

BREAKING STRENGTH

Breaking strength is the load a tile carries before it snaps, measured in newtons under the standard ISO 10545-4. It is not PEI, which is about the surface wearing away. This guide explains the two numbers the test produces, what the standard asks of porcelain, and why a tile that passes can still crack on a badly prepared floor.

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TWO NUMBERS, ONE TEST

A tile is laid across two supports and pressed in the middle until it breaks. The lab records two things from that one break, and product pages carry both.

BREAKING STRENGTH

The force that broke it, **in newtons**. It answers what this tile takes. Because a thicker tile takes more, the number rises and falls with thickness as much as with the body.

MODULUS OF RUPTURE

The same break with thickness divided out, **in newtons per square millimetre**. It answers how strong the material is. Two tiles of very different thickness from one factory body report the same modulus.

Compare bodies with the modulus. Compare what will survive a dropped pan with the breaking strength.

WHAT THE STANDARD ASKS FOR

ISO 13006 sets the minimum a dry-pressed porcelain tile has to reach. Porcelain sits in group Bla, which is the group for bodies that absorb 0.5% of their weight in water or less.

ISO 13006 MINIMUMS FOR DRY-PRESSED PORCELAIN, GROUP BIA

MEASURE

MINIMUM

Breaking strength, tile 7.5 mm thick or more

1,300 N

Breaking strength, tile under 7.5 mm

700 N

Modulus of rupture

35 N/mm²

Wall tile and thin decorative pieces are tested the same way and judged against lower minimums, because nobody walks on them. A number under 1,300 N is not automatically a weak tile; it is a tile being asked to do a different job.

THICKNESS DOES THE WORK

Breaking strength does not rise evenly with thickness. It rises with the square of it. Add half again to the thickness and the tile takes roughly twice the load; double the thickness and it

takes about four times.

This is why a 20 mm outdoor paver and a 6 mm wall tile pressed from the same body report very different newtons and almost the same modulus of rupture. The material did not change. The section did.

A TILE THAT PASSES CAN STILL CRACK

The test presses a tile that is supported at both ends and free in the middle. A floor is not that. On a floor the mortar underneath carries the load, and the tile only has to hold what the mortar does not.

VOIDS A hollow spot under a tile turns the whole slab into the test rig. Full mortar coverage matters more to a finished floor than the last 200 newtons on a spec sheet.

DEFLECTION A subfloor that flexes will crack tile that passed every test. The fix is under the tile, not in it.

MOVEMENT Floors expand. Without a joint at the perimeter and through large fields, the tile takes the strain and something has to give.

See installation basics for what a good installer does about all three.

THE OTHER RATINGS

Wear. PEI rates the glaze against foot traffic. Strength is the body; PEI is the surface.	Slip. Grip is rated by the DIN 51130 ramp test for shoes and by DIN 51097 for bare feet.
Water.	Stains.

Water absorption under ISO 10545-3 is what puts a tile in group Bla in the first place.

Stain resistance is rated Class 1 to Class 5 under ISO 10545-14.

QUESTIONS, ANSWERED

Is a higher number always better?

For a floor, more is margin. But past the minimum for the job, the floor under the tile decides whether it cracks, not the tile. A 1,300 N tile on full mortar coverage outlasts a 2,000 N tile over a void.

Why do two tiles in the same series report different numbers?

Usually thickness. A series often runs one thickness for its large format and another for a smaller one, and breaking strength follows the section. Check the modulus of rupture instead; if it matches, the body is the same.

Does breaking strength tell me a tile is safe outdoors?

No. Outdoors is decided by frost resistance under ISO 10545-12 and by grip when the surface is wet. A strong tile that absorbs water can still fail a freeze.

What actually breaks a floor tile?

Point loads on an unsupported spot. A chair leg, a dropped tool, an appliance on a hollow tile. Spread loads almost never break tile that was laid properly.

Where do I find it on a product page?

In the performance table, as **Breaking strength** and **Modulus of rupture**, both citing ISO 10545-4, alongside the PEI rating and the stain class.

CHECK ANY FLOOR AGAINST THIS GUIDE

Every PORCEMALL product page lists its breaking strength and modulus of rupture in the technical data table. Open a product page and check it against this guide.

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