AS 6183:2025

Australian STANDARD®

STANDARDS Australia

Fire protection equipment — Carbon dioxide extinguishing systems for use on premises — Design and installation (ISO 6183:2022, MOD)



AS 6183:2025

This Australian Standard ® was prepared by FP-011, Special Hazard Fire Protection Systems. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 26 February 2025.

This Standard was published on 21 March 2025.

The following are represented on Committee FP-011:

Australasian Fire and Emergency Service Authorities Council
Australian Chamber of Commerce and Industry
Australian Industry Group
CSIRO
Engineers Australia/Society of Fire Safety
Facility Management Association of Australia
Fire Protection Association Australia
National Fire Industry Association

This Standard was issued in draft form for comment as DR AS 6183:2023.

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

ISBN 978 1 76175 110 3

Fire protection equipment — Carbon dioxide extinguishing systems for use on premises — Design and installation (ISO 6183:2022, MOD)

Originated as AS 6183—2011.
Second edition 2025.

COPYRIGHT

© ISO 2025 — All rights reserved
© Standards Australia Limited 2025

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).

Preface

This Standard was prepared by the Standards Australia Committee FP-011, Special Hazard Fire Protection Systems, to supersede AS 6183:2011.

The objective of this document is to specify requirements and give recommendations for the design, installation, testing, maintenance and safety of fixed carbon dioxide firefighting systems in buildings, plants or other structures.

This document is an adoption with national modifications and has been reproduced from ISO 6183:2022, *Fire protection equipment — Carbon dioxide extinguishing systems for use on premises — Design and installation*. The modifications are set out in national variations boxes which give instructions where the ISO text is to be modified for use in Australia. Due to ISO copyright policy it is not possible to directly modify the ISO content.

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.

© Standards Australia Limited 2025

Contents

Preface ii
Foreword vi
Introduction vii
1 Scope 1
2 Normative references 1
3 Terms and definitions 2
4 Use and limitations 5
4.1 General 5
4.2 Uses for carbon dioxide systems 5
4.3 Limitations for carbon dioxide systems 6
4.4 Temperature limitations 6
5 Safety 6
5.1 Hazard to personnel 6
5.2 Safety precautions 6
5.2.1 Normally occupied and normally unoccupied areas 6
5.2.2 Warning notices for occupiable areas 8
5.2.3 Warning notices for unoccupiable areas 10
5.3 Electrical hazards 11
5.4 Electrical earthing 12
5.5 Electrostatic discharge 12
6 System design 13
6.1 General 13
6.1.1 Introduction 13
6.1.2 Specifications 13
6.1.3 Working documents 13
6.2 Carbon dioxide supply 13
6.2.1 Quality 13
6.2.2 Quantity 14
6.2.3 Container arrangement 15
6.2.4 Storage containers 16
6.3 Distribution 18
6.3.1 General 18
6.3.2 Piping 19
6.3.3 Fittings 19
6.3.4 Pipe and valve support 20
6.3.5 Valves 20
6.3.6 Nozzles 21
6.4 Enclosures (total flooding) 22
6.4.1 Structural strength 22
6.4.2 Loss through openings 22
6.4.3 Ventilation systems 22
6.5 Detection, actuation and control systems 22
6.5.1 General 22
6.5.2 Shut-down of plant and equipment 23
6.5.3 Automatic detection 23
6.5.4 Operating devices 23
6.5.5 Control equipment 25
6.5.6 Audible alarms and visual indicators 26
6.6 Local control (LC) and local control stations (LCS) 28
7 Carbon dioxide flow and concentration calculations 28
7.1 General 28

7.2 System flow calculations 29
7.2.1 General 29
7.2.2 Friction losses 29
7.2.3 Pressure drop 29
7.2.4 Valves and fittings 30
7.2.5 As-installed calculations 30
7.2.6 Specific requirements 30
7.3 Carbon dioxide concentration requirements 30
7.3.1 Flame extinguishment 30
7.3.2 Inerting 31
7.4 Total flooding quantity 31
7.4.1 General 31
7.4.2 Design quantity 31
7.4.3 K_B factor 32
7.5 Design of local application systems 35
7.5.1 General 35
7.5.2 Carbon dioxide requirements 35
7.5.3 Rate by area method 35
7.5.4 Rate by volume method 37
7.6 Duration of protection — total flooding systems 38
7.7 System performance 39
7.7.1 Discharge time 39
7.7.2 Extended discharge 39

8 Commissioning and acceptance 39
8.1 General 39
8.2 Tests 40
8.2.1 General 40
8.2.2 Enclosure check 40
8.2.3 Review of mechanical components 40
8.2.4 Review of enclosure integrity 41
8.2.5 Review of electrical components 42
8.2.6 Preliminary functional tests 43
8.2.7 System functional operational test 43
8.2.8 Remote monitoring operations (if applicable) 43
8.2.9 Control panel primary power source 43
8.2.10 Completion of functional tests 44
8.3 Completion certificate and documentation 44

9 Inspection, maintenance, testing and training 44
9.1 General 44
9.2 Inspection 45
9.2.1 General 45
9.2.2 Container 45
9.2.3 Hose 45
9.2.4 Enclosures 45
9.3 Maintenance 45
9.3.1 General 45
9.3.2 User's programme of inspection 45
9.3.3 Service schedule 46
9.4 Training 46

Appendix A (normative) **Working documents 47**

Appendix B (normative) **Carbon dioxide system pipe and orifice size determination 54**

Appendix C (informative) **System performance verification 62**

Appendix D (informative) **General information on carbon dioxide 63**

Appendix E (informative) **Examples of calculations 68**

Bibliography **73**

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 21, *Equipment for fire protection and firefighting*, Subcommittee SC 8, *Gaseous media and firefighting systems using gas*.

