to swim back to the point of safe exit but no less than 50 m;

— surface operation of the quick release and removal of the weight ballast system;

— removal of scuba system on the surface;

— procedures allowing a scuba diver to ascend to the surface in the event of an out-of-breathing gas situation, acting as both receiver and donor: this may include emergency ascents and the use of alternative breathing gas supply (own and buddy's);

— equipment care and maintenance (at water's edge);

— diver assistance techniques (self/buddy) (i.e. to assist a buddy to the surface and provide support on the surface);

— simple under-water navigation.

9 Practical training parameters

9.1 An open water dive shall comprise at least the following activities:

— briefing;

— preparation to dive;

— pre-dive checks;

— entry into water;

— descent procedures;

— under-water activity;

— ascent and surfacing procedures;

— exit from water;

— debriefing;

— post dive procedures;

— recording the dive.

9.2 All underwater skills in confined water shall be taught, directly supervised and evaluated by a scuba instructor, who shall be in the water during each session. The scuba instructor shall be in direct control of students throughout all sessions.

9.3 The student shall effectively show proof of, or demonstrate, to a scuba instructor:

a) a five minute survival swim/float without the use of mask, fins, snorkel, or other swimming aids;

b) distance swimming capability by one of the two following methods:

   — swim 200 m without the use of mask, fins, snorkel, or other swimming aids; or

   — swim 300 m using mask, fins and snorkel without other swimming aids.

If conditions warrant students may wear a diving suit provided they are weighted for neutral buoyancy.

9.4 Before participating in open water dives a student shall have demonstrated sufficient theoretical knowledge and scuba skills in confined water to be able to perform the open water dives in the prevailing conditions.

9.5 No more than three open water dives shall be conducted on a given day.

9.6 All open water dives shall be conducted in water that allows direct vertical access to the surface. Open water dives therefore shall not be conducted in under-water caves, inside wrecks or below ice.

9.7 During open water dives, the student shall at least be equipped with diving equipment as defined in 3.8, except that a means to measure depth and time and to safely limit exposure to inert gas is not required during the first two open water dives.

9.8 All under water skills in open water shall be taught, and evaluated by a scuba instructor of level 2. The scuba instructor shall be in the water and in charge of each open water dive.

The scuba instructor shall be in direct control of students throughout all sessions. Once students have completed all the requirements for supervised diver in accordance with ISO 24801-1, they may be accompanied during an underwater tour, during navigation exercises or during surface swims by a dive leader at the discretion of a scuba instructor of level 2.

The overall supervision of students is solely the scuba instructor's responsibility. The scuba instructor shall limit the number of students per scuba instructor or dive leader where environmental conditions are less than ideal, for example where underwater visibility is poor or there is significant water movement. The scuba instructor may also use additional aids to improve safety such as ascent lines, surface support

stations or safety scuba divers. Where safety scuba divers are used they shall have an appropriate level of rescue competency of at least dive leader level.

9.9 The scuba instructor shall limit the number of students on open water dives so that either the scuba instructor or a dive leader is able to provide direct supervision.

9.10 The scuba instructor shall cancel or abort the open water dive if environmental conditions, equipment problems or a student's physical or mental condition make this necessary.

10 Evaluation

10.1 Knowledge

The student shall demonstrate to a scuba instructor knowledge of scuba diving by taking and passing an oral or written examination as prescribed by a training organization. This examination shall test scuba diver level 2 theoretical knowledge in accordance with Clause 7 and knowledge of scuba skills in accordance with Clause 8 (see Annex A for an explanatory example).

10.2 Scuba skills

The student shall satisfactorily demonstrate to a scuba instructor, the scuba skills in accordance with Clause 8 (see Annex B for an explanatory example).

Students to be qualified shall complete at least four qualifying open water dives in accordance with 9.1 in the range between 4 m and 20 m under the direct supervision of a scuba instructor.

The underwater duration of each qualifying open water dive shall be at least 15 min. Each student shall have logged a total accumulated minimum duration of 80 min underwater before qualification.

For the purposes of this part of ISO 24801, open water (see 3.6) may also include certain sites that provide controlled conditions designated for recreational scuba diving. A site that provides conditions typically associated with natural bodies of water, such as appropriate depths for diving, but that has any of the following variables affecting typical open water sites deliberately controlled by manmade factors shall be considered a controlled environment:

a) water movement;

b) visibility;

c) water temperature.

Such sites are considered to be less challenging than most open water sites but may be used for level 2 skill training and evaluation. In these cases the programme shall contain at least two dives, providing at least 90 min total dive time, in such conditions. These shall be followed by a further two dives in traditional open water sites which shall include the following skills:

— proper descent and ascent procedures;

— mask-clearing, including removal and replacement;

— procedures allowing a scuba diver to ascend to the surface in the event of an out-of-breathing gas situation: this may include emergency ascents and the use of alternative breathing gas supply (own and buddy's);

— under-water buoyancy control.

