



**STONE
DESIGN**

Your Passport to the World of Stone

THE HISTORY OF STONE
and
STONE GLOSSARY A TO Z

A GENERAL OVERVIEW OF THE MAKEUP
AND USE OF DECORATIVE STONES

Stone is a natural solid formation of one or more minerals. Thousands of types of stones have been quarried through the centuries. Quarries are located all round the world, with the majority located in Italy, Spain, Turkey, United States, Mexico, China, Taiwan, India, Greece, Canada, France, and Brazil.

The earth began as a massive body of gas and liquid minerals, which slowly cooled and condensed to a solid core. Pressure formed the earth's crust and forced heavy minerals down to the core of the earth where they were trapped. As the crust thickened it squeezed the inner core, which created intense pressure and heat within the earth. Crystals and other solid forms began to grow from the mineral vapors released. As the earth's crust began to expand and erode, heat and pressure pushed the solid minerals up to the earth's surface forming colossal rock beds. It took up to 100 million years to form some of these beds. Many of the beds are now quarries where the stone is mined.

Most of these minerals can be identified by their color, hardness and crystal formation. Crystals come in variety of shapes and sizes, and are often difficult to identify. Many stones look similar to each other; however, they are all unique.

The stone is quarried in large blocks from open pit mines. These quarry blocks, usually ten feet long and 4 to 6 feet square are sawn into tile as thin as $\frac{1}{4}$ " and into sheets called slabs as thin as $\frac{3}{4}$ ". The stone surface is ground away in a multi-step process that smoothes the surface until it achieves a high gem-like polish. A well-polished stone will look wet with an almost three-dimensional depth to the surface. This is especially beautiful in granite. No man-made stone product can duplicate this astonishing effect. Tile cut from stone is generally $\frac{3}{8}$ " thick and 12" by 12" in size, although 16" by 16" and 18" by 18" tile is made as well. Most slabs imported into the United States are $\frac{3}{4}$ " thick. Material $1\frac{1}{4}$ " thick is imported as well, but in limited quantities. Thicker stones are almost

always ordered to specification for commercial buildings, pavement, and monuments are called dimensional stones.

The majority of residential and commercial interior stone pieces are produced from $\frac{3}{4}$ " and $1\frac{1}{4}$ " thick material. Kitchen counters, bathroom vanities, bars, fireplace surrounds, hearths, tub surrounds, tables, and wall cladding are just a few of the items made from slab and dimensional stone.

IGNEOUS STONES

Igneous stones are mainly formed with volcanic material such as magma. Underneath the earth's surface, liquid magma cools and solidifies. Mineral gases and liquids penetrate into the stone and create crystalline formations of various colors.

Granite: Granite was formed by the titanic forces of the earth's colliding tectonic plates. Granite is almost as hard as diamonds. Granite is primarily made up of quartz (35%), feldspar (45%), and potassium, with very little calcite. Granite normally comes in darker colors, providing a heavy crystalline and granular appearance with mineral grains. It is a very hard material and is easier to maintain than marble, yet it is still porous and will stain. The combinations of quartz, mica, and feldspar define different types of granite. Black granite is known as an anorthosite rather than true granite, as it contains very little quartz and feldspar. Granite will endure the wear and tear of kitchen and high traffic environments and is the stone of choice for commercial projects.

METAMORPHIC STONES

Metamorphic stone originates from a natural change from one type of stone to another type through a combination of heat, pressure, and minerals. The change may be a new crystalline formation, texture, or color.

Marble: Marble is limestone softened due to heat and pressure and re-crystallized around new mineral components. Marble mainly consists of calcium and dolomite. Marble is found in many colors and is usually heavily veined and with many mineral grains. Its hardness rates from 2.5 to 5.0 on the MOH scale.

Marble is classified into three categories:

1. Dolomite – contains more than forty-percent magnesium carbonate.
2. Magnesian – contains between five and forty percent magnesium carbonate.
3. Calcite – contains less than five-percent magnesium carbonate.

