



Playground equipment and surfacing

Part 1: General safety requirements and test methods (EN 1176-1:2008, MOD)

AS 4685.1:2014, *Playground equipment and surfacing, Part 1: General safety requirements and test methods (EN 1176-1:2008, MOD)*, is a modified adoption of EN 1176-1:2008, *Playground equipment and surfacing, Part 1: General safety requirements and test methods*, and is reproduced with the permission of CEN, Avenue Marnix 17, B-1000 Brussels, Belgium. All exploitation rights of the European Standards in any form and by any means are reserved world-wide to CEN and its National Members, and no reproduction may be undertaken without express permission in writing by CEN through Standards Australia Limited.



STANDARDS
Australia

This Australian Standard® was prepared by Committee CS-005, Playground Equipment. It was approved on behalf of the Council of Standards Australia on 13 March 2014. This Standard was published on 24 April 2014.

The following are represented on Committee CS-005:

- Australian Industry Group
 - Australian Institute of Landscape Architects
 - Department for Health and Ageing, SA
 - Early Childhood Australia
 - Education and Early Childhood Services Registration and Standards Board
 - Engineers Australia
 - Institute of Public Works Engineering Australia
 - Kidsafe
 - Monash University
 - National Association of Testing Authorities Australia
 - Occupational Therapy Australia
 - Play Australia
 - Play Equipment Importers and Exporters
-

This Standard was issued in draft form for comment as DR AS 4685.1.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting www.standards.org.au

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.org.au, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard[®]

Playground equipment and surfacing

Part 1: General safety requirements and test methods (EN 1176-1:2008, MOD)

Originally as part of AS 1924.1—1976.
Previous edition AS 4685.1—2004.
Second edition AS 4685.1:2014.

COPYRIGHT

© Standards Australia Limited

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.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 1 74342 677 7

PREFACE

This Standard was prepared by the Standards Australia Committee CS-005, Playground Equipment, to supersede, AS 4685.1—2004, *Playground equipment, Part 1: General safety requirements and test methods*.

This Standard will apply from the date of publication. However, the Committee has decided that to avoid excessive costs to manufacturers and operators, the superseded Standard, AS 4685.1—2004, will continue as an alternative for a period of one year after the publication date.

Designers and providers must note the importance of providing inclusive play and recreation settings for children and adults with disabilities. In particular, where the design of play equipment and surfaces provides access for users with wheelchairs or mobility aids to elevated surfaces, care must be taken to ensure that the design protects these users from falls through elevated openings. Refer to the AS 1428, *Design for access and mobility* (series) for further guidance regarding inclusive environments.

Designers and providers of playground equipment are strongly urged to reduce the potential for foreseeable misuse of their products. Among other appropriate design measures, unintended access should be actively discouraged through the elimination of unnecessary handholds and footholds, the inclusion of physical barriers, and the use of dimensions and profiles that are intrinsically difficult for children to climb.

Designers and providers of playgrounds are strongly urged to minimize the harmful effects of UV exposure to children and other users by incorporating shade structures and natural shade within the design. The Committee noted that the provision of shade has the additional benefit of reducing the potential for severe skin burns from exposed hot surfaces.

The objective of this Standard is to specify general safety requirements for playground equipment covering materials, design and manufacture.

This Standard is an adoption with national modifications and has been reproduced from EN 1176-1:2008, *Playground equipment and surfacing, Part 1: General safety requirements and test methods*, and has been varied as indicated to take account of Australian conditions. The modifications are specified in Appendix ZZ.

As this Standard is reproduced from an International Standard, the following applies:

- (a) In the source text ‘this part of EN 1176’ should read ‘this Australian Standard’.
- (b) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

<i>Reference to International Standard</i>	<i>Australian/New Zealand Standard</i>
EN 1177	AS/NZS 4422
Impact attenuating playground surfacing—Determination of critical fall height	Playground surfacing—Specifications, requirements and test method
EN 834	AS 2321
Short link chains for lifting purposes—General conditions of acceptance	Short link chains for lifting purposes

