Designation: C 450 – 08

Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping, and Vessel Lagging[1]

This standard is issued under the fixed designation C 450; 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 practice provides tables of dimensions of preformed insulation that shall be used in fabricating covers for use on valves, ells, tees, flanges, and vessels in the pressure range from 150 to 1500 psi (1 to 10 MPa). These tables, which are part of this standard, are published separately as the ASTM Recommended Dimensional Standards for Fabrication of Thermal Insulation Fitting Covers for NPS Piping, and Vessel Lagging. The tables provide dimensions for use in forming pipe fitting covers for NPS pipe operating at high temperature and low temperature. The tables also include dimensions for use in forming thermal insulation into curved segments, and lagging, for application on vessels. This practice does not apply to reflective-type insulation.

1.2 This practice does not specify fabrication methods. Thermal insulation for fitting covers is formed by numerous fabrication methods. In general, insulations are cut by circular or band saws, shaped by grinders or millers, or molded. Each method has certain advantages and disadvantages, depending upon the material to be formed, number of cuts required, material waste permissible, and quantity of fittings being produced. Fitting parts are assembled using adhesives and fabrication cements applied using dip pots, rollers, doctor blades, brush, or trowel, depending upon the materials being used. Any specification of the fabrication techniques is beyond the scope of this standard.

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]

C 168 Terminology Relating to Thermal Insulation

C 585 Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System)

2.2 *ASTM Adjuncts:*[3]

ADJC0450 Recommended Dimensional Standards for Fabrication of Thermal Insulating Fitting Covers for NPS Piping and Vessel Lagging

3. Terminology

3.1 *Definitions*—For definitions used in this practice see Terminology C 168.

4. Significance and Use

4.1 This system of dimensions provides a guide for forming thermal insulation in advance of field application. Forming is done by cutting, grinding, milling, or molding, depending upon the method most suitable for the thermal insulation being fabricated. It is equally applicable for all service temperature ranges.

5. Basis of Design

5.1 All dimensions presented are based on the use of pipe insulation manufactured to Practice C 585 and to the Basic Dimensional Standards for Pipe Insulation as given in Tables 1 and Tables 2 of the ASTM Recommended Dimensional Standards for Prefabrication and Field Fabrication of Thermal Insulation Fitting Covers for NPS Piping, and Vessel Lagging.[3]

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[1] This practice is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.20 on Homogeneous Inorganic Thermal Insulations.

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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 at a nominal cost from from ASTM International Headquarters. Order Adjunct No. ADJC0450.

5.2 The tables provide dimensions for insulation fitting covers for installation on nominal pipe size (NPS) pipe operating at high and low temperatures.

5.3 Dimensions presented for cutting beveled blocks from preformed thermal insulation (lags) are based on blocks 6 in. (152 mm) wide by the thickness required.

5.4 Dimensions given for flanged pairs, flanged fittings, and flanged valves do not allow for flange bolt removal. When bolt removal is required, the covering length over the flange shall be increased as specified by the purchaser.

6. Fabrication

6.1 Any method of forming may be used if the resulting fitting conforms to inside and outside the dimensions listed.

6.2 The main body of the insulation fitting shall be cut from standard pipe size pipe covering of the proper size and thickness.

6.3 Where only one insulation type is required, and is available in sufficient thickness, multiple layers are not required.

6.4 Where two insulations of different temperature ratings are required, each insulation type shall be assembled in its proper location in the fitting using double layer construction.

6.5 Flat block, cut to proper curvature, may be used in place of preformed pipe insulation. The user shall be informed when a change, for example, supplying a fabricated product instead of a molded or preformed pipe insulation, that may cause differences in the thermal or mechanical performance characteristics of the end product.

6.6 Where the body of the flange cover extends over adjacent pipe insulation, the portion of the cover shall be fabricated using the pipe insulation as the body and adding an insert collar. Another method, which has been used, is by adding an insert or section, commonly called a "dutchman," made of block.

6.7 Valves manufactured by various companies for the same pressure and nominal pipe size may not have the same bonnet dimensions, or height of bonnet flange above centerline of valve. Because of this, the valve insulation is designed to fit the largest valve of a size, type, and pressure. In some instances, additional insulation may be required to fill or build up the insulation for proper fitting around the bonnet. In other instances it may be necessary to cut back insulation around the bonnet to provide access to the packing gland. Cutout for hand wheel assembly and packing gland should be done at time of application.

7. Assembly and Tolerances

7.1 All formed pieces shall fit tightly together so that both sides and length of the insulation joint can close within a maximum of 1⁄16 in. (1.6 mm).

7.2 Low-temperature pipe insulation fabricated from block or board stock shall contain no more than four cemented "through" joints per full section of insulation, excluding the half section mating plane.

7.3 Finished pieces shall be identified using tags, attached strip, etc. for ease of field installation.

7.4 The inner and outer surface of vessel insulation sections shall be concentric with the outer surface. The deviation from concentricity shall not exceed 3⁄16 in. (5 mm).

7.5 Material (glue, adhesives, etc.) used in the fabrication of fitting covers shall be those recommended by the manufacturer for the specific application and exposure conditions.

8. Field Application Sequence

8.1 Insulation coverings for welded or screwed fittings should be applied before the pipe insulation.

8.2 Pipe insulation should be installed up to all flanges, flanged fittings, and flanged valves. Provide sufficient space for future bolt removal where required.

8.3 Covers for flanges, flanged fittings, and flanged valves should be installed so as to extend, not less than specified thickness, over adjacent pipe insulation or minimum 2 in. (50mm).

8.4 Where required, the junction between the pipe insulation and flanged fittings covers can, by use of non-setting cements, sealents or other methods, also serve as an expansion or contraction joint.

9. Keywords

9.1 dimensions; thermal insulating materials; thermal insulating materials—fabrication; thermal insulating materials—fittings; thermal insulating materials—pipe