These stunningly beautiful stones are softer than granite and need more care, but are suitable for bathrooms, fireplaces, and most residential low-traffic areas.

Slate: Slate is a fine-grained metamorphic stone that formed from clay, sedimentary rock shale, and sometimes quartz. It is very thin and can break easily. Colors are usually black, gray, and green, but can be red, pink, cream, gold, rust, or a combination of colors. Slate may be used nearly everywhere, but it is not recommended for a kitchen countertop.

SEDIMENTARY STONE

Natural forces such as glaciers, rivers, winds, oceans, and plants form sedimentary stone. Tiny pieces of rock, bone, and other organic material break off due to these elements and accumulate to form rock beds,

which bond together over millions of years of heat and pressure. Sedimentary stone is not recommended for kitchen countertops.

Travertine: The accumulation of calcite from hot springs creates travertine.

Travertine contains lots of holes that were formed by water flowing through the stone. These holes are often filled with synthetic resins or cements to reduce the maintenance of the stone and provide a smooth surface. Travertine can be classified as limestone and a marble. Common colors are cream and brown.

Limestone: Limestone consists mainly of calcite and is known to contain lime from seawater. It does not show much graining or crystalline structure, has a smooth granular surface, and varies in hardness. Some of the more dense limestones can be polished. Softer than marble, it is more likely to stain. Common colors are black, gray, white, yellow, and brown.

Onyx: Onyx is translucent, like frosted glass, with either layers or loops of color in pastel shades of yellow, brown, and green. Onyx can also be dark, vibrant red, green, and gold. Although it is often called “onyx marble”, onyx is formed in a different manner than marble. Unlike marble, onyx does not change from one material to become another. Onyx is formed in cold solutions of carbonated spring water and is composed of crystalline silica, like the semi-precious stone agate. Onyx is found in Mexico and Pakistan.

A ABRASIVE FINISH: A flat non-reflective surface finish generally recommended for exterior use (also called sand-rubbed). Good for outside stairs because it does not get slippery when wet.

A ABRASIVE HARDNESS OR ABRASIVE RESISTANCE: The ability of stone floors and treads to withstand foot traffic. Varieties with an abrasion resistance rating of 10 or more are recommended for use as flooring. Flooring using two or more varieties will not wear evenly if the ratings vary by more than 5.

ABSORPTION: The percentage of moisture absorbed by weight. MIA has established a range of .069% to .0609% for a 48 hour soak, using test methods described in current ASTM standards.

ANCHOR: A metal device used to attach stone to a structure.

ARMSTONE: Trade name for an artificial granite.

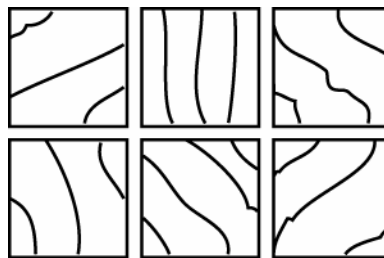
ARRIS: A sharp ridge or line formed when two surfaces come together at an exterior angle.

ARTIFICIAL MARBLE: See Fortified Marble.

ASHLAR: Stones with faces cut as squares or rectangles so that the mortar joints between them can be very thin.

B BEVELED EDGE: The underside of the edge is cut on a slant, not at right angles with the top. (See also Undercut Beveled Edge).

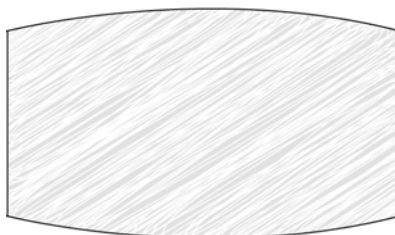
B BLEND PATTERN: Marble panels of the same variety but not necessarily from the same block are arranged at random to give an informal overall appearance. This is the scheme followed when no other pattern is specified.



