



## BASIC MARBLE & GRANITE REVIEW

Stuart Dean believes our customers should have a basic understanding of the science behind our marble and granite restoration and maintenance methods. We are experts in understanding what's involved in maintaining marble and granite floors and helping our customers make informed decisions to extend the lifespan of a valuable asset. To accomplish this requires the knowledge and experience of a trusted partner with 76 consecutive years as an industry leader. To help achieve this goal, we've compiled this paper and focused on key drivers that will deteriorate stone, as well as proven solutions to reduce costs and extend the life of your floors, while maintaining your brand image.

Marble is a non-foliated metamorphic rock resulting from the metamorphism of limestone, composed mostly of calcite (a crystalline form of calcium carbonate).<sup>1</sup> It is extensively used for sculptures and building material, as well as many other applications. Construction marble is a stone composed of calcite, dolomite or serpentine, which are capable of taking a polish. More generally in construction, specifically the dimension stone trade, the term "marble" is used for any crystalline calcitic rock (and some non-calcitic rocks) used as building stone. Marble is widely used on the interior, exterior, and as a flooring material.

Granite is a common and widely occurring type of intrusive, felsic, igneous rock. Granites usually have a medium to coarse grained texture and can be pink to dark gray or even black, depending on their chemistry and mineralogy.<sup>2</sup> Granite is nearly always massive (lacking internal structures), hard and tough, and therefore it has gained widespread use as a construction stone. Granite has been extensively used as a dimension stone and as flooring tiles in public and commercial buildings and monuments. With increasing amounts of acid rain, in parts of the world, granite has begun to supplant marble as a monument material, since it is much more durable. Polished granite is also a popular choice due to its high durability and aesthetic qualities. In building and for countertops, the term "granite" is often applied to all igneous rocks with large crystals, and not specifically to those with a granitic composition.

On the Moh's scale, stone is ranked on the relative hardness of stone on a logarithmic scale of one to ten, with one being the softest (talcum powder) and ten being the hardest (diamond). Marble rates a three on the scale. Its logarithmic scale means each unit increase represents a tenfold increase: a stone rated at two is ten times as hard as a stone rated at one. Marble, with a rating of three, is relatively soft. Granite is rated at seven, making it an extremely hard stone, far harder than marble.

## CAUSES OF MARBLE & GRANITE FLOOR BREAKDOWN

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Typical damages from high traffic on marble flooring can cause dulled surfaces with crater-like scratches, or snow-white spots with lines running across the floor. The dull look happens when the factory finish has been worn off, leaving bare, unprotected stone, which is extremely vulnerable to further dulling and damage.

Mopping and waxing procedures maintain most marble and granite floors. Floors that are maintained this way have usually completely lost their polish over the course of time. Polish is defined as the highly reflective finish associated with a newly installed marble floor. Marble floors with heavy wax coatings often look more like faux marble tile – they have none of the brilliant polish that is inherent to high-quality architectural stone. Typically, dissatisfaction with this dull appearance and a worn look is the first sign that a floor has not been properly maintained. The like-new appearance the floor had when it was first installed fades with time, and what is left is a dull floor due to lack of proper maintenance.

Marble floors that lack a polish appear that way for very straightforward reasons. The friction created by foot traffic and dirt has worn down the marble surface. If you were to look through a microscope at the surface of an old worn marble floor and compare it to the finish on a newly polished floor, you would be struck by how rough and cratered the former looked compared to the latter. It is the roughness of the surface, along with dirt and wax buildup in the nooks of the surface that prevent the floor from appearing polished. In order for something to appear polished, it must reflect light very effectively. To reflect light, it must be very smooth. A rough finish by definition reflects light poorly since it refracts, rather than reflects, the light waves that strike it. This is the basic reason an unpolished or worn floor appears as it does.

## SOLUTIONS

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Marble and granite differ substantially in their degree of hardness. Granite is far more dense and hard than marble. It is also true that different types of marble and granite within their respective categories vary in their degree of hardness. Because of these varying degrees of hardness, different types of stone require different honing procedures to produce a highly polished finish. For example, Negro Marquina marble typically requires much less aggressive honing than White Carrera. This usually means that less time is required to hone Negro Marquina than White Carrera, both because the very low grits may be unnecessary for Negro, and because less time may be required for each level of grit (60, 120, 220, 400, 800, etc.).

Literally dozens of gradations of hardness among the various types of marble and granite are used in commercial and institutional buildings. Stuart Dean knows precisely how much to hone and when to stop to produce the most desired end result. Our stone craftsmen are extensively trained, and it typically takes many years for a technician to develop the depth of knowledge to effectively polish a floor.

