

The following section outlines performance standards, some guided by the Tile Council of North America (TCNA). Not all tile is tested to the degree of detail given below, but rest assured that the tile industry has some of the highest performance standards of hard surfaces, as seen by the below-outlined breadth of technical data. The following section will include:

- Grade
- Abrasion Resistance
- Deep Abrasion
- Water Absorption & Moisture
- DCoF / Slip Resistance
- Product Use Classification (NEW 2022)
- R-Value / Anti Slip
- Breaking Strength
- Chemical Resistance

Grade

The Grade is the numerical ranking that reflects tile quality. Architessa exclusively carries Grade 1 material. The Grade is not generally publicly reported, so buying from an established brand with a good reputation is important.

Grade 1: Highest quality. Recommended for walls or floors.

Grade 2: Similar to Grade 1, but with slight imperfections. Recommended for walls or floors.

Grade 3: Lowest quality. Thinner tile is designed for walls, not floors. Floor tiles are allowed on walls. Grade 3 tiles are not allowed on floors.

Abrasion Resistance / Durability of Glazed Tiles

Abrasion resistance is the rating given to a tile product based on the hardness of its glaze to determine the proper usage. It is important to remember that Abrasion Resistance is the result of testing glaze wear over time; therefore, only glazed tiles will have this rating. From a technical perspective, ratings are determined by a measurement of Abrasion Resistance measured on a machine, which counts the number of revolutions under a standard abrasive load. Once the tile begins to show the damage, the revolutions are counted, (from 150 to 1500+) which gives the classification value. See the full Abrasion Resistance Chart [here](#).

Deep Abrasion / Durability of Unglazed Tiles

The abrasion resistance of unglazed ceramic tiles is called "deep abrasion". For unglazed tiles, the judgment of resistance to deep abrasion is made by measuring the length of the groove produced in the proper surface by means of a rotating steel disc, under given conditions and with the use of abrasive material. This apparatus essentially consists of a rotating disc, a storage hopper with a dispensing device for the abrasive material, a test specimen support, and a counterweight. The pressure with which the test specimens are held against the steel disc is determined by calibrating the apparatus against transparent fused silica.

Water Absorption & Moisture

Ceramic tiles are classified into four categories based on the weight of water absorbed as a percentage of tile weight. Porcelain is the only product that neatly fits into the impervious category. Other types of ceramics fall into the other groups based on porosity rate, which differs from product to product, even within the same manufacturer.

- >7% water absorption / Non-Vitreous x
- 3-7% water absorption / Semi-Vitreous
- .5-3% water absorption / Vitreous
- ≤.5% water absorption / Impervious

Vitrified = When the mix for a porcelain tile (such as silica and sand) is fired, it vitrifies due to the high temperatures. Vitrification (from the Latin vitreum, “glass” via the French vitrifier) means to become glass-like or to be transformed into a non-crystalline amorphous solid. Ceramic tiles are more like cement, in that they are porous and slightly less suitable than porcelain for wet environments, however, most ceramics have low enough porosity rates for wet areas. Porcelain tiles are fired at a much higher temperature than ceramic causing the tile to become fully vitrified (.5% or less water absorption). In reality, all ceramics are vitrified to some extent and the vitrified classification can often be confusing.

Tiles used outdoors must absorb <3% to be frost resistant. In order for a tile to be frost proof it must have an absorption rate of < .5%, which classifies it as porcelain. Frost resistance does not mean frost proof and not all frost-proof tiles are recommended for exterior use. Size, finish, and thickness may also be taken into consideration. Always check with the manufacturer on suitable applications, even with technical data in hand.

DCoF / Slip Resistance

The Dynamic Coefficient of Friction (DCoF value) is a measurement that determines how much friction there is on wet, level floors when walked upon. The results of DCoF testing help us determine the likelihood of whether or not a tile surface could contribute to someone slipping and/or falling.

According to the ANSI A137.1–2012 standard, ceramic tiles selected for level interior spaces when wet must have a minimum wet DCoF AcuTest value of at least 0.42. Tiles with lower value are not necessarily restricted to dry areas only, but rather are restricted to applications where they are kept dry when walked upon. In the case of residential bathrooms, the common use of bathmats can accomplish this. Similarly, in doorways, the use of entrance mats can accomplish the same.

Not all products with a DCoF AcuTest value over 0.42 are suitable for all applications. The type of use, traffic, contaminants, maintenance, expected wear, and manufacturer’s guidelines and recommendations are important and must also be considered by the specifier. This is why the Product Use Classification was established.

Product Use Classification (NEW 2022)

The Tile Council of North America, in collaboration with the American National Standards Institute, now requires tile manufacturers (as well as other hard surface flooring manufacturers) to provide “product use classifications” based on the properties of slip resistance.

Classification / Reference Identification / Criteria

Interior, Dry / **ID** / ≥ 0.42 dry DCOF* (Per Section 10.1)

Interior, Wet / **IW** / ≥ 0.42 wet DCOF* (Per Section 9.1) or Manufacturer-Declared

Interior, Wet Plus / **IW+** / Manufacturer-Declared Standards >ANSI A326.3 generally accepts minimum conditions/

Oils & Greases / **OG** / Manufacturer-Declared Standards >ANSI A326.3 generally accepts minimum conditions

Do note, Product Use Classification is a new standard and will take time for factory self-declared ratings to be established. You should reach out to your rep if you desire to check the self-declared rating on your specification or selection.

R-Value / Anti-Slip

The anti-slip rating comes in the form of an ‘R-value’. *The ‘R’ stands for ‘ramp test’; with the subsequent number indicating an anti-slip grade - 13 being strong, 9 being slight.* During the production process, the surface of the porcelain can be modified to have a rougher finish. This is achieved by adding a mineral called Corundum into the glazing mix. Corundum is added to the production line after the digital surface application and before entering the kiln for firing. That means that it crystallizes at the exact same temperatures as each of the other materials involved, so it blends perfectly and creates an anti-slip surface without changing the appearance of the tile.

- Rating R9 – Suitable for a less than 10° slope (minimal friction)
- Rating R10 – Suitable for a 10° to 19° slope (normal friction)
- Rating R11 – Suitable for a 19° to 27° slope (normal friction)
- Rating R12 – Suitable for a 27° to 35° slope (high friction)
- Rating R13 – Suitable for slopes more than 35° (very high friction)

Breaking Strength

Breaking strength is measured by force on an unsupported portion of tile until breakage occurs, expressed in lbs. To Comply with ANSI A137.1 “the average breaking strength is equal to or greater than 250 lbs for the floor, porcelain, quarry, and mosaic tiles and 125 lbs for glazed wall tiles.” Since the breaking strength minimum industry requirement for ceramic tile is a laboratory test of what is mostly an unsupported tile, it isn’t directly meaningful in terms of determining what kind of dead and live loads it can endure.

What’s more meaningful for your concerns pertaining to how a bonded tile will perform is the compressive strength physical characteristic of the tile. Most porcelain tiles have over 20,000 pounds per square inch compressive strength capacity or better.

Chemical Resistance

ASTM C650 is the standard test method for determining the resistance of ceramic tile to chemical substances. The test is intended for tile that will be used for lavatories, food counters, or similar residential, commercial, or medical installations. A tile sample is placed in continuous contact with a variety of chemicals for 24 hours, rinsing the surface and then examining the surface for visible variation, to seek a grade of “conforms” or “unaffected.”