This third edition cancels and replaces the second edition (ISO 6183:2009), which has been technically revised. It also incorporates the Amendment(s) ISO 6183:2009/Amd. 1:2017 and ISO 6183:2009/Amd. 2:2019.

The main changes are as follows:

— guidance on container storage has been updated;

— alerts when removing actuators have been added;

— a commissioning check list has been included in Annex A;

— pictorial examples have been added to Annex C.

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.

© Standards Australia Limited 2025

Introduction

This document is intended for use by those concerned with purchasing, designing, installing, testing, inspecting, approving, operating and maintaining carbon dioxide (CO_2) extinguishing systems.

This document applies only to carbon dioxide fixed fire-extinguishing systems in buildings and other premises on land. Although the general principles can apply to other uses (e.g. maritime use), for these other uses, it is likely that additional considerations will have to be taken into account and the application of the requirements given in this document is therefore unlikely to be fully satisfactory. General information about carbon dioxide as an extinguishing medium is given in Annex D. This can be useful background information for those unfamiliar with the characteristics of this medium.

It has been assumed in the preparation of this document that the execution of its provisions will be entrusted to those persons appropriately qualified and experienced in the specification, design, installation, testing, approval, inspection, operation and maintenance of systems and equipment, for whose guidance it has been prepared, and who can be expected to exercise a duty of care to avoid the unnecessary release of carbon dioxide. New requirements to minimize the need to release carbon dioxide during testing and commissioning procedures are included in this third edition. These are linked to the inclusion of enclosure integrity testing.

Carbon dioxide has for many years been a recognized effective medium for the extinction of flammable liquid fires as well as fires in the presence of electrical and ordinary Class A hazards. Nevertheless, in the planning of comprehensive schemes, it should be remembered that there can be hazards for which this media is not suitable, and that in certain circumstances or situations there can be dangers in its use requiring special precautions.

The use of carbon dioxide is no longer recommended for total flooding of occupied areas if more appropriate extinguishing agents are available. ISO 14520 provides requirements for other extinguishing agents that can be more appropriately used in these areas.

It is important that the fire protection of a building or plant be considered as a whole. Carbon dioxide systems form only a part, albeit an important part, of the available facilities. It cannot be assumed that their adoption necessarily removes the need to consider supplementary measures, such as the provision of portable fire extinguishers or other mobile appliances for first aid or emergency use, or to deal with special hazards.

Advice on these matters can be obtained from the appropriate manufacturer of the carbon dioxide or the extinguishing system. Information can also be sought from the appropriate fire authority, the health and safety authorities, and insurers. In addition, reference needs to be made, as appropriate, to the other national standards and statutory regulations of a given country.

It is essential that firefighting equipment be carefully maintained to ensure instant readiness when required. Routine maintenance is liable to be overlooked or given insufficient attention by the owner of the system. It is, however, neglected at the peril of the lives of occupants of the premises and at the risk of crippling financial loss. The importance of maintenance cannot be too highly emphasized. Inspection, preferably by a third party, should include an evaluation concluding that the extinguishing system continues to provide adequate protection for the risk (protected zones as well as state-of-the-art can change over time).

© Standards Australia Limited 2025

NOTES

Australian Standard®

Fire protection equipment — Carbon dioxide extinguishing systems for use on premises — Design and installation (ISO 6183:2022, MOD)

1 Scope

This document specifies requirements and gives recommendations for the design, installation, testing, maintenance and safety of fixed carbon dioxide firefighting systems in buildings, plants or other structures. It is not applicable to extinguishing systems on ships, in aircraft, on vehicles or on mobile fire appliances, or to below-ground systems in the mining industry; nor does it apply to carbon dioxide pre-inerting systems.

Design of systems where unclosable opening(s) exceed a specified area and where the opening(s) can be subject to the effect of wind is not specified, although general guidance on the procedure to be followed in such cases is given (see 7.4.3.2).

2 Normative references

NATIONAL VARIATIONS

1. After the first paragraph, *add* the following:

The Australian or Australian/New Zealand Standards listed below are modified adoptions of, or not equivalent to, the ISO normative references and are required for the application of this document. All references in the source text to those ISO normative references shall be replaced by references to the corresponding Australian or Australian/New Zealand Standards.

2. *Delete* "ISO 7240-2, *Fire detection and alarm systems — Part 2: Fire detection control and indicating equipment*" and *replace* with the following:

AS 1670.5, *Fire detection, warning, control and intercom systems — System design, installation and commissioning, Part 5: Special hazards system*

3. *Delete* "ISO 7240-23, *Fire detection and alarm systems — Part 23: Visual alarm devices*".

4. *Add* the following to the list of references:

AS 1670.1, *Fire detection, warning, control and intercom systems — System design, installation and commissioning, Part 1: Fire*

AS 1851, *Routine service of fire protection systems and equipment*

AS 2613, *Safety devices for gas cylinders*

AS 4041, *Pressure piping*

AS 4078, *Fire protection — Fire extinguishing media — Carbon dioxide*

AS/NZS 3000, *Electrical installations (known as the Australian/New Zealand Wiring Rules)*

AS/NZS 4680, *Hot-dip galvanized (zinc) coatings on fabricated ferrous articles*

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 7240-2, *Fire detection and alarm systems — Part 2: Fire detection control and indicating equipment*

© Standards Australia Limited 2025