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Standard Terminology Relating to Dimension Stone[1]

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This standard has been approved for use by agencies of the U.S. Department of Defense.

INTRODUCTION

Dimension stone, as used here, is natural stone that has been selected and fabricated to specific sizes or shapes, with or without one or more mechanically dressed or finished surfaces, for use as building facing, curbing, paving stone, monuments and memorials, and various industrial products. The term *dimension stone* is in contradistinction to crushed and broken stone, such as is used for aggregate, roadstone, fill, or chemical raw materials. Because all stone is a natural material, the definition excludes all manmade materials that simulate stone. In common practice, some dimension stones are reinforced, filled, or surface treated.

Terms used in definitions and nomenclature shall be interpreted in accordance with commonly accepted scientific and technical terms of the geological sciences except as otherwise specifically noted.

Examples of such exceptions are the broader commercial definitions of granite and marble, which have become well established in the dimension stone industry and trade. Definitions and terms included in these definitions have been formulated in accordance with common industrial usage *where this is not in conflict with current scientific usage*.

GENERAL TERMS

anchor—in general, a metal shape inserted into a slot or hole in the stone that provides for the transfer of loads from the stone to the building structure, either directly or through an intermediate structure.

anchorage—the system consisting of stone, anchor and primary structure, secondary structure or back-up preventing lateral movement of the stone.

arris—the junction of two planes of the same stone forming an external edge.

ashlar—(1) a squared block of building stone; (2) a masonry of such stones; (3) a thin-dressed rectangle of stone for facing of walls (often called ashlar veneer).

bearing check—a slot, generally not continuous, cut into the back or bed of dimension stone to accommodate a supporting angle or clip (see Fig. 1.)

building stone—natural rock of adequate quality to be quarried and cut as dimension stone as it exists in nature, as used in the construction industry.

chip—an irregularly shaped fragment dislodged from a stone surface.

cladding—nonload-bearing stone used as the facing material in wall construction that contains other materials.

coping—dimension stone used as the top course of a masonry wall, often sloped to shed water.

crack—a partial break in the stone (see fracture, microcrack, seam).

cubic stock—in general, a thick dimension stone unit which is not precisely defined in terms of thickness for every kind of stone, particularly for limestone and sandstone. For marble or granite, cubic stock is a unit that is greater than 50 mm in thickness. For limestone, cubic stock is a unit that is greater than 75 mm to 100 mm in thickness, and for sandstone, a unit that is greater than 150 mm to 200 mm in thickness. (In contrast, see *thin stone*.)

cut stone—stone fabricated to specific dimensions.

[1] This terminology is under the jurisdiction of ASTM Committee C18 on Dimension Stone and is the direct responsibility of Subcommittee C18.91 on Nomenclature and Definitions.

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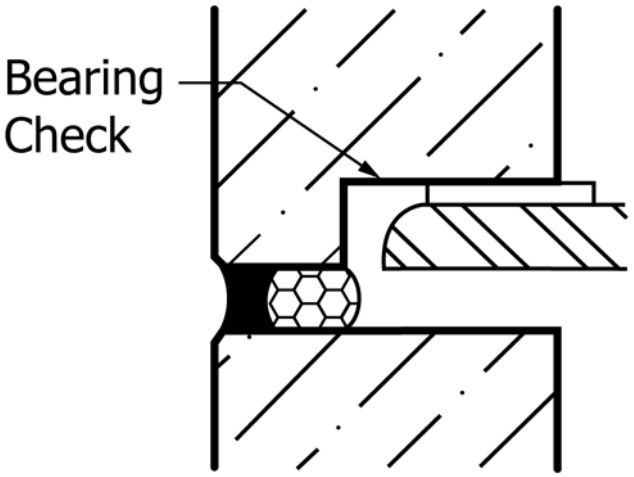

FIG. 1 Bearing Check

dimension stone—natural stone that has been selected and fabricated to specific sizes or shapes.