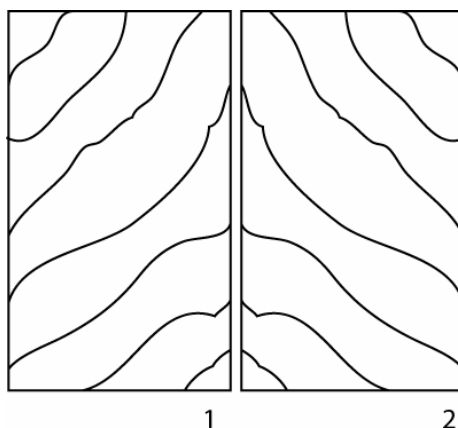
BLENDING: Placing adjacent marble veneer panels according to predominating colors and patterns to reach a pleasing look.

BLOCK: A large rectangular piece of rough stone as it comes from the quarry. (See also Quarry Block).

BOAT SHAPE: One of eight basic shapes for the stone tops. An ellipse with straight ends.



BOOK MATCH PATTERN: The adjacent faces of two marble panels are finished and placed next to each other as if two pages of an open book coming together at the center.



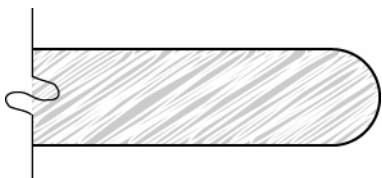
BRECCIA: Rocks made up of angular fragments of still older rocks, which have been melded together over time.

BULLNOSE: A rounded edge - available as:

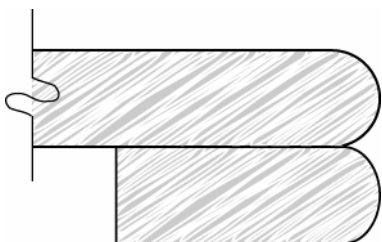
Demi Bullnose



Full Bullnose:



Double Bullnose:



BUTTERING: Putting mortar on marble pieces with a trowel before setting them in place.

C **CALCITE:** One of the most common minerals - calcium carbonate. It occurs in crystalline forms and is a major constituent of limestone, marble and chalk. Marble containing no more than 5% magnesium carbonate (dolomite) is sometimes called calcite marble.

CAULK: To fill or close a seam or joint so it is air or water tight. Stone is sealed with an elastic adhesive compound.

CAVITY VENT: An opening in veneer joints that permits air and moisture within the wall cavity to escape.

CHAMFER: To cut at an oblique angle. Same as bevel.

CLASSIFICATION SYSTEM: All marble is classified according to soundness for fabrication purposes. For the system approved by the MIA, see Group Classification for Soundness.

CONTROL JOINTS: A joint which helps avoid high stress on a structure when different parts change size as a result of shrinkage or expansion from temperature changes. (See also Expansion Contraction Joint).

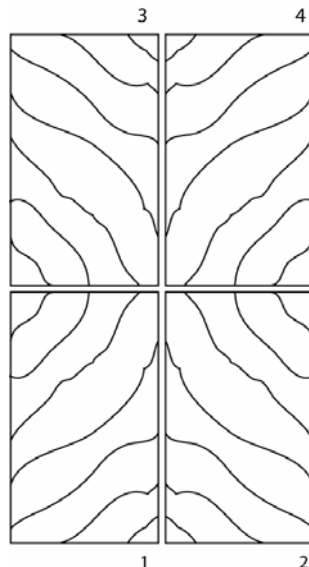
COURSE: A continuous flat range of stones across a wall or floor.

CLAMP: A U-shaped metal anchor that holds two adjacent pieces of stone together.

CUBIC STONE: Stone that has been fabricated to a thickness of more than two inches.

CUSHION: A resilient pad, which absorbs and counteracts severe stresses between two pieces of stone or stone and other materials.

