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Helmets for canoeing and white water sports

Helme für den Kanu- und Wildwassersport

Casques utilisés dans la pratique du canoë-kayak et des sports en eau vive

Ta slovenski standard je istoveten z: EN 1385:1997

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English version

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Helme für den Kanu- und Wildwassersport

This European Standard was approved by CEN on 11 October 1997.

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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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FOREWORD

This European Standard has been prepared by Technical Committee CEN/TC 158 "Head protection" the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by May 1998, and conflicting national standards shall be withdrawn at the latest by May 1998.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

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.

INTRODUCTION

The most common head injury in canoeing and white water sports happens when a person strikes an underwater object after capsizing. Under these circumstances it is extremely unlikely that the speed of impact will be greater than 18 km/h (5 m/s) because this is the highest recorded rate of flow in a white water river. The most common site of injury is the frontal or forehead area or the side of the eye socket.

To achieve the performance of which the helmet is capable, and to ensure stability on the head, it needs to be as close fitting as possible consistent with comfort. The helmet has to be securely fastened on to the head, and any chin strap has to be under tension at all times.

The protection given by a helmet depends on the circumstances of the accident and wearing a helmet does not always prevent death or long term disability.

A proportion of the energy of an impact is absorbed by the helmet, thereby reducing the force of the blow sustained by the head. The structure of the helmet may be damaged in absorbing this energy and any helmet that sustains a severe blow needs to be replaced even if damage is not apparent.

This standard includes the International Canoe Federation classification of risks.

1 Scope

This European Standard specifies requirements for helmets for canoeing and white water sports for use in waters of classes 1 to 4 as classified by Clause 4. The levels of protection recognise that most fatalities in canoeing and white water sports result from drowning after concussion and not from brain damage.

This standard is not intended to apply to helmets for use in extreme white water situations such as those where the jumping of high waterfalls is undertaken, because the need for impact absorption for such a helmet, and the area of the head to be protected, are greater than those for most canoeing and white water sports. The standard applies to helmets with and without holes in the shell.

NOTE: This standard does not provide performance requirements for visors, chin-guards or face-guards.

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. (standards.iteh.ai)

EN 960 : 1994	Headforms for use in the testing of protective helmets
ISO 6487 : 1987	Road vehicles - Measurement techniques in impact tests - Instrumentation.

3 Definitions

For the purposes of this European Standard the following definitions apply.

3.1 canoeing. The normal use of a canoe or of a kayak, in white water of classes 1 to 4 classified in accordance with Clause 4.

3.2 white water sports. Non-powered sporting activities carried out in and/or on moving water as defined by classes 1 to 4 in accordance with Clause 4.

3.3 helmet. Headwear that is intended to protect the wearer's head from concussion.

3.4 shell. The material that provides the general outer form of the helmet.

3.5 protective padding. Lining material used to either absorb impact energy or improve the wearer's comfort.

3.6 retention system. The entire assembly of components that prevent the helmet coming off the head.

3.7 chin strap. A strap passing under the wearer's lower jaw that is intended to prevent the helmet coming off the head.

3.8 harness. An assembly of headband and suspension designed to keep the helmet on the head, and to absorb some kinetic energy.

3.9 headband. A horizontal band of material that is adjustable to fit the circumference of the wearer's head above the eyes.

3.10 suspension. A means of resting the helmet on the upper parts of the head.

3.11 headform. A rigid object designed to simulate a human head for use in testing helmets.

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3.12 basic plane of the human head. A plane at the level of the external ear opening (external auditory meatus) and the lower edge of the eye sockets (orbits).

3.13 basic plane of a headform. The plane relative to the headform that corresponds to the basic plane of the human head.

3.14 reference plane. A construction plane parallel to the basic plane of the headform at a distance from it which is a function of the size of the headform.

4. White Water Classification of Rivers

NOTE 1: This classification is produced by the International Canoe Federation.

Class 1	Not difficult. Regular current, small waves and riffles, occasional small rapids; pebble banks, no or few obstructions.
Class 2	Moderately difficult. Clear and wide passages; irregular current, rapids bigger waves, easy eddies, stopper and whirlpools; simple obstructions in the passage, small ledges.
Class 3	Difficult. Course not always easily to recognize. High and irregular waves, long rapids, stopper, boils and whirlpools; occasional boulders, drops and various obstructions in the passage.
Class 4	Very difficult. Course difficult to recognize, inspection from shore is advised; big hydraulics, keepers and boils; staggered boulders in main stream, ledges with keepers.
Class 5	Exceedingly difficult. Inspection from shore is mandatory; extreme hydraulics, keepers and boils; narrow in the only line of passage, high drops in cascades with difficult entrances and/or exits.
Class 6	The absolute limit of difficulty. Usually considered unrunnable. All previous mentioned difficulties increased to the limit of practicability. Attempts at certain water levels imply a high risk to life.