DISCUSSION—The term *dimension stone* is in contradistinction to crushed and broken stone, such as is used for aggregate, roadstone, fill, or chemical raw materials. In common practice, some dimension stones are reinforced, filled, or surface treated.

dressed stone—See **cut stone, finished stone.**

durability—the measure of the ability of dimension stone to endure and to maintain its essential and distinctive characteristics of strength, resistance to decay, and appearance. Durability is based on the length of time that a stone can maintain its innate characteristics in use. This time will vary depending on the environment, the use, and the finish of the stone in question (for example, outdoor versus indoor use).

dry seam—a natural separation that has not been filled or bonded.

fabrication—*when applied to dimension stone*, any of the processes involved in changing a raw stone piece to its final end use form. This includes, but is not limited to cutting, splitting, grinding, drilling, or face-finishing.

fading (slate)—a slate that has a significant color change within the first year of exposure to weather, often the result of chemical alteration of the iron minerals.

finished stone—dimension stone with one or more mechanically exposed surfaces.

filling—the application of materials, often cements or synthetic resins, into natural voids in a stone during fabrication.

fissure—a naturally occurring separation which may or may not affect the performance of the stone.

flagstone—nominally flat pieces of stone generally furnished in irregular shapes with broken edges, typically used for paving.

fleuri-cut (cross-cut), *adj*—describes stone that is cut parallel to the natural veining.

flooring—stone used as in interior pedestrian wearing surface.

fracture—a complete break in the stone (see crack, microcrack, seam).

freestone—a stone having little or no preferential direction of splitting which may be cut freely in any direction without fracture or splitting.

grain—(*1*) a distinguishable rock constituent which itself has a distinct identity, for example, a mineral crystal, an oolith, a rock fragment (in sedimentary rocks), or clast.

(*2*) a direction in a rock body along which it is more easily broken, split, or cut. See rift.

granular—composed of particles visible to the unaided eye. For sedimentary stone, the predominant particle distribution is less than 4 mm in size.

hysteresis—the residual strain in stone after the stress causing such strain is changed.

installation—the process of assembling dimension stone into a structure.

kerf—(1) a slot, either local or continuous, cut into the edge of a stone, typically with a saw blade, for insertion of anchors. (2) the width of a cut when sawing through stone blocks or jointing slabs. (See Fig. 2.)

lamination—*when applied to the processing of dimension stone*, refers to the adhesive bonding of multiple layers of stone, or stone to other materials.

liner—a small block of stone secured to the rear face of a dimension stone panel with pins and adhesive for the purpose of providing a concealed horizontal bearing surface (see Fig. 3a and 3b in C1242).

microcrack—a crack too small to be seen with the unaided eye (see crack, fracture, seam).

microfissure—a fissure that cannot be seen with the unaided eye.

monumental stone—rock of adequate quality to be quarried and cut as dimension stone as it exists in nature, as used in the monument and memorial industry.

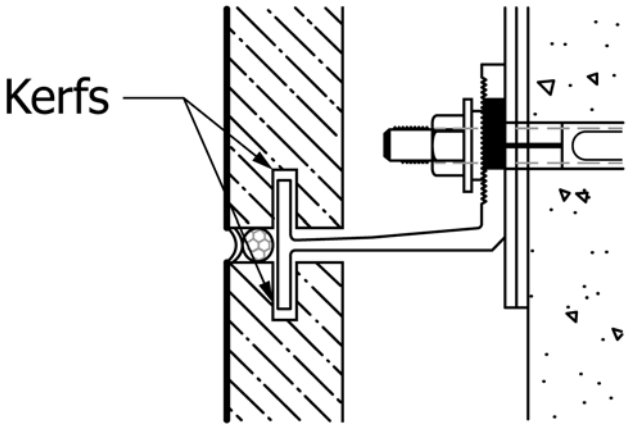

FIG. 2 Kerfs

open seams—unfilled fissures or naturally occurring cracks in stone.

panel—cut stone with face dimensions large in relation to its thickness, for placement in a building structure or frame assembly.

paving—stone used in an interior pedestrian wearing surface as in patios, walkways, driveways, and the like. (See *flooring*)

pits—small depressions, voids or pinholes in stone, especially on a finished surface.

polished finish—a surface that has high luster and strong reflection of incident light.

processing—the work involved in transforming quarry blocks into dimension stone, including sawing, drilling, grinding, honing, polishing, carving, and all other operations necessary for installation.

rebated kerf—A kerf that includes a second cut at 90 degrees to the kerf axis to accommodate the anchor configuration and prevent the anchor from interfering with movement capability at the stone joint (see Fig. 3).

resination—a cosmetic enhancement to stone slabs containing pits, fissures, cracks or other surface irregularities in which an adhesive resin of epoxy, polyester, or acrylic base has been applied to the slab face and allowed to cure prior to the polishing of the slab.

ribbon—in some slate, narrow bands of contrasting color or appearance differing in some degree in chemical composition from the main body.

rift—(*1*) a consistent direction or trend in a rock body along which the rock is most easily split or broken.

