Designation: C1803 – 15

Standard Guide for Abrasion Resistance of Mortar Surfaces Using a Rotary Platform Abraser[1]

This standard is issued under the fixed designation C1803; 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 guide is intended to assist in establishing procedures for determining the relative abrasion resistance of treated or untreated mortar surfaces.

1.2 This guide utilizes the rotary platform abraser, which generates a combination of rolling and rubbing to cause wear to the specimen surface. Wear can be quantified as cycles to a specific end-point. Other commonly used evaluations are presented in Appendix X1 and include mass loss, wear index, or volume loss.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

NOTE 1—Other procedures used to measure abrasion resistance of concrete surfaces include Test Methods C418, C779/C779M, C944/C944M, and C1138M. Other methods that reference the rotary platform abraser and may be of interest include Specification C744 and Test Methods C1353, D4060 and F510.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C33/C33M Specification for Concrete Aggregates

C109/C109M Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)

C125 Terminology Relating to Concrete and Concrete Aggregates

C418 Test Method for Abrasion Resistance of Concrete by Sandblasting

C744 Specification for Prefaced Concrete and Calcium Silicate Masonry Units

C779/C779M Test Method for Abrasion Resistance of Horizontal Concrete Surfaces

C944/C944M Test Method for Abrasion Resistance of Concrete or Mortar Surfaces by the Rotating-Cutter Method

C1138M Test Method for Abrasion Resistance of Concrete (Underwater Method)

C1353 Test Method for Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform Abraser

D4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

D6532 Test Method for Evaluation of the Effect of Clear Water Repellent Treatments on Water Absorption of Hydraulic Cement Mortar Specimens

F510 Test Method for Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Method

G195 Guide for Conducting Wear Tests Using a Rotary Platform Abraser

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this guide, refer to Terminology C125.

3.2 *Definitions of Terms Specific to This Guide:*

3.2.1 *abraser, n*—an instrument designed to determine the resistance of surfaces to abrasion, also referred to as an abrader.

3.2.1.1 *Discussion*—For the rotary platform abraser used in this guide, abrasion is produced by a combined action of rolling and rubbing.

3.2.2 *abrasion cycle, n*—one complete rotation of the specimen turntable platform.

3.2.3 *resurface, v*—the procedure of refreshing the running surface of an abrasive wheel.

4. Summary of Guide

4.1 Abrasion resistance of a treated or untreated mortar surface is determined by subjecting a specimen to rotary rubbing action under controlled conditions of pressure and abrasive action. The test specimen, mounted on a turntable

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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.

platform, turns on a vertical axis, against the sliding rotation of two abrading wheels. One abrading wheel rubs the specimen outward toward the periphery and the other, inward toward the center while a vacuum system removes wear debris generated during the test. The resulting abrasion marks form a pattern of crossed arcs in a circular wear path that is 12.7 mm wide, whose inner diameter is located 31.75 mm from the center of the specimen, and covers an area of approximately 30 cm^2. Unless otherwise agreed upon between the interested parties, specimens are subjected to 200 cycles or 1000 cycles with the abrading wheels being cleaned with a stiff bristle brush after every 50 cycles. The effectiveness of a treatment involves comparing treated specimens to control (untreated) specimens using the same mortar, method of preparation, and curing regimen. Resistance to abrasion is evaluated by various means, which are described in Section 11 and Appendix X1.

5. Significance and Use

5.1 Wear on mortar surfaces can be generated by a number of factors including skidding, scraping or sliding of objects on the surface, foot and tire traffic. This guide provides a means to quantify the abrasion resistance of treated or untreated mortars and other similar products.

5.1.1 This guide can be used to determine the effectiveness of fluid applied hardeners, densifiers and sealers by comparison with untreated control specimens.

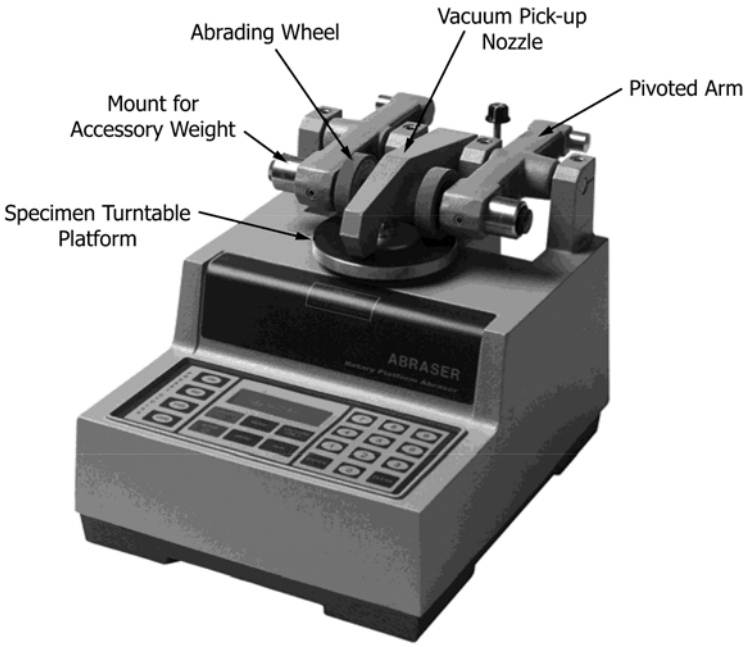
5.1.2 This guide can be used with other test methods to determine the effectiveness of surface treatments after abrasion. For example, Test Method D6532 can be used to evaluate the effectiveness of clear water repellents on hydraulic cement mortar specimens based on water absorption after water soaking, by testing the specimen prior to abrasion and after the specimen has been subjected to abrasion.

5.2 This guide may be useful for acceptance testing of a mortar surface, and it can be used to evaluate the effects of processing variables such as substrate preparation before treatment, surface texture, treatment application variables, and curing regimen.

5.3 Results may be used to correlate with in-place performance, for comparative rating of the performance of alternative materials, or for comparison among treated and untreated surfaces. The resistance of material surfaces to abrasion, as measured on a testing machine in the laboratory, is generally only one of several factors contributing to wear performance as experienced in the actual use of the material. Other factors may need to be considered in any calculation of predicted life from specific abrasion data.

5.4 The resistance of mortar to abrasion may be affected by factors including test conditions, type of abradant, pressure between the specimen and abradant, selection of mortar-making materials (mixture proportions, curing and finishing procedures), and type, kind, or amount of treatment materials.

5.5 Abrasion tests utilizing the rotary platform abraser may be subject to variation due to changes in the abradant during the course of specific tests. Depending on abradant type and test specimen, the abrading wheel surface may become clogged due to the adhesion of wear debris generated during the test to the surface of the abrasive wheel. To provide more consistent results, the abrading wheels should be cleaned and resurfaced at regularly defined intervals.



NOTE: Vacuum suction system and auxiliary weights not shown

FIG. 1 Rotary Platform Abraser