



# 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/C 1101M; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

## 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:*<sup>2</sup>

**C 168** Terminology Relating to Thermal Insulation

## 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.

## 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 shall 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:*

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

Current edition approved Nov. 1, 2006. Published Nov. 2006. Originally approved in 1988. Last previous edition approved in 2000 as C 1101/C 1101M – 00.

<sup>2</sup> 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.

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 inaccuracy of the sag measurement, there is an uncertainty of 0.05 in. [1.3 mm]. Therefore, for sag measurements at the rigid-semirigid determination point, a

greater number of sample measurements is necessary in order to make a valid determination of rigidity.

## 9. Precision and Bias

9.1 No information is presented about either the precision or bias for Test Methods C 1101/C 1101M for classifying flexibility or rigidity since the test results are nonquantitative.

## 10. Keywords

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

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