(*2*) The grain orientation in stone, particularly in sedimentary stones, showing more or less clearly how the stone was originally bedded, and with or without color or grain-size changes or voids.

rock—a naturally occurring, consolidated aggregation of one or more minerals constituting the crust of the Earth.

rustication (or reveal)—a continuous groove cut within the face or along the edge of a dimension stone panel, usually for the purpose of visually imitating or accentuating a joint location (see Fig. 4).

sample—a small part or quantity of stone, usually a slab, panel, or ashlar, that is cut from a larger block of stone.

seam—a naturally filled or bonded feature in the stone, such as a streak or a vein, which may or may not adversely affect the strength of a stone (see **crack**, **fracture**, **microcrack**).

shaped stone—dimension stone processed by carving, grinding, sawing, or other means into specific nonplanar configurations.

shop drawings—*when applied to dimension stone*, a highly detailed drawing that shows the net dimensions, joint dimensions, anchor locations and orientations, of the dimension stone and the relationship with the other building materials being used.

slab—a piece of stone produced by shaving or splitting in the first milling or quarrying operation. A slab has two parallel surfaces.

snip—the area of a stone surface from which a chip has been dislodged.

sound stone—stone which is free of cracks, fissures, or other physical defects.

spalls—(*1*) fragments or chips from a piece of dimension stone. (*2*) waste stone usually of small size from the quarrying and milling of dimension limestone.

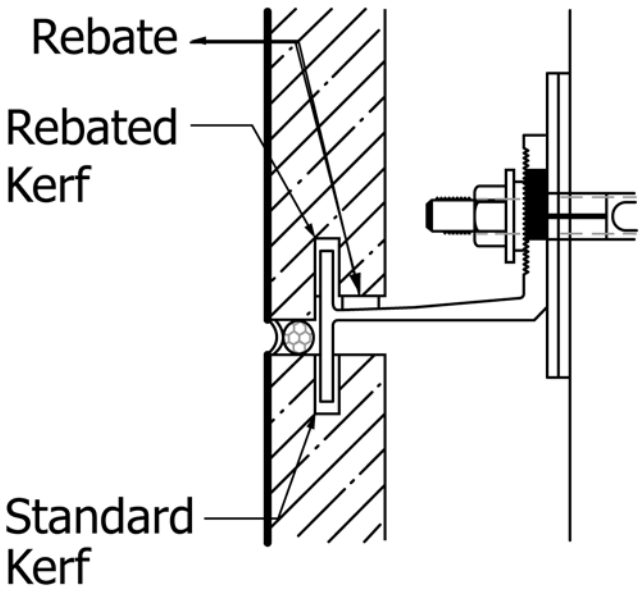

FIG. 3 Rebated Kerf

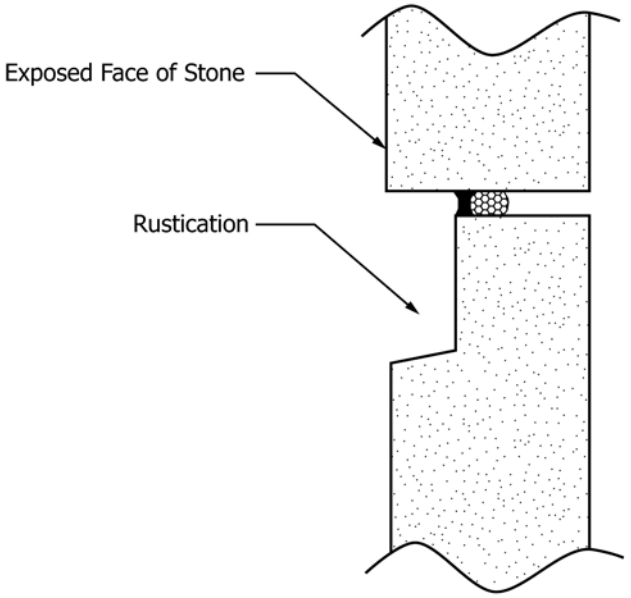

FIG. 4 Rustication

specifying authority—party requiring testing of dimension stone material.

specimen—an individual piece of stone that is cut from a sample to be used for physical or mechanical testing.

sticking—a method of repairing the butt edge of a broken piece of stone, generally done with dowels, cements, or epoxies. The pieces are "stuck" together, thus "sticking".

stone—a naturally-consolidated substance formed from minerals, geologically synonymous with rock (see *rock*, see *dimension stone* if selected or fabricated).

