SS 485:2022
AS 4856:2013, IDT
(ICS 93.080.20)

SINGAPORE STANDARD

Specification for slip resistance classification of pedestrian surface materials

Singapore Standards Council

Australian Standard AS 4586:2013, “Slip resistance classification of new pedestrian surface materials” is endorsed as a Singapore Standard with the reference number SS 485:2022. AS 4586:2013 is published by Standards Australia and can be obtained from Standards Australia or its authorised distributors (see: www.standards.org.au).

Please note that the 2013 edition of this standard is the version adopted as a Singapore Standard. Any subsequent revision of this Australian Standard will have to be reviewed by the relevant committees under the Singapore Standardisation Programme to ascertain its suitability as a Singapore Standard. Users may contact EnterpriseSG at standards@enterprisesg.gov.sg regarding this Singapore Standard.

National Foreword

This Singapore Standard was prepared by the Working Group on Slip Resistance Classification of Pedestrian Surface Materials set up by the Technical Committee on Workplace Safety and Health under the purview of the Quality and Safety Standards Committee.

This Singapore Standard aims to provide users and specifiers of pedestrian surface materials with the means for classifying and selecting such surfaces for use according to their pedestrian slip resistance.

This standard is an identical adoption of AS 4586:2013, “Slip resistance classification of new pedestrian surface materials”, published by Standards Australia.

NOTE – Where appropriate, “AS 4586” is read as “SS 485”.

In Singapore, the following apply:

a) Pedestrian surfaces include public trafficable areas.

b) Specifiers should consider the likely in-service wear conditions and its effects on slip resistance, taking into account the material type, pedestrian and other traffic and environmental conditions, high incidence of substances contaminants such as grease, oil, water, dust or other perishable waste or residues including cleaning, sealing and carpet wear and stretch, when specifying a particular slip resistance classification.

c) Users and specifiers may refer to Annex ZA “Selection of pedestrian surface materials” on recommendations for pedestrian surface materials in some specific typical locations

d) For B3.2, when sliders are not in use, they are to be stored in the dark at a temperature below 25 ºC and preferably below 15 ºC.

e) The pendulum friction apparatus is calibrated to ensure compliance with BS 7976-3, “Pendulum testers – Part 3: Method of calibration”, CEN/TS 16165, “Determination of slip resistance of pedestrian surfaces – Methods of evaluation” or BS EN 13036-4 “Road and airfield surface characteristics – Test methods – Part 4: Method for measurement of slip/skid resistance of a surface: The pendulum test”.

f) The slip resistance performance of surfaces over service life is affected by factors such as ageing, intensity of use, weathering and maintenance. There will be a need for service life testing of the surfaces to ascertain ‘in-use’ slip resistance properties to support decision making on risks arising from deteriorated slip resistance performance.

Users may refer to the following for more information:

BS 8204-6:2008+A1:2010 “Screeds, bases and in situ floorings – Synthetic resin floorings. Code of practice”, Annex B specifies the use of equipment that is easy to set up on site and provides immediate test results.

Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

NOTE

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "mature standards". Mature standards will not be subject to further review, unless there are requests to review such standards.*

2. *An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore, the Singapore Standards Council and Standards Australia shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*

3. *Compliance with a SS or TR does not exempt users from any legal obligations.*

Annex ZA
(informative)

Selection of pedestrian surface materials

It should be noted that compliance with the recommendations of this Annex will not necessarily alleviate all hazards. However, it will reduce certain pedestrian risks.

Table ZA.1 provides recommendations for pedestrian surface materials in some specific locations. Other design considerations include the following:

a) Amount and type of expected traffic (vehicles, trolleys, people hurrying, elderly, disabled people with or without walking aids, and children);

b) Product characteristics (wear resistance and cleanability) and the consequences of exposure to the types of contaminants that might be anticipated;

c) Environmental design factors (visibility issues and contamination minimisation);

d) Management policy and maintenance practices (types of cleaning equipment, frequency and effectiveness of cleaning);

e) Compliance with occupational, health and safety requirements;

f) Special provisions for slip hazards (guards and handrails); and

g) Alternative information sources (use of contrasting colours and warning signs).

Table ZA.1 – Pedestrian surface material selection guide for general locations

Location	Pendulum	Ramp
Indoor public accessible area / corridor / walkway	P1 (Z)	R9
Internal stair tread, nosing and landing	P3 (X)	R10
Internal ramp and slope (gradient not steeper than 1:14)	P3 (X)	R10
Internal ramp and slope (gradient steeper than 1:14)	P4 (W)	R11
Entry area / foyer [specific area where it may be prone to being wet]	P3 (X)	R10
Covered public accessible area / corridor / walkway / porch / lift lobby [exposed to weather on side(s)]	P3 (X)	R10
General outdoor public area / corridor / walkway	P4 (W)	R11
External stair tread, nosing and landing	P4 (W)	R11
Location	**Pendulum**	**Ramp**