Step one in achieving a highly polished floor, then, is to make it very smooth. With both marble and granite, the only effective means of smoothing the surface is honing. “Honing” is an industry term that refers to abrasively smoothing a surface.

For all intents and purposes “honing” a stone floor is synonymous with “sanding” a piece of wood. The honing method involves either stone grinding or machine honing with diamond pads. Diamond pads are circular pads with industrial diamonds attached to the bottom. These pads are a relatively new innovation that enables the honing process to be done more efficiently and quietly, and so they are the material of choice for nearly all marble restorative companies.

The final step in achieving high quality sheen is to polish the honed finish with an acid (“acid polishing”). The typical method is to use oxalic acid with a buffering agent of aluminum oxide. The acid, which is relatively mild, nevertheless serves to melt the very top layer of the stone, while the rotary action of the buffing machine smooths the surface. The result is an extremely smooth finish.

While there are other ways to polish, acid polishing is the method of choice for a truly brilliant polish, and it is the most commonly used method in factory applications. After polishing the floor, the residue of the acid is then thoroughly rinsed and neutralized.

Many of our valued customers ask how long a newly polished floor will look like-new. A floor polished by an expert stone technician using the general methodology described above will look dramatically superior to its former appearance. Just how dramatic the difference is will depend on how poorly the floor looked to begin with. Floors that have not been polished in years will probably appear to have been newly replaced. Even a floor that has been polished three months prior to restoration will look substantially better, but the contrast will not be as great.

It is important to note that the floor will almost never look exactly as it did when it was first installed. This is particularly true of granite floors. Newly installed floors are polished in a factory. The general procedure used to polish in the factory is the same, but the equipment is different. The factory machines used to hone the surface of the stone are gigantic devices that are capable of generating thousands of foot-pounds of pressure. With that much pressure, these machines can hone the surface to a point where it is far smoother than anything that can be achieved in the field. Recall that reflectivity is a function of smoothness: the smoother the surface can be made, the more brilliant the polished finish. Unfortunately, until new technologies are developed, the spectacular finish of a new floor can only be approximated with on-site restoration services. Fortunately, technology is rapidly improving, and we are coming closer and closer to matching the ideal of a factory polish.

Precisely how a floor is to be maintained depends on many factors. The types of stone, traffic patterns and degrees of traffic, the quality of the desired finish and the resources available to pay for the desired end product are all key elements to be considered. Stuart Dean is an expert at identifying and recommending the best treatment for each unique stone floor.

When a customer hires Stuart Dean to maintain their marble or granite floor on a contractual basis, we follow a practice of completely restoring the finish as a first step. The method is usually identical to that described above, with one additional crucial step called Vitrification. This method is also sometimes referred to as crystallization.

A word on Vitrifying: This process is vital to the economic maintenance of a highly polished floor and we feel our customers should know precisely why this is so.

Maintaining a floor to a very high polish is not possible without Vitrifying unless the floor is constantly re-honed and polished.

Constant re-honing of the entire wear area of a busy floor is usually prohibitively expensive. Some companies prefer instead to re-polish small areas each evening. Unfortunately, if the floor in question is relatively large, area re-polishing can result in a “patchwork quilt” effect, with some areas of the floor looking outstanding and others quite poor.

An additional beneficial feature of the Vitrification process is that in most instances it will reduce the slipperiness of the surface of the stone. The tendency for a person to slip on the surface of polished granite or marble is a function of the coefficient of friction of the surface. The higher this friction number, the less likely the person will be to slip. When the Vitrifying chemical is burnished into the surface of the marble or granite, it raises the coefficient of friction, reducing the likelihood of someone slipping and falling compared to stone that was polished, but had no such protection.

After restoration is performed on the granite or marble floor, a maintenance program will be recommended and should be adhered to for best results. Fortunately, large sections of the floor will still be in excellent condition thanks in part to the extra protection provided by the crystallizing process. These areas can simply be polished, allowing us to concentrate primarily on restoring the worn areas so that the entire floor once again looks outstanding. In the future, as other areas gradually deteriorate and lose their polish, they too will be re-honed, acid polished and re-vitrified. Employing the Vitrifying process as part of on-going maintenance clearly saves substantial time and money.

The method for maintenance described above is not always applied uniformly to every customer, but it is the method used to obtain the best result. Stuart Dean recommends frequency of service based on the degree of wear and tear the floor is subjected to, and the extent to which the customer desires a very high quality appearance at all times. For customers who demand very high quality, our monthly service, which includes monthly honing and acid polishing, is highly recommended.

Before work is performed on any stone floor, it is critical to acquire precise information on methodologies and frequencies when soliciting stone maintenance bids: One is practically never comparing “apples to apples.”