DISCUSSION—This term does not include any manufactured stone-like products or manmade materials that simulate stone.

texture—

(1) a modified appearance of dimension stone resulting from one or several mechanical surface treatments. Untreated stone surfaces have textural characteristics described under (*2*).

(2) that aspect of the physical appearance of a rock that is determined by size, shape, and mutual relations of the component grains or crystals. Textures related to dimension stone include *equigranular* (grains of approximately the same size); *inequigranular* (grains of markedly unequal sizes); *porphyritic* (see Note 2 under Granite Group); *interlocking* (in which grains with irregular boundaries interlock by mutual penetration); interlocking and porphyritic textures are characteristic of granites and marbles; *clastic* (naturally cemented fragmental grains but without mosaic or interlocking relations; this texture is typical of sandstones and some limestones); *mosaic* (closely packed grains with smooth to moderately irregular, noninterlocking mutual boundaries); *granoblastic* (a megascopically granular mosaic texture in which the grains are tightly compacted and the minerals are dominantly equidimensional and present irregular mutual boundaries; mosaic and granoblastic textures are characteristic of metamorphic rocks).

thermal hysteresis—the permanent, incremental deformation of certain stones due to thermal cycling, usually associated with loss of strength.

thin stone/thin veneer—a cladding under 50 mm (2-in.) thick.

tile—a thin modular stone unit.

unfading (slate)—a slate that shows no significant color change within the first year of exposure.

vein-cut, *adj*—describes stone that is cut perpendicular to the natural veining.

veining—the presence in an otherwise homogeneous stone of bands, streaks or irregular bodies of a contrasting color or appearance, and frequently having a different mineralogical composition to the predominant material. "Veining" does not apply to gneiss, commercial granite types, and slate (see *ribbon*).

veneer—a nonload-bearing facing of stone attached to a backing for the purpose of ornamentation, protection, or insulation.

DISCUSSION—Veneer shall support no vertical load other than its own weight and possibly the vertical dead load of veneer above.

*walls, veneered—*See *veneer.*

waxing—the practice of filling minor surface voids in stone with certain polyester compounds, cabinetmaker's wax, or melted shellac. (It does not refer to the application of paste wax to make the surface shinier.)

wear—the removal of material or impairment of surface finish through friction or impact.

DISCUSSION—Wear is an artificial process. The rate of wear may be affected by chemical action.

weathering—natural alteration by either chemical or mechanical processes due to the action of constituents of the atmosphere, surface water or ground water, or to temperature change.

DISCUSSION—Changes by weathering are not necessarily undesirable or harmful; rather they may enhance the texture and color of the stone.

STONE FINISHES—BY FAMILY

Every material used in construction has a finish or surface; dimension stone has a plethora of finishes. This section describes common finishes and classifies them into a number of families by relief or roughness. The finishes in each family are also arranged from the least relief to the most relief.

Stone finishes are a complex matter for a number of reasons. New manufacturing or finishing methods or variations or combinations of other methods of finishing stone are continually being developed. Stone finish names sometimes overlap or are variations of other finishes.

Finish options for any kind of stone vary by the geologic category of the stone (whether igneous, metamorphic, or sedimentary) and the unique combination of geological or physical properties of the stone type. This means that any particular finish cannot be put on every type of stone (see Applicability of Finishes for Various Stone Types Table in Guide C1528 for Selection of Dimension Stone for Exterior Use). The individual definitions are sometimes nonspecific or nearly overlap. In practice, a detailed definition of a specific stone finish is established between the producer and designer through dialogue, or reference sample(s), or both.

The family or individual title "finish" will be used uniformly throughout this section for ease of reference, although the term "surface" would be more accurate when no work has been done on it and no improvements made postquarry (as in certain rough finishes; see Note 2). "Surface" will be used uniformly in the sense of the outward appearance or face of the stone. Thus we have the Least Textured Finishes (family) and the Polished (finish)—a highly-reflective surface, and so forth.

Surface Variation

The dimensions of variation in surface profile given in the following definitions are for indicative purposes only. The values do not denote acceptable tolerances or minimum or maximum values of surface variation for any given finish.

LEAST TEXTURED FINISHES
(less than 1 mm [1⁄32 in.] of surface variation)

polished—a highly-reflective surface, produced by mechanical abrasion and buffing.

honed—a non-reflective to semi-reflective superfine satin-like surface with no surface pattern, produced by mechanical abrasion.

smooth—a non-reflective surface with a barely-visible surface pattern of random markings, produced by mechanical abrasion.

machine gauged—a process by which stone material is removed (see Note 1) to a specified thickness, incidentally resulting in a finish.

