Designation: C1639 – 16

Standard Specification for Fabrication Of Cellular Glass Pipe And Tubing Insulation[1]

This standard is issued under the fixed designation C1639; 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 specification covers fabrication techniques for cellular glass block into billets to fabricate pipe and tubing insulation. All materials shall be in accordance with Specification C552.

1.2 The purpose of this specification is to optimize the thermal performance of installed cellular glass insulation systems. This is best achieved by limiting the number of joints, in particular through joints.

1.3 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.

1.4 *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]

C168 Terminology Relating to Thermal Insulation

C450 Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping, and Vessel Lagging

C552 Specification for Cellular Glass Thermal Insulation

C585 Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing

D312 Specification for Asphalt Used in Roofing

2.2 *ASTM Adjuncts:*[3]

ADJC0450A ASTM Recommended Dimensional Standards for Fabrication of Thermal Insulation Fitting Covers

3. Terminology

3.1 Terminology C168 shall be considered as applying to the terms in this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *billet / bun*—a single piece of insulation made up from a number of smaller blocks held together with an adhesive.

3.2.2 *lags*—pieces of insulation typically curved or tapered used for insulating pipes, tanks and other cylindrical equipment.

3.2.3 *precision cut V-grooved pipe insulation, n*—rigid insulation pieces cut into 4-sided polygons, of two parallel surfaces and two non-parallel surfaces of equal angles = 180° / *N*, such that when *N* number of these sections are assembled, they form an approximate circle and can be installed around a pipe.

3.2.3.1 *Discussion*—The adjective precision refers to the fact that when these *N* sections are installed onto a pipe, they fit exactly with no appreciable gaps between sections.

3.2.4 *bond joint, n*—the joint formed by the adhered mating surfaces of several thicknesses of cellular glass block or fabricated cellular glass insulation pieces that are used to create a cellular glass insulation billet, bun, or pipe and tubing insulation segments. See Fig. 1.

3.2.4.1 *Discussion*—A bond joint is created during the fabrication of cellular glass pipe and tubing insulation and is made with a full depth (100 % coverage) of an approved adhesive. (See 3.2.1 and 8.4).

3.2.5 *fabrication joints – see bond joint, n*—the joint between adhered mating surfaces of cellular glass pipe and tubing insulation segments formed by fabricated segments or sections of cellular glass insulation that are assembled in the fabrication shop, facility, or jobsite, to produce the cellular glass pipe and tubing insulation. See Figs. 2-4.

3.2.5.1 *Discussion*—A fabrication joint is created at a fabrication shop or facility and is made with a full depth (100 % coverage) of an approved adhesive.

3.2.6 *field joints, n*—mating surfaces of cellular glass insulation created during the installation process.

3.2.6.1 *Discussion*—Field joints shall be formed with full depth adhesive, full depth of sealant or from the mating surfaces of the cellular glass insulation.

[1] This specification is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.40 on Insulation Systems.

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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.

[3] Available from ASTM International Headquarters. Order Adjunct No. ADJC0450A.