External ramp and slope (gradient not steeper than 1:14)	P4 (W)	R11
External ramp and slope (gradient steeper than 1:14)	P5 (V)	R12
Bus stop, taxi stand, passenger pick up	P4 (W)	R11
MRT station, bus interchange concourse / platform (internal)	P1 (Z)	R9
MRT station, bus interchange concourse / platform (naturally ventilated)	P2 (Y)	R9
MRT station, bus interchange entrances (prone to being wet)	P3 (X)	R10
Shop and supermarket [specific area where it may be prone to being wet]	P3 (X)	R10
Hawker centre / food court / fast food / food outlet / canteen dining area (internal or covered)	P3 (X)	R10
Hawker centre / food court / fast food / food outlet / canteen dining area (external)	P4 (W)	R11
Canteen stall and washing Area	P4 (W)	R11
Hospitals and aged care facilities – Dry areas	P2 (Y)	R9
Hospitals and aged care facilities – Ensuites	P3 (X)	R10
Communal changing rooms	P3 (X)	A
Swimming pool surrounds and communal shower rooms	P4 (W)	B
Swimming pool ramps and stairs leading into water	P5 (V)	C
Toilet / nursing room	P3 (X)	R10
Games court & gymnasium (ref Note 5)	P3 (X)	R10
Refuse bin centre	P3 (X)	R10
M&E plant room (ref Note 6)	P3 (X)	R10
Roof maintenance (accessible for maintenance personnel only) (ref Note 7)	P3 (X)	R10

NOTE 1 – Appropriate measures should be taken to exclude casual water from dry areas.

NOTE 2 – The values from the pendulum and ramp columns in the table are not equivalent from each other. E.g. achieving the “P1 (Z)” classification for pendulum test is not the equivalent of “R9” for the ramp test. It is not necessary to meet both criteria.

NOTE 3 – P0 to P5 are the new values used in the Australian Standard (AS 4586:2013). The alphabets (V, W, X, Y, Z) in brackets are the equivalent values used in the previous Australian Standards (AS 4586:2004 or earlier versions) and are for ease of reference to values used in the past (e.g. SS 485:2011 or earlier).

NOTE 4 – All floors with wet pendulum classifications of P0(Z) or P1(Z) should have a dry floor friction classification of D1.

NOTE 5 – Depending on specific usages, floor can be a lower slip resistance classification to suit its purpose or sports requirements

NOTE 6 – M&E rooms are spaces visited by maintenance personnel. Such spaces can have varying floor conditions where water, oil, or grime may exist. Specifiers may propose appropriate slip resistant values to meet such varying needs. Electrical rooms with raised floor systems can consider lower slip resistant values.

NOTE 7 – Roof maintenance generally refers to concrete roofs and do not include metal roofs.

NOTE 8 – The surface material selection guide has only P1 and R9 as the minimum classification. As there is no lower limit in classification P0, it is not appropriate for any spaces to be specified with such classifications.

NOTE 9 – The Classification A to C are found in Table 4 of AS 4586 and are values derived from wet-barefoot inclining platform test.

NOTE 10 – Rubber sliders (i.e. Slider 55 or Slider 96) are used in the wet pendulum test method. Clay and concrete pavers have been traditionally tested using Slider 55 whereas for other pedestrian surfaces, Slider 96 is used. When testing highly profiled surfaces such as tactile, granolithic finishes etc., Slider 55 generally produces more consistent results than Slider 96. The standard Slider 96 was prepared to have a poor abrasion resistance such that the rubber would be less likely to become contaminated, as fresh surfaces would be produced during testing. It was also formulated to be temperature independent. When assessing products for wet barefoot areas, or unusually rough products, the use of the softer more resilient Slider 55 is preferable.

SINGAPORE STANDARDS COUNCIL

The Singapore Standards Council (SSC) facilitates the development, promotion and review of Standards and Technical References in Singapore. This work is done through partnerships with the industry, academia and government organisations, under the national standardisation programme overseen by Enterprise Singapore.

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Singapore Standards (SSs) and Technical References (TRs) are in the form of specifications for materials, products, services and systems, codes of practice, requirements for interoperability, methods of test, management systems, guidelines, nomenclatures, etc.

TRs are pre-SSs developed to address urgent industry demand and are issued for industry trials over a period of time. Comments received during this trial period are considered when a TR is reviewed. TRs can become SSs after the trial period, continue as TRs for further industry trials or be withdrawn.

To ensure adequate viewpoints are considered in the development and review of SSs and TRs, committees and working groups set up by the Standards Council consist of representatives from various key stakeholders which include industry associations, professional bodies, academia, government agencies and companies. SSs are also put up for public comment before publication.

Acknowledgements

The adoption of AS 4856:2013 as a Singapore Standard was approved on 30 September 2022 by the Quality and Safety Standards Committee (QSSC) under the purview of the Singapore Standards Council.

First endorsement, 2001
First revision, 2011
Second revision, 2022

QSSC consists of the following members:

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The Technical Committee set up the Working Group on Resistance Classification of Pedestrian Surface Materials to carry out the adoption of this standard. The Working Group consists of the following experts who contribute in their *individual capacity:*

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The organisations in which the experts of the Working Group are involved are:

3M Innovation Singapore Pte Ltd
Housing & Development Board
Institute of Technical Education
Land Transport Authority
National Parks Board
Pidilite Innovation Centre
Real Estate and Construction Centre / Real Estate & Construction Academy
RSP Architects Planners & Engineers (Pte) Ltd
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