D **DIAMOND MATCH PATTERN:** (Also called quarter match). Two sets of marble panels are each book matched. Then, one set is end matched over the others. (See also Book Match Pattern and End Match Pattern).



DOLOMITE: A mineral, calcium magnesium carbonate. Also marble consisting largely (over 40%) of this mineral.

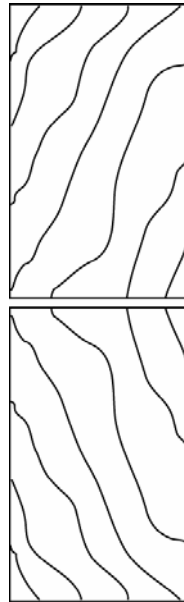
DOWEL: A round metal pin that fits into two adjacent pieces to align them and to prevent them from slipping. Used to strengthen joints.

DRESSING: Shaping and squaring (also called scabbing) blocks of stone which are stored or shipped.

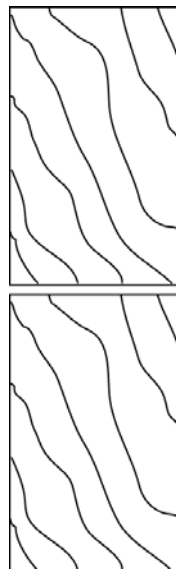
DRIP: An indentation cut into the underside of projecting stone to divert water from running down the face of the wall or other surface.

E EDGES: Fabricated edges to order in six styles: straight, chamfered, full, bullnose, demi-bullnose, double bullnose or undercut beveled.

E END MATCH PATTERN: Adjacent faces of two marble panels are finished and placed one above the other, coming together at the top.



END SLIP PATTERN: Marble panels from the same block are placed end to end in sequences so that the pattern and color repeat vertically.



EFFLORESCENCE: A whitish powder sometimes found on an unpolished stone surface. It represents salt deposits that have been carried through or onto the surface by moisture.

ERECTION: Installing fabricated marble. (See also Installation).

EXPANSION-CONTRACTION JOINT: A joint designed to expand or contract with temperature changes. (See also Control Joint).

F FABRICATE: To prepare stone for installation - to manufacture it. This includes trimming or cutting slabs to specified sizes and shapes, planning the blending or matching of slabs and numbering them so they can be installed in sequence, carving edge details, mitering aprons, laminating pieces to achieve a specified thickness at the edge. Reinforcing slabs for additional strength when necessary, filling natural voids and finishing the face (fabricated stone is also referred to as Dimensional stone). Fabrication should occur only after the site has been prepared for installation. The fabricator should take his own measurements. Once cut, the size of stone cannot be adjusted.

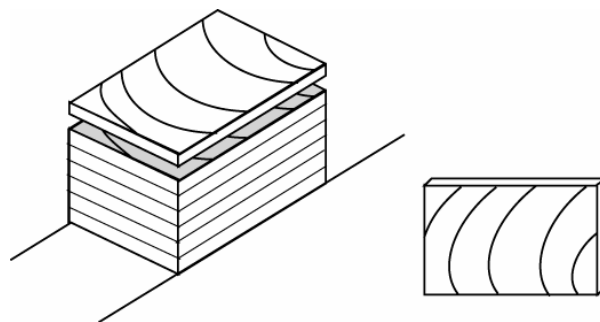
FACE: The exposed surface of a piece of stone. The face must be finished.

FILLING: Irregularities occur in all natural materials. The form they take in marble is gaps and voids in the stone. These are filled during fabrication with shellac, cement, synthetic resin or other similar materials to strengthen the stone and prevent it from cracking or breaking.

FILLER STRIP: Resilient material placed at the back of a stone joint to function as a sealant stop.

FINISH: The final treatment of a piece of stone, which will give it a shiny or dull look. For details on the four basic finishes available, see: Abrasive, Honed, Polished and Thermal.

FLEURI: A mottled effect which results from sawing marble blocks parallel to their natural bedding plane, instead of at right angles, the more customary procedure.



