

Australian/New Zealand Standard™

Methods of testing protective helmets

Method 5.2: Determination of strength of retention system—Dynamic strength

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CS/97, Testing of Helmets and Visors. The previous edition of the retention system strength test, AS 2512.5—1986, *Methods of testing protective helmets*, Method 5: *Determination of strength of retention system and its attachment points* has been revised in two parts, including this Method and Method 5.1: *Determination of strength of retention system—Static strength*.

METHOD

1 SCOPE This Standard sets out a method for determining the dynamic strength of the retention system of a protective helmet. The method applies to each individual component of a system in which the components can be independently fastened without securing the complete assembly.

2 REFERENCED DOCUMENTS The following document is referred to in this Standard:

AS/NZS

2512 Methods of testing protective helmets

2512.1 Method 1: Definitions and headforms

2512.2 Method 2: General requirements for the conditioning and preparation of test specimens and laboratory conditions

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

4 PRINCIPLE With the helmet positioned on a fixed headform, a dynamic force is applied to the retention system. The displacement of the retention system is then measured.

NOTE: It is acknowledged that the value obtained for the displacement of the retention system includes any reading due to the compression of impact-attenuating material (e.g. the crushable liner) and due to the elongation caused by the helmet rotating.

5 APPARATUS The following apparatus is required:

- (a) A loadbearing device which shall consist of a chin strap stirrup with a guide bar. The bar shall have a steel end stop of diameter 125 ± 25 mm. The stop shall be covered with a 2 mm rubber pad with a Shore A Durometer hardness of 50–70.

The mass of the guide bar assembly shall be 7.0 ± 0.1 kg. The guide bar shall not have a diameter of more than 32 mm.

The chin strap stirrup shall consist of two metal rollers each with a diameter of 12.7 ± 1.0 mm that have a distance of 75.0 ± 1.5 mm centre to centre.

The guide bar shall be provided with a cylindrical drop weight of 10.0 ± 0.1 kg. The diameter of the contact face of the drop weight shall exceed the diameter of the end stop.

NOTE: The guide bar should allow for drop heights from 0.1 to 1 m.

- (b) A device to measure the dynamic and permanent displacement of the chin strap stirrup.
- (c) A test headform of the dimensions and design specified in AS/NZS 2512.1.
- (d) A complete headform of the dimensions and design specified in AS/NZS 2512.1.
- (e) A rigid support to mount the headform on during testing.

Typical apparatus is shown in Figure 1.

6 PROCEDURE The procedure shall be as follows:

- (a) Condition and prepare the helmet(s) in accordance with AS/NZS 2512.2.
- (b) Ensure that the laboratory conditions are as specified in AS/NZS 2512.2.
- (c) Position the helmet on a complete headform in accordance with AS/NZS 2512.2. Fasten the retention system according to manufacturer's instructions. Remove the helmet from the headform ensuring that the retention system geometry is maintained and reposition the helmet on the test headform.
- (d) Fasten the chin strap under the stirrup bars so that the entire test apparatus hangs freely on the retention system. The load shall be applied normally to the basic plane of the test headform and symmetrical with respect to the mid-sagittal plane.
- (e) Raise the drop weight to the height specified in the product Standard and allow it to fall and impact the end stop. Measure the maximum dynamic displacement.
- (f) After 30 s measure the permanent displacement of the chin strap stirrup.
- (g) Release the load and then ascertain whether or not the retention system can be released by normal operation.

7 TEST REPORT The test report shall include the following:

- (a) Identity of helmet under test.
- (b) Details of the headform.
- (c) Maximum dynamic and permanent displacement caused by the test load.
- (d) Whether or not the retention system separated from its points of attachment either to the helmet or to other components where a system is so designed.
- (e) Whether or not the retention system could be released by normal operation.
- (f) Reference to this Australian/New Zealand Standard, i.e. AS/NZS 2512.5.2.