

PERSONAL



MARBLE

Guide n ° 1. Criteria for choosing a natural stone

What really matters is the high qualitative level that can be obtained with a natural stone floor or internal cladding, derived from the **functional and aesthetic** benefits that they can effectively guarantee.

The best qualitative level of a floor and an internal lining can be reached, when the basis of the work carried out are:

- 1. A good projection and a careful selection of materials** that guarantee, in addition to an optimal architectural result, easy maintenance over time of the quality of the floor and covering.
- 2. A conscious management of the activity of the pose, finalized to the prevention** of the causes of lack of quality.

Criteria for choosing a natural stone for interior floors.

The qualitative level of a coating depends on the benefits that it can guarantee. In this sense, we recognize three kinds of requirements that should satisfy

- 1.** Related to resistance to use, degradation and maintenance of floors - resistance to wear, resistance to concentrated loads and shocks, ease of cleaning and recovery of the surface, etc.-

2. Related to safety and comfort of use -slip resistance, surface level and absence of roughness, absence of emission of unpleasant and / or harmful odors, etc.-

3. Related to the aesthetic aspect -chromatic, design, textures, etc.-

The level of quality required for a floor is associated with the use of the environment and the qualitative level of the project.

It is essential to proceed to a detailed selection of the natural stones available in the market in order to individualize those that have the physical, mechanical, chemical, aesthetic and economic characteristics in line with the project's requirements.

The selection of a natural stone for use in a floor or an internal covering should be made on the basis of the following criteria:

- * **Durability** of natural stone.
- * **Surface finish.**
- * **Dimension of the elements.**
- * **Background color.**
- * **Design of the natural stone.**
- * **Availability in the market** * **Cost.**

The hierarchy or greater importance of one parameter with respect to another, depends on each specific project.

The designer's first step should be to individualize the order of importance of these parameters and determine those that are discriminating.

I. Durability.

One of the main requirements applied to floors and coatings is that of being durable, that is, in a degree of maintaining substantially unchanged over

time the characteristics possessed at the time of installation on site, in terms of color, surface finish and general condition of the surface.

The durability of a natural stone is associated with its ability to resist stresses and aggressive agents present in the environment, such as pedestrian traffic, concentrated loads (weights), harmful and penetrating substances, etc.

In other words, the selected natural stones must have chemical, physical and mechanical characteristics proportional to the type and intensity of the solicitations with which their surfaces will be attacked, in direct relation to the type of use intended for the project.

The technical characteristics that particularly influence the durability of a natural stone used for a floor and / or internal cladding are the following:

- * **The apparent volumetric mass**, which gives an indication of the compactness of the material.
- * **The absorption coefficient**, which gives an indication of the compactness of the material and its resistance to absorb eventual substances that could stain it.
- * **Impact resistance**, which gives an indication of the resistance of the material under the action of concentrated loads (weights). Or the impact of objects against the surface.
- * **Abrasion resistance**, which gives an indication of the resistance of the material to be consumed by the action of pedestrian traffic.
- * **The micro hardness Knoop**, which gives an indication of the resistance of the material under the action of concentrated loads (weights), particularly related to the wheels of chairs in offices or cars in shopping centers.
- * **Resistance to chemical agents**, which gives an idea of the resistance of the material to be more or less attacked by the action of substances of various types

Among a range of natural stones, the material that presents the best values of the technical characteristics required for its longest duration under the conditions of use foreseen by the project will be more durable.

The first characteristic that a natural stone must satisfy in order to last over time is that of resisting the abrasive action produced by the sole and cleats of the shoes, which in many cases is the main cause of loss of shine and surface scratches.

Naturally, the abrasive action of pedestrian traffic is proportional to its intensity, which can be low as in private residential environments, medium intensity as in premises open to the public: banks, businesses, offices, etc. and high intensity as in shopping malls, government, administrative offices, airports, stations, etc.

In residential settings, virtually all commercial natural stones with the desired surface finish can be specified and applied without problem.

In environments subject to medium intensity traffic, many materials can also be used, provided that, for all those who require a resin and mesh treatment, an energy and thorough cleaning of the surface is carried out beforehand, in order to eliminate all incoherent substances before the final coating.

For granites, the surface finish can be glossy, while for other materials such as marble and travertines, a matte gloss with a satin effect is recommended.

In public environments subject to high pedestrian traffic, the preference should be given to granites and similar stones or to compact, homogeneous marbles that do not require stuccoing, resins, meshes or reinforcements of another nature.