EN		AS/NZS	
1991	Actions on structures	1170	Structural design actions
1991-1-2	Part 1-2: General actions—Actions on structures exposed to fire	1170.1	Part 1: Permanent, imposed and other actions
1991-1-3	Part 1-3: General actions—Snow loads	1170.3	Part 3: Snow and ice actions
1991-1-4	Part 1-4: General actions—Wind actions	1170.2	Part 2: Wind actions
EN ISO		AS	
2307	Fibre ropes—Determination of certain physical and mechanical properties	4143	Methods of test for fibre ropes
9554	Fibre ropes—General specifications	4142	Fibre ropes
EN ISO/IEC		AS ISO/IEC	
17025	General requirements for the competence of testing and calibration laboratories	17025	General requirements for the competence of testing and calibration laboratories

Only normative references that have been adopted as Australian or Australian/New Zealand Standards have been listed.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annex or appendix to which they apply. A ‘normative’ annex or appendix is an integral part of a Standard, whereas an ‘informative’ annex or appendix is only for information and guidance.

CONTENTS

1	Scope	7
2	Normative references	7
3	Terms and definitions	8
4	Safety requirements	15
4.1	Materials	15
4.1.1	General.....	15
4.1.2	Flammability.....	15
4.1.3	Timber and associated products	15
4.1.4	Metals.....	16
4.1.5	Synthetics.....	16
4.1.6	Dangerous substances	16
4.2	Design and manufacture.....	16
4.2.1	General.....	16
4.2.2	Structural integrity.....	17
4.2.3	Accessibility for adults	18
4.2.4	Protection against falling.....	18
4.2.5	Finish of equipment.....	22
4.2.6	Moving parts.....	22
4.2.7	Protection against entrapment.....	22
4.2.8	Protection against injuries during movement and falling	27
4.2.9	Means of access	38
4.2.10	Connections	40
4.2.11	Consumable components.....	40
4.2.12	Ropes.....	40
4.2.13	Chains.....	42
4.2.14	Foundations	42
4.2.15	Heavy suspended beams.....	43
5	Test methods and reports.....	44
6	Information to be provided by the manufacturer/supplier	45
6.1	Information to be provided by the manufacturer/supplier of playground equipment.....	45
6.1.1	General product information	45
6.1.2	Pre-information	45
6.1.3	Installation information	45
6.1.4	Inspection and maintenance information	46
6.2	Information to be provided by the manufacturer or supplier of impact-attenuating surfacing.....	47
6.2.1	Pre-information	47
6.2.2	Installation	47
6.2.3	Inspection and maintenance	47
6.2.4	Identification of impact-attenuating playground surfacing.....	47
7	Marking	48
7.1	Equipment identification.....	48
7.2	Base level mark.....	48
Annex A	(normative) Loads	49
A.1	Permanent loads.....	49
A.2	Variable loads.....	49
A.3	Number of users on the equipment.....	54
Annex B	(normative) Method of calculation of structural integrity.....	56
B.1	General principles: Limit state	56
B.2	Load combinations for static analysis	57

B.3	Worked example of the calculation of user loads (without safety factors).....	58
B.4	Calculation of forces acting on a swing seat	61
B.5	Worked examples for forces acting on a swing (without safety factors).....	63
B.6	Calculation of forces acting on the cable of a cableway.....	64
B.7	Worked example for forces acting on a cableway (without safety factors)	66
Annex C (normative) Physical testing of structural integrity		68
C.1	Pass/fail criteria	68
C.2	Test load for equipment.....	69
C.3	Load application	70
C.4	Test report.....	70
Annex D (normative) Test methods for entrapment		71
D.1	General	71
D.2	Head and neck entrapment	71
D.3	Entrapment of clothing (Toggle test)	77
D.4	Finger entrapment	80
Annex E (informative) Overview of possible entrapment situations		83
Annex F (informative) A–deviations		85
F.1	General	85
F.2	France	85
F.3	Germany	85
Bibliography		88

INTRODUCTION

It is not the purpose of the requirements of this standard to lessen the contribution that playground equipment makes to the child's development and/or play, which is meaningful from an educational point of view.

This standard acknowledges the difficulties of addressing safety issues by age criteria alone because the ability to handle risk is based on the individual users' level of skills and not by age. Also users other than the intended age range will almost certainly make use of the playground equipment.

