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Standard Specification for Aluminum Jacketing for Insulation¹

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1. Scope

1.1 This specification covers aluminum jacketing for thermal and acoustical insulation operating at either above or below ambient temperatures and in both indoor and outdoor locations. It does not cover insulation jacketing made from other materials such as mastics, fiber reinforced plastic, PVC, or stainless steel nor does it cover the details of thermal or acoustical insulation systems.

1.2 This specification provides physical requirements for aluminum jacketing for thermal and acoustical insulation. Guide C1423 provides guidance in selecting jacketing materials and their safe use.

1.3 This is a material specification and does not imply any performance of the installed system using the materials specified herein. For information about installation of aluminum jacketing, see (1).²

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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:³

B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate

C168 Terminology Relating to Thermal Insulation

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

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

C835 Test Method for Total Hemispherical Emittance of Surfaces up to 1400°C

C1371 Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emis-someters

C1423 Guide for Selecting Jacketing Materials for Thermal Insulation

D3363 Test Method for Film Hardness by Pencil Test

E84 Test Method for Surface Burning Characteristics of Building Materials

F1249 Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor

2.2 ANSI Standard:⁴

ANSI H35.2/H35.2(M) Dimensional Tolerances for Aluminum Mill Products

3. Terminology

3.1 *Definitions*—Definitions in Terminology C168 apply to terms used in this specification.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *box rib*—aluminum sheet formed to have alternating parallel grooves and ridges with a cross section approximating a square wave

3.2.2 *cladding (as related to insulation jacketing)*—synonymous with jacketing

3.2.2.1 *Discussion*—The three terms “jacketing”, “lagging”, and “cladding” are considered synonymous in most metal jacket related applications and geographies. However, in some cases in the power industry in North America the term “lagging” has a different meaning than “jacketing” or “clad-ding” and refers specifically to a heavier gauge of jacketing.

3.2.3 *crevice corrosion*—Localized corrosion of metal jack-eting surface at, or immediately adjacent to, an area that is shielded from full exposure to the environment because of close proximity between the metal and the surface of another material.

3.2.4 *cross crimped*—synonymous with 4.8 mm corrugated

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² The boldface numbers in parentheses refer to a list of references at the end of this standard.

³ 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.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

3.2.5 *deep corrugated*—aluminum sheet formed to have alternating parallel grooves and ridges with a cross section approximating a sine wave

3.2.6 *finish*—the texture of the aluminum surface

3.2.7 *gore*—jacketing for elbows, fittings, or other non-straight portions of the piping system made from a multitude of similar overlapping pieces

3.2.8 *lagging (as related to insulation jacketing)*—synonymous with jacketing

3.2.8.1 *Discussion*—The three terms “jacketing”, “lagging”, and “cladding” are considered synonymous in most metal jacket related applications and geographies. However, in some cases in the power industry in North America the term “lagging” has a different meaning than “jacketing” or “cladding” and refers specifically to a heavier gauge of jacketing.

3.2.9 *moisture retarder (moister barrier)*—a layer of plastic film or other material applied to the inner side of metal jacketing to inhibit jacket corrosion by interfering with the formation of a galvanic cell between the dissimilar metals of the pipe and jacket or by preventing crevice corrosion

3.2.9.1 *Discussion*—A moisture retarder is not an insulation system water vapor retarder and does not perform the same function.

3.2.10 *polykraft*—a multilayer composite film used as a moisture retarder on metal jacketing consisting of at least one layer of minimum 65 g/m² kraft paper and one or more layers of plastic film, usually polyethylene at a minimum thickness of 38 microns.

3.2.11 *polysurlyn*—a multilayer film used as a moisture retarder on metal jacketing consisting of at least one layer of ethylene/methacrylic acid copolymer and one or more layers of other polymers, usually polyethylene.

3.2.12 *safety edge*—an edge of metal jacketing that has been de-burred or rounded by a rolling operation

3.2.13 *safety hem*—a rounded edge of metal jacketing created by folding the edge of sheet jacketing completely back upon itself using a roll former or a brake.

3.2.13.1 *Discussion*—The fold is typically made toward the underside of the jacketing so that the original edge is hidden and the external appearance of the jacketing is preserved.

3.2.14 *splice roll*—metal jacketing sold in roll form where the package contains two separate pieces of metal jacketing rolled approximately end to end.

3.2.14.1 *Discussion*—A splice roll occurs when the metal coil being used to form the roll jacketing reaches its end before the required roll length is obtained.

3.2.15 *split roll*—synonymous with splice roll.

4. Significance and Use

4.1 This specification is used to specify material by physical property requirements that address the prerequisites in Sections 6 to 10. The designer of an insulation system, after determining the system requirements, shall use this specification to specify the appropriate aluminum jacketing.

5. Classification

5.1 Classification of aluminum jacketing is based on three factors:

5.1.1 *Outer surface treatment and emittance (ε):*

5.1.1.1 Type I = Bare surface, $\epsilon = 0.1$,

5.1.1.2 Type II = Painted with pigmented paint, $\epsilon = 0.8$,

5.1.1.3 Type III = Painted with unpigmented paint, $\epsilon = 0.5$, and

5.1.1.4 Type IV = Plastic film coated surface, $\epsilon = 0.85$.

5.1.1.5 Paint systems for Types II and III must be factory applied and baked on.

5.1.1.6 Plastic film for Type IV must be factory applied and heat laminated to the surface.

5.1.2 *Alloy and Temper per Specification B209:*

5.1.2.1 Grade 1 = Alloy 3105 or 3003, half hard temper (H14.)

5.1.2.2 Grade 2 = Alloy 3105 or 3003, quarter hard temper (H12 - lock forming quality),

5.1.2.3 Grade 3 = Alloy 1100, dead soft temper,

5.1.2.4 Grade 4 = Alloy 3004,

5.1.2.5 Grade 5 = Alloy Alclad 3004 (alloy 3004 clad both sides with alloy 7072 for improved corrosion resistance), and

5.1.2.6 Grade 6 = Alloy 5052.

5.1.3 *Moisture Retarder:*

5.1.3.1 Class A = polysurlyn, 76 microns thick,

5.1.3.2 Class C = polykraft per section 3.2.10,

5.1.3.3 Class D = painted, and

5.1.3.4 Class E = no moisture retarder.

NOTE 1—Class B was removed in 2011 because it was not used or produced. The remaining Classes were not renumbered to avoid conflicts with engineering specifications that reference the remaining Classes.

6. Materials and Manufacture

6.1 Aluminum jacketing materials are composed of a single material or a lamination of several components. The materials are supplied in the form of rolls or sheets or preformed to fit the surface to which they are to be applied. The materials are applied in the field or as a factory-applied composite with the insulation.

6.2 The primary material shall be aluminum and shall have a finish that is smooth, 4.8 mm corrugated, or stucco embossed. The dimensions of corrugations (pitch and depth) must be agreed to by manufacturer and purchaser to achieve interchangeability, constant rigidity, and appearance.

6.3 When agreed upon by purchaser and seller, aluminum sheets used as pipe insulation jacketing (see 8.2) shall have a safety edge or a 10–15 mm safety hem along one entire width edge of the sheet. Aluminum jacketing with a safety edge or safety hem must still meet the length dimensions specified in 8.2.1. A safety hem shall not be specified when the finish is 4.8 mm. corrugated.

6.4 In most cases, the inner surface of aluminum jacketing material is coated or covered with a moisture resistant film to retard possible galvanic or chemical corrosion, or both, of the jacketing.

6.5 For highly corrosive ambient conditions or to increase emittance, the purchaser shall specify that the outer surface of