Australian/New Zealand Standard™

Methods of testing protective helmets

Method 1: Definitions and headforms

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CS/97, Testing of Helmets and Visors, to supersede AS/NZS 2512.1:1996.

The dimensions specified in this Standard were based on those in ISO/DIS 6220, *Headforms for use in the testing of protective helmets*, as it is the de facto International Standard. Therefore, any headform complying with the dimensional requirements of ISO/DIS 6220 is deemed to comply with the dimensional requirements of this Standard.

The principal difference between this edition and the previous edition of the Standard is the lowering of the test line for the A–Q headforms in the frontal and temporal regions (dimensions '*d*' and '*e*' in Table 1, as illustrated in Figure 2).

Additionally, the definitions from AS/NZS 1801, *Occupational protective helmets*, and AS 4067, *Firefighters' helmets—Specification*, were added to this edition.

METHOD

1 SCOPE This Standard sets out general information relating to the methods of testing protective helmets and defines commonly used terms. It also specifies materials and sizing of headforms for use in the testing of protective helmets. Details of headform dimensions below line *HH′* are included, to be used if a complete headform is required.

2 REFERENCED DOCUMENT The document below is referred to in this Standard:

AS
1100 Technical drawing
1100.101 Part 101: General principles

3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

3.1 Approved—approved by the appropriate regulatory authority.

3.2 Basic (basal) plane—a plane through the centre of the right and left ear openings and lower edge of the eye sockets (see Figure 1) and represented on a reference headform (see Figures 2 and 3) or test headform.

3.3 Bitragion coronal arc—the arc between the right tragion and left tragion as measured over the top of the head in a plane perpendicular to the mid-sagittal plane (see Figure 4).

3.4 Bitragion inion arc—the arc between the right tragion and left tragion as measured over the inion (see Figure 5).

3.5 Brim—where fitted, a rim surrounding the shell which may form a gutter.

3.6 Chinstrap—an adjustment device, being a part of the retention system, fitting under the chin to secure the helmet to the head.

3.7 Comfort padding—a non-energy-absorbing material which may define the internal form of a helmet and may be used for helmet size adjustment.

3.8 Coronal plane—the plane, perpendicular to the basal and mid-sagittal planes, which passes through the centres of the external ear openings.

3.9 Crown—the portion of the helmet which covers the head above the reference plane.

3.10 Ear covers—an accessory of the helmet which, when fitted, provides cover for the ears. May be combined with neck cover.

3.11 Faceshield—a part of the helmet which provides limited protection for all or part of the face and may supplement primary eye protection.

3.12 Harness—the assembly by means of which the helmet is maintained in position on the head and which may provide a means of absorbing kinetic energy. It may consist of the following:

(a) *Cradle*—the fixed or adjustable assembly of the parts of the harness in contact with the head, excluding the headband and nape strap.

(b) *Cushioning*—material to improve wearer comfort but which is not intended to perform the function of protective padding.

(c) *Headband*—part of the harness which surrounds the head in the area of the base of the skull, including the sweatband.

(d) *Nape strap*—a strap which, when in use, is located completely below the basal plane and aids helmet retention; it may be an integral part of the headband.

(e) *Sweatband*—an accessory to cover at least the inner front surface of the headband to improve wearer comfort.

3.13 Helmet positioning index—the distance between the forward brim of the helmet at its intersection with the mid-sagittal plane and the basic plane of the reference or test headform, when the helmet is firmly and properly positioned on the reference headform as specified by the manufacturer.

NOTE: Where the manufacturer has not provided the ‘positioning index’, this index shall be determined by the test laboratory.

3.14 Horizontal centre plane—any plane passing through the helmet which intersects with the helmet surface equidistant from the top of the helmet at all points.

3.15 Liner—the protective component(s) of a helmet, which may provide either the general inner or outer form of the helmet, or both.

3.16 Mid-sagittal plane—a longitudinal plane through the apex of a reference headform or test headform, perpendicular to the basic plane and geometrically bisecting the headform. (See Figure 6.)

3.17 Neck cover—an accessory of the helmet which, when fitted, provides cover for the neck. May be combined with ear covers.

