

AS/NZS ISO 16073.5:2024
ISO 16073-5:2019



Australian/New Zealand Standard™

Wildland firefighting personal protective equipment — Requirements and test methods

Part 5: Helmets



AS/NZS ISO 16073.5:2024

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee SF-049, Firefighters Personal Protective Equipment. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 23 May 2024 and by the New Zealand Standards Approval Board on 01 May 2024.

This Standard was published on 7 June 2024.

The following are represented on Committee SF-049:

- Association of Accredited Certification Bodies, Australia
- Australasian Fire and Emergency Service Authorities Council
- Australian Chamber of Commerce and Industry
- Australian Fashion Council
- AWTA Product Testing (Testing Interests Australia)
- Better Regulation Division (Fair Trading, SafeWork NSW, TestSafe)
- CSIRO
- Department of Defence (Australian Government)
- Fire and Emergency New Zealand
- New Zealand Leather & Shoe Research Association
- New Zealand Professional Firefighters Union
- NSW Rural Fire Service Association
- Pacific Safety International, NZ
- RMIT University
- The Workwear Group New Zealand
- United Firefighters Union of Australia
- VicLab (Testing Interests Australia)

This Standard was issued in draft form for comment as DR AS/NZS ISO 16073.5:2023.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

www.standards.govt.nz

ISBN 978 1 76139 660 1

Australian/New Zealand Standard™

Wildland firefighting personal protective equipment — Requirements and test methods

Part 5: Helmets

First published as AS/NZS ISO 16073.5:2024.

COPYRIGHT

© ISO 2024 — All rights reserved

© Standards Australia Limited/the Crown in right of New Zealand, administered by the New Zealand Standards Executive 2024

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth) or the Copyright Act 1994 (New Zealand).

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-049, Firefighters Personal Protective Equipment.

The objective of this document is to specify the minimum performance requirements and methods of test for helmets used for wildland firefighting.

This document covers the general design of wildland firefighting helmets, the minimum levels of performance for the materials employed and the methods of test used. The personal protective equipment (PPE) is not intended to provide protection during fire entrapment.

This document does not cover PPE for structural firefighting (see ISO 11999 series), for use against chemical, biological, radiological and nuclear hazards, or for use where a reflective outer surface is required (see ISO 15538).

This document is identical with, and has been reproduced from, ISO 16073-5:2019, *Wildland firefighting personal protective equipment — Requirements and test methods — Part 5: Helmets*.

As this document has been reproduced from an International document, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Preface	ii
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Design and general requirements	1
4.1 General	1
4.2 Helmet shell	2
4.3 Vertical clearance	2
4.4 Horizontal clearance	2
4.5 Wearing height	2
4.6 Mass	2
4.7 Shell conspicuity	2
4.8 Retroreflective material	2
4.9 Neck protector	3
4.10 Retention system	3
4.11 Accessories attached on the helmet	3
5 Performance requirements	3
5.1 Shock absorption	3
5.1.1 Crown impact	3
5.1.2 Off-crown impacts	3
5.2 Resistance to penetration	4
5.3 Retention system strength	4
5.4 Lateral rigidity	4
5.5 Flame resistance	4
5.6 High-temperature stability	4
5.7 High radiant heat environments	4
5.8 Electrical insulation	5
5.9 Optional low-temperature tests	5
6 Test requirements	5
6.1 Samples	5
6.2 Conditioning for testing	6
6.2.1 Preconditioning chamber	6
6.2.2 Preconditioning	6
6.2.3 Low temperature conditioning	6
6.2.4 High temperature conditioning	6
6.2.5 Wet conditioning	7
6.3 Headforms	7
6.3.1 Construction	7
6.3.2 Selection of size	7
6.3.3 Measurement of clearances and wearing height	7
6.4 Shock absorption test	8
6.4.1 Principle	8
6.4.2 Apparatus	9
6.4.3 Test procedures	9
6.5 Penetration resistance test	9
6.5.1 Apparatus	9
6.5.2 Test procedure	10
6.6 Retention system strength test	10
6.6.1 Principle	10
6.6.2 Apparatus	10

6.6.3	Procedure.....	11
6.7	Lateral rigidity test.....	12
6.8	Flame resistance test.....	12
6.8.1	General.....	12
6.8.2	Apparatus.....	12
6.8.3	Test procedure.....	12
6.9	Electrical insulation test.....	12
7	Marking and labelling.....	13
7.1	General marking requirements.....	13
7.2	Label durability and legibility.....	13
7.3	Compliance marking requirements.....	13
8	Manufacturer's information.....	14
Annex A	(normative) Conditioning and testing schedule.....	16
Annex B	(informative) Guidelines for personal protective equipment (helmet) design.....	17
Annex C	(normative) Thermal stability of helmets at elevated temperatures.....	18
Annex D	(informative) Recommendations for the materials and construction of helmets.....	20
Bibliography		21

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective equipment*, Subcommittee SC 14, *Firefighters personal equipment*.

