

SLIP RESISTANCE OF CERAMIC & PORCELAIN TILES

Testing methods • P / BPN / SRV • R ratings • wet-barefoot classes • NZ Building Code D1

Purpose of this guide

A practical technical reference for architects, designers, builders and specifiers selecting European Ceramics floor tiles. It explains the principal AS 4586 slip-resistance tests and how the results relate to New Zealand Building Code Clause D1/AS1. It is not a project-specific compliance certificate; the tested product, finish, test method, installation, expected contaminants, slope and maintenance regime must all be considered.

1. NZ Quick-Reference Selection Guide

Application	Preferred test	Key threshold / class	NZ compliance note
Level public/access route expected to become wet	Wet pendulum, Slider 96	SRV $\geq$ 39	NZBC D1/AS1 2.1.2. A P3 label alone is not enough unless its actual SRV is 39-44; P4/P5 exceed the threshold.
Level access route expected to remain dry	Dry floor friction	COF $\geq$ 0.40 (D1)	NZBC D1/AS1 2.1.3.
Stairs / ramps not steeper than 1:12	Wet pendulum	P4 accepted	NZBC D1/AS1 2.1.5. AS 4586 Appendix F applies to sloping access generally.
Primarily barefoot wet area, e.g. pool surrounds / communal showers	Wet-barefoot ramp	Class B accepted	NZBC D1/AS1 2.1.2(c).
Industrial/commercial area exposed to oils or grease	Oil-wet inclining platform	R class selected to risk/use	NZBC D1/AS1 2.1.4 accepts Appendix D; HB 198 Table 3B provides suggested R values.
Existing installed floor / condition monitoring	Wet pendulum or dry friction to AS 4663	Measured in-service result	Useful where wear, cleaning or sealing may have changed performance; not a substitute for new-product AS 4586 classification.

Critical NZ point

NZBC D1/AS1 requires SRV 39 for level access routes expected to become wet. Under AS 4586 Slider 96, P3 spans SRV 35-44. Therefore P3 does not automatically prove D1/AS1 compliance: the numerical SRV must be checked.

2. The 5 AS4586 Test Methods

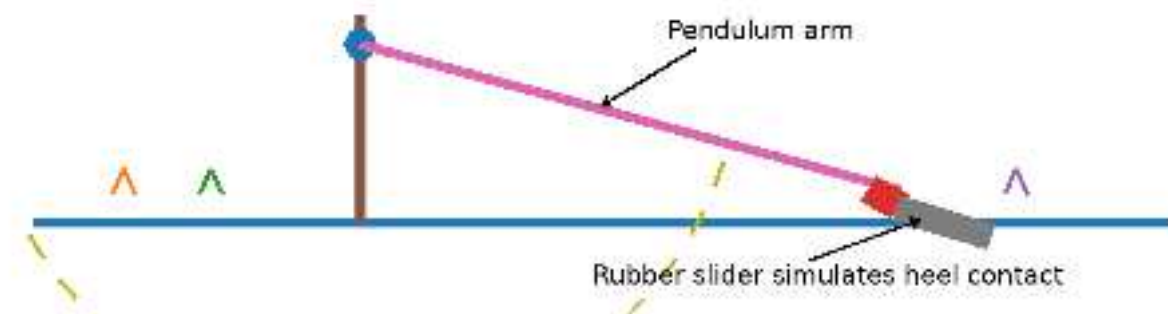
AS 4586	Test	Result	What it represents
Appendix A	Wet pendulum	P0-P5 plus individual BPN and sample SRV	Water-wet pedestrian surfaces; portable; commonly most relevant to entrances and external/public access routes.
Appendix B	Dry floor friction	D0 / D1 and COF	Surfaces intended to remain dry.
Appendix C	Wet-barefoot inclining platform	A / B / C	Pools, communal showers and other barefoot wet areas.
Appendix D	Oil-wet inclining platform	R9-R13	Commercial / industrial floors where oil or grease contamination and work footwear are relevant.
Appendix E	Displacement volume	V4 / V6 / V8 / V10	Supplementary assessment of heavily profiled industrial surfaces; often paired with R rating.

AS 4586:2013 is the new-surface classification standard cited by NZBC D1/AS1. Building CodeHub records AS 4586:2013/Amdt 1:2017. AS 4663 is used for measurement of existing pedestrian surfaces.

3. Wet Pendulum Test — P rating, BPN and SRV

WET PENDULUM TEST | AS 4586 Appendix A

Surface is wetted. The pendulum slider passes across the test tile and loses energy. BPN readings are averaged to SRV and classified P0-P5.