**FREQUENTLY ASKED  
QUESTIONS**

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**Polishing a marble floor looks so simple. Why can't everyone (janitorial services, restoration companies) maintain these floors to the same degree and quality?**

Direct experience plays a substantial role in first determining the way in which a floor should be addressed. It's the only way to know precisely which methods to employ to quickly and cost-effectively service a floor. Marble and granite surfaces differ in their responses to similar methods. At least 150 different types of granite and marble are currently commercially available. While the general method of restoring a floor is the same across these different stone types, the precise method used to efficiently restore a particular type of stone varies considerably because the stones do vary in their responses to the methods. Knowing which grades of abrasive material to use, for how long, and when to hone or to simply Vitrify is an acquired skill. Stuart Dean has a combination of direct hands-on and industry-leading insight derived from 76 years experience in the art of stone restoration. Customers are right to be concerned about which chemicals are being used on their floors. Given that an incorrect application of certain products or processes can do irreparable harm, customers should be very concerned that the company that maintains their stone floor has experience and a proven, lengthy safety record.

**I hear so much about "natural restorative methods" as being preferable to others. What are they, and is this true?**

As a marketing slogan, "natural restorative techniques" is pretty clever. Unfortunately, like most marketing slogans, it has little meaning. There is no such thing as a "natural restorative technique" for marble or granite. There are only differing methods and applications of honing materials and chemicals that work or do not work. You cannot polish marble with granola, grape nuts or tofu. You must use an abrasive to smooth the surface. And to achieve a high-quality polish where none exists, you must use a polishing compound. Polishing compounds and diamond pads do not grow on trees, and marble and granite never spring from the earth with a "natural" polish.

The specific method Stuart Dean employs (diamond pad abrasive honing, acid polishing and neutralization) have been proven over decades of use. We have been using oxalic acid as our polishing compound for over forty years. In this time, we have never destroyed a floor or been required to replace a floor because our general technique had been inappropriate. We have built an excellent reputation as "the company to go to" for granite and marble restoration. Over the course of 40 years, we have stayed abreast of the safest and most effective technologies available. Our methods are as safe or safer than any other being used today.

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**If I hire Stuart Dean to maintain my floors, can I get a tailored service package to fit my budget instead of the automatic monthly program?**

Of course! Please keep in mind that the normal monthly maintenance program is by no means an extravagance, and that it has been tailored to fit the needs of a demanding marketplace. Our standard monthly program provides what we and most of our customers believe is the best value. Stuart Dean also offers customer-tailored programs that are often superior to competitive programs for similar prices.

**I have asked three companies for bids to maintain my marble floor. Is there a common industry standard for maintaining floors, for example, does everyone use the same method at the same frequency? Am I comparing apples to apples?**

Fortunately, there is not a generic program in use by everyone. Each stone floor is unique as is each recommendation on how to restore it. This can be readily seen in the difference in quality between a typical Stuart Dean maintained floor and those maintained by others. The fundamental difference in most cases is that we direct our technicians to continuously re-hone and polish all areas that are badly worn *every month, keeping a close eye on all areas to maintain consistency*. Most competitive programs restore the surface of the floor in the first month, and then use polishing compounds in successive months, ignoring the steady accumulation of scratches on the surface that gradually erode the polish. Others may spend time each evening honing partial areas of the floor that result in an uneven appearance. Sometimes, an in-house janitorial staff that lacks the expertise and ability to do a high quality job may also carry out this honing.

It has been our experience that these methods are generally ineffective at maintaining a high-quality finish on a floor. Recall that the shininess of a floor is a function of the surface's smoothness. If a floor is subject to heavy traffic, no amount of chemical treatment will maintain the smoothness of the floor: The constant wear and tear created by the friction of shoes, dirt and dust will rapidly create the microscopic peaks and valleys on the surface that ruin a polished appearance. When this happens, you must re-hone the surface to reestablish a smooth finish, and then re-polish it to recreate the appearance the floor had at the outset of the maintenance program.

Similarly, there is simply no substitute for having an experienced, savvy stone restoration expert honing your floor. Stuart Dean technicians are trained for a minimum of two years before they can run a stone restoration crew. We have found that there is no substitute for years of proven experience.

Stuart Dean is a pioneer in the field of stone restoration and maintenance services. Our services extend the life, increase the value, and enhance the beauty of stone floors. Providing customized solutions tailored to meet each client's need, a national team of experts specialize in one point of contact, ongoing contracts and project-based work. Stuart Dean provides ease of service to companies with single and multiple locations in need of solutions that deliver consistent outcomes, and cost-effective preventative solutions.

### References

- <sup>1</sup> Wikipedia 2009: Marble <http://en.wikipedia.org/wiki/Marble>
- <sup>2</sup> Wikipedia, 2009: Granite <http://en.wikipedia.org/wiki/Granite>