**Designation: ~~C120/C120M – 15~~ C120/C120M – 15a**

# Standard Test Methods ~~of~~ for Flexure Testing of ~~Slate (Breaking Load, Modulus of Rupture, Modulus of Elasticity)~~Structural and Roofing Slate[1]

This standard is issued under the fixed designation C120/C120M; 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.

## INTRODUCTION

~~Due to the unique properties of slate, the flexure test is better adapted to use for strength and elasticity determinations than either compression or tension tests. Furthermore, several uses of slates are such that these determinations are of special interest and value, besides furnishing comparative data.~~

~~The property of slate termed "grain" causes a slab of the material to break transversely in one direction somewhat more readily than at right angles to this direction. For this reason it is desirable to test the strength and elasticity both parallel and perpendicular to the grain.~~

Breaking load test results ~~for samples~~ of roofing slate under this test method are only valid for the commercial supply of slates of that thickness or greater. For the commercial supply of thinner ~~roofings~~roofing slates, testing on samples of the minimum specified thickness must be conducted.

When comparing roofing slates of equal thickness, but from various sources, slates which meet the required breaking load at the lowest specimen thickness will yield the best performance on the roof in terms of resistance to impact damage.

The reliability of the data produced under this test method is largely influenced by the care and protocol used in obtaining and preparing the test specimens.



## ~~1. Scope~~

~~1.1 These test methods cover determination of the breaking load, modulus of rupture and modulus of elasticity of slate by means of flexure tests.~~

~~1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.~~

~~1.3 *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]~~
~~C119 Terminology Relating to Dimension Stone~~
~~C1799 Guide to Dimension Stone Test Specimen Sampling and Preparation~~

## ~~3. Terminology~~

~~3.1 *Definitions*—All definitions are in accordance with Terminology C119.~~

[1] These test methods are under the jurisdiction of ASTM Committee C18 on Dimension Stone and are the direct responsibility of Subcommittee C18.01 on Test Methods.
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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.

## 4. Significance and Use

4.1 These test methods are useful in indicating the differences in flexure (breaking load, modulus of rupture, modulus of elasticity) between various slates. These test methods also provide one element in the comparison of slates.

## 5. Apparatus

5.1 *Testing Machine*—The accuracy of the testing machine shall be within 1 % for the range from 10 to 1000 lbf [50 to 5000 N].

5.2 *Load Application and Support Blocks*—The supports for the specimen shall be of the rocker type (Fig. 1) with the edges at least as long as the width of the specimen. The load application block may be of either the rocker or rigid type. The portions of the load application and support blocks contacting the stone shall be rounded, with a nominal radius of ½ in. [13 mm].

## 6. Sampling

6.1 Select the sample to represent a true average of the type or grade of stone under consideration and of the quality supplied to the market under the type designation to be tested. The sample may be selected by the purchaser or his authorized representative from the quarried stone or taken from the natural ledge and shall be of adequate size to permit the preparation of the desired number of test specimens. When perceptible variations occur, the purchaser may select as many samples as are necessary for determining the variations in flexure (breaking load, modulus of rupture, modulus of elasticity).

NOTE 1—Refer to Guide C1799 for additional information on selecting, preparing, and conditioning test specimens.

