



Designation: C 616 – 9903

Standard Specification for Quartz-Based Dimension Stone¹

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.

¹ This specification is under the jurisdiction of ASTM Committee C-18 on Dimension Stone and is the direct responsibility of Subcommittee C18.03 on Material Specifications.

Current edition approved April 10, 1999; Dec. 1, 2003. Published July 1999; January 2004. Originally published as C 616 – 68; approved in 1968. Last previous edition approved in 1999 as C 616 – 989.

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.

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*, Vol 04.07-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,A,B,C}	2 ^D	I Sandstone	C 241/C 1353
	8	II Quartzitic Sandstone	
	8	III Quartzite	

^APertains only to stone subject to foot traffic.

^BThe 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.

^CAbrasion 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.

^DNot recommended for paving in areas subject to heavy foot traffic.

 **C 616 – 9903**

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).