Designation: ~~D5121 – 15~~ D5121 – 22

Standard Practice for Preparation of Rock Slabs for Durability Testing[1]

This standard is issued under the fixed designation D5121; 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 practice covers the preparation of rock slabs for various tests and any visual inspections used to evaluate the durability of rock for erosion control. These tests include, but are not limited to, Test Methods ~~D5240~~D5240/D5240M, ~~D5312~~D5312/D5312M, and ~~D5313~~D5313/D5313M. This practice is appropriate for the assessment of breakwater stone, armor stone, riprap, and gabion sized rock materials.

1.2 *Units*—The values stated in SI units are to be regarded as standard. The ~~values~~ inch-pound units given in parentheses are ~~mathematical conversions to inch-pound units that are provided for information only and are not considered standard.~~for information only.

1.3 All observed and measured values shall conform to the guidelines for significant digits and rounding established in Practice D6026, unless superseded by this standard.

1.4 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

1.5 *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~~ safety, health, and ~~health~~environmental practices and determine the applicability of regulatory limitations prior to use.* For a specific hazards statement, see Section 7.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

[1] This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.17 on Rock for Erosion Control.

Current edition approved ~~July 1, 2015~~Jan. 1, 2022. Published ~~July 2015~~January 2022. Originally approved in 1990. Last previous edition approved in ~~2006~~2015 as D5121~~–10.~~–15. DOI: ~~10.1520/D5121-15.~~10.1520/D5121-22.

[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.

***A Summary of Changes section appears at the end of this standard**

D4992 Practice for Evaluation of Rock to be Used for Erosion Control
~~D5240~~D5240/D5240M Test Method for Evaluation of the Durability of Rock for Erosion Control Using Sodium Sulfate or Magnesium Sulfate
~~D5312~~D5312/D5312M Test Method for Evaluation of Durability of Rock for Erosion Control Under Freezing and Thawing Conditions
~~D5313~~D5313/D5313M Test Method for Evaluation of Durability of Rock for Erosion Control Under Wetting and Drying Conditions
D6026 Practice for Using Significant Digits and Data Records in Geotechnical Data

3. Terminology

3.1 *Definitions*—For definitions of common technical terms used in this standard, refer to Terminology D653.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *rock saw, n*—a saw capable of cutting rock. The term "rock saw" shall include the blade which saws the rock, any components that control or power the sawing process or both, and framework on which the blade and any other associated components are mounted.

3.2.1.1 *Discussion—*
A rock saw may be a water-cooled diamond blade or diamond wire saw.

3.2.2 *slab, n*—a section of rock having two smooth, approximately parallel faces, produced by two saw cuts. The thickness of the slab is generally less than the other dimensions of the rock. The slab will be the specimen of a rock which will subsequently undergo durability tests.

3.2.3 *slice, n—in rock testing*, the smooth surface of rock piece produced by the cutting of the rock by a rock saw.

3.2.4 *gabion-fill stone, n*—stone generally less than 25 kg (50 lb) and placed in baskets of wire or other suitable material. These baskets are then tied together to form an integral structure designed to resist erosion along stream banks and around bridge piers.

4. Significance and Use

4.1 This practice is used to prepare rock specimens for durability testing and to evaluate any internal defects, such as cracks, that may not be apparent on the surfaces of broken blocks of rock. Such evaluation can also aid in the selection and location of slabs for testing as outlined in Practice D4992. In some cases, the need for further testing or evaluation may be eliminated.

4.2 The sawing of rock samples will reduce them to a suitable specimen size and quantity for testing and, in many cases, preserve the natural structure of the internal defects so the samples can be evaluated by the various durability tests.

4.3 Durability tests specimens should be 65 ± 5 mm (2.5 ± 0.25 in) thick normal to bedding or any potential planes of weakness which may be observed in the samples. In no case will the size of the slab be less than 125 mm (5 in.) on a side, excluding the thickness Ideally, a test specimen size equal to the proposed design size would provide the ultimate in correlation between laboratory tests and actual field performance. However, in most cases, this is neither practical nor economically feasible.

