

Helmets for firefighters

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Foreword

This Product Assessment Specification (PAS) has been prepared in consultation with, and published at the request of, manufacturers and fire brigades for improved levels of head protection for firefighters.

PAS 021 incorporates requirements from British and European Standards relevant to head protection. It is not a British Standard and will be withdrawn on publication of its content in, or as, a British Standard.

Acknowledgement is given to the following organisations who were consulted in the preparation of this specification:

Hampshire County Council Fire and Rescue Service
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Chief and Assistant Chief Fire Officers' Association
Fire Brigade Union
Sonic Communications (International) Ltd.

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1 Scope

This Product Assessment Specification specifies requirements for the principal characteristics of helmets for firefighters with regard to the level of protection, comfort and durability offered. It allows for specific optional requirements to meet the needs of the fire service.

Helmets conforming to this PAS are not necessarily intended for special applications such as oil fires, forest fires, etc.

Annex A and figures 1 to 9 are integral parts of this specification.

2 References

2.1 Normative references

This specification incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on page 26. For dated references only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this specification only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This specification refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on page 26, but reference should be made to the latest editions.

3 Definitions

For the purposes of this specification, the following definitions apply.

3.1 firefighter's helmet

NOTE. Hereafter referred to as helmet.

Headgear intended to provide protection of the wearer's head against hazards which might occur during operations carried out by firefighters.

3.2 headform

Head-shaped mould used for testing certain helmet characteristics.

NOTE. The headform is designed in accordance with BS EN 960.

3.3 basic plane

- 1) Of the human head. Plane at the level of the opening of the external auditory meatus (external ear opening) and the lower edge of the orbits (eye sockets).
- 2) Of the headform. Plane that corresponds to the basic plane of the human head.

3.4 reference plane

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.

3.5 longitudinal vertical median plane

Vertical plane of symmetry of the headform.

3.6 sagittal plane

Plane of the helmet corresponding with the longitudinal vertical median plane of the headform when the helmet is correctly adjusted on it.

3.7 central vertical axis

Line relative to the headform that lies in the plane of symmetry normal to the basic plane at a point equidistant from the front and the back of the headform at the level of the reference plane.

3.8 vertical axis

Axis of the helmet corresponding with the vertical axis of the headform when the helmet is correctly adjusted on it.

3.9 basic shape

Outer shape which the helmet would have if it had neither comb nor brim nor any of the fairings or radiusing associated with these.

3.10 helmet shell

Component that gives the helmet its general shape and on which may be fixed various accessories.

3.11 brim

Ridge protruding outwards from the basic shape of the helmet shell, forming the lower edge of the helmet shell, and including its associated fairings and radiusing.

3.12 integral part

Part which is not removable from the helmet without use of tools.

3.13 accessory

Optional part which is removable from the helmet without the use of tools.

3.14 retention system

Those parts which are responsible for securing the helmet in position on the head, including items which enable adjustment or improvement to comfort.

3.15 chinstrap

Part of a retention system that consists of a strap which passes underneath the wearer's chin and which helps to ensure that the helmet is correctly maintained in place.

3.16 neck guard

Integral part or accessory which protects the back of the neck from water or other liquids, from hot materials and from radiant heat.

3.17 eye shield; face shield

Integral part or accessory placed in front of the eyes and covering part or the whole of the face.

3.18 ear flaps

Integral part or accessory of the helmet which protect the ears of the wearer.

3.19 facepiece fixing

System enabling a facepiece or a respiratory protective device to be fixed to the helmet in such a way that correct sealing around the face is achievable.

4 General characteristics

4.1 The fit of the helmet shall be adjustable, in order to improve wearing comfort and helmet efficiency. This adjustment shall be possible without the use of tools. When this adjustment covers several sizes of head circumference, the relevant instructions shall be provided by the helmet manufacturer.

4.2 There shall be no sharp edges, roughness, or projection of any part of the helmet that may come into contact with the wearer when the helmet is worn such as are likely to cause injury to the wearer.

4.3 For those parts of the helmet that come into contact with the skin, materials which are likely to cause skin irritation or any adverse affect on health shall not be used. For a material not in general use, advice as to its suitability shall be sought from the material supplier before its introduction.

4.4 The materials used for helmets shall be of durable quality. Their characteristics shall not undergo appreciable alteration under the influence of ageing or of circumstances of use to which the helmet is normally subjected, i.e. exposure to sun, rain, cold, contact with skin and effects of sweat.

4.5 Substances recommended by the manufacturer for cleaning, maintenance or disinfection shall have no adverse effect on the helmet and shall be unlikely to have any adverse effect upon the wearer when applied in accordance with the manufacturer's instructions.

4.6 The fitting of any interchangeable integral part shall not affect the performance of the helmet. The replacement of the removable parts shall be described in the manufacturer's instructions.

4.7 The helmet shall not affect the wearer's hearing under normal circumstances of use.

4.8 Where neck, ear and face protectors do not form integral parts of the helmet, the helmet shall have the facility for the fitting of optional neck, ear and face protection.