NOTE 1—The resulting coarsely ground surface can be produced by a number of methods.

hand-rubbed—a non-reflective surface with a slight stipple pattern, produced by hand-applied abrasive pads or hand-held machines.

AGED FINISHES
(less than 3 mm [⅛ in.] of surface variation)

acid-washed—a worn surface produced by applying acid.

antiqued—a worn surface produced by applying abrasive tools, sometimes in combination with acid and/or wet/dry abrasive.

tumbled—a worn surface produced by rotating stone objects (like tiles) in a drum, sometimes with sand or aggregate stone, until the faces and edges become eroded.

SAWN FINISHES
(1 mm to 5 mm [1/32 in. to 3/16 in.] of surface variation)

diamond sawn—a surface with a very low-relief pattern of linear and/or curved grooves, produced by diamond saw blades (either circular, belt, or gang).

wire sawn—a surface with a pattern of linear and/or curved grooves produced by a wire saw.

chat sawn—a surface with shallow linear grooves, produced by gangsawing with coarse chat sand.

shot sawn—a surface with random grooves and markings, produced by gangsawing with chilled steel shot.

TEXTURED FINISHES
(1 mm to 6 mm [1/32 in. to ¼ in.] of surface variation)

sandblasted—an irregular, pitted surface produced by impacting sand particles at high velocity against a stone surface.

DISCUSSION—The resulting texture will vary, depending on the stone type and the pressure and concentration of impacts. The size and depths of the pits can range from nearly invisible to very pronounced.

plucked—a machined surface with occasional pits, obtained by rough planing the stone surface, thus breaking or "plucking" out small particles.

thermal (or flamed)—a roughly textured surface produced by brief exposure to a high-temperature flame resulting in exfoliation of the stone surface.

DISCUSSION—The resulting appearance will vary, depending on the grain structure of the stone. This process may change the natural color of the stone.

bush-hammered—a uniformly textured surface with small evenly-spaced pits produced by a hand or pneumatic hammer and carbide-tipped head having numerous points.

tooled—a linear patterned surface, consisting of parallel concave grooves 3-6 mm on center (or 4, 6, or 8 grooves per in.), produced by hand or pneumatic chisel, or planer tool.

water jet—a roughly textured surface produced by exposure to a high-pressure stream of water.

DISCUSSION—The resulting texture will vary, depending on the stone type, the pressure of the water jet stream, and the nozzle speed and position as it traverses the surface of the stone.

6/8 cut (or 6/8 point)—a herringbone patterned surface, consisting of short parallel concave grooves rotated 10 to 30 degrees from each other, produced by a hand or pneumatic hammer fitted with a carbide-tipped chisel of closely-spaced blades.

ROUGH FINISHES
(3 mm [⅛ in.] or more in surface variation)

natural cleft—an irregularly textured low-relief surface, produced by splitting stone along its bedding plane, stratification, or rift.

split face—a slightly convex or concave surface, produced by hydraulic stone splitters with straight or toothed blades or by driving wedges into a stone without natural cleavage surfaces.

rock face (or rock-pitched)—a split surface that has been dressed by machine or by hand to produce a convex bold projection along the face of the stone. This finish provides a bolder, more massive appearance than split face. See Fig. 5.

NOTE 2—The above rough finishes and other less-common ones can have a different appearance when separated along the bedding, stratification, or rift, or perpendicular to it. This applies in particular to finishes sometimes called natural strata and bed face, among others.

DISCUSSION—A dimension stone finish selection and specification procedure will consider all surface finishes on a stone unit. A typical piece will be sawn to particular dimensions on six sides. A finish is often specified for more than one side. For example, a stair step may have a thermal finish on the tread side, a honed finish on the riser side, and the remaining unexposed surfaces could be left with a sawn finish.

