

CEN TC 329

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Recreational diving services — Safety related minimum requirements for the training of recreational scuba divers — Part 2: Level 2 - "Autonomous Diver"

Dienstleistungen des Freizeittauchens — Sicherheitsrelevante Mindestanforderungen an die Ausbildung von Freizeit-Gerätetauchern — Teil 2: Ausbildungsstufe 2 - "Selbstständiger Taucher"

Services relatifs à la plongée de loisirs — Exigences minimales de sécurité concernant la formation des plongeurs en scaphandre autonome de loisirs — Partie 2 : Niveau 2 - "Plongeurs autonome"

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Foreword

This document has been prepared by CEN /TC 329, "Tourism Services".

This document is currently submitted to the Formal Vote.

This document has to be implemented at national level, either by publication of an identical text or by endorsement, by month/year, and conflicting national standards have to be withdrawn by month/year.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document:

Introduction

The European Standards relating to recreational diving services have been prepared by CEN/TC 329/WG 3 "Recreational Diving Services", with the aim of establishing a series of specifications for safety practices and the provision of services.

Therefore these 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.

In any case, they cannot substitute for nor impose upon legal requirements, the alteration of which is outside the competence of the CEN/CENELEC members.

The European Standard prEN 14153 consists of the following parts:

- prEN 14153-1, *Recreational diving services - Safety related minimum requirements for the training of recreational scuba divers - Part 1: Level 1 – "Supervised Diver"*,
- prEN 14153-2, *Recreational diving services - Safety related minimum requirements for the training of recreational scuba divers - Part 2: Level 2 – "Autonomous Diver"*,
- prEN 14153-3, *Recreational diving services - Safety related minimum requirements for the training of recreational scuba divers - Part 3: Level 3 – "Dive Leader"*.

The requirements specified are minima; they do not preclude the provision of additional training or the assessment by a service provider of additional competencies. The above mentioned European Standards represent a tool for comparison of existing (or future) qualifications of scuba instructors. In no way do they represent a course programme nor do they imply that course programs and scuba instructor certifications issued by different nations or organisations must necessarily correspond to these levels.

1 Scope

This European Standard specifies the competencies that a scuba diver has to have achieved in order for a service provider to award the scuba diver certification indicating that he has met or exceeded scuba diver level 2 – "Autonomous diver" and assessment of these competencies.

It also specifies conditions under which training has to be provided, in addition to the general requirements for recreational diving service provision specified in prEN 14467.

This European Standard applies only to contractual training and certification in recreational scuba diving.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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

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

prEN 14153-3, *Recreational Diving Services - Safety related minimum requirements for the training of recreational scuba divers - Part 3: Level 3 – "Dive Leader"*

prEN 14413-1, *Recreational Diving Services - Safety related minimum requirements for the training of scuba instructors - Part 1: Level 1*

prEN 14413-2, *Recreational Diving Services - Safety related minimum requirements for the training of scuba instructors - Part 2: Level 2*

prEN 14467, *Recreational diving services – Requirements for recreational scuba diving service providers*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 250 and EN 12628 and the following apply:

3.1 training organisation

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

NOTE Entity may include scuba diving federations and scuba diver training agencies.

3.2 certification

confirmation that a student has completed scuba diver training which fulfils all requirements according to this European Standard, as issued by training organisations

3.3 scuba instructor

individual qualified according to prEN 14413-1 or prEN 14413-2 respectively

3.4 dive leader

individual qualified according to prEN 14153-3

3.5 breathing gas

mixture of oxygen and nitrogen with no less than 20 % oxygen

3.6 confined water

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

3.7 open water

body of water significantly larger than a swimming pool offering conditions typical of a natural body of water encountered in the region

3.8 diving equipment

equipment consisting of the following items:

- fins,
- mask,

- snorkel,
- demand regulator (also referred to as a regulator),
- alternative breathing gas system

NOTE This could range from a simple octopus system to a duplicate breathing system with a separate breathing gas supply.

- 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 Specific environments may require additional equipment (e.g. an underwater navigational aid, knife/cutting device).

4 Competencies of a recreational scuba diver at level 2 – "Autonomous Diver"

A scuba diver at level 2 – "Autonomous Diver" shall be trained such that when assessed 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 – "Autonomous Diver" 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 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 – "Autonomous Diver" requires an appropriate orientation from a dive leader.

Where further instruction is required this can only be provided by a suitably qualified scuba instructor of level 2.

If accompanied by a scuba instructor, a scuba diver at level 2 – "Autonomous Diver" 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

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

5.1 Minors

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

5.2 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. In any 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 diving related risks.

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

6 Introductory information

Information according to prEN 14467 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 and flag,
- 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.