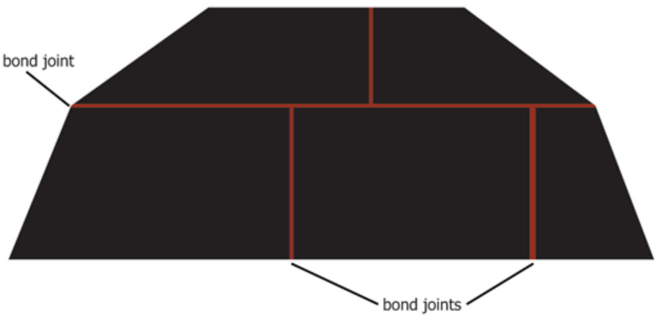

FIG. 1 Cellular Glass Insulation Billet

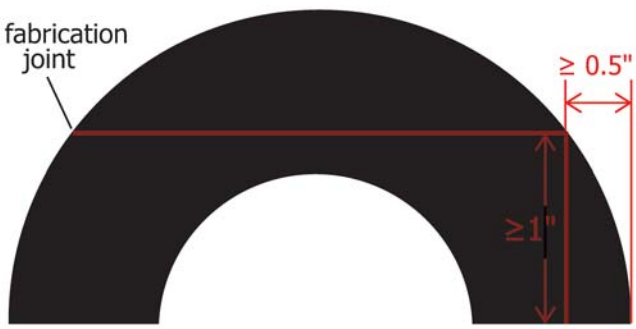

FIG. 2 Non-through Joints

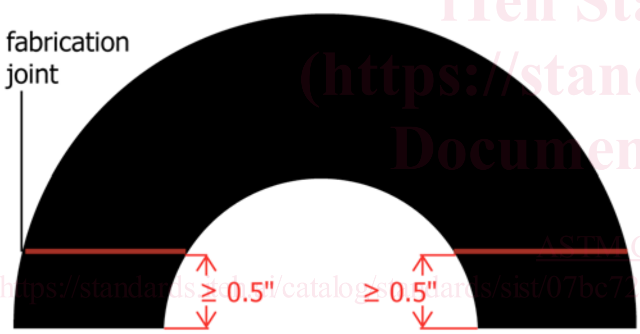

FIG. 3 Through Joints

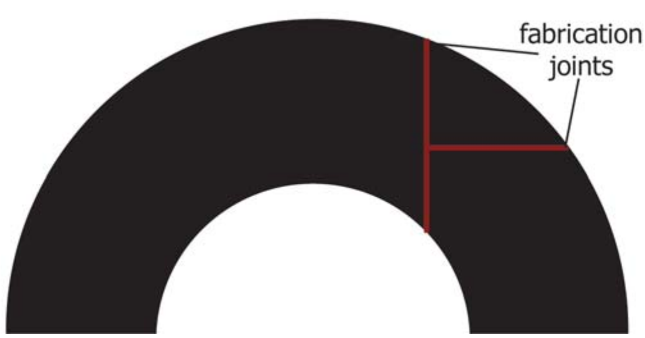

FIG. 4 90° Joint Intersection

3.2.7 *non-through joints, n*—bond or fabrication joints that start at the outside circumference of fabricated insulation and run continuously in a straight line to the opposite side terminating at the outside circumference of the pipe insulation. (See Fig. 2.)

3.2.7.1 *Discussion*—Non-through joints do not intersect the pipe insulation's inside diameter (ID).

3.2.8 *through joints, n*—bond or fabrication joints that start at the outside circumference of fabricated insulation and run continuously in a straight line through the fabricated piece and terminates at the pipe insulation's inside diameter (ID) (See Fig. 3.)

3.2.8.1 *Discussion*—Through joints intersect the pipe/ insulation interface.

3.2.9 *beveled lag, n*—rigid insulation pieces cut into isosceles trapezoid shape used to form a 360° circle that is installed around pipe or tubing.

3.2.9.1 *Discussion*—Beveled lags differ from precision cut V-grooved in that pieces are a minimum of 8 in. (203 mm) wide and are not bonded to a scrim, fabric or jacketing.

4. Classification

4.1 Specification C552 defines Type I and Type II materials. The same classifications shall be used in this standard.

5. Workmanship, Finish, and Appearance

5.1 The insulation shall have no visible defects that will adversely affect its performance.

6. Standard Sizes, Dimensions, and Fabrication Configurations of Cellular Glass Pipe and Tubing Insulation

6.1 Cellular glass pipe and tubing insulation shall be fabricated in lengths as agreed to by the purchaser and the supplier. Typical lengths are 23½ in. (597 mm), 23⅝ in. (600 mm), 24 in. (610 mm), 35½ in. (902 mm), or 36 in. (914 mm).

6.2 Cellular glass pipe and tubing insulation with outer diameters that are ≤ 6⅝ in. (≤168 mm) shall be made to a minimum thickness of 1-in. (25 mm). Pipe insulation with outer diameter that is >6⅝ in. (>168 mm) shall be made to a minimum 1 ½-in. (38 mm) thickness. Sizes shall conform to Practice C585.

6.3 Cellular glass pipe insulation with outer diameters that are <15¾ in. (<400 mm) shall be provided in half sections. Half sections shall consist of hollow cylindrical sections split lengthwise in a plane that includes the cylindrical axis.

6.4 Cellular glass pipe insulation with outer diameters that are ≥15¾ in. (≥400 mm) and ≤ 30 in. (≤762 mm) shall be provided in half-sections, quarter-sections or curved sidewall segments, as agreed upon by the fabricator and purchaser.

6.5 Cellular glass pipe insulation with outer diameters that are >30 in. (>762 mm) shall be furnished as curved sidewall segments (see Fig. 5) which shall be fabricated in equal size segments such that no additional field cuts are required.

6.6 For operating temperatures above ambient, circular cut segmented fabrication as shown in Fig. 5, beveled lags, or precision cut V-grooved pipe insulation, as shown in Fig. 6, specifically cut to fit the required diameter, are acceptable alternatives.