



ARDEX Technical Note 3.2:

Specify Natural Stone Wall and Floor Tiling – Selecting natural stone tiles

Natural stone is the fundamental primary, durable construction material dating back to prehistory. Its aesthetic beauty and elegance, the variety of colours, textures and finishes provide never ending possibilities for architectural design.

The benefits of natural stone can be summarised in two areas:

- ▶ Mineralogically, they can be far more abrasion resistant than tiles or agglomerated stone. They can be chemical resistant to acids, fats and sugars, which might affect cements or concrete. They can be resistant to de-icing agents and chloride ingress as opposed to concrete or cement bound tiles.
- ▶ Structurally, they can have very high compressive strengths and tensile bonding due to intergrowth of minerals. They can be naturally frost resistant due to an adequate pore structure. They can also be stain resistant where other finishes are prone.

Denomination

BS EN 12440 specifies an essential naming criteria for all natural stone tiles:

- ▶ Traditional name of the stone:
Some stones are given commercial names but it is vital that the traditional name is established and referenced so that all appropriate historical information can be found.
- ▶ Petrological family:
The scientific name of the rock should be obtained by petrographic examination according to EN 12407 and 4.2 of prEN 12670:1997.
- ▶ Colour:
The range of colour that a stone variety shows referenced.
- ▶ Place of origin reference: Enables further investigation on geological variations between the different beds or types of stone, extraction, environmental and ethical issues.
- ▶ Finish:
Defined as axed, dolly pointed surface, filled, flame textured, honed, polished, riven, rubbed, tooled. If fine rubbed or honed, it should have the grit size so that the finish can be accurately specified.

For example, BS EN 12440 will give a name such as Imperial Red Sandstone Cherry Red Arbroath. This tells the specifier the commercial name, the lithology and the typical colour. Properly named sample stone certainly assists in the assessment of the stone's suitability for the intended project.

Stone assessment

To ensure a safe construction and avoid costly mistakes, it's important to make an initial assessment of a stone's properties for the required performance.

CE certificates

CE Marking of tile and stone products is mandatory, which is a great benefit for designers and specifiers. CE certification ensures that data is presented in a format common throughout Europe, which allows for an accurate comparison between differing stones. The clear values of fundamental properties allow more accurate design and detailing of the ideal stone to be used.

With CE marking, the stones should have the mean and a statistically Highest Expected Value (HEV) and/or the Lowest Expected Value (LEV) calculated based on a 75% confidence level. All products bearing the CE marking shall conform to the declared values.

Testing

It is vital that the chosen stone's properties are adequate for the intended use. Apart from the existing available data it may be necessary to conduct some preliminary testing to confirm the suitability of a stone. All tests should be done to the relevant British Standards.





▶ **Safety**

The safety factor needs to be established using guidance provided in the relevant British Standard. Slip resistance is a key factor for safety considerations. The factor of safety for stone tends to be higher than for some other materials for several reasons as:

- Stone is a natural material;
- Stone is brittle;
- Some stones weaken over time as a result of atmospheric attack or from micro-cracking as a result thermal/moisture or wind stresses;
- Some stones may contain unseen flaws or inclusion that may have not been in the tested samples.

▶ **Thickness of stone**

It's important to calculate the required thickness of stone cladding or paving. It requires considerations of the expected load, safety factor, stone properties such as the flexural strength and the breakout load at fixing etc. Further information on detailed calculations is available in BS 8298.

Once the technical properties of the short listed stones are established, this information can be used to design the project.

