



Designation: **C1809—15** **C1809 – 16**

# Standard Practice for Preparation of Specimens and Reporting of Results for Permeance Testing of Pressure Sensitive Adhesive Sealed Joints in Insulation Vapor Retarders<sup>1</sup>

This standard is issued under the fixed designation C1809; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This practice provides instruction for the preparation of test specimens of pressure sensitive adhesive (psa) sealed joints of the type employed in insulation vapor retarder systems, for subsequent testing per Test Methods E96/E96M to determine the water vapor permeance (“permeance”) of those joints. It does not cover preparation of other types of joints.

1.2 This practice also provides requirements for the content of reports issued in conjunction with Test Methods E96/E96M testing of these joints.

1.3 Joints are made with factory coated psa tapes or psa coated laminate jacket (vapor retarder cladding) materials.

1.3.1 The types of materials and joints to be tested are generally encountered in mechanical systems in commercial and industrial insulation applications, and in HVAC systems insulation.

1.3.2 Typical psa joints that are employed in vapor retarder systems for mechanical insulation include:

1.3.2.1 Overlap with double-sided tape.

1.3.2.2 Overlap with coated laminate jacket.

1.3.2.3 Butt with single-sided insulation tape.

1.3.2.4 Intersection of overlap and butt joint.

1.4 Test Methods E96/E96M is to be followed for specific testing instruction beyond the areas of guidance provided herein, that is, after the specimens are prepared in the desired test configuration.

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

1.6 *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>

C1775 Specification for Laminate Protective Jacket and Tape for Use over Thermal Insulation for Outdoor Applications

E96/E96M Test Methods for Water Vapor Transmission of Materials

C168 Terminology Relating to Thermal Insulation

## 3. Terminology

3.1 *Definitions:*

3.1.1 *laminate jacket*—see Specification C1775.

3.1.2 *water vapor permeance, water vapor barrier*—see Terminology C168.

3.2 *Definitions of Terms Specific to This Standard:*

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.40 on Insulation Systems. Current edition approved April 15, 2015; March 1, 2016. Published May 2015; April 2016. Originally approved in 2015. Last previous edition approved in 2015 as C1809 – 15. DOI: 10.1520/C1809-15; 10.1520/C1809-16.

<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.

3.2.1 *pressure sensitive adhesive, n*—an adhesive that requires some degree of pressure, and only pressure, to adequately bond to a substrate.

3.2.2 *SSL tape, n*—A pressure sensitive, double-sided “Self Sealing Lap” tape that is commonly used to seal the longitudinal overlap joint in pipe insulation jacketing.

#### 4. Summary of Practice

4.1 Specimen preparation as directed herein addresses configuration and sealing of psa joints for subsequent permeance testing.

4.2 The permeance test itself is performed per Test Methods **E96/E96M**.

#### 5. Significance and Use

5.1 PSA joints are a necessary and critical component of an insulation vapor retarder system and, in addition to knowing the permeance of the vapor retarder being used, assessing the permeance of the joints is necessary to indicate the expected performance of the system.

5.2 Test Methods **E96/E96M** does not include instructions specific to preparing multiple-piece assemblies such as psa joints. This practice provides those instructions.

5.3 There are a number of variables involved in making a psa joint, and those need to be considered in specimen preparation and data reporting. Such variables include:

5.3.1 Means of applying pressure to seal the joint,

5.3.2 Amount of pressure applied,

5.3.3 Dwell time prior to test,

5.3.4 Backing surface upon which joint is prepared,

5.3.5 Ambient conditions for specimen preparation,

5.3.6 Dimensions of materials,

5.3.7 Configuration of joint,

5.3.8 Dish size,

5.3.9 Test area of specimen, and

5.3.10 Area of joint.

5.4 It is not likely that field-installed joints will achieve as good a seal as those prepared in the laboratory. Field installations can involve extremes in ambient conditions, surface contamination, limited space, varying pipe radii, varying pressure applied, and variation in base insulation density and rigidity.

5.4.1 Results obtained through application of this practice and Test Methods **E96/E96M** are best used to compare materials and configurations. It is urged not to equate actual field performance with the results obtained in a laboratory setting.

#### 6. Procedure

6.1 Use an aluminum test dish with nominal outside diameter of 6 in. (152 mm) and specimen template with nominal outside diameter of 5.75 in. (146 mm).

