Designation: C1290 – 16

Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts[1]

This standard is issued under the fixed designation C1290; 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 the composition, size, dimensions, and physical properties of flexible fiber glass blanket, ductwrap, used to externally insulate HVAC ducts used for the distribution of condition air within the temperature range of 35°F (1.7°C) and 250°F (121°C).

1.2 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.

1.3 When the installation and use of thermal insulation materials, accessories, and systems may pose safety and health problems, the manufacturer shall provide the user appropriate current information regarding any known problems associated with the recommended use of the company's products, and shall also recommend protective measures to be employed in their safe utilization. The user shall establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.

1.4 The following safety hazards caveat pertains only to the test methods, Section 13, in this specification. *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]

C167 Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations

C168 Terminology Relating to Thermal Insulation

C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

C390 Practice for Sampling and Acceptance of Thermal Insulation Lots

C411 Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation

C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

C665 Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

C1104/C1104M Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation

C1136 Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

C1045 Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions

C1304 Test Method for Assessing the Odor Emission of Thermal Insulation Materials

C1338 Test Method for Determining Fungi Resistance of Insulation Materials and Facings

C1617 Practice for Quantitative Accelerated Laboratory Evaluation of Extraction Solutions Containing Ions Leached from Thermal Insulation on Aqueous Corrosion of Metals

E84 Test Method for Surface Burning Characteristics of Building Materials

E96/E96M Test Methods for Water Vapor Transmission of Materials

E2231 Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics

2.2 *Other Documents:*

CAN/ULC-S102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies[3]

[1] This specification is under the jurisdiction of ASTM Committee C16 onThermal Insulation and is under the direct responsibility of Subcommittee C16.23 .

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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 Underwriters Laboratories (UL), 333 Pfingsten Rd., Northbrook, IL 60062-2096, http://www.ul.com.

3. Terminology

3.1 *Definitions*—For definitions of terms defined in this specification, see Terminology C168.

4. Classification

4.1 Fibrous glass flexible blanket HVAC duct external insulation consists of the following three types:

4.1.1 *Type I*—Blankets without facing.

4.1.2 *Type II*—Blankets faced with a vapor-retarder facing having a water vapor permeance no higher than 1.0 Perm.

4.1.3 *Type III*—Blankets faced with a vapor-retarder facing with a water vapor permeance no higher than 0.02 Perm that meet physical property requirements of Specification C1136.

5. Ordering Information

5.1 Specific installation, insulation type, thermal resistance, thickness, length, and width suited for the intended use shall be specified by the purchaser.

6. Materials and Manufacture

6.1 *Basic Material*—The basic material shall be fibers made from glass processed from the molten state into fibrous form.

6.2 *Manufacture*—Insulation shall consist of bonded fibers formed into flexible blanket rolls with or without various adhered facings.

7. Physical Properties

7.1 *Thermal Resistance*—The material shall be tested at the out of package thickness and at the installed thickness for the thermal resistance at 75°F (24°C) mean temperature in accordance with 13.2. The installed thermal resistance shall be tested with the material compressed to 75 % of the labeled out of package thickness. For each case the tested thermal resistance, R, for the average of any four randomly selected samples, shall not be more than 5% below the label R-Values, when tested in accordance with 13.2 nor shall any single specimen be more than 10 % below the label R-Values[4].

NOTE 1—Consult the local or state building codes for the minimum installed thermal resistance, R-value, required to be installed.

NOTE 2—To obtain the measured installed R-value during installation, the duct wrap insulation shall be cut to a stretch-out as indicated in Table X1.1 in Appendix X1.

7.2 *Surface Burning Characteristics*—Types I, II, and III, when tested in accordance with 13.3, shall have a flame spread index not greater than 25, and smoke developed index not greater than 50.

7.3 *Hot Surface Performance*—Insulation shall not flame, glow, or smolder when tested in accordance with 13.4 at 250°F (121°C).