FOREIGN FABRICATED MARBLE: Marble fabricated outside the U.S. or Canada. The danger of importing marble which has already been fabricated is that there is a far greater margin for errors.

FOREIGN MARBLE: Marble quarried outside the U.S. or Canada. Importing marble should be done only under the supervision of a professional importer because marble is fragile, difficult to handle and likely to become damaged and because negotiating the consequences of a damaged shipment is time-consuming, expensive and often impossible for the inexperienced.

FORTIFIED MARBLE: A man made product resembling natural marble. Often composed of thermosetting resins as a matrix plus fillers. Also called Artificial Marble.

G GANG SAW: A saw with several parallel blades, used to make several cuts simultaneously. Gang saws are used in cutting slabs from marble blocks at the quarry.

G GRANITE: The hardest of all building stones. A granular igneous rock composed principally of feldspar and quartz, with lesser amounts of dark ferrous-magnesium materials.

GROUP CLASSIFICATION FOR SOUNDNESS: Standard industry practice, supported by the MIA, requires certain methods of fabrication in accordance with the degree of fragility of a piece of marble. The more natural veins and faults, the more decorative the marble.

Group A: Marbles have uniform and favorable working qualities.

Group B: Marbles are similar to A, but offer somewhat less favorable working qualities, and may have natural faults and require a limited amount of reinforcement.

Group C: Marbles generally contain geological flaws, voids, veins and lines of separation and require a fair amount of reinforcement.

Group D: Marbles, those highly prized for their decorative qualities, are similar to C, but have more natural faults and maximum variation in working qualities. They require considerably more reinforcement.

GROUT: A thin, course mortar used for filling masonry joints.

H HONE (OR HONED FINISH): A satin smooth surface with little or no gloss.

I INSTALLATION: Setting Marble in its final place.

J JOINT: The point at which two pieces of material come together.

JOINTING SCHEME: An architects' drawing which shows the dimensions, location and configuration of stone panels and joints in relation to the overall structure.

L LIMESTONE: Any stone consisting wholly or principally of calcite (calcium carbonate). Marble is limestone which has been transformed (metamorphosed) over time. The variety of limestone used as a building stone is hard and lasting; can be cut easily and shaped with saws, planes and lathes, and has a minimum of graining.

LINERS: Structurally sound sections of marble cemented and doweled to the back of thin marble units to give greater strength, additional bearing surface or to increase joint depth.

M MANUFACTURE: Fabricate – prepare marble for installation. (See also Fabricate).

MARBLE: The most elegant of all building stones. Like other rocks, marble is a mass of minerals consolidated over millennia of time under the tremendous heat and pressure of massive upheavals of the earth's inner core. Unlike other rocks marble consists of a mosaic of interlocking grains of limestone and other crystalline (transparent) minerals – calcite, dolomite or serpentine. One of its essential characteristics is that it will shine when polished.

MARBLE CONTRACTOR: Someone who installs marble.

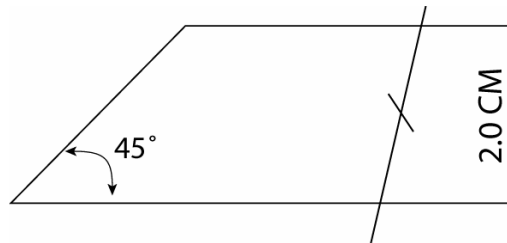
MARBLE INSTITUTE OF AMERICA (MIA): The principal national trade association of the American marble industry. Members are marble contractors, exporters, importers, manufacturers, producers and wholesalers in the U.S. and Canada.

MARBLE MANUFACTURER: Someone who fabricates marble. (See also Fabricate).

MARBLE PRODUCER: Someone who quarries marble.

