

1 Department of Public Service

2

3 Adopted Permanent Rules Relating to Insulation Standards

4

5 Rules as Adopted

6 7640.0120 DEFINITIONS.

7 Subpart 1. **Applicability.** For the purposes of this
8 chapter, the following definitions of terms apply. Technical,
9 scientific, and engineering terms undefined by this part have
10 the meanings given in ASTM C 168, Standard Definitions of Terms
11 Relating to Thermal Insulation Materials.

12 [For text of subps 2 to 16, see M.R.]

13 Subp. 17. **Manufacturer of insulation.** "Manufacturer of
14 insulation" means:

15 A. an industry member who produces insulation
16 materials in their final form for distribution or sale to
17 intermediate and ultimate consumers;

18 B. an industry member who produces insulation
19 materials or installation instructions for a product the
20 manufacture of which is completed at the jobsite; or

21 C. an installer of an insulation product the
22 manufacture of which is completed at the jobsite who prepares or
23 modifies the product's installation instructions.

24 An applicator, contractor, or fabricator of insulation
25 materials who installs, applies, or uses insulation materials
26 for their intended uses and follows the manufacturer's
27 installation instructions, without changing the thermal or
28 physical properties of the insulation material is not a
29 manufacturer of insulation.

30 [For text of subps 18 to 26, see M.R.]

31 7640.0130 INSULATION MATERIALS STANDARDS.

32 [For text of subpart 1, see M.R.]

33 Subp. 2. **General testing requirements.** General testing
34 requirements for regulated thermal insulation materials in this
35 part are as follows:

1 [For text of item A, see M.R.]

2 B. All regulated thermal insulation materials must be
3 tested for compliance with the standards in this part as follows:

4 [For text of subitems (1) to (4), see M.R.]

5 (5) Insulation must have flammability
6 characteristics in accordance with the UBC, sections 1712 and
7 1713, for its intended uses.

8 C. All thermal performance tests must be conducted in
9 accordance with this item, unless additional requirements are
10 imposed within the body of a materials standard. Insulation's
11 thermal performance must be stated in R-value.

12 (1) One of the following test methods must be
13 used: ASTM C 177, ASTM C 236, ASTM C 518, ~~or~~ ASTM C 976, or
14 ASTM C 1114. Manufacturers shall select the appropriate test
15 method for the material unless a specific method or procedure is
16 referenced within a materials specification. Thermal
17 conductivity ~~must-only-be-measured~~ measurements at a mean
18 ~~temperature-of~~ temperatures other than 75 degrees Fahrenheit are
19 not required.

20 (2) R-value testing must be performed at the
21 insulation's representative thickness, and be consistent with
22 the requirements of Code of Federal Regulations, title 16, part
23 460. Unit R per inch must be derived from R-value testing
24 performed to its representative thickness.

25 (3) For foam plastic insulations that incorporate
26 blowing agents other than air or pentane, R-value tests must be
27 done on samples that have been treated to fully reflect the
28 effect of aging on the product's R-value. If criteria for
29 treating samples to reflect the effect of aging are not
30 specified within a material specification, the samples must be
31 treated for either 90 days at 140 ±2 degrees Fahrenheit (60 ±1
32 degree centigrade) or six months at ambient conditions prior to
33 conditioning and thermal resistance testing. During treating,
34 air circulation must be provided so that all surfaces of the
35 insulation are exposed to the surrounding environmental
36 conditions.

1 [For text of subitems (4) to (6), see M.R.]

2 [For text of item D, see M.R.]

3 Subp. 3. Cellulose insulation.

4 A. Cellulose fiber in loose-fill form must meet the
5 following requirements:

6 (1) The product must comply with ASTM C 739,
7 Standard Specification for Cellulosic Fiber (wood-base)
8 Loose-Fill Thermal Insulation or the United States Consumer
9 Product Safety Commission Interim Safety Standard for Cellulose
10 Insulation, Code of Federal Regulations, title 16, part 1209
11 subpart B.

12 [For text of subitems (2) and (3), see M.R.]

13 B. Cellulose fiber spray-applied must meet the
14 following requirements:

15 [For text of subitems (1) and (2), see M.R.]

