

Australian Standard[®]

**PROTECTIVE HELMETS FOR
VEHICLE USERS**

This Australian Standard was prepared by Committee CS/76, Protective Helmets for Motor Cyclists. It was approved on behalf of the Council of the Standards Association of Australia on 10 March 1988 and published on 9 May 1988.

The following interests are represented on Committee CS/76:

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Australia Post
Australian Consumers' Association
Australian Helmet Manufacturers and Importers Association
Australian Motorcycle Council
Australian Road Research Board
Autocycle Council of Australia
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VEHICLE USERS**

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PREFACE

This Standard was prepared by the Association's Committee on Protective Helmets for Motor Cyclists, to supersede AS 1698—1980.

The committee has made a number of significant changes in this edition, as listed below, but has been unable to complete the preparation of requirements that would have accommodated all matters of concern that were before the committee. A shortage of data and research contributed to this difficulty.

The principal changes in order of appearance include the following:

- (a) Reference to AS 2512, *Methods of testing protective helmets*, for definitions, and test methods.
- (b) Re-expression and amplification of the requirements for the edge of shell neck and eye openings (see Clause 4.3.3).
- (c) Re-expression of the requirements for visors (see Clause 4.4).
- (d) Re-expression of the requirements for the selection of test sites, with a note referring to the intent and variations to be considered (see Clause 6.1).
- (e) Addition of solvent preconditioning for the impact energy attenuation testing where residual and ageing stresses are under consideration (see Clause 6.1). The preconditioning requirements are given in AS 2512.2.
- (f) A note to state that free-end restraints for the retention system are not to be considered as load-bearing (see Clause 6.4).
- (g) A note to provide for the waiving of type tests of the smaller helmets of a series with otherwise equivalent features (see Clause 7).
- (h) An addition to the labelling requirements to show that the liner is essential to the intended performance of the helmet (see Clause 9(g)).

While no longer prepared to prohibit an all black helmet, the committee generally was of the view that a conspicuous (i.e. not dark coloured) helmet is a wise choice. A major influence on the committee decision was the knowledge that black is a colour favoured by many riders, and it is a practice for riders to paint their own helmets black. The painting of a helmet without the full knowledge and controls applied by the manufacturer could seriously degrade the helmet's protective capabilities.

The committee has resolved to specify a performance test to limit the potential to impart rotational accelerations to the head through oblique impacts and frictional forces on external features. Such a test is now specified in BS 6658, *Specifications for protective helmets for vehicle users*, but the committee has not at the time of publication been able to fully assess that test.

Other requirements to be reviewed, and amended as soon as resolved, include the following:

- (i) *Shell neck and eye openings*. While Clause 4.3.3 does require either specified attached edging or full rounding of the shell edge, the committee recognizes that the object is to avoid cutting edges that may be forced into contact with the face or neck.
- (ii) *Impact sites for energy attenuation tests*. The committee recognizes that test apparatus now in use may require modification to enable impact tests to be applied to sites below the test line. This Standard provides for tests between the test line and the basic plane (see Clause 4.3.1(b)); when headforms that include the jaw are specified, tests in that region are intended. The committee therefore expects suitable test apparatus to be available in due course.
- (iii) *Headforms*. In addition to headforms for impact testing of regions outside the test area, the committee is concerned that no headforms are available to suit helmets for children. This has prevented the Standard from being extended to cater for such sizes. Development of such headforms is also of relevance to Standards for helmets used by children in other activities.
- (iv) *Helmet compression test*. There is evidence to show that such a test is desirable.

Data and research is essential to the continued development of this Standard, and the committee has prepared recommendations for the authorities on projects that are required.

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FOREWORD

The primary purpose of this Standard is to provide a specification for protective helmets for on-road motor cyclists, although other users may gain appropriate protection in other situations. The Standard also provides a basis for helmets used in motor sports where speed is a determining factor. Helmets designed specially for motor sport are available, and these may include features, including extra strength, which are not mandatory in this Standard but which are desirable for certain activities. It is not expected that these features will generally conflict with the requirements of this Standard. Extra features are likely to increase the mass or bulk of the helmet, and the committee considers that this Standard should not impose these disadvantages at this time.

