
**Personal protective equipment — Test
methods for footwear**

AMENDMENT 1

*Équipement de protection individuelle — Méthodes d'essais pour les
chaussures*

AMENDEMENT 1

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Foreword

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Amendment 1 to ISO 20344:2004 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 161, *Foot and leg protectors*, in collaboration with Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 3, *Foot protection*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Page 1, Clause 2

Add the following normative reference:

“ISO 13287:2006, *Personal protective equipment — Footwear — Test method for slip resistance*”

Page 40

Insert the following subclause immediately after 5.17.6.

“ 5.18 Determination of footwear slip resistance

Determine the footwear slip resistance in accordance with Annex A.”

Page 72

Insert the following annex between 8.7.4 and the Bibliography:

Annex A (normative)

Determination of footwear slip resistance

A.1 Test parameters

The coefficient of friction of the footwear is determined according to ISO 13287:2006 under the test conditions given in Table A.1, ensuring that the 7° heel mode contact angle is set up with the shoemaking last holding the footwear lowered onto the 7° setting wedge under its own weight.

Table A.1 — Test conditions

Test condition	Foot position	Floor	Lubricant
A (forward heel slip)	ISO 13287:2006, 8.2 a)	ISO 13287:2006, 6.5	ISO 13287:2006, 5.2
B (forward flat slip)	ISO 13287:2006, 8.2 c)		
C (forward heel slip)	ISO 13287:2006, 8.2 a)	ISO 13287:2006, 6.4	ISO 13287:2006, 5.1
D (forward flat slip)	ISO 13287:2006, 8.2 c)		

A.2 Calibration procedure of ceramic tiles

A.2.1 General

Before performing a test on a ceramic tile, the tile shall be calibrated according the following procedure.

Only ceramic tiles giving test results in the range 0,18 to 0,22 shall be accepted for testing footwear. Tiles giving results outside this range shall be rejected.

A.2.2 Materials and apparatus

A.2.2.1 Material 'Slider 96'¹⁾, of calibrated hardness (96 ± 2) IRHD measured value at (23 ± 2) °C and resilience of (24 ± 2) % at 23 °C of specimen size: ($25,4 \pm 0,1$) mm wide, at least 50 mm long and greater than 5 mm thick and with vertical walls and square edges.

Storage of Slider 96 rubber: storage temperature should be below 25 °C and preferably below 15 °C. Moist conditions should be avoided and conditions should be such that condensation does not occur. Protect from light, particularly direct sunlight and strong artificial light. Protect from circulating air by wrapping it in paper or polyethylene (but not plasticized PVC film such as clingfilm) or storing in an air tight container. It is recommended that Slider 96 sliders are discarded 12 months after issue.

1) "Slider 96" material (formerly known as "Four S rubber") can be obtained from: RAPRA Technology Ltd., Shrewsbury, Shropshire, UK, SY4 4NR, tel.: + 44 1939 250383, fax: + 44 1939 251118, email: info@rapra.net. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this product.

A.2.2.2 Means of cutting Slider 96. Slider 96 rubber (A.2.2.1) is supplied pre-moulded in a suitable size and form. However, if larger sheets of Slider 96 rubber are obtained then a means is required of cutting a rectangular test specimen such that it has vertical walls, square edges, is $(25,4 \pm 1,0)$ mm wide and at least 50 mm long. A means of trimming specimens parallel to the 25,4 mm edge while retaining a vertical wall and square edge can also be required (see A.2.3.5, Notes 1 and 2).

NOTE Cutting by some methods such as shoemaking press knives can produce concave walls.

A.2.2.3 Rigid, rectangular backing plate, with dimensions at least as wide as the specimen cut with the device and at least 50 mm long.

A.2.2.4 Means of securely attaching a specimen of Slider 96 rubber (A.2.2.1) to the backing plate (A.2.2.3). Suitable adhesives include: epoxy resins, cyanoacrylate or solvent-based contact adhesive. The face to be bonded should be lightly abraded with abrasive paper (A.2.2.6) then cleaned by blowing with clean air or by wiping with a suitable solvent such as methanol and allowing to dry in air before bonding.

NOTE Double-side tape can be suitable at the low level of coefficient of friction expected when testing on ceramic tile with detergent solution.

A.2.2.5 Means of attaching the specimen backing plate (A.2.2.3) to the test apparatus at the required contact angle.

NOTE A rectangular metal box of dimensions 180 mm × 90 mm × 90 mm can be used to replace the shoemaking last described in ISO 13287 and the backing plate (A.2.2.3) attached to it.

A.2.2.6 400 grit silicon carbide abrasive paper, mounted on a flat, rigid surface.

A.2.2.7 Dry, absorbent paper towel.

A.2.2.8 Ceramic tile as specified in ISO 13287.

A.2.2.9 Test machine as specified in ISO 13287.

A.2.3 Preparation of test slider and ceramic tile

A.2.3.1 If necessary, cut to size a specimen of Slider 96 rubber (A.2.2.1) using the cutting device (A.2.2.2) and clean using distilled water then dry in air. Do not use the Slider 96 specimen that is used for calibration purposes for any other purpose or with any other lubricant.

