

Marine safety helmets

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Foreword

This Publicly Available Specification has been published to provide an interim specification in the absence of a British or European standard specifying performance criteria for marine safety helmets for use by occupants of small, fast craft.

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Acknowledgement is given to the following organizations who were consulted in the development of this specification:

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 17 and a back cover.

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Introduction

This Publicly Available Specification specifies the requirements for marine safety helmets for use by occupants of small, fast craft.

Wearers need to be made aware that the protection given by a helmet in an accident depends on the circumstances of the accident and wearing a helmet cannot always prevent death, injury 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.

1 Scope

This Publicly Available Specification specifies the performance requirements and test methods for marine safety helmets intended to be worn by users of small, fast craft. It includes the following:

- construction, including extent of protection;
- shock absorption properties;
- penetration resistance;
- retention system strength and effectiveness;
- buoyancy;
- marking and information.

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.

BS EN 960:1995, *Headforms for use in the testing of protective helmets*.

BS AU 228-1a:2000, *Impact tests on road vehicles — Specification for measurement techniques and general instrumentation*.

3 Terms and definitions

For the purposes of this Publicly Available Specification the following terms and definitions apply.

3.1

shell

materials that provide the hard outer form of the helmet

3.2

retention system

complete assembly by means of which the helmet is maintained in position on the head, including any devices for adjustment of the system or to enhance the wearer's comfort

3.3

chin strap

part of the retention system consisting of a strap of material that passes under the wearer's chin

3.4

peak

extension from the basic form of that part of the helmet that would come above the eyes of the wearer

3.5

chin cup

cup mounted on the retention system to locate the strap on the point of the wearer's chin

3.6

visor

transparent eye-protector extending over the eyes and all or part of the face

4 Materials

The helmets shall be constructed from materials that are known not to deteriorate under the following conditions:

- ageing;
- exposure to sun;
- extremes of temperature;
- exposure to fresh or salt water.

Metal parts, for example those used to fasten the chin strap to the shell, either shall be made from a metal that is known to be resistant to corrosion on exposure to salt water, or shall be protected against corrosion, for example by electro-plating.

For those parts of the helmet coming into contact with the skin, materials known not to undergo alteration arising from the effects of sweat and toiletries shall be used. Materials known to cause skin allergies shall not be used.

For stitching, thread shall be used that is known to be resistant to rotting when exposed to salt water.

5 Construction

5.1 General

The helmet shall comprise a shell with any necessary protective liner secured within it and shall be fitted with a retention system conforming to 5.4. The shell shall not extend more than 10 mm beyond the protective liner.

5.2 Extent of protection

When assessed in accordance with 7.6 the entire edge of the helmet shall extend at least as far as the FF" plane (see Figure 1).

NOTE The shell may be pierced by holes to allow ventilation and the draining of water.

5.3 Finish

All edges shall be smooth and rounded. There shall be no rigid projections on the inside of the helmet. Any external projection shall not exceed 5 mm and shall be smoothly faired to the adjacent surface.

5.4 Retention system

A retention system shall be permanently fixed to the helmet and shall incorporate a chin strap not less than 18 mm wide. Fastening and adjustment devices shall be permanently fitted to adjust and maintain tension in the system. The fastening and adjustment devices shall have no sharp edges.

NOTE 1 The fastening and adjustment devices may be combined.

The retention system shall be such that it can be freed by deliberate action only. The fastening device shall be coloured red or orange or shall have a retro-reflective label affixed to it.

NOTE 2 It is permissible for the retention system to include padding or other means of enhancing comfort for the wearer.

5.5 Mass

The mass of the helmet excluding accessories shall not exceed 700 g.

5.6 Peak

The helmet shall not include an integral peak. If a peak is to be supplied as an accessory, appropriate fixings shall be provided on the helmet.

5.7 Chin cup

If the chin strap includes a chin cup it shall be made from flexible material.

6 Performance requirements

6.1 Shock absorption

6.1.1 *Rigid mode test — Crown and off-crown impacts*

When helmets which have been conditioned in accordance with 7.7 are tested in accordance with 7.8.1 the force transmitted to the headform shall not exceed 12.5 kN.

6.1.2 *Falling headform test — Off-crown impacts*

When helmets which have been conditioned in accordance with 7.7 are tested in accordance with 7.8.2 the deceleration shall not exceed 250g at any time, and the total time during which it exceeds 150g shall be not greater than 5 ms. The helmet shall remain on the headform and the retention system shall remain fastened.

6.2 Penetration resistance

6.2.1 *Crown penetration*

When helmets which have been conditioned in accordance with 7.7 are tested in accordance with 7.9.3.1 the point of the striker shall not contact the surface of the headform.

6.2.2 *Off-crown penetration*

When helmets which have been conditioned in accordance with 7.7 are tested in accordance with 7.9.3.2 the point of the striker shall not contact the surface of the headform.

6.3 Retention system strength and effectiveness

6.3.1 *Retention system strength*

When helmets which have been conditioned in accordance with 7.7 are tested in accordance with 7.10 the dynamic extension of the chin strap (including slippage of the fastening device), shall not exceed 35 mm and the residual extension, with the weight at rest on the end stop, shall not exceed 25 mm.

Damage to the retention system shall not be deemed to be grounds for rejection of the helmet provided that the extension does not exceed the specified limits.

NOTE In this test, slippage of the fastening device may be measured and recorded separately from other components of the extension. However, no upper limit for the slippage of the fastening device as a separate parameter is specified in this document.

6.3.2 *Retention system effectiveness*

When tested in accordance with 7.11 the helmet shall remain on the headform.

6.4 Buoyancy

When the helmet is released at the end of the salt water immersion in accordance with 7.7.5, the helmet shall float to the surface of the water.

7 Testing

7.1 Headforms

Headforms conforming to BS EN 960:1995 shall be used. The sizes of the headforms used shall be as given in Table 1.

Headforms for helmet sizing assessment, determination of extent of protection, marking-out of test area, retention system effectiveness and retention system strength tests shall conform to BS EN 960:1995, 2.3, 2.4, 4.1, 4.2, 4.3.1 and 4.3.2, as applicable and to BS EN 960:1995, Clause 5 item b).

Headforms for the shock absorption test shall conform to BS EN 960:1995, 2.1, Clause 3, 4.1, 4.2, 4.3 and Clause 5 item b).