Designation: C 503 – 08a

Standard Specification for Marble Dimension Stone[1]

This standard is issued under the fixed designation C 503; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the material characteristics, physical requirements, and sampling appropriate to the selection of marble for general building and structural purposes. Refer to Guides C 1242 and C 1528 for the appropriate selection and use of marble dimension stone.

1.2 Dimension marble shall include stone that is sawed, cut, split, or otherwise finished or shaped into blocks, slabs or tiles, and shall specifically exclude molded, cast and artificially aggregated units composed of fragments, and also crushed and broken stone.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C 97 Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone

C 99 Test Method for Modulus of Rupture of Dimension Stone

C 119 Terminology Relating to Dimension Stone

C 170 Test Method for Compressive Strength of Dimension Stone

C 241 Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic

C 880 Test Method for Flexural Strength of Dimension Stone

C 1242 Guide for Selection, Design, and Installation of Dimension Stone Anchoring Systems

C 1353 Test Method Using the Taber Abraser for Abrasion Resistance of Dimension Stone Subjected to Foot Traffic

C 1528 Guide for Selection of Dimension Stone for Exterior Use

3. Terminology

3.1 *Definitions*—All definitions are in accordance with Terminology C 119.

4. Classification

4.1 Dimension marble is classified as follows:

4.1.1 *I Calcite*.

4.1.2 *II Dolomite*.

NOTE 1—See Terminology C 119 for definitions of calcite and dolomite.

5. Soundness

5.1 Marbles are further classified into four "Soundness" groups: A, B, C, and D. Classifications are based on the properties encountered in fabrication and has no reference whatsoever to comparative merit or value. Marble is classified by its producer.

5.2 The Soundness classifications indicate what repairs may be necessary prior to or during installation, based on standard trade practices.

5.3 The groupings A, B, C, and D, should be taken into account when specifying marble, for all marbles are not suitable for all building applications. This is particularly true of the comparatively fragile marbles classified under Soundness Groups C and D, which may need additional fabrication before or during installation. Only Soundness Group A marble should be used for exterior installations, or any applications that require the stone panel to resist lateral loads or to bear weight without reinforcement.

5.3.1 The four groups are:

Group A—Sound marbles with uniform and favorable working qualities; containing no geological flaws, voids, spalls, cracks, open seams, pits or other defects.

Group B —Marble similar in soundness to Group A, but with less favorable working qualities; may have some minor small holes or voids that may require a limited amount of one or more of the following: waxing[3], sticking[4], and filling[5].

Group C—Marble with some variations in working qualities; geological flaws, voids, and lines of separation are common. It is standard practice to repair these variations by

[1] This specification is under the jurisdiction of ASTM Committee C18 on Dimension Stone and is the direct responsibility of Subcommittee C18.03 on Material Specifications.

Current edition approved Oct. 1, 2008. Published November 2008. Originally approved in 1962. Last previous edition approved in 2008 as C 503 – 08.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Waxing refers to the practice of filling minor surface imperfections such as voids or sand holes with melted shellac, cabinetmaker's wax or certain polyester compounds. It does not refer to the application of paste wax to make the surfaces shinier.

[4] Sticking describes the butt edge repair of a broken piece now generally done with dowels, cements or epoxies. The pieces are "stuck" together, thus "sticking."

[5] Filling—voids, such as those which occur naturally in marble, can be filled with polyester compounds.

TABLE 1 Physical Requirements

NOTE—The values in Table 1 were established using samples prepared according to the individual test methods. Finishes, other than those specified in the individual test methods, may result in a deviation from established values.

Physical Property	Test Requirements	Classification(s)	Test Method(s)
Absorption by weight, max, %	0.20	I, II	C 97
Density, min, lb/ft^3(kg/m^3)	162 (2595)	I Calcite[A]	C 97
	175 (2800)	II Dolomite[A]	C 97
Compressive strength, min, psi (MPa)	7500 (52)	I, II	C 170
Modulus of rupture, min, psi (MPa)	1000 (7)	I, II	C 99
Abrasion resistance, min, H_A [B,C,D]	10	I, II	C 241/C 1353
Flexural strength, min, psi (MPa)	1000 (7)	I, II	C 880

[A] See Terminology C 119 for definitions of calcite and dolomite.

[B] Pertains to light foot traffic only. On commercial or institutional stairways, floors, and platforms subject to heavy foot traffic, a minimum abrasion hardness of 12.0 is recommended. Where two or more marbles are combined for color and design effects, there should be no greater difference than 5 points in abrasion resistance.

[C] The supplier of the No. 60 Alundum abrasive, Norton, has indicated that the formula for Norton treatment 138S has been changed. The new abrasive is currrently more aggressive, resulting in lower abrasive hardness values (H_a) than when the standard was initially established. As such, care should be taken when interpreting H_a values from tests using the new abrasive, particularly with regard to current ASTM stone standard specification requirements for abrasion resistance, which were developed when the original abrasive was still in use. Committee C18 is actively studying alternatives to address this issue.

[D] Abrasion Resistance Test Method C 1353 will eventually replace Test Method C 241. It is not necessary to perform both tests. Availability of the proper equipment and materials by the testing laboratory may determine which test is performed.

one or more of the following methods: waxing[3], sticking[4], filling[5], cementing, or other forms of additional reinforcement.

Group D —Marbles similar in soundness to Group C, but containing a larger proportion of natural faults, maximum variations in working qualities, and requiring more of the same methods of finishing.[6]

6. Physical Properties

6.1 Marble supplied under this specification shall conform to the physical requirements prescribed in Table 1.

6.2 Marble for exterior dimension use shall be Soundness Group A stone, free of spalls, cracks, open seams, pits, or other defects that are likely to impair its structural integrity in its intended use.

6.3 Marble for interior use may be Soundness Group A, B, C or D.

6.4 Soundness Group B and C marbles can be reinforced, filled or cemented for use on light- to medium-duty walking surfaces and other interior applications.

6.5 Soundness Group D marbles can be reinforced, filled or cemented for use on vertical interior applications. This group may also be suitable for use in some light-to medium-duty interior pedestrian surface applications.

7. Sampling

7.1 Samples for testing to determine the characteristics and physical properties shall be representative of the marble to be used.

8. Keywords

8.1 calcite; dolomite; marble

[6] A "liner" is usually a thin slab of stone cemented to the back of a piece of finished marble for reinforcing.