The colors used should preferably be light background. The use of polychrome materials can help hide eventual stains or differences in tones, due to areas with different traffic intensity, assuming that all the materials

used in the floor have the same resistance to wear. For this reason, the use of granites and marbles on the same floor should be avoided.

The granites can also be with a shiny finish, better if they are light colors, in all other cases the matte gloss finish is recommended.

In public and private environments in direct contact with the outside, it is advisable to provide a filter area, made with compact materials and with a matt or flamed gloss surface finish in the case of granites. This finish is more resistant to graffios and dirt from the outside and also has anti-slip power in the presence of water.

The second benefit that a durable natural stone has to satisfy is that of resisting concentrated loads or weights, from the action of the wheels of office chairs, furniture and other decorative elements, from the heels of shoes, from the falling bodies and blunt objects, etc.

Concentrated loads can cause the breakage of floors in some natural stones. In environments where office work is carried out, the application of granites and similar materials, or of compact, homogeneous and fine grained marbles should be preferred.

A particular case of concentrated loads is represented by wheeled carts used to transport objects and people, for example at railway stations, airports, shopping centers, etc. In some cases, these loads or stresses can cause the floors to break and, therefore, it is necessary to dimension the thickness of the floors, taking into account the physical and mechanical characteristics of the material as well as the dimension of the pieces that make up the floor.

A good adhesion of the elements to the ground by means of cement or glue, contributes to improving the behavior of natural stones to stresses.

The third performance that a natural stone must satisfy in order to be durable over time is that of resisting substances that can attack and stain it, represented in particular by food products.

In residential environments such as kitchens and in public places, such as shopping malls, bars, restaurants, etc. The use of compact, low-absorbent materials and treated with water-repellent or oil-repellent products is always recommended.

In addition, the preference of the materials should be oriented towards those that, due to the design of the veins and the background, allow better concealment of eventual spots or leaks of remaining substances, partly absorbed by natural stone. The recommended finish is satin matte gloss.

Therefore a good selection of materials, adequate surface finish and treatment with chemicals is recommended, especially in cases of medium and high intensity traffic.

The floors and coverings made of natural stone have already demonstrated their ability to resist the stresses caused by use, keeping their beauty and splendor unchanged for centuries.

It is enough to see the **floors of the churches and historical buildings** that in many cases are in an optimal state of preservation and that due to the superficial aspect that the passage of time has conferred on them, emanate a fascinating sense of lived.

II. Surface finish of natural stones.

Each material, according to its chemical, physical, mineral characteristics and the thickness with which it is made, allows for a great diversity of surface finishes; for example, a granite can be flamed, while a marble cannot. Surface elaborations, such as boring, can be carried out with thickness equal to or greater than 2 cm.

The stones and limestones, for example do not manage to shine, their shine is almost glossy but not matte.

If a glossy surface finish is required on a high traffic project, then it would be better to specify and apply a granite instead of a marble, travertine or stone.

Possible surface finishes of natural stones.

* **Rustic cut in quarry:** Material cut in the extraction mines, generally with a diamond wire or diamond chain machine. More or less smooth and rustic surface.

* **Split face:** Material cut according to the natural skirts of the material. It can also be artificially obtained with special machines, up to certain thicknesses. See Picture of rosso asiago split face in: <http://www.personal-marble.com> Page Marble, Red color.

* **Cut with gangsaws:** Material cut with diamond blade. Rustic surface.

* **Only cut surface with disc:** Material cut with diamond disc. Rustic surface.

* **Only cut surface diamond.** Material cut with diamond wire in the extraction mines or in the workshops, with a single or multi-wire machine. Rustic surface.

* **Coarse, medium and fine strimming:** It is the oldest of the surface treatments of the stone, and it is carried out with punches of different sizes in order to create areas on the surface under relief and areas on relief, as if imitating the spacing ending.

* **Chiselling:** Made with utensils of different sizes, by hand and following a direction, it can be more or less fine.

* **Medium and fine graduation made with utensils:** of various shapes and sizes that leave a parallel design of different shapes and sizes on the surface. Rustic surface.

* **Coarse, medium and fine bush hammer:** Made with a machine and utensils in a pyramid shape of different sizes that leave the surface homogeneous and rough. Ideal for medium and fine grana natural stones. Rustic surface.

* **Multiple freshness.** Made with a bridge disc and consists of successive and parallel cuts of different shape and size. Rustic surface.