4.9 Helmets shall be compatible with the wearing of self contained breathing apparatus or corrective or protective glasses.

NOTE. Brims, chinstraps, neck guards, eye shields, face shields, ear flaps and earpiece fixings should be regarded as optional components in helmet design.

5 Requirements

5.1 Protected area

When adjusted on the headform as described in **6.1.2** and conditioned in accordance with **6.2.2**, the helmet shall cover at least the area which is 12.7 mm above the reference plane. See line AA' in figure 1.

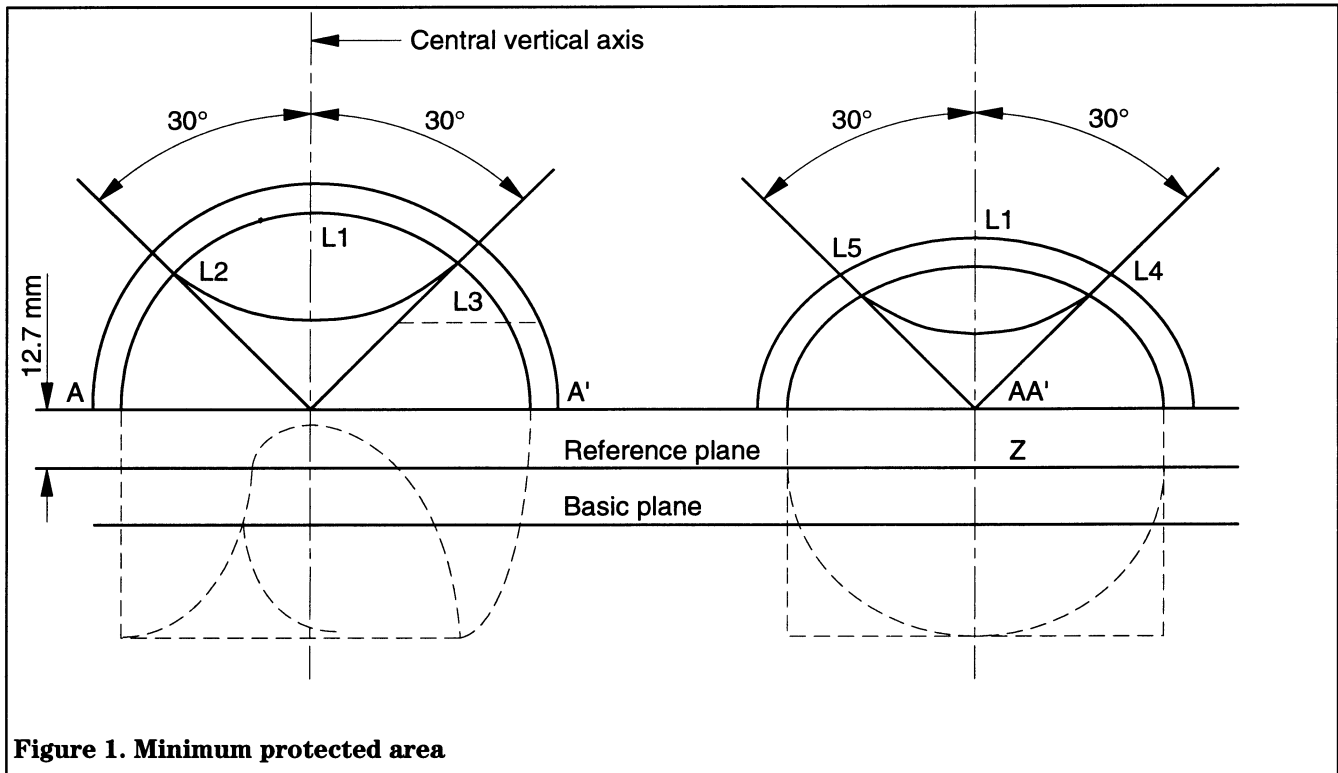


Figure 1. Minimum protected area

5.2 Field of vision

When a helmet is adjusted on the headform as described in 6.1.2 and conditioned in accordance with 6.2.2, the wearer's field of vision shall correspond to the following angles:

- a) a dihedral angle of at least 105° measured horizontally between L and K on each side of the sagittal plane which passes through the L point. See figures 2 and 4;
- b) an upper dihedral angle greater than 7° above the reference plane and which is defined by the straight line passing through L1 L2. See figures 3 and 4;
- c) a lower dihedral angle greater than 45° under the basic plane and which is defined by the straight line passing through K1 K2 situated on the surface of the headform at 31 mm on each side of the K point. See figures 3 and 4.

5.3 Shock absorption

When a helmet is tested by the method described in 6.3, the force transmitted to the headform shall not exceed 15 kN.

5.4 Resistance to sharp objects

When a helmet is tested by the method described in 6.4, there shall be no contact between the striker and the headform.

5.5 Mechanical rigidity

When tested by the method described in 6.5, the maximum transverse and longitudinal deformations of the helmet shall not exceed 40 mm. The residual deformations shall not exceed 15 mm.