Other Standards (viz AS 2063, *Lightweight protective helmets (for use in pedal cycling, horse riding and other activities requiring similar protection)*, Part 1: *Basic performance requirements*, and Part 2: *Helmets for pedal cyclists*) may be more appropriate for other than vehicle users where conditions of use dictate that a helmet is acceptable only if it is of low mass and compact.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
PROTECTIVE HELMETS FOR VEHICLE USERS

1 SCOPE. This Standard specifies requirements for protective headgear for vehicle users, as designed to mitigate the adverse effect of a blow on the head. The Standard is written with particular reference to motor cyclists, but is equally applicable to users of other types of vehicle.

Specific marking requirements are also included.

NOTE: Recommendations for characteristics of materials used in the manufacture of protective helmets are provided in Appendix A.

2 REFERENCED DOCUMENTS. The documents below are referred to in this Standard.

AS	
1609	Eye protectors for motor cyclists and racing car drivers
2512	Methods of testing protective helmets
	Method 1: Definitions and headforms (AS 2512.1)
	Method 2: General requirements for the conditioning and preparation of test specimens and laboratory conditions (AS 2512.2)
	Method 3.1: Determination of impact energy attenuation—Helmet drop test (AS 2512.3.1)
	Method 4: Determination of penetration resistance (AS 2512.4)
	Method 5: Determination of strength of retention system and its attachment points (AS 2512.5)
	Method 6: Measurement of peripheral vision clearance (AS 2512.6)

3 DEFINITIONS. For the purpose of this Standard, the definitions given in AS 2512.1 apply.

4 CONSTRUCTION.

4.1 General. The helmet shall consist of a shell with a hard smooth outer surface capable of resisting penetration, a means of absorbing impact energy, and a retention system.

None of the protective components of the helmet shall be inadvertently detachable.

Any devices attached to the helmet shall be such that they are unlikely to cause injury to the wearer in the event of an accident.

4.2 Retention. The retention system shall be constructed so that when properly fastened the helmet cannot be readily dislodged from its normal position on the wearer's head under impact conditions. A chin cup shall not be fitted to the chin strap.

4.3 Projections.

4.3.1 Rigid projections on internal surface of shell. Rigid projections on internal surfaces shall comply with the following:

- (a) *Above the test line*, the only rigid projections shall be those for the attachment of eye protection, communication, ventilation systems, and life support

equipment, and these shall have an overall height not greater than 2 mm, measured from the internal surface of the shell.

- (b) *Between the test line and the basic plane*, rigid projections shall be such that, when the helmet is tested in accordance with Clause 6.2 using a hemispherical anvil only for one impact onto the projection from outside the shell, the impact energy attenuation shall comply with the requirements of Clause 6.2, except as follows:

When the overall height of the projection, measured from the internal continuous shell surface, is not greater than the following, the projection shall be deemed to comply with Clause 4.3.1(b):

- (i) For chin strap attachment 5 mm.
(ii) For other purposes 2 mm.

NOTE: Continuous shell surface is to be taken to mean a reference surface that disregards local depressions and raised parts.

- (c) *Below the basic plane*, any rigid projection shall be of such location and size as will be unlikely to allow the projection to cause injury to the wearer.

NOTE: Energy-absorbing materials, chamfering of projection corners, padding, and a maximum projection height of 5 mm will reduce the likelihood of injury.

4.3.2 Rigid projections on external surface. Only rigid projections necessary for the retention system and the attachment of eye protection, communication and ventilation systems, and life support equipment, shall be permitted, and such projection shall have a height of not more than 5 mm.

4.3.3 Shell opening(s). The edge of shell neck and eye openings shall be—

- (a) finished with an attached edging that is neither hard nor brittle; or
(b) fully rounded.

NOTE: The above requirements are intended to reduce or eliminate injury from contact with the edges of openings.

4.4 Visors. Where a helmet is fitted or supplied with a visor, that visor shall comply with AS 1609.

5 MATERIALS. Except as specifically provided for herein, the characteristics of the materials used in the manufacture of helmets shall be established by the manufacturer as being suitable for the purpose, having regard to the provisions of Appendix A.

6 PERFORMANCE REQUIREMENTS.

6.1 General. The tests specified in Clauses 6.2 and 6.3 shall be applied at any points above the test line, other than specifically excluded within that Clause.

The sequence of tests shall be as follows:

- (a) Peripheral vision.
(b) Strength of retention system.