Original European Ceramics schematic. Apparatus shown diagrammatically and not to scale.

BPN versus SRV: BPN (British Pendulum Number) is the individual pendulum reading. AS 4586 classifies the sample using the Slip Resistance Value (SRV), derived from the sample results. In everyday tile specifications “BPN” and “pendulum value” are often used loosely, but the test report should be checked for the actual SRV, slider type and P classification.

P class	Slider 96 SRV / mean BPN	Slider 55 SRV	Practical reading
P5	>54	>44	Highest P class
P4	45-54	40-44	High wet slip resistance
P3	35-44	35-39	Moderate class; for NZ wet level access route the actual Slider 96 SRV must be at least 39
P2	25-34	20-34	Lower wet classification
P1	12-24	<20	Low wet classification
P0	<12	Not classified on same threshold table	Lowest class / no defined lower limit

Classification ranges summarised from AS 4586:2013 Appendix A / Table 2. NZBC D1/AS1 specifies Slider 96 for SRV 39 wet access-route compliance.

4. Oil-Wet Ramp Test — R Rating

OIL-WET INCLINING PLATFORM / R RATING | AS 4586 Appendix D

Test persons in specified work footwear walk on a tile surface coated with lubricating oil as incline increases. The corrected acceptance angle gives R9-R13.



R rating is a laboratory classification — not a safe installed slope.

Original European Ceramics schematic. The incline angle is a classification test condition and is not an allowable installed floor slope.

R class	Corrected acceptance angle	Interpretation
No R classification	< 6°	Below R9 threshold
R9	≥ 6° to < 10°	Lowest classified R band
R10	≥ 10° to < 19°	Common light commercial/internal specification
R11	≥ 19° to < 27°	Higher grip; NZBC commentary notes R11 will often be equivalent to SRV 39 under water-wet conditions
R12	≥ 27° to < 35°	High slip resistance, typically for higher contamination risk
R13	≥ 35°	Highest classified R band

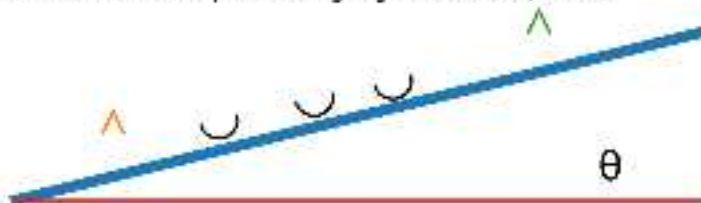
R is not a “ramp slope rating”

The oil-wet ramp is the laboratory test apparatus. An R11 result does not mean a tile is safe to install on a 19-27° ramp. Installed slope, contaminant, footwear, drainage and use must be separately assessed.

5. Wet-Barefoot Ramp — Classes A, B and C

WET-BAREFOOT INCLINING PLATFORM | AS 4586 Appendix C

Barefoot test persons walk on a continuously wetted test surface while the platform angle is increased. The corrected acceptance angle gives Class A, B or C.



Classification angle only — not an allowable installed ramp slope.

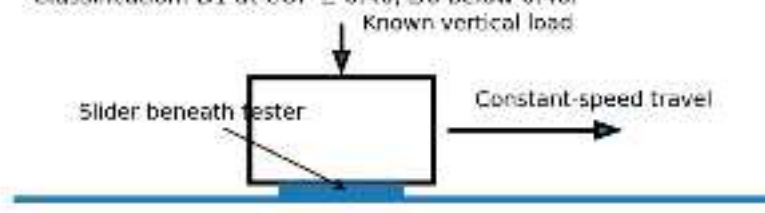
Original European Ceramics schematic. Wet-barefoot classes are separate from R classes and P classes.

Barefoot class	Acceptance angle	Use / code relevance
No classification	$< 12^\circ$	Below Class A
A	$\geq 12^\circ$ to $< 18^\circ$	Lower barefoot wet class
B	$\geq 18^\circ$ to $< 24^\circ$	NZBC D1/AS1 accepts Class B for primarily barefoot areas such as pool surrounds and adjacent communal showers
C	$\geq 24^\circ$	Highest barefoot class; often selected for pool ramps / stairs to water under HB 198 guidance

6. Dry Floor Friction — D rating / Coefficient of Friction

DRY FLOOR FRICTION TEST | AS 4586 Appendix B

A floor-friction tester moves across the dry tile. Tangential force divided by vertical load gives dynamic COF. Classification: D1 at COF ≥ 0.40 ; D0 below 0.40.