NOTE 2: Helmets for use in water classes 5 and 6 are outside the scope of this standard. It is expected that these helmets will have performance requirements in excess of this standard.

5 Construction

5.1 Materials. The mechanical properties of the materials used in the manufacture of the helmet should not deteriorate significantly during the period of normal use, due to influences such as exposure to sun, to temperature changes or to fresh or salt water. Metal parts used to fasten the chin strap and/or a suspension cradle to the shell, should be protected from or resistant to corrosion. The materials forming the parts of the helmet coming into contact with the skin, should not deteriorate in strength significantly due to contact with sweat and materials which are known to cause skin disorders shall not be used. The thread used for stitching on webbing should be resistant to rotting.

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5.2 Extent of shell. When the helmet is placed on a headform of size given in Table 1, and the chin strap is secured, the shell including any holes shall cover all parts of the headform above the lines ACDF shown in figure 1 except that there may be cut-outs on each side of the helmet to expose the ears for hearing purposes. The dimension "y" (see figure 1) for the headforms in Table 1 shall be taken from Table 1 of EN 960 : 1994. The point C for each headform (figure 1) is the midpoint of A-Z and the point D is vertically beneath it on the reference plane.

Table 1: Sizes of headforms

Code letter	Circumference of headform mm
A	500
E	540
J	570
M	600
O	620

5.3 Holes. The shell may be pierced by holes that allow ventilation or the draining of water.

5.4 Projections. Rivet heads shall be rounded and shall not project more than 2 mm beyond the outer surface of the shell. All edges of the shell shall be smooth and rounded to a radius of not less than 1 mm. Any rigid internal projection shall be covered with protective padding.

5.5 Retention system. The width of any chin strap shall be not less than 15 mm. The chin strap shall be fitted with a device to adjust and maintain tension in the strap, and shall not include a chin cup.

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5.6 Face guards and visors. If the helmet is fitted with means for attaching a face guard or visor then the means of attachment shall not reduce the degree of protection of the helmet.

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6 Performance requirements

6.1 Impact protection. Helmets shall be capable of withstanding an impact of not less than 15J.

The deceleration of the headform shall not exceed 250 g_n where g_n is an acceleration of 9,81 m/s².

Testing shall be in accordance with 7.6. The helmet shall be capable of conforming to these requirements regardless of which conditioning procedure in 7.5 has been chosen. A helmet that has been subjected to the procedure in 7.6 shall not be subjected to it a second time.

NOTE. This implies that in order to use all four conditioning procedures, a set of at least four helmets is needed.

6.2 Retention system strength. When the retention system is tested by the method described in 7.7 the maximum dynamic extension shall not exceed 25 mm.

6.3 Retention system effectiveness. When the helmet is tested by the method in 7.8. the front edge of the helmet shall not move upwards by more than 80 mm.

6.4 Buoyancy. After conditioning for water immersion in accordance with 7.5.3, the helmet shall float to the surface.

7 Testing

7.1 General. Helmets that are adjustable in size shall be tested at the extremes of the size range. For non-adjustable helmets, the next smallest size shall be used. The liner or cradle (including the adjustment system) shall remain intact and fully attached to the shell throughout each of the performance tests.

Any helmet that has been tested shall not be offered for sale and shall not be used for protection.

7.2 Headforms. The headforms used shall be full headforms conforming to EN 960. The sizes given in Table 1 are to be used.

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7.3 Number of samples and sequence of tests.

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7.3.1 Number of samples. Five helmets for each headform size shall be submitted for testing.

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7.3.2 Sequence of tests. The sequence of testing shall be in accordance with Tables 2 and 3.

Table 2: Sequence of testing

Performance test	Sequence test	Sample number			
Impact protection (7.6)	1st	1	2	3	4
Retention system effectiveness (7.8)	2nd	1			
Retention system strength (7.7)	3rd		2	3	
Buoyancy (6.4)	4th				4

NOTE. The fifth sample is for reference and can be used to re-assess failure of any of the performance requirements.

Table 3 : Test parameters

Sample number	Conditioning
1	High temperature (7.5.1) No re-conditioning
2	Low temperature (7.5.2) No re-conditioning
3	Artificial ageing (7.5.4) No re-conditioning
4	Water immersion (7.5.3) No re-conditioning

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7.4 Test area. Determine the test area of the helmet as follows. Place the helmet on a headform of appropriate size (see Table 1). Apply a vertical load of 50 N on the crown of the helmet in order to stabilize the helmet on the headform. Position the front edge of the helmet as instructed by the manufacturer, and draw a horizontal line on the helmet at the level of the AA' plane of the headform (see figure 1a). Draw a point B which is 25 mm above the reference plane at the front of the helmet.

The test area is defined as above the line BCA'C' as shown in figures 1a) and 1b).