NOTE The amount of underwater time, the number of dives and the depths needed for competence can vary. In determining these details, the scuba instructor and the training organization need to take into account that the training is competence to 20 m and additional underwater time or dives can be required.

As an option a training organization may allow that students, after having acquired all skills required by this International Standard but before they are awarded their qualifications, demonstrate their maturity for autonomous diving by carrying out a dive without direct supervision, satisfying the following conditions:

— this dive is carried out in buddy groups;

— each pair is deploying a surface marker buoy;

— provisions are in place for monitoring the students' movements at all times, with means for rapid intervention in case of danger;

— all other parameters shall be suitable for the competencies the students have achieved.

11 Requirements for training organizations

A training organization shall have a permanent headquarters and maintain records of all currently qualified scuba divers and scuba instructors at all levels.

The training organization shall identify the person or persons responsible for:

— implementation and maintenance of the training programme;

— quality assurance and customer satisfaction;

— recording diver qualifications;

— recording instructor qualifications.

A training organization shall be able to confirm the qualifications of a diver to diving instructors or service providers and shall be able to confirm the status of instructors to any interested party.

Annex A
(informative)

Example of an information sheet for medical screening

Medical Statement

This is a statement in which you are informed of some potential risks involved in recreational scuba diving and of the conduct required of you during the recreational scuba training.

You must complete this Medical Statement, which includes the medical-history information section, to enrol in the recreational scuba-training programme.

To the Participant:

The purpose of this medical information sheet is to inform you whether you should be examined by a physician before participating in recreational diving training. If any of these conditions apply to you this does not necessarily disqualify you from recreational scuba diving. It only means that you must seek the advice of a physician.

Please acknowledge that you have read and understood the information provided below by initialling each individual point.

Please be advised that if any of these items apply to you, for your own safety you must consult a physician prior to participating in recreational scuba diving.

YOU MUST CONSULT A PHYSICIAN IF:	**Initials**
You are pregnant or you suspect you may be pregnant	
You regularly take medications (with the exception of birth control)	
You are over 45 years of age and one or more of the following apply:	
— you smoke	
— you have a high cholesterol level	
YOU SHOULD CONSULT A PHYSICIAN IF YOU EVER HAD:	**Initials**
Asthma, or wheezing with breathing, or wheezing with exercise	
Any form of lung disease	
Pneumothorax (collapsed lung)	
History of chest surgery	
Claustrophobia or agoraphobia (fear of closed or open spaces)	
Epilepsy, seizures, convulsions or take medications to prevent them	
History of blackouts or fainting (full/partial loss of consciousness)	
History of diving accidents or decompression sickness	
History of diabetes	
History of high blood pressure or take medications to control blood pressure	
History of any heart disease	
History of ear disease, hearing loss or problems with balance	
History of thrombosis or blood clotting	
Psychiatric diseases	
I AM AWARE THAT I COULD BE UNFIT TO DIVE IF I HAVE OR DEVELOP DURING THE COURSE ANY OF THE FOLLOWING CONDITIONS:	**Initials**
Cold, sinusitis, or any breathing problems (e.g. bronchitis, hay fever)	
Acute migraine or headache	
Any kind of surgery within the last 6 weeks	
Under influence of alcohol, drugs or medications affecting the ability to react	
Fever, dizziness, nausea, vomiting and diarrhoea	
Problems equalizing (popping ears)	
Acute gastric ulcers	
Pregnancy	

Annex B
(informative)

Examples for the degree of mastery required for the level 2 scuba diver examination

Table B.1 — Theory topic

Theory topic	Required competency	Criteria testing
Equipment: Regulators	1. Explain the purpose of each major component of the regulator system and explain its purpose. 2. Describe the features and benefits of common regulator designs. 3. Identify desirable regulator system accessories/design types for the local environment. 4. Identify when a regulator requires servicing/inspection and assess basic functionality. 5. …	Written and/or oral theory exam and scuba instructor observation.

Table B.2 — Practical topic

Practical topic	Required competency	Criteria testing
Dive planning and preparation	1. Plan dive considering air consumption, navigation, communication, entry/exit methods, etc. 2. Assess environmental conditions. 3. Personal preparation for dive (good health, mental preparation, etc). 4. Equipment preparation. 5. Buddy checks. 6. Discuss buddy communication (e.g. hand signals) and means of maintaining contact. 7. Consider emergency. 8. …	Observation of practical exercises by scuba instructor and written theory examination.
Buoyancy	1. Demonstrate buoyancy control underwater by pivoting on the fin tips or other point of contact. Buoyancy is to be controlled by a buoyancy compensator oral inflation system and lung volume control. 2. Hover underwater using by a buoyancy compensator or drysuit power inflator system and lung volume control. 3. …	Scuba instructor observation.

Bibliography

[1] ISO 24801-1, *Recreational diving services — Requirements for the training of recreational scuba divers — Part 1: Level 1 — Supervised diver*

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