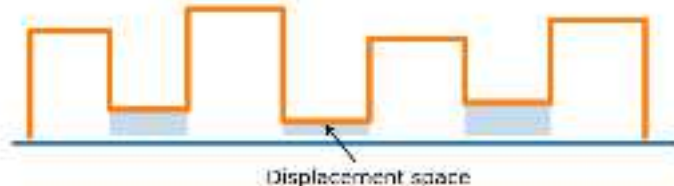
Original European Ceramics schematic. This test is for dry conditions; do not use it to claim wet slip performance.

Class	Mean dynamic COF	NZ relevance
D1	COF ≥ 0.40	Meets NZBC D1/AS1 2.1.3 for level access routes expected to remain dry
D0	COF < 0.40	Does not meet the D1/AS1 0.40 dry level-access threshold

7. Displacement Volume — V classes for profiled Industrial Tiles

DISPLACEMENT VOLUME / V CLASS | AS 4586 Appendix E

For severely profiled industrial surfaces, cavities can provide space for contaminants beneath the walking surface. Measured displacement volume produces V4, V6, V8 or V10 and may be specified with an R rating.



V class	Minimum displacement volume
V4	$\geq 4 \text{ cm}^3/\text{dm}^2$
V6	$\geq 6 \text{ cm}^3/\text{dm}^2$
V8	$\geq 8 \text{ cm}^3/\text{dm}^2$
V10	$\geq 10 \text{ cm}^3/\text{dm}^2$

D1/AS1 2.1.4 notes that some processing activities require profiled/displacement surfaces and points to AS 4586 Appendix E. HB 198 notes that V classification may be considered with R classifications in some industrial applications.

8. How P, BPN/SRV, R, A/B/C and D compare

There is no universal conversion table

P, R, A/B/C and D results come from different contaminants, footwear conditions and test mechanics. They are not mathematically interchangeable. Any “P3 = R10” style chart is only an application-based shorthand, not a conversion of test results.

Result	What it is	Test condition	Best use
BPN	Individual wet pendulum reading	Wet surface + rubber slider	Numerical reading; not itself the AS 4586 sample classification
SRV	Mean/classification value from wet pendulum sample	Wet surface + Slider 96 or 55	Used to determine P0-P5
P0-P5	Wet pendulum class	Water-wet pedestrian contact	Most directly useful for NZ public wet access routes because D1/AS1 gives SRV/P criteria
R9-R13	Oil-wet ramp class	Oil + specified work footwear on inclining platform	Relevant to industrial/commercial oil/grease risk; D1/AS1 accepts method in Appendix D
A/B/C	Wet-barefoot ramp class	Water + bare feet	Relevant to pools / communal shower areas
D0/D1	Dry floor friction class	Dry slider moving across surface	Relevant only where access route remains dry
V4-V10	Displacement volume	Surface profile / contaminant reservoir	Supplementary industrial parameter; not a friction rating

9. NZ Building Code Clause D1 — What the code actually requires

NZBC Clause D1.3.3(d) requires access routes to have adequate slip-resistant walking surfaces under all conditions of normal use. D1/AS1 is an Acceptable Solution and provides the following pathways relevant to tiled surfaces:

Situation	Clause	Compliance route / note
Level access routes expected to become wet	D1/AS1 2.1.2	SRV $\geq$ 39, wet pendulum, Slider 96; or Table 2 acceptable wet material. For barefoot wet areas, Class B is accepted.
Level access routes expected to remain dry	D1/AS1 2.1.3	COF $\geq$ 0.40 from AS 4586 Appendix B, or a Table 2 acceptable dry material.
Industrial/commercial oil or similar contaminants	D1/AS1 2.1.4	AS 4586 Appendix D is an accepted method. HB 198 Table 3B gives suggested R-values for commercial situations.
Sloping access routes, stairs and steps	D1/AS1 2.1.5	Use AS 4586 Appendix F to derive appropriate classification. P4 is also accepted for stairs and ramps not steeper than 1:12.
Transition from wet to dry at non-housing entrances	D1/AS1 2.1.6	Provide absorbent matting, extend wet-slip-resistant flooring, or combine both. Commentary suggests ~1.8 m minimum mat length or wet-resistant floor typically 6-10 m, depending on use.
Housing	D1/AS1 2.1.2 commentary	Wet requirement applies to access-route approach to main entrance. Internal housing access routes, including kitchens and bathrooms, are assumed dry in normal use for D1/AS1.