* **Flamed:** Made only on granites, by machine with an oxyacetylene flame at 45 ° that, attacking the surface, gives it a similar appearance to the bush hammer, but maintaining the color of the material more uniform. The flamed like the bush hammer tend to smooth the surface and to conceal the possible aesthetic defects of the natural stone

* **Sandblasting:** It is obtained by projecting an abrasive mixture of sand and water on the surface with strong pressure and speed. It gives the surface a pleasant appearance and is not harsh to the touch. It is also used to make lettering and design inscriptions.

* **Antiqued:** Consists of consuming the surface and edges of the material by means of machinery that uses an aqueous mixture of abrasives, which, attacking the stone, gives it a natural aged appearance.

* **Brushed:** It is obtained with the use of brushes to make mounted on the same automatic lines that are normally used to shine the stones. The final appearance of the surface is matte and slightly wavy gloss, consumed, pleasant to the touch and with an "orange peel" appearance.

* **Calibration, levigation and lucidity:** The succession of these elaborations in sequence, allows to eliminate the irregularities of the surface (calibration) and to obtain a smooth surface (levigated) with a matt shine or mirror shine. The latter, mirror shine, is the most widespread surface finish, which accentuates the chromatic quality and renders the surface perfectly reflective.

The matte shine and mirror shine of marbles, granites and other natural stones is obtained by a mechanical and chemical process with automatic lines that use progressively finer grain abrasives (60, 120, 220, 400, etc.).

These surface finishes can be combined in the same floor or in the same element of a floor and / or cladding. For example, a part of the surface can be flamed and another glossy. In a floor made with Roman travertine and with travertine dice noce for example, you can leave the largest pieces, shiny and the smallest pieces, travertine dice noce, matt gloss. Thus, it is possible to contrast the color and the surface finish.

III. Dimensions of the elements made with natural stones.

Natural stones for floors and coverings have the characteristic of a strong three-dimensionality, linked to the dimensions of the blocks extracted, so that the products recovered from them can have variable surfaces depending on the different demands of a project.

The minimum and maximum dimensions of a floor element or a cladding, mainly depends on the following factors:

- * Geometry of the element that forms the floor or natural stone cladding.
- * Petrographic characteristics of natural stone.
- * Chemical, physical and mechanical characteristics of natural stone.
- * Average dimensions of the sheets available to collect the floor and / or cladding in natural stone.
- * Manipulation of the elements and technique of pose or placement that is intended to be used

With the current manufacturing technologies, online from Maxima, it is possible to make elements of floors and coverings of many dimensions and shapes, provided they are compatible with the dimensions of commercially available sheets.

It could be concluded by saying that the attention to the dimensions of the elements achievable with a natural stone, at the time of choosing it, is largely justified by the need to simplify production and placement while containing costs.

IV. Background color and material design

By background color of a natural stone, it is understood the predominant color of the material, which determines the chromatic characteristic. The rocks in terms of coloration can be subdivided into monochromatic and polychromatic.

Monochromatic rocks are those rocks with a uniform tint, such as **Thassos White or Zimbabwe Black**. Also the rocks characterized by a color resulting from the combination of so many chromatically close colors, that at a certain distance they seem of uniform color. And finally those rocks with a predominant color over the others, such as bardiglio or "i serpentini"

They are **polychromatic rocks**, the deer and breach marbles, i mandorlati, cipollini, etc.

Nature has created such a variety of materials that every chromatic requirement can find its right answer. Some types of rocks, such as the **"rosa del Portugal"** marble, have a quality so variable that within the same family or the same block it can contain colors that vary from pinkish white to orange pink, allowing the designer to make combinations in based on the different graduations and color shades.

The design of a natural stone is related to its structure and the presence of coloring substances, minerals and / or inclusions of various kinds contained in its mass.

Below we illustrate some of the main **types of designs found in natural stones:**

* **Deer design:** typical of many marbles, also present in some granites such as "multicolor", it is based on the veins of the material, due to coloring substances and / or mineral inclusions; veins can have different colors, dimensions and movements, depending on the type of material. For example, the "**Bianco Statuario Venato**" is characterized by its more or less dark gray veins, generally narrow, which bursts elegantly against the pure white background of the material.

A particular case of deer design is typical of "**arabescato marbles**", such as the "**Arabescato del Cervaiolo**". In reality it is a gap made up of white marbles, linked together with a greenish-gray cement, this binding cement constitutes the characteristic vein of the material.

With the materials that present wide and particular veins, it is possible to make decorative motifs "**open book**" or "**macchia aperta**"

* **Granular design:** typical of granites and similar materials, it is based on a uniform distribution of its grains or crystals, of small, medium or large dimensions.

