Designation: C 616 – 03

Standard Specification for Quartz-Based Dimension Stone[1]

This standard is issued under the fixed designation C 616; 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.

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

1. Scope

1.1 This specification covers the material characteristics, physical requirements, and sampling appropriate to the selection of quartz-based dimension stone for general building and structural purposes.

1.2 Quartz-based dimension stone shall include stone that is sawed, cut, split, or otherwise finished or shaped, and shall specifically exclude molded, cast, or otherwise 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 1353 Test Method Using the Taber Abraser for Abrasion Resistance of Dimension Stone Subjected to Foot Traffic

3. Terminology

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

4. Classification

4.1 Quartz-based dimension stone sandstone shall be classified according to the free silica content as follows:

4.1.1 *I Sandstone*, with 60 % minimum free silica content.[3]

4.1.2 *II Quartzitic Sandstone*, with 90 % minimum free silica content.

4.1.3 *III Quartzite*, with 95 % minimum free silica content.

5. Physical Properties

5.1 Quartz-based dimension stone supplied under this specification shall conform to the physical requirements in Table 1.

5.2 Quartz-based dimension stone shall be sound, durable, and free of spalls, cracks, open seams, pits, or other defects that are likely to impair its structural integrity in its intended use.

5.3 The desired color and texture, with their permissible natural variations in material characteristics for all material to be produced for the project, shall be established by control samples. Select representative samples by viewing a sufficient number of physical samples prior to production that show the complete range of variations in color and texture of the quartz-based dimension stone specified.

6. Sampling

6.1 Samples, if required, for testing to determine the characteristics and physical properties shall be representative of the quartz-based dimension stone to be used.

[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.

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[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] Free silica consists of detrital quartz grains plus authigenic silica.

TABLE 1 Physical Requirements

NOTE—The material property 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.

Property	Test Requirements	Classifications	Test Method(s)
Absorption by weight, max, %	8	I Sandstone	C 97
	3	II Quartzitic Sandstone	
	1	III Quartzite	
Density, min, lb/ft^3(kg/m^3)	125 (2003)	I Sandstone	C 97
	150 (2400)	II Quartzitic Sandstone	
	160 (2560)	III Quartzite	
Compressive strength, min, psi (MPa)	4000 (27.6)	I Sandstone	C 170
	10000 (68.9)	II Quartzitic Sandstone	
	20000 (137.9)	III Quartzite	
Modulus of rupture min, psi (MPa)	350 (2.4)	I Sandstone	C 99
	1000 (6.9)	II Quartzitic Sandstone	
	2000 (13.9)	III Quartzite	
Abrasion resistance, min H[A,B,C]	2[D]	I Sandstone	C 241/C 1353
	8	II Quartzitic Sandstone	
	8	III Quartzite	

[A]Pertains only to stone subject to foot traffic.

[B]The supplier of the abrasive, Norton, has indicated that the formula for No. 60 Alundum abrasive (Norton Treatment 138S) has been changed. The new abrasive is currently more aggressive, resulting in lower H_a values than when the standard was initially established. As such, care should be taken when interpreting H_a test results, both with regard to this standard and with regard to historical data from the same quarry source. Committee C-18 is actively studying alternatives to deal with this issue.

[C]Abrasion Resistance Test Method C 1353 will eventually replace Test Method C 241 and 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.

[D]Not recommended for paving in areas subject to heavy foot traffic.