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English version

Diving accessories — Snorkels — Safety requirements and test methods

Accessoires de plongée — Tubas —
Exigences de sécurité et méthodes d'essai

Tauch-Zubehör — Schnorchel —
Sicherheitstechnische Anforderungen und
Prüfverfahren

This European Standard was approved by CEN on 1997-06-29. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 136, Sport, playground and other recreational equipment, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 1998, and conflicting national standards shall be withdrawn at the latest by January 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

A snorkel allows the user to breathe when facing downwards without having to raise the mouth out of the water. However, using a snorkel complicates the breathing process.

At normal breathing conditions, a certain amount of residual air remains in the bronchial tubes and trachea, referred to as the natural dead space. When using a snorkel, an artificial dead space is added, thus increasing the total dead space. This in turn decreases the fraction of the inhaled air volume participating in the respiratory exchanges.

Moreover, the submerged length of the snorkel shifts the static balance of the respiratory system. Lastly, dependent on the snorkel's dimensions and shape, the breathing resistance increases.

This standard deals with these problems in terms of setting constructional as well as performance requirements. Accordingly, corresponding test methods are assigned.

The protection offered by a snorkel cannot guarantee the absence of accidents of fatal outcome or leading to long-term disability. For this reason, due care should always be exercised when using a snorkel.

1 Scope

This standard specifies safety requirements in order to increase the safety in the use of snorkels for swimmers and divers.

This standard is applicable to snorkels that allow users to breathe at the water surface whilst floating with the face submerged. It covers snorkels used by swimmers, skin divers as well as SCUBA (acronym for self-contained underwater breathing apparatus) divers.

This standard is not applicable to combined face masks and snorkels, in which the snorkel tube opens into the face mask.

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 71-3	<i>Safety of toys — Part 3: Migration of certain elements</i>
ISO 868	<i>Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)</i>

IEC 50 (845) : 1987 *International Electrotechnical
Vocabulary; Chapter 845:
Lighting*

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 snorkel

A device composed of a tube with a mouthpiece and such optional devices as valves, water deflectors, allowing breathing while swimming in a face-down position.

3.2 mouthpiece

That part of a snorkel which is inserted between lips and teeth and which comes into contact with the mucous membrane of the mouth during correct use.

4 Safety requirements

4.1 Dimensions

The snorkels need not conform to the design illustrated in figure 1; compliance is only required in the case of the dimensions specified in table 1.

The dimensions of the snorkel, as illustrated in figure 1, shall comply with table 1.

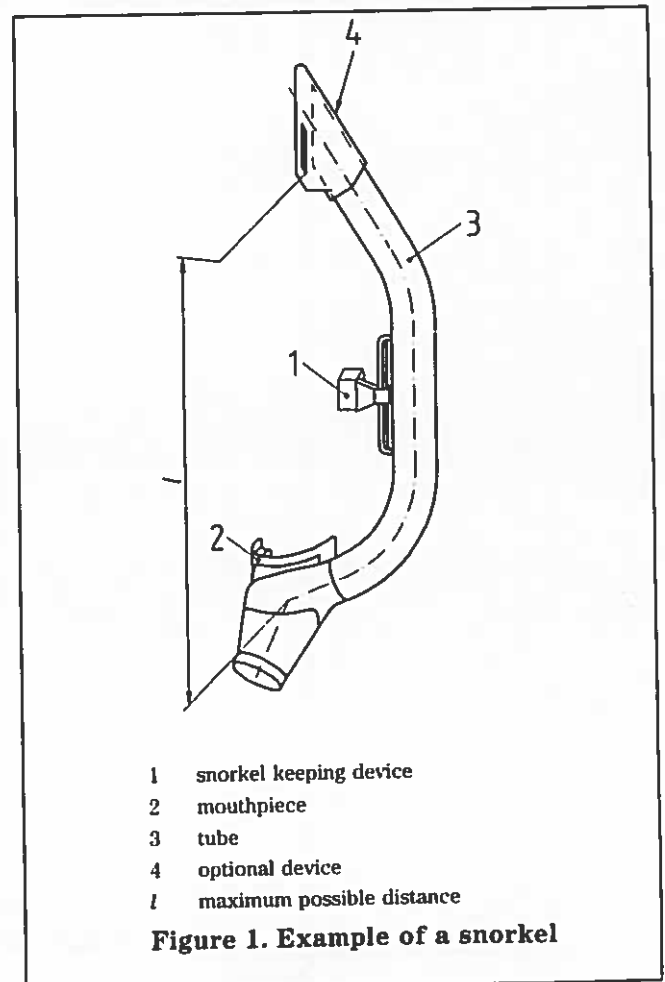


Table 1. Dimensions		
Type	Total inner volume*) max. cm ³	l max. cm
1 Persons with height ≤ 150 cm	150	35
2 Persons with height > 150 cm	230	38
Swimming competition	230	48

*) The total inner volume representing the dead space of the snorkel for respiratory exchange.