3.18 Peak—a permanent or detachable extension of the helmet above the eyes. A peak may be an integral part of the shell, or a separate device that is fixed or detachable. (See Figure 7.)

3.19 Permanently attached—not removable except by using a tool or causing damage to the helmet.

3.20 Projection—any fixed part which extends abruptly beyond the internal or external surface of the helmet.

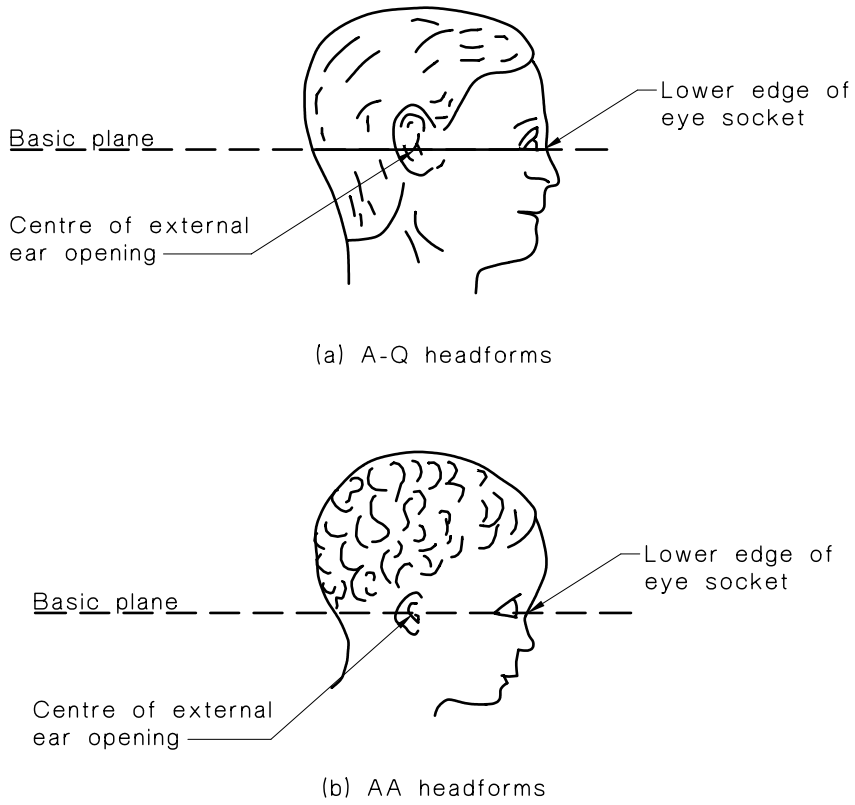

FIGURE 1 LOCATION OF BASIC PLANE

3.21 Protective helmet (helmet)—a device worn on the head, designed to mitigate the adverse effects of a blow to the head within a specified area. It includes retention and protective components, such as a shell, liner and harness.

3.22 Protective padding—material which is intended to contribute to the ability of a helmet to attenuate the energy of a blow to the head.

3.23 Reference headform—a measuring device contoured to specific dimensions with surface markings indicating headform identification, the locations of the basic, mid-sagittal and reference planes, and the centres of the external ear openings.

3.24 Reference plane—a plane above and parallel to the basic plane on a reference or test headform. (See Figure 8.)

3.25 Retaining strap—a strap which passes under the wearer's lower jaw to retain the helmet in position. It may be attached either to the shell or the headband.

3.26 Retention system—the complete assembly by means of which the helmet is retained in position on the head during use. It may include a harness.

3.27 Shell—the component of a helmet which provides the general outer form of the helmet.

3.28 Shock absorbing liner—where applicable, material contributing to the absorption of kinetic energy during an impact.

3.29 Test headform—a test device contoured to specific dimensions for all surface areas that contact the helmet, with surface markings indicating the locations of the basic, mid-sagittal and reference planes.

3.30 Test line—a line denoting the extent of protection of a helmet coinciding with the dimensions given in Table 1, as shown in Figures 2 and 3.

NOTES:

1 The test line is not necessarily the extent of coverage.

2 Helmets may have parts below the test line which, because of the shape of the helmet, may be contacted during testing, even though the test site is located above the test line. Such contact does not invalidate a test.