MARBLE SAMPLES: Small pieces of marble are helpful in suggesting the general range of markings and colors of a given variety, but they should be regarded solely as a general guide. Seeing three 12" x 12" samples from the same slab is the minimum basis for judging a slab. Natural variations can be very great from one lot to another, and marble users are advised to select all the slabs they plan to use at the same time and to design color schemes on the basis of the slabs ordered, not the samples.

MITER: To form an oblique surface in order to butt it against a second oblique surface to which it is to be joined.



O **ONYX MARBLE:** A form of marble found principally in Pakistan and Mexico in highly translucent pale to medium greens and brown. It is a crystalline, commonly microcrystalline. It tends to be translucent and to show characteristics of layering. It is considered a marble because it can be polished.

P **PANEL:** A flat piece of fabricated stone veneer.

P **PARGING:** Applying a coat of mortar to the back of the stone or to the face of back-up material to insulate the stone from dampness.

PAVER: A single unit of fabricated marble for use as exterior paving material.

POINTING: The final filling and finishing of mortar joints that have been raked out.

POLISHED FINISH: A glossy surface, which brings out the full color and character of the marble. Not generally recommended for exterior use.

POULTICE: A moist mass of chemicals spread on a cloth and applied to remove dirt and stains.

Q **QUARRIER:** The person or company who extracts natural stone from a quarry.

Q **QUARRY:** The place where natural stone deposits of stone are taken from the earth. May be an open pit or mine.

QUIRK MITER JOINT: A joint formed by two panels at an acute angle, with the meeting edges mitered and the exposed portion finished.

R

RACE TRACK SHAPE: One of eight basic shapes for custom fabricated stone tops. Two elongated half-circles joined.



REGLET: A groove for guiding or holding a panel.

REINFORCEMENT: A fabrication strategy used to strengthen structurally unsound marble. (See Group Classification for Soundness). The traditional technique is called rodding (see below). A more recent method is to laminate fiberglass sheets to the back of the marble.

RODDING: The traditional technique for reinforcing structurally unsound marble. In rodding, rods are cemented into channels cut into the back of a piece of marble.

ROUGH SAWN STONE: A stone panel right after the gang-sawing process – with no polishing or shaping.

S

SAND-RUBBED FINISH: A flat non-reflective surface finish generally recommended for exterior use. (Also called Abrasive Finish).

SCABBLING: Removing surface irregularities from marble blocks that are to be stored or shipped.

SEALANT: A chemical compound used to seal joints. Stone veneer joints are generally sealed with an elastic adhesive compound.

SEALING: Making something watertight or leak-proof with a chemical compound. An elastic adhesive compound is generally used for stone veneer joints.

SEDIMENTARY ROCKS: Rocks formed by sedimentary deposits (mineral or organic matter deposited by water, air or ice). Marble is one example.

SERPENTINE MARBLE: Marble containing large amounts of the mineral serpentine. It's green and has a tendency to warp.

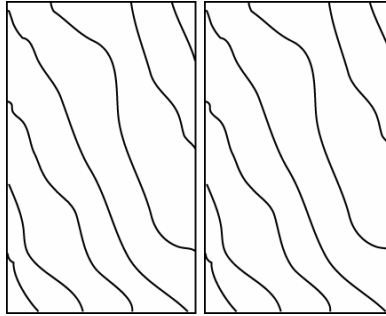
SETTER: A specialist experienced in installing marble.

SETTING SPACE: The distance between the face of the finished marble and the face of the back-up material.

SHAPES: Custom fabricated tops in eight basic shapes: race track, boat shape, super ellipse, round, elliptical oval, round oval, square and rectangle.

SHOP DRAWING: A detailed drawing, usually prepared by the shop fabricator, to show the dimensions of panels.

SIDE SLIP PATTERN: Marble panels are placed side-by-side to give a horizontal repeat to the pattern and blended color.



SLAB: A slice of marble cut from the quarry block prior to fabrication.

SOFFIT: The finished underside of a lintel, beam or other overhead member.