Source: MBIE, Acceptable Solution D1/AS1, 2nd Edition Amendment 6 (effective 1 January 2017), paragraphs 2.1.2-2.1.6.

10. Ceramic tile finishes in D1/AS1 Table 2

Ceramic tile surface	Level dry	Level wet	Sloping/stairs dry	Sloping/stairs wet
Unglazed — smooth	Yes	Test	Yes	Test
Unglazed — profiled	Yes	Test*	Yes	Test*
Unglazed — grit	Yes	Test**	Yes	Test**
Glazed — smooth / polished	Yes	No	No	No
Glazed — profiled	Yes	Test*	Yes	Test*
Glazed — grit	Yes	Test**	Yes	Test**

* D1/AS1 notes the pendulum may not suit heavily profiled/patterned surfaces. ** D1/AS1 Note 10 states a grit finish that feels rougher than 80-grit sandpaper may be deemed acceptable wet without testing. Glazed/polished surfaces are stated as unsuitable for sloping surfaces or stairs even where measurements may indicate adequacy. Source: D1/AS1 Table 2 and Notes 7, 9 and 10.

11. Common specification guidance — SA HB 198:2014 Table 3B

Important: The following is guidance, not a New Zealand Building Code mandate. D1/AS1 itself points designers to HB 198 Table 3B for suggested R values in commercial situations. Use project risk, slope, drainage, footwear, cleaning and expected contaminants to confirm the final selection.

Application (HB 198 guidance)	Wet pendulum	Ramp / barefoot class
External ramps / footpaths steeper than 1:14	P5	R12
External walkways, courtyards, balconies, carpark, roof decks under 1:14	P4	R11
Undercover carpark	P3	R10
Wet entries / access areas to hotels, offices, public buildings	P3	R10
Transitional entry areas	P2	R9
Dry entries / internal lift lobbies	P1	R9
Public / commercial toilet facilities	P3	R10
Fast-food / food court / fresh produce areas	P3	R10
Loading docks under cover / commercial kitchens	P5	R12
Behind bars / cold stores / freezers	P4	R11
Pool ramps / stairs leading into water	P5	Class C
Pool surrounds / communal shower rooms	P4	Class B
Communal changing rooms	P3	Class A
Hospital / aged-care bathrooms and ensuite	P3	Class B
Hospital / aged-care wards and corridors	P2	R9

Source basis: SA HB 198:2014 Table 3B, as referenced by NZBC D1/AS1 2.1.4. These values are guidance and should not be represented as mandatory NZBC values unless the project documents specifically adopt them.

12. European Ceramics Specification Checklist

- Always match the test report to the exact tile range, colour/finish, production type and thickness being supplied. Do not transfer a rating between visibly different surfaces without evidence.
- For a P-rated tile, record both the P class and the actual Slider 96 SRV/BPN result. This is essential around the NZBC SRV 39 threshold.
- For imported R-rated product, do not assume an R result automatically converts to a P result. D1/AS1 commentary says R11 will often be equivalent to SRV 39, but this is not a universal conversion.
- For pools and communal showers, use a wet-barefoot A/B/C classification where barefoot use is the design condition.
- For commercial kitchens, food processing and workshops, consider the oil-wet R rating and, where strongly profiled surfaces are used, whether a V displacement class is also appropriate.
- Test results are for the tested surface condition. Wear, sealers, cleaning products, grout residue, contaminants and maintenance can materially alter in-service slip resistance.
- Where a surface is already installed or performance is disputed, consider in-situ testing to AS 4663 using an appropriately accredited test provider.

Recommended wording for EC project submittals

“Slip resistance: tested to AS 4586:2013 [Appendix / method], classification [P / R / A-B-C / D], measured value [SRV/BPN/COF/angle where applicable]. Suitability is subject to the project-specific NZBC D1 access-route condition, slope, expected contaminants and maintenance regime.”

13. References and Source Documents

- [MBIE — NZ Building Code Clause D1, Acceptable Solution D1/AS1, 2nd Edition Amendment 6 \(effective 1 Jan 2017\)](#)
- [MBIE — Slip-resistant walking surfaces guidance](#)
- [Building CodeHub — AS 4586:2013 / Amdt 1:2017 record](#)
- [Standards Australia — AS 4586:2013 Slip resistance classification of new pedestrian surface materials](#)
- [Standards Australia — SA HB 198:2014 Guide to the specification and testing of slip resistance of pedestrian surfaces](#)
- [AS 4663:2013 — Slip resistance measurement of existing pedestrian surfaces](#)

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