Risk-taking is an essential feature of play provision and of all environments in which children legitimately spend time playing. Play provision aims to offer children the chance to encounter acceptable risks as part of a stimulating, challenging and controlled learning environment. Play provision should aim at managing the balance between the need to offer risk and the need to keep children safe from serious harm.

The principles of safety management are applicable both to workplaces in general as well as to play provision. However, the balance between safety and benefits is likely to be different in the two environments. In play provision exposure to some degree of risk may be of benefit because it satisfies a basic human need and gives children the chance to learn about risk and consequences in a controlled environment.

Respecting the characteristics of children's play and the way children benefit from playing on the playground with regard to development, children need to learn to cope with risk and this may lead to bumps and bruises and even occasionally a broken limb. The aim of this standard is first and foremost to prevent accidents with a disabling or fatal consequence, and secondly to lessen serious consequences caused by the occasional mishap that inevitably will occur in children's pursuit of expanding their level of competence, be it socially, intellectually or physically.

Refusal of admittance and access as a safety precaution is problematic due to, for example, breach in supervision or help by peers. Requirements of significant importance, such as, for example, head and neck entrapment and protection against inadvertent falls, have been written with this in mind. It is also recognised that there is an increasing need for play provision to be accessible to users with disabilities. This of course requires play areas to provide a balance between safety and the offer of the required level of challenge and stimulation to all possible groups of users. However, for the purposes of protection against head and neck entrapment, this standard does not take into account children with an increased size of the head (e.g. hydrocephalus or Downs Syndrome) or wearing helmets.

AUSTRALIAN STANDARD

Playground equipment and surfacing

Part 1:

General safety requirements and test methods (EN 1176-1:2008, MOD)

1 Scope

This part of EN 1176 specifies general safety requirements for public playground equipment and surfacing. Additional safety requirements for specific pieces of playground equipment are specified in subsequent parts of this standard.

This part of EN 1176 covers playground equipment for all children. It has been prepared with full recognition of the need for supervision of young children and of less able or less competent children.

The purpose of this part of EN 1176 is to ensure a proper level of safety when playing in, on or around playground equipment, and at the same time to promote activities and features known to benefit children because they provide valuable experiences that will enable them to cope with situations outside the playground.

This part of EN 1176 is applicable to playground equipment intended for individual and collective use by children, but excluding adventure playgrounds. It is also applicable to equipment and units installed as children's playground equipment although they are not manufactured as such, but excludes those items defined as toys in EN 71 and the Toys Safety Directive.

NOTE Adventure playgrounds are fenced, secured playgrounds, run and staffed in accordance with the widely accepted principles that encourage children's development and often use self-built equipment.

This part of EN 1176 specifies the requirements that will protect the child from hazards that he or she may be unable to foresee when using the equipment as intended, or in a manner that can be reasonably anticipated.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 335-2:2006, *Durability of wood and wood-based products — Definition of use classes — Part 2: Application to solid wood*

EN 350-2:1994, *Durability of wood and wood-based products — Natural durability of solid wood — Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

EN 351-1:2007, *Durability of wood and wood-based products — Preservative-treated solid wood — Part 1: Classification of preservative penetration and retention*

EN 636, *Plywood — Specifications*

EN 1177, *Impact attenuating playground surfacing — Determination of critical fall height*

EN 1991-1-2, *Eurocode 1: Actions on structures — Part 1-2: General actions — Actions on structures exposed to fire*

EN 1991-1-3, *Eurocode 1: Actions on structures — Part 1-3: General actions — Snow loads*

EN 1991-1-4, *Eurocode 1: Actions on structures — Part 1-4: General actions — Wind actions*

EN 13411-3, *Terminations for steel wire ropes — Safety — Part 3: Ferrules and ferrule-securing*

EN 13411-5, *Terminations for steel wire ropes — Safety — Part 5: U-bolt wire rope grips*

EN ISO 2307, *Fibre ropes — Determination of certain physical and mechanical properties (ISO 2307:2005)*

EN ISO 9554, *Fibre ropes — General specifications (ISO 9554:2005)*