NOTE 1—The quality of the result produced by this standard is dependent upon the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice D3740 does not in itself assure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluation some of those factors.

5. Apparatus

5.1 *Rock Saw*—~~Any laboratory~~ Laboratory diamond ~~saw~~saws used to cut geological and concrete specimens, ~~or a~~ diamond ~~saw~~saws used for lapidary purposes, ~~shall be acceptable. A~~ and diamond wire saws, are acceptable. For saws using a blade, minimum blade diameter of 35 cm (14 in.) will be needed to obtain the required slab (a larger blade is preferable). ~~The blade shall be~~ Use a circular diamond blade. The size of the slab that can be obtained by sawing is limited by the blade-stabilizing flanges. Table 1 gives the approximate blade diameter and slab height relationships for saws typically used.

5.1.1 The rock saw apparatus shall have a vise to hold the samples during the cutting process, in addition to an automatic feed

TABLE 1 Approximate Blade Diameter and Slab Height Relationship

Blade Diameter, Nominal, ~~cm~~ (in.)	Slab Height, Nominal, ~~cm~~ (in.)
~~35 (14)~~	~~15 (6)~~
~~45 (18)~~	~~20 (8)~~
~~60 (24)~~	~~25 (10)~~

TABLE 1 Approximate Blade Diameter and Slab Height Relationship

Blade Diameter, Nominal, mm (in.)	Slab Height, Nominal, mm (in.)
350 (14)	150 (6)
450 (18)	200 (8)
600 (24)	250 (10)

(either gravity, hydraulic, or screwfeed operated) that controls the cutting action. A table saw with a removable vise is also acceptable. The saw shall have a platform to prevent the cut slab from falling and shattering.

5.2 *Camera*—A video or still camera capable of producing good quality, color images for taking pictures of the rock sample and specimens before and after slab cutting.

5.3 *Photographic Scale*—A scale of appropriate dimension and division when compared to the field of view and the detail being studied. When selecting a scale, always choose the scale that will provide at least as precise a measurement as the system that will be measuring the photographic information. If the system has a precision to one ~~millimetre,~~millimeter, make sure the scale used is accurate and precise to at least one ~~millimetre~~millimeter across the entire scale.

6. Materials

6.1 *Coolant*—Water shall be used as a coolant between the rock surface and the saw blade during the cutting process. Coolants other than water may interfere with subsequent testing or evaluation, or both.

6.2 *Wash*—Water shall be used for washing samples and specimens. Washing with something other than water may interfere with subsequent testing or evaluation or both.

7. Hazards

7.1 Circular, diamond saw blades do not have sharp protruding teeth that wood-cutting blades have, and as such are not inherently as dangerous as blades with teeth. However, their use does require care, safe handling procedures, and proper safety equipment.

7.2 During the sawing action rock cuttings may become projectiles and potentially harm eyes. Also, blades have been known to stick or bind and the object being cut or the blade may become a projectile.

7.3 Use appropriate personal protective equipment, such as safety glasses, face shield, and protective screen on the saw.

8. Procedure

8.1 Choose individual rock samples for testing that are representative of the total rock mass, as noted in Practice D4992. The sample shall be of a size to fit within the vise of the saw without further mechanical reduction of size.

NOTE 2—Test specimens may also be prepared by cutting a 65 mm (2.5 in.) thick slab from a 150-mm (6-in.) diameter drill core such that any apparent zones of weakness are included

8.2 Clamp the rock sample in the vise, or hand-hold it on the saw table such that the rock sample will be sawn perpendicular to the bedding or banded texture of the rock, unless another orientation is specified for the saw cut.

8.3 Cut the sample in a single pass between the midpoint of the rock and one-third of the distance from its edge. Make the cut either by: (*1*) automatically feeding the sample within the vise through the blade, or (*2*) hand-holding and hand-feeding soft rocks