

Australian/New Zealand Standard

Slip resistance of pedestrian surfaces

Part 1: Requirements

AS/NZS 3661.1:1993

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- Adhesives and Sealants Manufacturers Association of Australia
- Association of Consulting Engineers of Australia
- Building Services Corporation, New South Wales
- Building Workers Industrial Union, Australia
- Ceramic Manufacturers Association of New South Wales
- Ceramic Manufacturers Association of Victoria
- Australian Chamber of Commerce and Industry
- CSIRO, Division of Building, Construction and Engineering, Australia
- Department of Administrative Services—Australian Construction Services
- Institute of Municipal Engineering Australia
- Master Builders Construction and Housing Association of Australia
- N.S.W Technical and Further Education Commission
- University of New South Wales
- Victorian Association of Ceramic Tile Merchants
- Works Consultancy Services, Central Laboratories, New Zealand

Additional interests participating in preparation of Standard:

- Australian Association of Ceramic Tile Merchants
- Australian Stone and Terrazzo Association
- Australian Uniform Building Regulations Coordinating Council
- Clay Brick and Paver Institute, Australia
- Concrete Masonry Association, Australia
- Worksafe Australia
- Testing interests

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PREFACE

This Standard was prepared by the Joint Australia/New Zealand Standards Committee BD/44 on Slip Resistance. It is the first of a two-part series on slip resistance, the second part (in course of preparation) being a guide to reducing slip hazards.

This Standard is issued as a Joint Australian/New Zealand Standard under the terms of the Active Cooperation Agreement between Standards Australia and Standards New Zealand.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand StandardSlip resistance of pedestrian surfaces

Part 1: Requirements

1 SCOPE This Standard specifies the minimum coefficient of friction values for pedestrian surfaces when measured in accordance with the test methods set out in Appendices A and B. These test methods enable characteristics of surface materials to be determined in either a wet or dry condition, and are appropriate for measurements to be undertaken either in the laboratory under conditions in which the surface materials are intended to be installed, or in situ after installation.

Other test methods can be used to meet the compliance requirements specified herein, for example test procedures based on force plates (see Footnote†, Clause 2).

This Standard does not cover grating, and may not cover some resilient surfaces.

NOTE: Part 2 of this Standard, in course of preparation, will provide information on the reduction of slip hazards where they relate to specific situations.

2 APPLICATION It is intended that this Standard be used as a test method to establish the slip resistance of a pedestrian surface in either the 'wet' or the 'dry' condition. A surface with a coefficient of friction equal to or greater than the minimum values specified in Clause 5 is considered to be slip resistant.

This Standard is also intended for testing products manufactured to increase the slip resistance of existing in situ surfaces. Where an in situ surface does not comply, reference should be made to a future Part which will provide information on improving the slip resistance of the surface. Obviously footwear is an important consideration.

Unless otherwise stated, the method specified for the measurement of wet slip resistance is used for all wet areas. Wet areas are all external pedestrian areas plus those internal pedestrian surfaces that are normally wet during use.

NOTES:

- 1 It is anticipated that Regulatory Authorities may specify the areas required to be slip resistant and whether these areas are to be considered 'wet' or 'dry'.
- 2 Water should be excluded from all dry areas, for instance by the appropriate design of entrance foyers.
- 3 Building operators should ensure correct maintenance procedures are carried out.

This Standard may not apply to heavily-profiled surfaces where the surface has been specifically manufactured to be highly slip resistant. Examples of highly-profiled surfaces are given in Figure 1. Such surfaces generally have a displacement volume greater than or equal to 4 cm³/dm². Such surfaces are primarily intended to provide drainage or entrapment of anticipated contaminant materials. Heavily profiled surfaces must still take into consideration any requirements contained in AS 1428 or NZS 4121.

NOTES:

- 1 The inclining ramp test method used in Germany* may be more suitable to measure the slip resistance of heavily-profiled surfaces under laboratory conditions. Dynamic test machines based on force plates may also be suitable for determining the level of slip resistance for specific applications†.
- 2 Although materials have been successfully tested for slip resistance, other factors need also to be considered. These other factors may be the subject of different tests which may be located in other Standards, for instance, tests using laboratory based machines that simulate speed and force loading profiles of the slipping shoe and use a force plate to measure the dynamic friction coefficient†.

3 REFERENCED DOCUMENTS

The documents below are referred to in this Standard:

AS

1428 Design for access and mobility

NZS

4121 Code of Practice for Design for Access and Use of Buildings and Facilities by Disabled Persons

4 GENERAL

The surface to be measured shall be representative of, and in the form in which it is intended for use. For example, floors intended to be sealed or otherwise treated with a permanent surface coating shall be tested with the coating in place.

NOTE: While it is not intended that the test will take into account any future wear or maintenance of the surface, tests should be carried out in the direction resulting in the minimum coefficient of friction where samples have a surface that would have different coefficients of friction when measured in different directions.

5 FRICTION REQUIREMENTS OF SURFACES

5.1 Horizontal surfaces

5.1.1 Coefficient of friction—wet When tested in accordance with the method set out in Appendix A, the pedestrian surface shall have a mean coefficient of friction of not less than 0.4 and no specimen in that sample shall be less than 0.35.

5.1.2 Coefficient of friction—dry When tested in accordance with the method set out in Appendix B the pedestrian surface shall have a mean coefficient of friction of not less than 0.4 and no specimen in that sample shall be less than 0.35.

NOTE: It would generally be expected that surfaces which have been shown to comply with Clause 5.1.1 would also comply with Clause 5.1.2.

5.2 Ramps and other sloped areas For all sloped or graded surfaces with a gradient not less than 2%, the minimum required value for the coefficient of friction of either wet or dry surfaces as specified in Clauses 5.1.1 and 5.1.2 respectively, shall be increased in accordance with the following equation, expressed to an accuracy of 0.01.

$$\mu_m = \frac{100\mu + M}{100 - M\mu}$$

* Guidelines for floors, in workrooms and work areas with increased slipping hazard—ZH1/571. Accident Prevention and Industrial Medicines (Sankt Augustin, Germany), April 1989.

† Stevenson M G Hoang K Buterngchit Y and Lloyd D G *Measurement of slip resistance of shoes on floor surfaces*, Part 1: *Methods*. Journal of Occupational Health and Safety — Australia and New Zealand, 1989, 5(2), pp 115-120.