4.2 Mouthpiece

The mouthpiece shall be of non-toxic material of sufficient flexibility (e.g. rubber, silicon, vinyl) to be placed easily in the mouth.

The material from which the mouthpiece is made shall comply with the requirements for element migration from polymeric and similar materials given in EN 71-3.

The mouthpiece shall be designed so that it is easily retained in the mouth, e.g. using two flat lugs for gripping between the teeth.

The mouthpiece shall have a maximum hardness of 80 Shore A when measured in accordance with ISO 868.

The design of the mouthpiece including the minimum material hardness shall be such that during proper use in water its nominal cross-section is maintained.

All parts of the mouthpiece coming into contact with the oral mucosa shall be smoothly finished.

The end of the tube shall not extend beyond the mouthpiece into the mouth.

4.3 Tube

The tube shall have a maximum hardness of 100 Shore A when measured in accordance with ISO 868.

4.4 Flow of air

When tested in accordance with 5.2, the resistance of the tube and mouthpiece to flow of air shall not exceed 10 mbar at a simulated sinusoidal RMV (respiratory minute volume) of 62,5 l/min.

4.5 Joints

When tested in accordance with 5.3 with an axial force of 50 N for 10 s, joints shall show no signs of disengagement.

4.6 Optional devices

4.6.1 Snorkel keeping device

Any snorkel keeping device, affixed to the tube to prevent loss of the snorkel in use, shall be arranged in such a way that the position of the snorkel can be adjusted.

The snorkel keeping device shall enable the snorkel to be displaced from the mouth and replaced without having to displace the face mask.

4.6.2 Shut-off valves

If a shut-off valve to prevent the ingress of water is fitted, it shall only shut off when submerged. If previously subjected to a negative pressure of 50 mbar, it shall have a cracking pressure of opening not exceeding 40 mbar.

4.6.3 Sharp edges

Any optional devices, fitted to the air intake and to the tube shall not have sharp edges.

4.7 Safety colour

The outer surface of the top 30 mm of the tube shall be marked in fluorescent red to yellow or pink, luminance factor $\beta \geq 0,25$. For definition see 845-04-69 of IEC 50 (845) : 1987.

5 Test methods

5.1 Testing of dimensions

Determine the length l as the distance between the centre of the mouthpiece opening and the lowest part of the air intake opening.

If the mouthpiece has a swivel mount, determine the minimum and the maximum length.

Take the mean value of these two measurements as the length l .

If the snorkel comprises a corrugated hose, bend this hose with the mouthpiece showing upwards without reducing the inner cross-section of the corrugated hose and add 2 cm to the distance measured in accordance with the first paragraph to get the length l .

5.2 Method for determination of the air flow rate

Connect the mouthpiece to a breathing simulator.

Set the breathing simulator to a sinusoidal operation of 25 strokes/min with 2,5 l/stroke at ambient pressure and temperature.

The deviation between frequency and amplitude shall be not more than 3 %.

Take the pressure recording at the mouthpiece.

Continue the measurement for at least 15 cycles or until steady state is achieved.

5.3 Method for the determination of strength of joints

5.3.1 Principle

The joint is subjected to a tensile force and the joint is then examined for damage.

5.3.2 Apparatus

A tensile testing machine or a dead weight arrangement, with means for measuring with an accuracy of ± 2 N over the whole measuring range.

Clamps, with jaws.

5.3.3 Procedure

Attach the clamps to the snorkel on either side of the joint. Apply a force between the two clamps of $50\text{ N} \pm 2\text{ N}$ at a uniform rate over 5 s.

Maintain the force for 10 s.

Release the force and examine the joint for any damage.

5.3.4 Report

Report any damage to joint apparent upon visual and tactile examination.

6 Warning label

A warning label, printed with at least the following, shall be affixed to the tube of each snorkel:

For your safety read the enclosed instructions.

7 Instructions for use

Instructions showing at least the following information shall be attached to the snorkel or given in or on the packaging, at point of sale.

- a) instructions how to use the snorkel, e.g. use the snorkel only in water;
- b) indication of possible misuse; e.g. warning on size 2 snorkels not to be used by persons < 150 cm;
- c) warning: adding any foreign objects to this product, e.g. extending its length, can cause potential danger to life;
- d) depth limitation for use in diving, if any;
- e) size grouping;
- f) instructions concerning maintenance and storage, including instructions concerning replacement of the safety colour marking.

8 Marking

Each snorkel shall be marked with the following information:

- a) the name, trademark or other means of identification of the manufacturer, supplier or importer;
- b) the number of this European Standard, EN 1972.