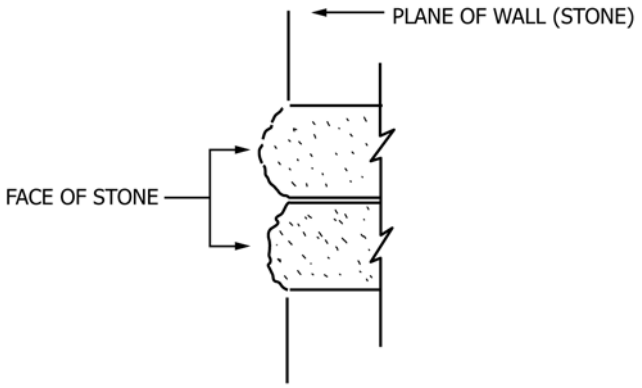

FIG. 5 Rock Face Diagram

GRANITE GROUP

granite (commercial definition)—a visibly granular, igneous rock generally ranging in color from pink to light or dark gray and consisting mostly of quartz and feldspars (Note 1), accompanied by one or more dark minerals. The texture is typically homogeneous but may be gneissic or porphyritic (Note 2). Some dark granular igneous rocks, though not geologically granite, are included in the definition (Note 3).

DISCUSSION—*Granite (scientific definition)*—A visibly granular, crystalline rock with equigranular or inequigranular texture, normally having an essential composition of two feldspars (alkali feldspar plus sodic plagioclase or two alkali feldspars (see second paragraph)) and quartz; certain granites contain only one feldspar. Quartz may amount to 10 to 60 % of the felsic (light-colored) constituents, while alkali feldspars may constitute about 35 to 100 % of total feldspars. Feldspars may be present as individual grains, or may be mutually intergrown on a megascopic to submicroscopic scale. Besides quartz and feldspars, granite typically also contains varietal minerals, commonly micas or hornblende, or both, more rarely pyroxene.

Alkali feldspar refers to a range of composition between $KAlSi_3O_8$ (potassic feldspar end member) and $NaAlSi_3O_8$ (albite end member), with 0 to 10 % of $CaAl_2Si_2O_8$ (anorthite end member). Potassic feldspar, which in granites is typically orthoclase or microcline, forms a nearly complete isomorphous series with the albite end member. The albite-anorthite compositional range, which may include as much as 10 % of $KAlSi_3O_8$ in solid solution, represents a continuous isomorphous series known as plagioclase feldspars; these have been arbitrarily subdivided according to the ration of anorthite (An) to albite (Ab) at 10, 30, 50, 70, and 90 % An. The plagioclase of granite *sensu stricto* commonly is oligoclase ($An_{10–30}$), less commonly albite ($An_{0–10}$).

DISCUSSION—*Gneiss*—A foliated crystalline rock composed essentially of silicate minerals with interlocking and visibly granular texture in which the foliation is due primarily to alternating layers, regular or irregular, of contrasting mineralogic composition. In general, a gneiss is characterized by relatively thick layers as compared with a schist. According to their mineralogic compositions gneisses may correspond to other crystalline rocks with visibly granular, interlocking texture, such as those included under the definition of commercial granite, and then may be known as *granite gneiss*, *granodiorite gneiss*, etc., if strongly foliated, and *gneissic granite*, etc., if weakly foliated. This distinction is subjective and not critical.

DISCUSSION—*Porphyritic Texture*—A texture defined by relatively large grains (phenocrysts), typically of feldspar, that are distributed in a distinctly finer-grained matrix. The phenocrysts of porphyritic granites generally are rectangular or partly rounded in outline, and may be as much as several centimetres in maximum dimension.

DISCUSSION—*Black Granites*—Dark-colored igneous rocks defined by geologists as *basalt, diabase, gabbro, diorite,* and *anorthosite* are quarried as building stone, building facings, monuments, and speciality purposes and sold as *black granite*. The chemical and mineralogical compositions of such rocks are quite different from those of true granites, but black granites nevertheless may be satisfactorily used for some of the same purposes as commercial granite. They possess an interlocking crystalline texture but, unlike granites, they contain little or no quartz or alkali feldspar. Instead, black granites are composed dominantly of intermediate to calcic plagioclase accompanied by one or more common dark rock-forming minerals such as pyroxenes, hornblende, and biotite. Such rocks, because of their relatively high content of iron and magnesium, are designated as *ferromagnesian* or *mafic*. An exception is *anorthosite* which, though commonly dark, consists mostly or entirely of calcic plagioclase.

DISCUSSION—*Iridescent Granite*—A labradoritic granite characterized by a play of colors, ranging from clearly visible to brilliant. The play of colors is caused by the intergrowth of unmixed sodium and calcium plagioclase into very fine lamellae. It is commonly referred to by names such as black pearl, blue pearl, and emerald pearl.

LIMESTONE GROUP

limestone—a rock of sedimentary origin composed principally of calcium carbonate (the mineral calcite), or the double carbonate of calcium and magnesium (the mineral dolomite), or some combination of these two minerals.