16 (3) Determination of thermal performance must be
17 in accordance with subpart 2, item C, at the test defined
18 density of the material. R value testing must be performed at a
19 thickness of material of two inches, unless the material is
20 designed for use at a lesser maximum thickness and the material
21 is so designated on the label or label notice by the
22 manufacturer. It must then be tested at the maximum thickness
23 of suggested use.

24 (4) Density must be determined in accordance with
25 ASTM E 605. The density established by this test must be used
26 in the preparation of manufacturer's installation guidelines and
27 in the determination of thermal performance.

28 (5) Critical radiant flux and smoldering
29 combustion must be in accordance with ASTM C 739, or the CPSC
30 Interim Safety Standard for Cellulose Insulation, Code of
31 Federal Regulations, title 16, part 1209. ~~If-the-product-in
32 loose-fill-form-meets-the-criteria-for-critical-radiant-flux,
33 then-a-test-of-the-product-in-spray-applied-form-for-critical
34 radiant-flux-is-unnecessary.~~

35 (6) Moisture absorption must be determined in
36 accordance with section 14 of ASTM C 553. Moisture absorption

1 must not exceed 15 percent by weight.

2 (7) The product must have a minimum
3 adhesive/cohesive bond strength per unit area of five times the
4 weight of the material under the test plate when tested in
5 accordance with ASTM E 736.

6 Exception: Testing and compliance with bond strength
7 criteria are not required of products that are intended only for
8 installation in enclosed cavities, and the product is identified
9 as intended only for those installations.

10 (8) Corrosion must be in accordance with ASTM C
11 739, or the CPSC Interim Safety Standard for Cellulose
12 Insulation, Code of Federal Regulations, title 16, part 1209.
13 If the product in loose-fill form meets the criteria for
14 corrosion, then a test of the product in spray-applied form is
15 unnecessary.

16 (9) Odor emission must be in accordance with ASTM
17 C 739, or the CPSC Interim Safety Standard for Cellulose
18 Insulation, Code of Federal Regulations, title 16, part 1209.
19 If the product in loose-fill form meets the criteria for odor
20 emission, then a test of the product in spray-applied form is
21 unnecessary.

22 (10) Fungi resistance must be in accordance with
23 ASTM C 739, or the CPSC Interim Safety Standard for Cellulose
24 Insulation, Code of Federal Regulations, title 16, part 1209.
25 If the product in loose-fill form meets the criteria for fungi
26 resistance, then a test of the product in spray-applied form is
27 unnecessary.

28 Subp. 4. Mineral fiber insulation.

29 A. Mineral fiber in loose fill form must comply with
30 ASTM C 764, Standard Specification for Mineral Fiber Loose Fill
31 Thermal Insulation.

32 B. Mineral fiber in batts and blankets form must
33 comply with ASTM C 665, Standard Specification for Mineral Fiber
34 Blanket Thermal Insulation for Light Frame Construction and
35 Manufactured Housing.

36 C. Mineral fiber in board form must comply with ASTM

1 ~~E-612, Standard Specification for Mineral Fiber Block and Board~~
2 ~~Thermal Insulation~~, meet the following requirements:

3 (1) The basic material must be made from mineral
4 substances such as rock, slag, or glass processed from a molten
5 state into a fibrous form. Insulation must be composed of
6 mineral fibers with water resistant binder added and formed into
7 flat rectangular units. Insulation boards must be uniform in
8 quality and free from defects, such as broken edges, splits, or
9 loose materials which would impair the intended use.

10 (2) Thermal performance and surface burning
11 characteristics must be determined in accordance with subpart 2.

12 D. Spray applied mineral fiber must comply with ASTM
13 C 1014, Standard Specification for Spray Applied Mineral Fiber
14 Thermal or Acoustical Insulation.

15 Subp. 5. Foam plastic insulation.

16 A. Molded expanded polystyrene insulation must comply
17 with ASTM C 578, Standard Specification for Preformed, Cellular
18 Polystyrene Thermal Insulation and the accompanying
19 Supplementary Requirements.