7.4 *Water Vapor Permeance*—When tested in accordance with 13.5, the vapor-retarder facing of a Type III product shall have a vapor permeance of no more than 0.02 Perm before laminating to fiber glass. The vapor–retarder facing of the Type II product shall have a vapor permeance of no more than 1.0 Perm before laminating to fiber glass.

7.5 *Water Vapor Sorption*—The water vapor sorption of the insulation blanket shall be not more than 5 % by weight, when tested in accordance with 13.6.

7.6 *Odor Emission*—A detectable odor of strong objectionable nature recorded by more than two of the five panel members shall constitute rejection of the product when tested in accordance with 13.7.

7.7 *Corrosiveness – Steel Only*—When tested in accordance with 13.8 per Specification C665, any corrosion resulting from the unfaced insulation in contact with steel plates shall be judged to be no greater than the comparative plates in contact with sterile cotton.

7.7.1 *Alternative Test – Steel Only*—When tested in accordance with 13.8.1 per Practice C1617, the mass loss corrosion rate of the unfaced insulation extract shall not exceed that of the 5-ppm chloride solution.

7.8 *Fungi Resistance*—When tested in accordance with 13.9, the test specimens that have growth greater than that on the comparative items shall be considered to have failed. Test specimens on which the growth is not greater than that on the comparative items shall be considered to have passed.

8. Dimensional Tolerances

8.1 After conditioning for a minimum of 24 h at 70 ± 3°F (21 ± 1.6°C) and 50 ± 5 % relative humidity, the insulation shall conform to the dimensional tolerances listed in Table 1. All measurements shall be made in accordance with 12.1.

9. Sampling

9.1 Sampling of the insulation shall be in accordance with Practice C390. Specific provisions for sampling shall be agreed upon between the purchaser and the supplier.

10. Inspection

10.1 Inspection of the insulation shall be as agreed upon by the purchaser and the manufacturer as part of the purchase agreement.

11. Qualification and Inspection Requirements

11.1 *Qualification Requirements*—The following requirements are generally used for purposes of initial material or product qualification:

11.1.1 Thermal resistance,

11.1.2 Surface burning characteristics,

11.1.3 Water vapor permeance, except for Type I material,

11.1.4 Water vapor sorption,

11.1.5 Odor emission,

11.1.6 Corrosiveness, and

TABLE 1 Dimensional Tolerance, in. (mm)

Dimension	Tolerance
Width	−⅛ (3.2)
Length	−none, excess permitted
Thickness	−⅛ (3.2), excess permitted

[4] The ranges of thermal resistance, R, listed in this section are allowed by the Federal Trade Commission's 16 CFR part 460 Trade Regulation Rule: Labeling and Advertising of Home Insulation.

11.1.7 Fungi resistance.

11.2 *Inspection*—The following requirements are generally used for purposes of acceptance sampling of lots or shipments of qualified thermal insulation:

11.2.1 Dimensional tolerances, and

11.2.2 Workmanship.

12. Workmanship and Finish

12.1 Although all requirements for physical properties of materials such as blankets are not easily defined or stated numerically, it is understood that the insulation will be essentially free of defects that adversely affect thermal performance, such as local compressed areas, low density areas, tears, and holes.

12.2 Vapor retarder facings shall be free of excessive tears, rips, holes, and other defects that will adversely affect performance.

13. Test Methods

13.1 *Dimensions*—Test in accordance with Test Method C167.

13.2 *Thermal Resistance:*

13.2.1 Test in accordance with Test Method C177 or Test Method C518 at 75°F (24°C) mean temperature (see also Practice C1045). If the test is conducted using Test Method C518, the manufacturer shall certify that recent calibrations have been made.

13.2.2 If the blanket is furnished with an adhered facing, carefully remove the facing to provide a surface equivalent to the original surface that the blanket had before the application of the facing.

13.3 *Surface Burning Characteristics*— Determine the surface burning characteristic for the composite material in accordance with Test Method E84, and Practice E2231. For Canada, test in accordance with Test Method CAN/ULC-S102. When the referenced Canadian document in this specification is referred to in applicable Canadian building codes, the editions, referenced by those building codes, shall govern.