DISCUSSION—Recrystallized limestone, compact microcrystalline limestone, and travertine that are capable of taking a polish are also included in the category *commercial marble* and may be sold as either limestone or marble.

Special varieties of commercial limestone

calcarenite—a limestone composed predominantly of clastic sand-size grains of calcite, or rarely aragonite, commonly as tiny fossils, shell fragments, or other fossil debris.

DISCUSSION—Some calcarenites contain oolites (or ooliths), that is, small spherical or subspherical grains that are composed of concentric layers of calcite and typically resemble roe. Such rocks may be termed *oolitic* limestones if the oolites are present in substantial amounts. Oolitic limestones are calcarenites, but not all calcarenites are oolitic limestones. The shell fragments and small fossils of some calcarenites have concentric coatings of calcite that may cause them to resemble oolites but the term *oolitic* is not appropriate for such calcarenites unless true oolites also are present.

coquina—a limestone composed predominantly of unaltered shells or shell fragments loosely cemented by calcite.

DISCUSSION—Coquina generally is very coarse-textured and has high porosity.

dolomite—a sedimentary carbonate rock (a variety of limestone) that consists largely or entirely of the mineral dolomite.

DISCUSSION—The rock term dolomite, as applied to dimension stone, is synonymous with the term dolostone as used in sedimentary petrology.

microcrystalline limestone—a limestone that consists largely or wholly of crystals that are so small as to be recognizable only under magnification. If it is capable of taking a polish, it is classified commercially as a marble.

oolitic limestone—a limestone composed largely of the spherical or subspherical particles called oolites or ooliths.

recrystallized limestone—a limestone in which a new pattern of crystallinity has pervasively replaced the crystal orientation in the original clastic particles, fossils or fossil fragments, and interstitial cement. The new generation of crystals, encompassing both fragmental and matrix materials, extends across boundaries between former crystals. The new crystals generally are larger than those of the original rock. Evidence of original textures may or may not be retained. See also **marble** (next section).

travertine—See **travertine** in **OTHER GROUP**.

MARBLE GROUP

All stone here defined as marble must be capable of taking a polish.

Stone in this category comprises a variety of compositional and textural types, ranging from pure carbonate to rocks containing very little carbonate that are classed commercially as marble (for example, serpentine marble). Most marbles possess an interlocking texture and a range of grain size from cryptocrystalline to 5 mm.

marble (I calcite, II dolomite)[2]—carbonate rock that has acquired a distinctive crystalline texture by recrystallization, most commonly by heat and pressure during metamorphism, and is composed principally of the carbonate minerals calcite and dolomite, singly or in combination.

limestone marble—compact, dense limestone that will take a polish is classified as marble in trade practice. Limestone marble may be sold as limestone or as marble.

onyx marble—translucent, generally layered, cryptocrystalline calcite with colors in pastel shades, particularly yellow, brown, and green.

DISCUSSION—Onyx marble is formed by slow precipitation from generally cold solutions of carbonated (carbon-dioxide saturated) spring water.

DISCUSSION—The term "onyx" to designate onyx marble is a misnomer. True onyx is a nearly pure crystalline silica (silicon dioxide) closely related to agate, a semi-precious stone.

QUARTZ-BASED DIMENSION STONE GROUP

sandstone (commercial definition) (I)[3]—sedimentary rock composed mostly of mineral and rock fragments within the sand size range, from 0.06 to 2.0 mm, and having a minimum of 60 % free silica, cemented or bonded to a greater or lesser degree by materials including silica and various carbonates, with iron oxides or clay sometimes present, and which has a compressive strength over 28 MPa (4,000 psi).

quartzitic sandstone (commercial definition) (II)[3]—sandstone containing at least 90 % free silica (quartz grains plus siliceous cement), which has a compressive strength over 69 MPa (10 000 psi).

quartzite (commercial definition) (III)[3]—highly indurated, typically metamorphosed sandstone containing at least 95 % free silica, which has a compressive strength of over 117 MPa (17 000 psi).

bluestone—a dense, hard, fine-grained, commonly feldspathic sandstone of medium to dark greenish-gray or bluish-gray color that may split readily along original bedding planes to form thin slabs (flagstone). The term bluestone is applied principally to stone with the above characteristics quarried in the eastern United States. This term is also used in reference to British dolerite and Australian basalt in their respective countries.