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 Use of dive tables (decompression tables) and dive computers

Students shall have an appropriate knowledge concerning the use of dive tables and dive computers 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

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

7.5.1 Direct effects of pressure

7.5.1.1 Increasing pressure (descent phase)

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

7.5.1.2 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)

7.5.1.3 Other pressure related conditions

- decompression illness (DCI) (including on-gassing, post-dive effects)
- nitrogen narcosis
- hypercapnia (excess carbon dioxide)
- oxygen toxicity
- contaminated breathing gas

7.5.2 Other hazards

- physical stress (incl. fatigue and exhaustion)
- exposure/hypothermia/hyperthermia
- in-water injuries
- drowning
- Hyperventilation
- airway control and related problems
- medication, drugs, alcohol

7.5.3 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 Dive environment

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.

7.7.1 Water

- temperature/thermoclines
- visibility
- movement (surface action, currents, tides, and the like)
- density (fresh and salt water)

7.7.2 Topography

- bottoms
- shorelines

7.7.3 Aquatic life

- animal
- plant

7.7.4 Environmental awareness

- preventive behaviour
- conservation
- preservation

7.7.5 Other topics

- weather conditions
- precautions for diving in new diving environments
- surface hazards
- overhead environments
- entanglement

8 Required scuba skills

8.1 Confined water scuba skills

Students shall be able to demonstrate the following skills in a comfortable and relaxed manner; each skill shall be mastered 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 - snorkel and regulator,
- regulator/snorkel exchanges 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,
- 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 demonstrate mastery of 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 - snorkel and regulator,

- regulator/snorkel exchanges 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,
- 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 of the weight ballast system,
- removal and replacement of 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 under-water 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 Prior to the first open water dive the student shall effectively show proof of, or demonstrate, to a scuba instructor the following skills, without the use of mask, fins, snorkel, or other swimming aids:

- 50 m distance swimming,
- 10 minute survival swim/float.

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 3 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 according to 3.7.

9.8 All under water skills in open water shall be taught, directly supervised 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 safe supervision of students is solely the scuba instructor's responsibility. The scuba instructor shall limit the number of students per scuba instructor 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 level 3 – Dive Leaders according to prEN 14153-3.

9.9 The scuba instructor shall limit the number of students on open water dives so that either the scuba instructor or a safety diver is able to establish physical contact with every student at any time during the open water dive.

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 Assessment

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 organisation. This examination shall test scuba diver level 2 theoretical knowledge according to clause 7 and knowledge of scuba skills according to 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 according to clause 8 (see Annex A for an explanatory example).

Students to be certified shall complete at least four qualifying open water dives according to 9.1 under the direct supervision of a scuba instructor.

The underwater duration of each of these four qualifying open water dives shall be at least 15 min.

Annex A (informative)

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

Theory topic	Required competency	Criteria testing
Equipment Regulators	<ol style="list-style-type: none"> 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.
Practical topic	Required competency	Criteria testing
Dive planning and preparation	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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

Annex B (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 program.

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 effecting the ability to react	
fever, dizziness, nausea, vomiting and diarrhoea	
problems equalising (popping ears)	
acute gastric ulcers	
pregnancy	

Annex C (informative)

A–deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN/ CENELEC member.

This European Standard does not fall under any Directive of the EU. In the relevant CEN/ CENELEC countries these A- deviations are valid instead of the provisions of the European Standard until they have been removed.

Clause	Deviation
5.2	<p>Portugal (Alínea a) do Artº 10º e Artº 9º do DL 48365 de 2 de Maio de 1968).</p> <p>Students shall have been medically screened and shall present the following documents:</p> <ul style="list-style-type: none"> — medial certificate, — lung X-ray, — ECG and reports.
5.2	<p>Spain (Orden Ministerial de 14 de octubre de 1997 (BOE nº 280 de 22 de noviembre de 1997) POR LA QUE SE APRUEBAN LAS NORMAS DE SEGURIDAD PARA EL EJERCICIO DE ACTIVIDADES SUBACUATICAS.)</p> <p>Documented evidence shall be obtained that the student has been medically screened as suitable for recreational diving by means of a medical examination.</p>
9.8 and 9.9	<p>France (Order of August 28, 2000, OGFR of September 6, 2000 RELATIVE TO THE TECHNICAL AND SAFETY RULES IN ESTABLISHMENTS ORGANISING THE PRACTICE AND TEACHING OF AIR SCUBA DIVING AS SPORTS AND LEISURE ACTIVITIES NOR : MJSK9870068A)</p> <p>The maximum number of divers per scuba instructor during training is limited to 1 scuba diver/scuba instructor (for the first dive) and to 4 scuba divers/scuba instructor for all further training dives.</p>
9.8 and 9.9	<p>Portugal (§ único Art.º 31º do DL 48365 de 2 Maio de 1968).</p> <p>The maximum number of students per scuba instructor shall be limited to 4.</p>