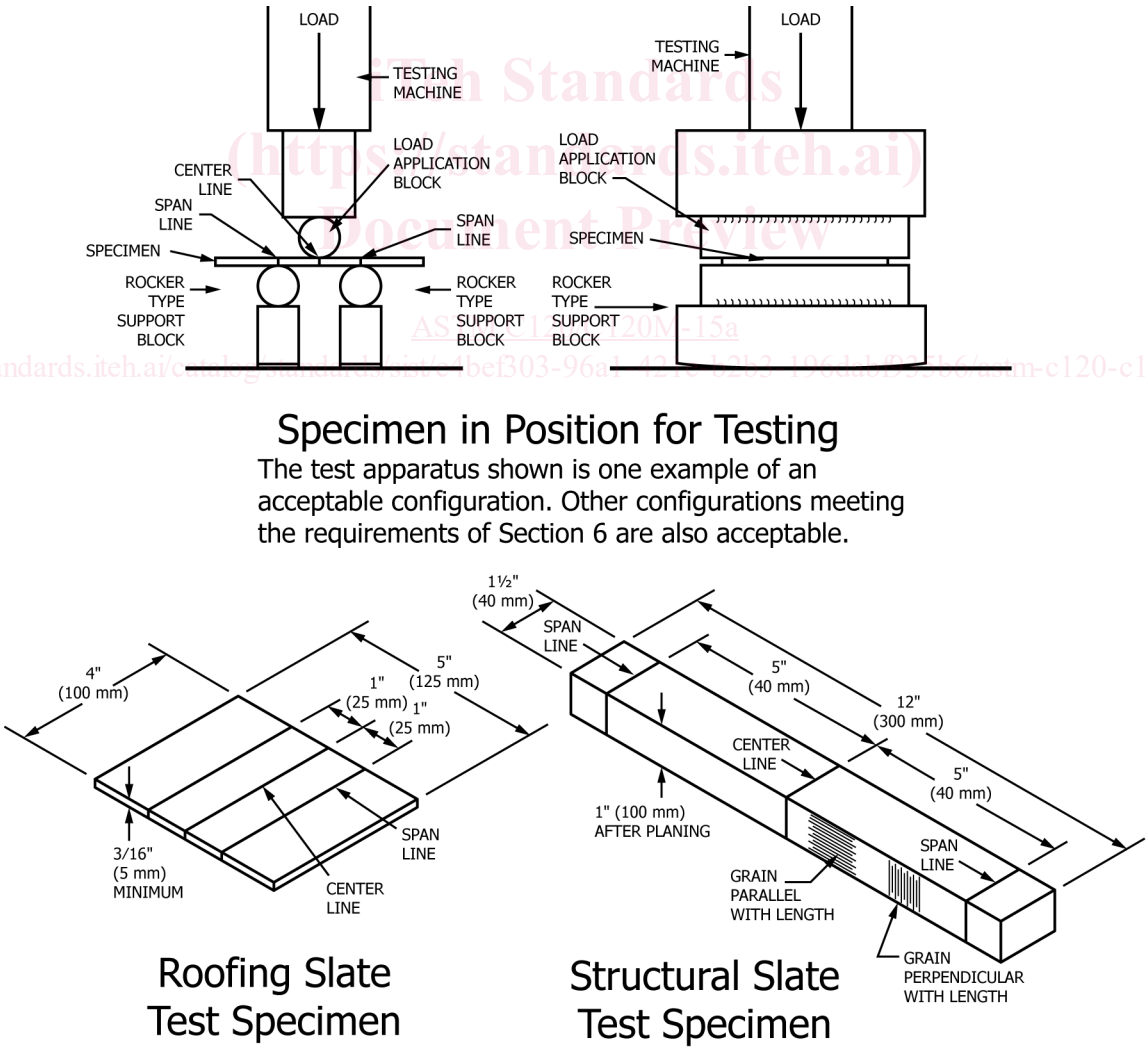


**FIG. 1 Specimens and Preferred Type of Loading Application and Support Blocks for Determining the Breaking ~~Load, Modulus of Rupture~~ Load and Modulus of ~~Elasticity~~Rupture of Slate**

~~BREAKING LOAD AND MODULUS OF RUPTURE~~

~~7. Test Specimens~~

~~7.1 *Structural or Electrical Slate*—Six representative specimens, 12 by 1½ by 1 in. [300 by 40 by 25 mm] in size, of the particular slate under consideration shall be tested.~~

~~7.2 *Roofing Slate*—At least ten specimens 4 in. [100 mm] in width, 5 in. [125 mm] or greater in length and minimum 3⁄16 in. [5 mm] thick.~~

## 1. Scope

1.1 These test methods cover determination of the breaking load of roofing slate and modulus of rupture of structural slate by use of simple three-point loading.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 *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.*

~~8. Preparation of Specimens~~

~~8.1 *Structural or Electrical Slate*—Split the slate for the test to a thickness of approximately 1¼ in. [30 mm] and then saw into strips 12 in. [300 mm] in length by 1½ in. [40 mm] in width. Cut half of these with the length parallel to the grain and half with the length perpendicular to the grain. Plane or rub down the 12 by 1½-in. [300 by 40-mm] faces to a thickness of approximately 1 in. [25 mm], taking care to have the finished surfaces as nearly parallel as practicable.~~

~~8.2 *Roofing Slate*—Cut one 4 by 5-in. [100 by 125-mm] specimen from each of a minimum 10 shingles. The saw blade shall be a continuous rim, diamond impregnated type, mounted to a water-cooled sliding bed saw capable of making a clean cut with no lacerated edges. Cut no part of the specimen nearer than 1 in. [25 mm] to a sheared edge or nail hole. The 5 in. [125 mm] or longer dimension is to be measured and cut parallel with the long dimension of the slate shingle. Do not resurface the split faces.~~



## 2. Referenced Documents

2.1 *ASTM Standards:*[2]

C119 Terminology Relating to Dimension Stone
C406 Specification for Roofing Slate
C629 Specification for Slate Dimension Stone
E4 Practices for Force Verification of Testing Machines
E145 Specification for Gravity-Convection and Forced-Ventilation Ovens



## 3. Terminology

3.1 *Definitions*—All definitions are in accordance with Terminology C119.

## 4. Summary of Test Method

4.1 Prepared and conditioned test specimens are placed on two support blocks in a test stand and loaded vertically at their center point by a third block.

## 5. Significance and Use

5.1 These test methods are useful in indicating the differences in flexure (breaking load, modulus of rupture) between various slates. These test methods also provide one element in the comparison of roofing slates under Specification C406 and structural slates under Specification C629.

## 6. Apparatus

6.1 *Ventilated Oven*—Conforming to the requirements of the applicable sections of Specification E145, and capable of maintaining a temperature of 140 ± 4°F (60 ± 2°C) and large enough to accommodate the test specimens.

6.2 *Testing Machine*—(see Fig. 1), conforming to the requirements of the applicable sections of Practices E4. The three-point loading method shall be used in conducting flexure tests employing support and loading blocks that will ensure that forces applied to the beam sill be vertical only and applied without eccentricity. The apparatus should be capable of maintaining the span length and distances between the loading block and support blocks within ±0.05 in. (±1 mm). The load should be capable of being