This first edition of ISO 16073-5, together with ISO 16073-1 to ISO 16073-8, cancels and replaces ISO 16073:2011.

The main changes are as follows:

- the content has been reviewed and separated into several parts;
- the respiratory protection has been deleted from the document.

A list of all parts in the ISO 16073 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Wildland firefighting involves work carried out mostly in summer temperatures and for many hours, during which the firefighter can develop high levels of metabolic heat. Consequently, a helmet should be light and commensurate with the risks to which the firefighter can be exposed in order to be effective without introducing excessive heat stress to the wearer.

It is important to train firefighters in the selection, use, care and maintenance of the personal protective equipment (PPE) covered by this document, including an understanding of its limitations.

It is intended that a risk assessment be undertaken to determine if the PPE covered by this document is suitable for its intended use and the expected exposure.

This document provides minimum performance requirements for wildland firefighters' personal protective equipment designed for use for extended periods during wildland firefighting.

Australian/New Zealand Standard

Wildland firefighting personal protective equipment — Requirements and test methods

Part 5: Helmets

1 Scope

This document specifies the minimum performance requirements and methods of test for helmets used for wildland firefighting.

This document covers the general design of wildland firefighting helmets, the minimum levels of performance for the materials employed and the methods of test used. The personal protection equipment (PPE) is not intended to provide protection during fire entrapment.

This document does not cover PPE for structural firefighting (see ISO 11999 series), for use against chemical, biological, radiological and nuclear hazards, or for use where a reflective outer surface is required (see ISO 15538).

Activities in support of wildland firefighting, such as the cutting of trees and the use of a chainsaw can require additional protection to that provided in this document. Users are directed to those relevant standards for the requirements associated with such protection.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 13688:2013, *Protective clothing — General requirements*

ISO 15025, *Protective clothing — Protection against flame — Method of test for limited flame spread*

ISO/TR 19591, *Personal protective equipment for firefighters — Standard terms and definitions*

EN 960, *Headforms for use in the testing of protective helmets*

CIE 54.2, *Retroreflection — Definition and measurement*

3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO/TR 19591 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Design and general requirements

4.1 General

Wildland firefighters require helmets to minimize the impact or penetration caused by falling tree branches as well as to provide protection to the head from flames, flying embers and radiant heat. Helmets shall also be fitted with securing mechanisms to prevent them from being dislodged during wildland firefighting operations. Recommendations for general consideration of design and

construction of helmets are given in [Annex B](#) and [Annex D](#). A summary of design and performance requirements are given in [Table 1](#).

The helmet may be required to interface with other items of PPE used for wildland firefighting.

The helmet shall meet the requirements as detailed in ISO 13688:2013, 4.2.

NOTE For more information, see ISO/TS 11999-2.

4.2 Helmet shell

There shall be no sharp edges, roughness or projection on any part of the helmet which may cause injury to the wearer, in contact or potential contact with the wearer when it is worn.

There shall be no holes on the shell's surface that may allow ingress of flying embers or hot debris.

The profile at the front edge of the shell shall not prevent the wearing of spectacles or goggles.

4.3 Vertical clearance

The vertical clearance between the top of the headform and the inside of the shell as shown in [Figure 1](#), when measured under the conditions given in [6.3.3](#), shall be no more than 50 mm.

4.4 Horizontal clearance

The horizontal clearance at the front and sides of the helmet, when measured under the conditions given in [6.3.3](#), shall be no less than 5 mm.

4.5 Wearing height

The wearing height, being the distance between the top of the headform and the bottom edge of the headband, when measured either at the front of the headform or at the side under the conditions given in [6.3.3](#), shall be no less than:

- 80 mm for helmets mounted on headform size designation 525 (as per EN 960);
- 85 mm for helmets mounted on headform size designation 555 (as per EN 960);
- 90 mm for helmets mounted on headform size designation 585 (as per EN 960).

4.6 Mass

If the mass of a complete helmet, including harness but without accessories, exceeds 800 g, this mass, determined to the nearest 30 g, shall be shown on a label attached to the helmet.

4.7 Shell conspicuity

The helmet shell shall have retroreflective markings in accordance with [4.8](#) adhered to the shell exterior. A minimum of 26 cm² of the markings shall be visible when the helmet is viewed from any angle at the reference plane (see figure footnote b on [Figure 2](#)). A material which combines both the fluorescent and retroreflective properties may be used. Care should be exercised when selecting marking materials to ensure they will not degrade the helmet shell.

4.8 Retroreflective material

The material shall have a coefficient of luminous intensity per square meter (CIL/m²) of not less than 85 cd/lx/m² when measured in accordance with CIE 54.2 with an observation angle of 0,2° and entrance angle of -4°.