6.2 Use a wax damming plate that produces an exposed specimen test surface diameter of 5.25 in. (133.5 mm).

6.3 Prepare specimens on a flat, smooth, hard and rigid surface, such as laboratory bench top, under standard conditions of 73°, ± 2°F (23°, ± 0.7°C) and 50 ± 5% RH.

6.4 ~~For butt joints, position the tape centered over two adjacent sheets of vapor retarder (see Fig. 1).~~ Butt Joints:

6.4.1 ~~Position the tape centered over two adjacent sheets of vapor retarder (see Fig. 1).~~ Position the tape centered over two adjacent sheets of vapor retarder (see Fig. 1).

6.4.2 ~~Separate the two sheets by a gap of 0.5 in. (12 mm) to duplicate a nominal field installation gap-gap, centered in the dish.~~

6.4.3 ~~Apply a 3 in. (76mm) (76 mm) wide tape, centered over the gap.~~

6.5 ~~For overlap Self-Seal Laps (SSL), or for overlap cladding joints, position the tape and vapor retarder sheets, or cladding sheets, so that there is a 1 inch (25 mm) overlap (see Fig. 2).~~ Self-Sealing Overlap Joints:

6.5.1 ~~Position the tape and vapor retarder sheets, or cladding sheets, so that there is a 1 in. (25 mm) overlap (see Fig. 2).~~ Position the tape and vapor retarder sheets, or cladding sheets, so that there is a 1 in. (25 mm) overlap (see Fig. 2).

6.5.2 ~~Center the exposed edge in the dish.~~ Center the exposed edge in the dish.

6.6 ~~For combination butt and lap joints (as with pipe insulation), first prepare a sheet with the lap joint then cut it in half, perpendicular to the joint. Make a butt joint per 6.3 with the two resulting sheets.~~ Overlap Seams with Single-Sided Tape Covering:

6.6.1 ~~Overlap the vapor retarder by 1 in. (25 mm) with exposed lap edge centered in dish.~~ Overlap the vapor retarder by 1 in. (25 mm) with exposed lap edge centered in dish.

6.6.2 ~~Center a 3 in. (75 mm) single-sided tape over the exposed lap edge (see Fig. 3).~~ Center a 3 in. (75 mm) single-sided tape over the exposed lap edge (see Fig. 3).

6.7 In all cases, make the vapor retarder sheet somewhat larger than the test specimen dimensions, then trim to correct size after making joint(s).