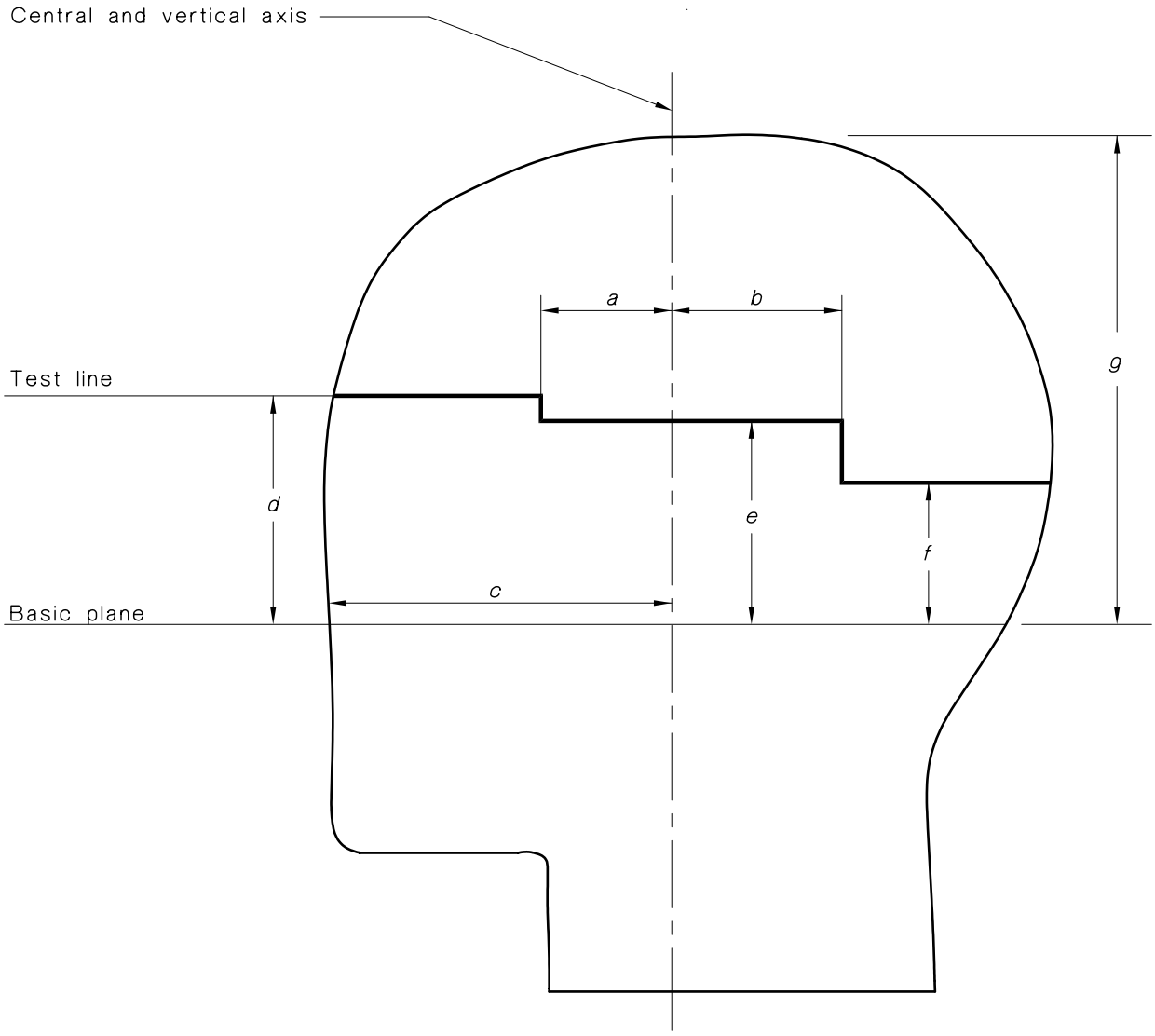

FIGURE 2 EXTENT OF PROTECTION AND TEST LINE FOR HELMETS INTENDED FOR PERSONS OVER FOUR YEARS OF AGE

