



Designation: C1289 – 21

Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board¹

This standard is issued under the fixed designation C1289; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers the general requirements for faced thermal insulation boards composed of rigid cellular polyisocyanurate surfaced with other materials. The insulation boards are intended for use at temperatures between -40 and 200°F (-40 and 93°C). This specification does not cover cryogenic applications. Consult the manufacturer for specific recommendations and properties in cryogenic conditions. For specific applications, the actual temperature limits shall be agreed upon by the manufacturer and the purchaser.

1.2 This standard is intended to apply to rigid cellular polyurethane-modified polyisocyanurate thermal insulation board products that are commercially acceptable as non-structural panels useful in building construction. The term polyisocyanurate encompasses the term polyurethane. For engineering and design purposes, users should follow specific product information provided by board manufacturers regarding physical properties, system design considerations and installation recommendations.

NOTE 1—See [Appendix X1](#) for guidance on determining wind pressure resistance of panels when required for wall sheathing applications.

1.3 The use of thermal insulation materials covered by this specification is typically regulated by building codes, or other agencies that address fire performance. Where required, the fire performance of the material shall be addressed through standard fire test methods established by the appropriate governing documents.

1.4 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.

NOTE 2—For conversion to metric units other than those contained in this standard, refer to [IEEE/ASTM SI 10](#).

¹ This specification is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.22 on Organic and Nonhomogeneous Inorganic Thermal Insulations.

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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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.6 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 The following documents, of the issue in effect on the date of material purchase, form a part of this specification to the extent specified herein:

2.2 ASTM Standards:²

- 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
- C203 Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- C208 Specification for Cellulosic Fiber Insulating Board
- C209 Test Methods for Cellulosic Fiber Insulating Board
- C303 Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation
- C390 Practice for Sampling and Acceptance of Thermal Insulation Lots
- C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- C550 Test Method for Measuring Trueness and Squareness of Rigid Block and Board Thermal Insulation
- C728 Specification for Perlite Thermal Insulation Board
- C1045 Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions

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.

C1058/C1058M Practice for Selecting Temperatures for Evaluating and Reporting Thermal Properties of Thermal Insulation

C1114 Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus

C1177/C1177M Specification for Glass Mat Gypsum Substrate for Use as Sheathing

C1303/C1303M Test Method for Predicting Long-Term Thermal Resistance of Closed-Cell Foam Insulation

C1363 Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus

C1763 Test Method for Water Absorption by Immersion of Thermal Insulation Materials

D1621 Test Method for Compressive Properties of Rigid Cellular Plastics

D2126 Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging

E84 Test Method for Surface Burning Characteristics of Building Materials

E96/E96M Test Methods for Water Vapor Transmission of Materials

IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): (The Modernized Metric System)

2.3 *Voluntary Product Standard:*³

Voluntary Product Standard PS 1–09 Structural Plywood

Voluntary Product Standard PS 2–10 Performance Standard for Wood Based Structural Use Panels

2.4 *CAN/ULC Standard:*⁴

CAN/ULC-S770-09 Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams

2.5 *CAN/CSA and CSA Standards:*⁵

CAN/CSA O325-07 (R2012) – Construction Sheathing

CSA O121-08 (R2013) Douglas Fir Plywood

CSA O151-09 Canadian Softwood Plywood

2.6 *ASHRAE Standards:*⁶

ASHRAE Handbook Fundamentals

3. Terminology

3.1 For complete descriptions of terms used in this specification, refer to Terminology **C168**.

3.2 The term polyisocyanurate encompasses the term polyurethane (see 1.2).

4. Classification

4.1 The faced thermal insulation boards composed of rigid cellular polyisocyanurate covered by this specification are classified as follows:

4.1.1 *Type I*—Faced with aluminum foil on both major surfaces of the core foam.

4.1.1.1 *Class 1*—Non-reinforced core foam.

4.1.1.2 *Class 2*—Glass fiber reinforced or non-reinforced core foam.

4.1.2 *Type II*—Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.

4.1.2.1 *Class 1*—Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.

(1) *Grade 1*—16 psi (110 kPa), min, compressive strength.

(2) *Grade 2*—20 psi (138 kPa), min, compressive strength.

(3) *Grade 3*—25 psi (172 kPa), min, compressive strength.

4.1.2.2 *Class 2*—Faced with coated glass fiber mat facers on both major surfaces of the core foam.

(1) *Grade 1*—16 psi (110 kPa), min, compressive strength.

(2) *Grade 2*—20 psi (138 kPa), min, compressive strength.

(3) *Grade 3*—25 psi (172 kPa), min, compressive strength.

4.1.2.3 *Class 3*—Faced with uncoated glass fiber mat facers on both major surfaces of the core foam.

(1) *Grade 1*—16 psi (110 kPa), min, compressive strength.

(2) *Grade 2*—20 psi (138 kPa), min, compressive strength.

(3) *Grade 3*—25 psi (172 kPa), min, compressive strength.

4.1.2.4 *Class 4*—Faced with coated or uncoated glass fiber mat facers on both major surfaces of the core foam. This product is used at a maximum thickness of ½ in. (12.7 mm).

(1) *Grade 1*—80 psi (551 kPa), min, compressive strength

(2) *Grade 2*—110 psi (758 kPa), min, compressive strength

(3) *Grade 3*—140 psi (965 kPa), min, compressive strength

4.1.3 *Type III*—Faced with a perlite insulation board on one major surface of the core foam and faced on the other major surface with any facer described in this specification.

4.1.4 *Type IV*—Faced with a cellulosic fiber insulating board on one major surface of the core foam and faced on the other major surface with any facer described in this specification.

4.1.5 *Type V*—Faced with oriented strand board (OSB) or plywood on one major surface of the core foam and faced on the other major surface with any facer described in this specification.

4.1.6 *Type VII*—Faced with glass mat faced gypsum board on one major surface of the core foam and faced on the other major surface with any facer described in this specification.

NOTE 3—These general statements refer to generic composition descriptions of facer materials that are currently commercially accepted in the marketplace for these products, using terms common to these competing products.

5. Ordering Information

5.1 Orders shall include the following information:

5.1.1 Title, designation, and year of issue of C1289,

5.1.2 Quantity of material being ordered,

5.1.3 Product name and manufacturer's name, address, and telephone number,

5.1.4 Type or Class, or both, if Type I; type, class, and grade or type and class, if Type II, (see Section 4),

5.1.5 R-value and specific thickness, as required (see 7.2),

5.1.6 Tolerance if other than specified (see 8.1),

5.1.7 Size(s) required (see 8.6),

5.1.8 Type of edge (see 8.3 and 8.4),

5.1.9 Sampling, if different (see 10.1),

³ United States Department of Commerce, National Institute of Standards and Technology, Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

⁴ Available from Underwriters Laboratories (UL), 2600 N.W. Lake Rd., Camas, WA 98607-8542, <http://www.ul.com>.

⁵ CSA Group, 178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3, <http://www.csagroup.org/ca>.

⁶ Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329, <http://www.ashrae.org>.