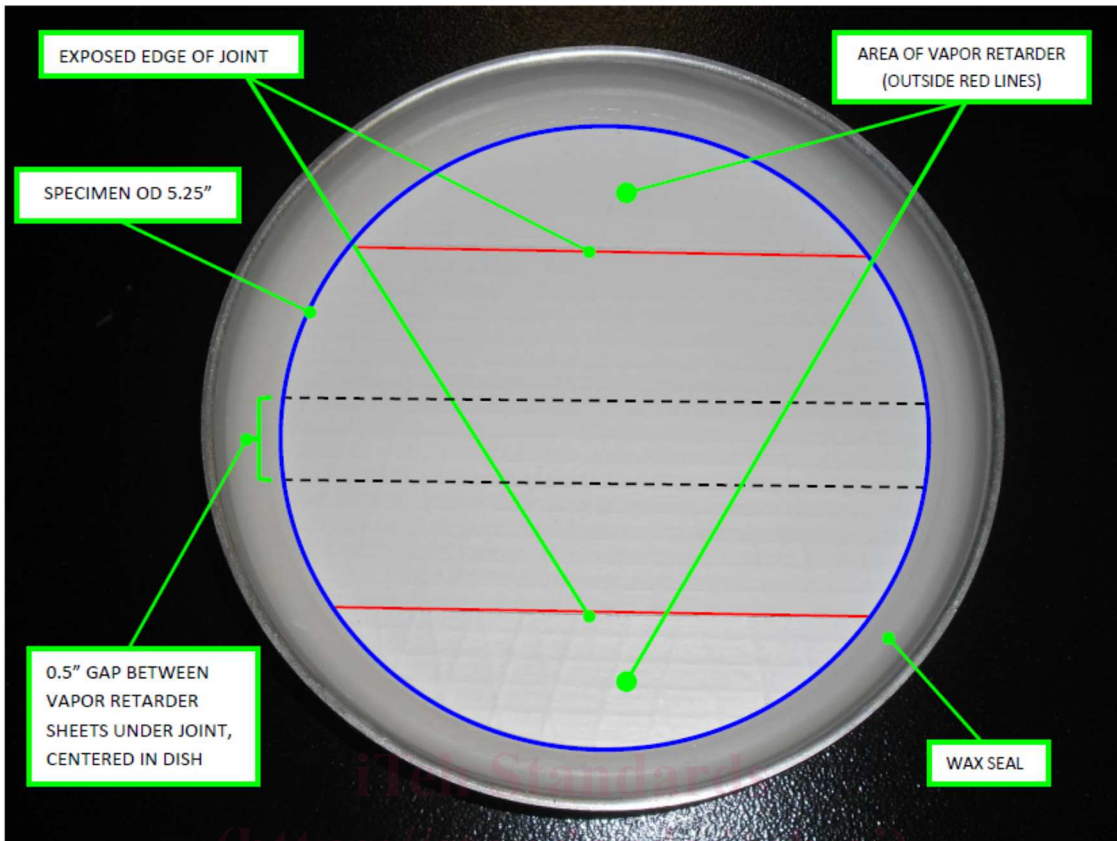


FIG. 1 Butt Joint Seam with a 3 in. Single-sided Tape Covering

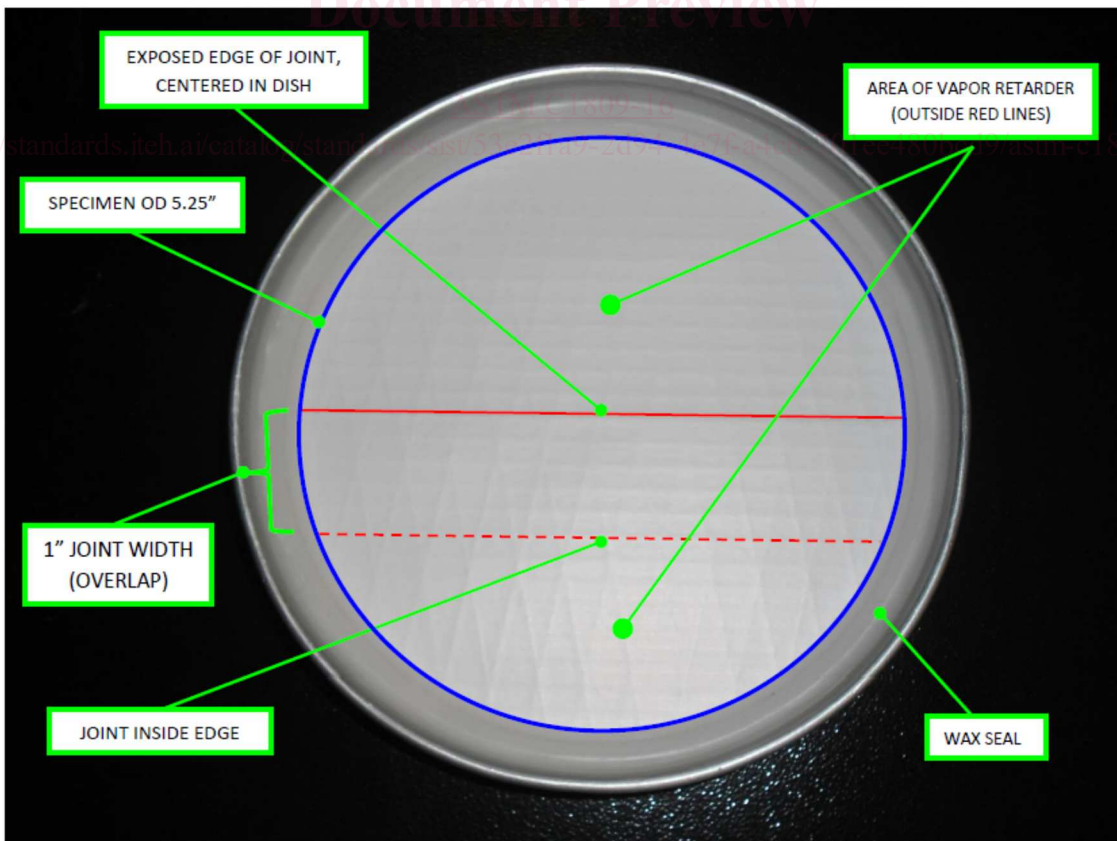


FIG. 2 1 in. Overlap Seam with Double-Sided Tape (SSL), or PSA Coated Cladding