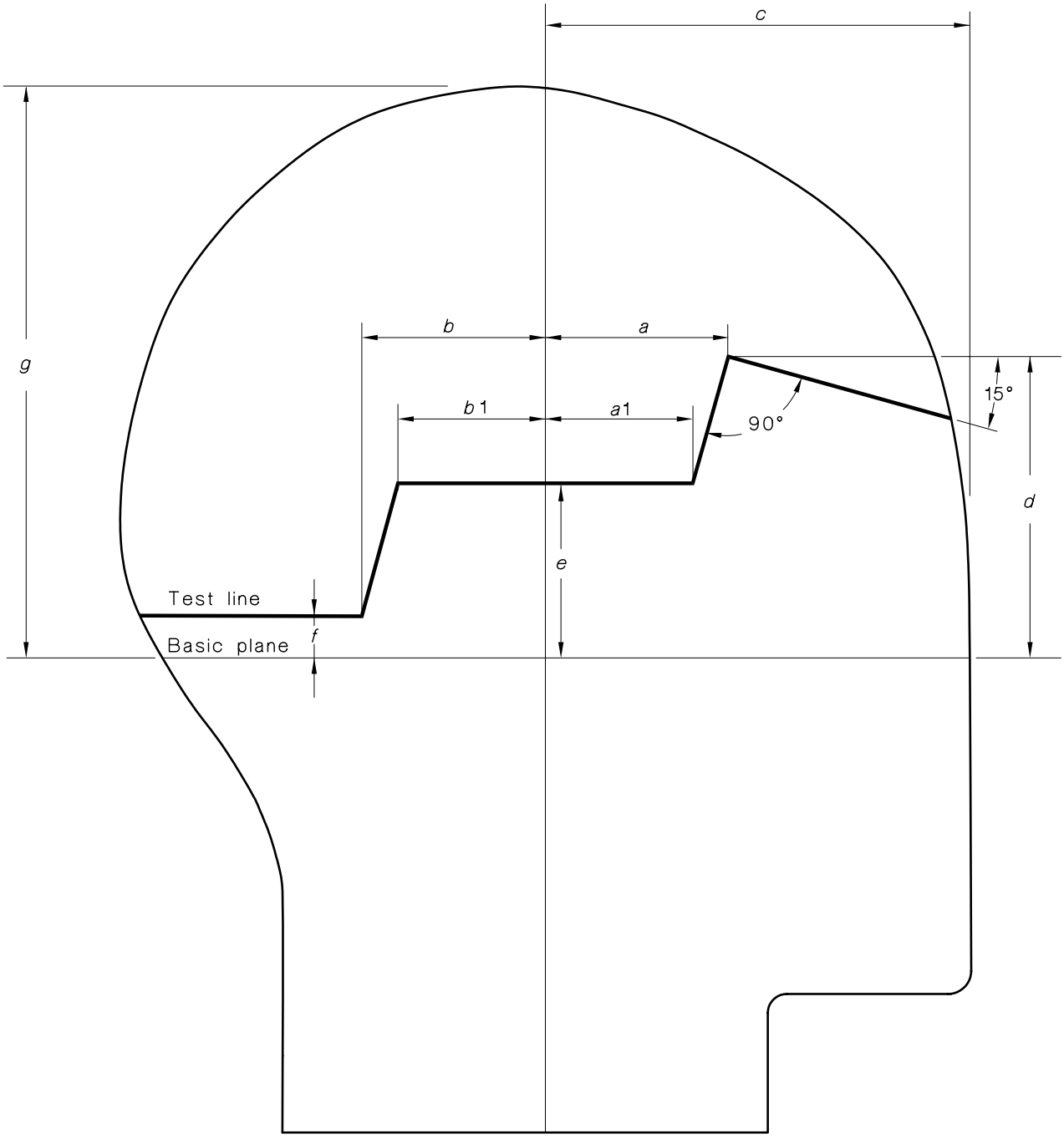

FIGURE 3 EXTENT OF PROTECTION AND TEST LINE FOR HELMETS INTENDED FOR PERSONS FOUR YEARS OF AGE AND UNDER