20 B. Extruded Polystyrene must comply with ASTM C 578,
21 Standard Specification for Preformed, Cellular Polystyrene
22 Thermal Insulation and the accompanying Supplementary
23 Requirements.

24 C. Unfaced polyurethane and polyisocyanurate in board
25 form must comply with ASTM C 591, Standard Specification for
26 Unfaced Preformed Rigid Cellular Polyurethane Thermal Insulation.

27 Exception: Aged R-value must be 5.6 per inch or greater at
28 75 degrees Fahrenheit.

29 [For text of item D, see M.R.]

30 E. Field applied urea formaldehyde foam must meet the
31 following requirements:

32 (1) The product must comply with ASTM C 951,
33 Standard Specification for Urea Formaldehyde Based, Foam in
34 Place Insulation.

35 [For text of subitem (2), see M.R.]

36 F. Spray applied urethane must comply with ASTM C

1 1029, Standard Specification for Spray Applied Rigid
2 Polyurethane Thermal Insulation.

3 G. Rigid cellular phenolic insulation must comply
4 with ASTM C 1126, Standard Specification for Faced or Unfaced
5 Rigid Cellular Phenolic Thermal Insulation.

6 H. Foam plastic insulation that conforms to all
7 requirements of ICBO Evaluation Service Acceptance Criteria for
8 Foam Plastic for the intended application meets the requirements
9 of part 7640.0130.

10 Subp. 6. Perlite and vermiculite insulation.

11 A. Perlite loose fill insulation must meet the
12 following requirements:

13 (1) The product must comply with ASTM C 549,
14 Standard Specification for Perlite Loose Fill Insulation.

15 [For text of subitem (2), see M.R.]

16 B. Vermiculite in loose fill form must meet the
17 following requirements:

18 (1) The product must comply with ASTM C 516,
19 Standard Specification for Vermiculite Loose Fill Thermal
20 Insulation.

21 [For text of subitem (2), see M.R.]

22 Subp. 7. Reflective foil insulation.

23 A. The following requirements apply to reflective
24 foil insulation:

25 [For text of subitem (1), see M.R.]

26 (2) Except for radiant barrier products, thermal
27 performance for single or multiple sheet sections must be
28 determined according to ASTM C 976 or ASTM C 236. The test
29 panel must consist of a panel using a wooden frame of two-by-six
30 inch boards 16 inches apart and at least 24 inches long, covered
31 with a minimum of 1/2-inch gypsum wallboard or 1/2-inch plywood
32 on each side. For tests in the vertical position, the test
33 panel must be at least seven feet high at a mean temperature of
34 75 degrees Fahrenheit, with a temperature differential of 30
35 degrees Fahrenheit. The resultant thermal performance must be
36 based upon the insulation and the associated air spaces.

1 [For text of subitems (3) to (6), see M.R.]

2 B. Reflective insulation systems with more than one
3 sheet must be tested according to ASTM C 976 or ASTM C 236 to
4 determine the thermal performance for heat flow in horizontal,
5 upward, and downward directions. The tested thermal performance
6 in the heat-flow direction or directions of the intended
7 application must be labeled on the material. The manufacturer
8 shall test once in each direction of intended application;
9 except that, for products labeled with only one heat-flow
10 direction, the manufacturer shall test two samples in that
11 direction. The tests must be done at a mean temperature of 75
12 degrees Fahrenheit, with a temperature differential of 30
13 degrees Fahrenheit.

14 C. A single sheet reflective insulation system must
15 be tested according to ASTM E 408 to determine its emissivity.
16 To get the R-value for the measured emissivity and a specific
17 air space and direction of heat flow, Table 2 in chapter 22 of
18 the ASHRAE Handbook of Fundamentals must be used. The R-value
19 shown for 50 degrees Fahrenheit must be used, with a temperature
20 differential of 30 degrees Fahrenheit.

21 [For text of item D, see M.R.]

22 Subp. 8. **Other insulation.** Insulation other than
23 insulation specified in subparts 1 to 7 must comply with the
24 requirements in items A to F.

25 [For text of item A, see M.R.]

26 B. Water or moisture absorption must be determined
27 according to one of the following methods:

- 28 (1) ASTM C 272;
29 (2) ASTM C 553, section 14;
30 (3) ASTM C 739, section 12; or
31 (4) ASTM D 2842.