A.2.3.2 Attach the specimen of Slider 96 rubber (A.2.2.1) to the backing plate (A.2.2.3) using adhesive (A.2.2.4).

A.2.3.3 Holding the specimen by the backing plate (A.2.2.3) and applying a light, evenly distributed pressure, abrade the surface of the rubber against the abrasive paper (A.2.2.6) until a visually even level of abrasion is achieved and the surface is parallel with the backing plate. For this procedure alternately use a backward and forward linear movement in a direction parallel to the long side of the specimen, and a side to side movement in a perpendicular direction with the final direction of abrasion parallel to the long side.

A.2.3.4 Remove any debris from the test slider surface by lightly brushing with dry paper towel (A.2.2.7).

A.2.3.5 Clean the ceramic tile (A.2.2.8) in accordance with ISO 13287.

The condition of the Slider 96 test slider should be restored at intervals as repeated use will cause edges to become rounded or a concave chamfer can develop across the tested edge. Either use the abrasion method described above to restore the slider to the correct condition and/or cut away the affected end section of material, providing at least 50 mm length remains and the new cut edge is vertical and flat.

NOTE 1 Both ends of the slider can be used provided that the end used is in the correct condition.

NOTE 2 When the thickness of the slider has been reduced to 5 mm by repeated use, it is advisable to replace it.

A.2.4 Calibration test procedure

A.2.4.1 Condition the ceramic tile and the test slider (A.2.3) for at least 3 h at the test atmosphere.

A.2.4.2 Attach the test slider (A.2.3) to the test machine so that the 25,4 mm edge is perpendicular to the direction of sliding movement and the line of action of the vertical force passes through the Slider 96 rubber/floor contact area.

A.2.4.3 Set the face of the test slider at a contact angle of $(7 \pm 0,5)^\circ$ to the surface of the ceramic tile (see Figure A.1).

A.2.4.4 Mount the tile and lubricate with detergent solution in accordance with ISO 13287.

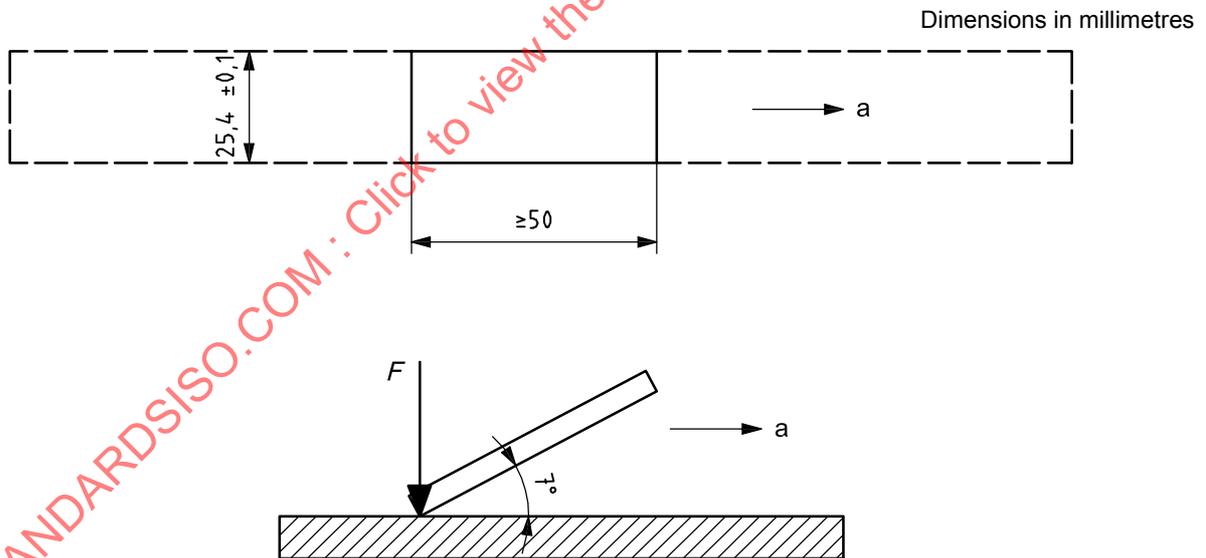
A.2.4.5 Apply the test conditions specified in ISO 13287 for the forward heel slip mode, applying a 500 N normal force.

A.2.4.6 Carry out the test procedure defined in ISO 13287 and determine the coefficient of friction of the tile in a single test run.

A.2.4.7 If the coefficient of friction is outside the specified range (0,18 to 0,22), reject the tile.

A.2.4.8 If the coefficient of friction is within specified range, accept the tile and record the values obtained.

A.2.4.9 Clean (A.2.3.1) and dry the Slider 96 specimen in air before returning to storage.



- Key**
- F* normal force
 - a* Sliding direction.

Figure A.1 — Orientation and contact angle of Slider 96 test slider