SOUNDNESS: Describes the degree to which untreated stone is free from cracks, faults and similar imperfections. It is of concern at the time of fabrication and installation.

SPALL: A chip or splinter separated from the main mass of stone.

SPOT (OR SPOTTING): Adhesive applied to the back of stone veneer to close the gap between it and the back-up wall and to hold it permanently in position.

STICKING: Cementing broken slabs or pieces of unsound marble together.

SUPER ELLIPSE: One of eight basic shapes for cut to order stone tops.

T **TEXTURE:** The size, degree of uniformity and arrangement of the minerals contained in a piece of marble. Grains of calcite, the principal constituent of most marbles, are crystalline and have definite cleavages, showing bright reflecting faces on a broken surface. Most marbles have elongated grains going in one direction.

THERMAL FINISH: A rough surface finish that tends to subdue the color and markings of marble.

THIN MARBLE: Any fabricated marble that is two inches or less thick.

TOLERANCE: Dimensions of fabricated marble are considered accurate within the following tolerances:

1. Tolerances for thickness.
 - Thin stock (7/8" to 2 1/4") – plus 1/8" or minus 1/16" when one face is finished.
 - Cubic stock (over 2 1/4") – plus 3/16" or minus 1/8" when one face is finished.
2. Tolerances for sizes and squareness.
 - Thin stock – plus or minus 1/16" when one face is finished.
 - Cubic stock – plus or minus 1/16" when one face is finished.

TOP SHAPES: Fabricated eight basic shapes to order for tops – race track, boat shape, super ellipse, round, elliptical oval, round oval, rectangular and square.

TRANSLUCENCE: Translucence is one of marbles' most intriguing attributes. Not all marbles possess it, nor do all which may have it to the same degree. It is dependent on four factors:

- (a) Crystal Structure
- (b) Color – white and lighter colored marbles are generally more translucent
- (c) Thickness – the thicker the panel, the less light is transmitted
- (d) Surface Finish – smooth finishes heighten translucency, rough ones decrease it.

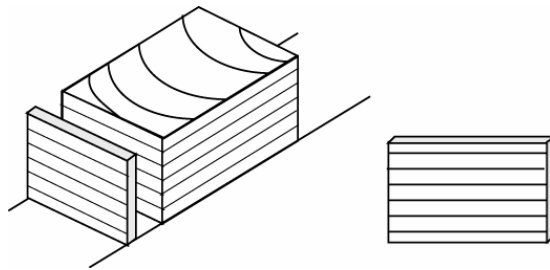
TRAVERTINE: A form of limestone deposited by springs, especially hot springs. Some varieties take a polish and are considered to be marble.

U UNDERCUT BEVELED EDGE: The underside of the edge is cut on a slant, angles to the top unit. A piece of fabricated dimension cubic or thin marble.

V VARIETY: The type of stone based on its color, physical properties or variations.

VEIN: (a) A streak or marking in marble – the result of mineral deposits. Iron oxides make the pinks, reds, yellows, and browns. Most grays, blue-grays and blacks are of bituminous origin. Greens are caused by micas, chlorite and silicates. (b) Also a distinct mass of rock or mineral deposits, a lode.

VEIN CUT: Marble cut across the bed on the perpendicular.



VENEER: A thin layer, used for facing walls.

VENEER PATTERN: The way in which marble panels are arranged. (See also Blending, Book Match).

VENTING: A method for allowing air and moisture to escape from a wall cavity. (See also Cavity Vent).

W WAXING: A process used in fabricating marble for interior use to fill natural voids with cement, shellac or other materials. (See also Fabricate and Group Classification for Soundness).

WEEP HOLES: Openings for drainage in veneer joints or in structural components supporting the veneer.

WIRE SAW: The saw used extensively by Europeans in quarrying marble. It is made of one or more wire cables. The cables run over the pulleys to cut marble into blocks and slabs by tension. A slurry of sand and water aids in the action.