



Designation: C 1101/C1101M – 95

# Standard Test Methods for Classifying the Flexibility or Rigidity of Mineral Fiber Blanket and Board Insulation<sup>1</sup>

This standard is issued under the fixed designation C 1101/C1101M; 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 These test methods cover the procedures for the classification of mineral fiber insulation as flexible, resilient flexible, semirigid, or rigid.

1.2 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other.

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:

C 168 Terminology Relating to Thermal Insulating Materials<sup>2</sup>

## 3. Terminology

3.1 *Definitions*—Terminology C 168 shall be considered as applying to the terms used in these test methods.

## 4. Significance and Use

4.1 Classification of insulation relative to flexibility or rigidity is useful in establishing installation and application characteristics.

## 5. Apparatus

5.1 *Iron Pipe*, ½-in. NPS (outside diameter 0.840 in. [21.3 mm]) measuring at least 12 in. [305 mm] in length.

5.2 *Rigidity Tester*, consisting of two horizontal, parallel, ½-in. NPS iron pipe supports (outside diameter 0.840 in. [21.3 mm]) at least 24 in. [610 mm] long and spaced 30 in. [762 mm] apart and horizontally to each other.

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee C-16 on Thermal Insulation and are the direct responsibility of Subcommittee C16.32 on Mechanical Properties.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.06.

## 6. Sampling

6.1 A test sample shall consist of one representative package of insulation. One test specimen measuring 12 in. by 12 in. [305 by 305 mm] and of full thickness shall be randomly cut from the sample for flexibility testing. If the rigidity portion of the procedure is to be performed, a test specimen measuring 32 in. [813 mm] long, and between 6 and 24 in. [152 and 610 mm] wide, and of full thickness shall be randomly cut from the sample.

## 7. Procedure

7.1 *Test for Flexibility*—Bend the 12 by 12-in. [305 by 305-mm] piece of insulation over the ½ in. NPS iron pipe through an angle of 90° and examine the outer surface for visible rupture.

7.2 *Test for Resilient Flexibility*—If no rupture occurs after undergoing the 90° bending in 7.1, release the bent insulation.

7.3 If the insulation is not classified as flexible or resilient flexible, it should be tested in accordance with 7.4 to determine the degree of rigidity.

7.4 *Test for Semirigidity and Rigidity*—Place the 32 in. [813 mm] long piece of insulation on the two horizontal, parallel, ½-in. NPS iron pipe supports spaced 30 in. [762 mm] apart. After 5 min have elapsed, measure the sag of the insulation to the nearest 0.05 in. [1.3 mm] at the center of the span, from a straight line connecting two points on the insulation's surface directly above the supports.

## 8. Interpretation of Results

8.1 *Test for Flexibility*—If there is no visible rupture, classify the material as flexible.

8.2 *Test for Resilient Flexibility*—If the insulation is classified as flexible in accordance with 8.1 and it springs back to its original form when it is released, classify it as resilient flexible.

### 8.3 Test for Semirigidity:

8.3.1 If the sag is greater than ½ in. [13 mm], the product is classified as semirigid.

8.3.2 If the test material fails to remain suspended, it is neither semirigid nor rigid and must be classified by the flexibility test as flexible or resilient flexible.

8.4 *Test for Rigidity*—If, after undergoing the test in 7.4, the sag is ½ in. [13 mm] or less, the product is classified as rigid.

8.5 Due to the accuracy of the sag measurements, at the

rigid-semirigid break point of ½ in. [13 mm], there is an uncertainty of 0.05 in. [1.3 mm]. Therefore, for sag measurements in this “gray area,” the test may not be valid. Greater accuracy may be attained by taking very careful sag measurements or by repeating the test several times.

## 9. Precision and Bias

9.1 The precision and bias for the procedure in Test Methods C 1101/C 1101M for classifying the flexibility or rigidity of mineral fiber blanket and board are being determined.

9.2 The precision of these test methods is not known because inter-laboratory data are not available. These test methods may not be suitable for use in specifications or in case of disputed results as long as these data are not available.

## 10. Keywords

10.1 flexibility; mineral fiber; resilient flexibility; rigidity; semirigidity; thermal insulation

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