13.4 *Hot Surface Performance*—The hot surface performance of the material shall be tested in accordance with Test Method C411. Type II and III materials shall be tested with the insulation blanket in contact with the hot plate.

13.5 *Water Vapor Permeance*—Test the permeance of the facing material in accordance with the Desiccant Method of Test Method E96/E96M.

13.6 *Water Vapor Sorption*—Determine the amount of water vapor sorption of the blanket test specimen in accordance with Test Method C1104/C1104M.

13.7 *Odor Emission*—Determine the odor emission in accordance with Test Method C1304.

13.8 *Corrosiveness*—The corrosiveness of the material shall be determined in accordance with the steel portion of the Corrosiveness test method in Specification C665.

13.8.1 *Alternative Test – Steel Only*—Determine the mass loss corrosion rate in accordance with Practice C1617.

13.9 *Fungi Resistance*—The fungi resistance of the material shall be determined in accordance with the Fungi Resistance test method in Specification C1338.

14. Rejection and Rehearing

14.1 Materials that fail to conform to the requirements in this specification shall constitute cause for rejection. Rejection shall be reported to the manufacturer or seller promptly in writing. The manufacturer and supplier have the right to verify rejected products.

15. Certification

15.1 When specified in the purchase order or contract, a producer's, supplier's, or independent third party's certification shall be furnished to the purchaser indicating that the material was manufactured, sampled, tested, and inspected in accordance with this specification and has been found to meet the requirements.

16. Product Marking

16.1 Type II and III material shall be marked continuously, at intervals not greater than 36 in. (914 mm) apart, with the following information: manufacturer, product name, surface burning characteristics, nominal thickness, nominal R-value, and installed R-value.

17. Packaging and Package Marking

17.1 *Packaging*—Unless otherwise specified, the insulation shall be packaged in the manufacturer's standard containers.

17.2 *Package Marking*— The markings shall be clear and legible. Unless otherwise specified, each container shall be marked with the manufacturer's name, address, and telephone number; product name; material width; length; thickness; nominal R-value; installed R-value; and facing type, if a facing is employed.

18. Keywords

18.1 blanket; ducts; fibrous glass; insulation; thermal resistance

APPENDIX

(Nonmandatory Information)

X1. INSULATION INSTALLATION STRETCH-OUT SCHEDULE

X1.1 This appendix has been included to show the insulation stretch-out schedule to be followed during installation of duct wrap material in order to prevent excessive compression of the material during installation.

X1.2 By following the schedule in Table X1.1, the reduction in material nominal thickness due to compression during installation will be limited to an average 25 %.

TABLE X1.1 Duct Wrap Stretch-Outs[A] in. (mm)

Labeled Thickness	Minimum Installed Thickness	Round[B]	Square[B]	Rectangular[B]
1.0 (25)	.75 (19)	P + 7.0 (178)	P + 6.0 (152)	P + 5.0 (127)
1.5 (38)	1.125 (29)	P + 9.5 (241)	P + 8.0 (203)	P + 7.0 (178)
2.0 (51)	1.5 (38)	P + 12.0 (305)	P + 10.0 (254)	P + 8.0 (203)
2.5 (64)	1.875 (48)	P + 14.5 (368)	P + 12.5 (318)	P + 9.5 (241)
3.0 (76)	2.25 (57)	P + 17.0 (432)	P + 14.5 (368)	P + 11.5 (292)
3.5 (89)	2.625 (67)	P + 19.5 (495)	P + 16.5 (419)	P + 13.0 (330)
4.0 (102)	3.0 (76)	P + 22.0 (559)	P + 18.5 (470)	P + 14.5 (368)

[A] Stretch-out is the length of insulation, duct wrap, that is added due to the outside perimeter of the installed insulation being larger than the outside perimeter of the duct and to achieve the above minimum installed thicknesses.
[B] P = Perimeter of duct, in. (mm).