* **Ghiandonate design:** typical of granites and similar materials such as "**Serizzo Ghiandone**", it is based on crystals or inclusions of a different material, in a "**glandular**" shape of more or less large dimensions, within a structure made up of crystals of dimensions smaller.

* **Breach design,** typical of many marbles, is based on a structure made up of many fragments of rocks of the same or different material, cemented or amalgamated between them, by another material. That example of gapped design are the "**Breccia Pernice**" and the "**Rosso Levanto**".

The design of a material is often related to the way it is cut in the mines and in the workshops with the looms. In general a natural stone can be cut to the "verse" that is to say in the parallel direction to the veins, (example: travertine to the water) and to the "contro" that is to say 90 ° of the veins (example: travertine to the grain) and to the "second" which is a middle way

between these two cutting systems, only used by necessity in some material mines.

Each material generally has its own optimal cutting sense, in terms of design and physical-mechanical characteristics, which does not mean that it can be cut in any other way, in order to obtain a particular architectural aesthetic effect.

The marbles, travertines, stones and granites, as natural stones, in their interior present variations of color and design, more or less sensitive. In this sense, of course there are relatively more homogeneous materials, such as granites and other materials such as marbles, with many more variations in colors and designs depending on the type and with variations even from block to block of the same material and the same mine.

This does not mean that within the limits linked to the quantity and type of the material to be supplied, it is possible to select the sheets in such a way as to obtain substantially homogeneous finished products.

V. Availability of the material and Cost.

A wide range of materials is commercially available in general, and there are no problems buying marble, travertine, stone, limestone, onyx and granite, unless it is not a material with little production and high demand.

This can vary according to the moment they are going through the extraction mines themselves.

It is advisable, especially for large and monochromatic floors, such as the Bianco Thassos, to check in advance and well in advance the possible difficulty in obtaining the material, in quantitative and qualitative terms according to the requirements of the project.

Regarding the **cost of the material**, when the budget available is limited, the cost is the determining parameter in the choice of the flooring material and the covering.

The cost of a natural stone depends on the following factors:

- * Market demand and material availability.
- * Place of origin of the material.
- * Material quality: extra, first, commercial, second, stock, remnants.
- * Required quantity of material supply.
- * Supplier supply possibilities.
- * Percentage of waste of the material in phase of cutting and realization of the floors and coatings.

The notable development of the natural stone sector has allowed excellent price competitiveness, unless it is not about exclusive or almost materials (such as statuary, calacatta, thassos white). In addition, it must be kept in mind and well aware that it is not necessary to use precious or semi-precious materials to carry out an optimal project.

In effect, as we have already had a way of highlighting, **each material has its own technical and expressive potentialities**, which, appropriately valued through a **careful projection and selection of materials**, also allow us to achieve **qualitative results of absolute respect**.

Criteria for choosing a natural stone for an internal lining.

The choice of a material for an internal lining **depends mainly on the aesthetic benefits to which it must satisfy**, in fact in this case, the surfaces are not subject to aggression from external agents or wear due to pedestrian traffic and / or objects in general.

From the point of view of the **durability of the material**, practically all the materials available on the market and with the desired surface finish can be used, with the exception of coatings used in environments characterized by the presence of water and humidity, such as in bathrooms where it is It is advisable to choose healthy, compact materials with a low coefficient of

water absorption, since by absorbing humidity from the environment, they also absorb dirt and in a short time they become dirty, for example from beige or cream to gray. Also keep in mind that less compact materials such as some stones and limestone can degrade superficially faster due to the products and vapors that are normally used in bathrooms, such as perfumes, shampoo, etc.

If, in any case, the choice of coating is oriented towards a rather soft stone or limestone, it is convenient to treat the material with protective water-repellent products that partially protect and retard wear over time.

It is also a good rule of thumb to place all natural stones in direct contact with water, such as shower and tub linings, on appropriately waterproofed walls.

Based on the assumptions already analyzed in the chapter regarding floors, **the selection of a material to be used as internal lining should be made on the basis of the following factors.**

- * **Background color of the material.** (marble, stone, travertine, granite)
- * **Material design.** (shape and distribution of veins)
- * **Surface finish.** (polished, honed, etc.)
- * **Dimensions of the cladding elements,** which can effectively be made with the chosen stones.
- * **Availability of the material in the market.**
- * **Material cost compatible with the project budget.**

Personal Marble, Quality Customized Solutions.

personalmarble.com personal-marble.com stock-marmo.com

info@personal-marble.com

WhatsApp: +39 335 7173748