DISCUSSION—Varieties of sandstone are commonly designated by the kind of interstitial or bonding materials, as *siliceous sandstone* (bonding material largely silica); *calcareous sandstone* (calcium carbonate as bonding material or as detrital grains, or both); *argillaceous sandstone* (a sandstone with sufficient amounts of clay present to cause only partial silica bonding of quartz grains, but still meet the criteria of sandstone definition. The integrity of this stone is very sensitive to moisture in exterior applications); *ferruginous sandstone* (a sandstone with prominent amounts of iron oxide minerals present, characteristically imparting a red-brown or brown color to the stone [*brownstone*], see Note 3). The more common commercial varieties of sandstone are defined as follows:

DISCUSSION—*sandstone (scientific definition)*—sedimentary rock composed mostly of mineral and rock fragments within the sand size range, from 0.06 to 2.0 mm, and having a minimum of 60 % free silica, cemented or bonded to a greater or lesser degree by materials including silica and various carbonates with iron oxides or clay sometimes present, and which fractures around (not through) the constituent grains.

quartzitic sandstone (scientific definition) –sandstone containing at least 90 % free silica (quartz grains plus siliceous cement), which may fracture around or through the constituent grains.

*quartzite (scientific definition)*highly indurated, typically metamorphosed sandstone containing at least 95 % free silica, which fractures conchoidally *through* the grains.

Brownstone—a dense, medium-grained stone, locally grading to conglomerate, with a distinctive dark brown to red-brown color. The term has been applied to stone quarried in the Jurassic-Triassic basins in the northeastern United States (mainly Massachusetts, Connecticut, and Pennsylvania), but the geographic limitation is undesirable.

DISCUSSION—These detrital stone types are locally quarried but are commerically unimportant:

conglomerate —a sedimentary rock consisting of rounded pebbles and cobbles in a sandstone matrix, typically strongly cemented.

siltstone—a fine-grained, noncarbonated clastic rock composed mostly of detrital quartz and clay minerals in which the particles have an approximate size range from 0.06 to 0.005 mm. Siltstone may be designated fine-grained sandstone, and is texturally transitional between sandstone and shale.

SLATE GROUP

slate—microcrystalline metamorphic rock most commonly derived from shale and composed mostly of micas, chlorite, and quartz. The micaceous minerals have a subparallel orientation and thus impart strong cleavage to the rock which allows the latter to be split into thin but tough sheets.

shale—a laminated, indurated rock which is over two-thirds clay-sized minerals. Shales progressively grade into slate. When put to slate-like uses these rocks must meet slate specifications in Specification C629.

DISCUSSION—This detrital stone type is locally quarried but is commercially unimportant.

[2] Designations I through IV correspond to Table 1 in Specification C503, for Marble Dimension Stone, Vol 04.08.

[3] Designations I through III correspond to Specification D616, for Quartz-Based Dimension Stone, Vol 04.08.

OTHER GROUP

There are a number of stones that are infrequently used. Some semiprecious stones such as jade are cut and used as dimension stone. They would most commonly be used as a contrast or accent in connection with other dimension stone. Other stones include:

alabaster—a soft, easily carved massive form of gypsum (calcium sulfate), often pleasingly blotched and stained. A banded stalagmitic calcite is also called alabaster.

greenstone—a metamorphic rock of basic or ultrabasic composition, of very fine grain size, ranging in color from medium green to yellowish green to almost black.

schist—a foliated metamorphic quartz-feldspar-containing rock characterized by thin foliae of platy or prismatic minerals such as mica or chlorite. Schists split readily along these planes of foliation. This rock exists in many graduations, some of them progressing into a gneiss.

serpentine (commercial definition)—a rock consisting mostly or entirely of serpentine (hydrated magnesium silicate), commonly greenish but can be black, red, or other colors; commonly veined with calcite, dolomite, or magnesite (magnesium carbonate) or a combination.

DISCUSSION—The stone referred to here as serpentine is called serpentinite in scientific usage to distinguish it from the mineral serpentine.

soapstone (steatite)—a talc-rich rock with a characteristic slippery feel. Soapstone is quarried for special purposes, such as fireplaces and laboratory counter tops, because of its refractory nature and resistance to acids.

travertine—a porous or cellularly layered partly crystalline calcite rock of chemical origin.

DISCUSSION—Travertine is formed by precipitation of calcite from generally hot or warm solutions of carbonated water, usually at the bottom of shallow pools. Pores and cavities commonly are concentrated in some of the layers, giving rise to an open texture.

DISCUSSION—Travertine is sometimes classified for commercial purposes as limestone because it is composed principally of calcium carbonate and is sometimes classified for commercial purposes as marble if it is capable of taking a polish.