32 [For text of items C and D, see M.R.]

33 E. The product must not produce a detectable odor
34 that is classified as objectionable and strong or very strong by
35 two or more panel members when tested in accordance with ASTM C
36 739, section 13.

1 [For text of item F, see M.R.]

2 7640.0140 REQUIREMENTS FOR INSULATION FOR SPECIAL APPLICATIONS.

3 Subpart 1. Physical requirements for insulation materials
4 designed for exterior, underground use.

5 A. The insulation, installed according to the
6 manufacturer's recommendations, must be in service tested at
7 either a testing facility or an actual house for a period of one
8 continuous year. The testing environment must have historical
9 winter weather conditions no less than 8,000 Fahrenheit heating
10 degree days, and soil conditions with drainage characteristics
11 classified as poor in Table 7-4 of the Building Foundation
12 Design Handbook. The purpose of the testing must be to
13 determine aged R-value performance.

14 Exception: In-service testing is not necessary if the
15 manufacturer demonstrates that a product of the same material
16 specification with equal or less durability in this application
17 has been successfully in-service tested. The manufacturer shall
18 demonstrate the equal or less durability test by comparing
19 laboratory test results of the physical characteristics listed
20 in part 7640.0140, subpart 1, item B, clauses (1) to (4).

21 B. The manufacturer shall demonstrate that the
22 product will exhibit less than a ten percent loss in R-value
23 contained in the FTC fact sheet filed under part 7640.0150,
24 subpart 2, item E, when installed underground and the combined
25 effect of assumed conditions on the following physical
26 characteristics are considered:

27 [For text of subitems (1) and (2), see M.R.]

28 (3) soil compatibility; and

29 (4) compressive strength.

30 The manufacturer shall state the assumed conditions in the
31 initial report filed according to part 7640.0150, subpart 2.

32 C. An association may conduct tests and prepare a
33 filing for exterior below grade application of a type of product
34 on behalf of its constituency. The association shall conduct
35 testing according to subpart 1, item A, on at least three

1 specimens of the product. The association shall demonstrate
2 that the manufacturers' products for which the tests and filing
3 would apply are representative of the tests and filing performed
4 by the association.

5 D. Mineral fiber board for exterior below ground
6 application must be manufactured to facilitate downward drainage.

7 Subp. 2. Requirements for installation instructions for
8 underground use. Written instructions on underground use of
9 insulation must contain instructions or information for vertical
10 and, if recommended, horizontal application regarding:

11 A. application techniques;

12 B. if required for the insulation, drainage, as
13 specified in section R-305 of the CABO One & Two Family Dwelling
14 Code;

15 C. if required for the insulation, waterproofing or
16 dampproofing, as specified in section R-306 of the CABO One &
17 Two Family Dwelling Code;

18 D. chemical resistance information;

19 E. ambient temperature range permitted during
20 application; and

21 F. backfill techniques and backfill materials for
22 prevention of damage to the insulation material and below grade
23 protective coating.

24 Subp. 3. Installation requirements for exterior above
25 ground and underground use.

26 A. Insulation extending above grade must be covered
27 with an exterior wall finish to protect the insulation from
28 deterioration due to sunlight, and physical abuse.

29 B. Polyurethane or polyisocyanurate application must
30 have a protective coating applied to its exterior surface below
31 ground. The type of protective coating and method of
32 application must be in accordance with the insulation
33 manufacturer's instructions and recommendations.

34 C. Mineral fiber foundation insulation must include
35 exterior drainage, as defined in part 7640.0120.

36 [For text of subp 4, see M.R.]

1 7640.0150 REPORTING REQUIREMENTS.

2 [For text of subpart 1, see M.R.]

3 Subp. 2. **Initial report.** An industry member shall file an
4 initial report at least 30 days before offering for sale in the
5 state any new products, significant changes to a product already
6 filed, or changes to product installation instructions to a
7 product already filed.

8 The initial report must include the following:

9 [For text of items A to E, see M.R.]

10 F. results of initial tests, as required by part
11 7640.0130, identifying tests performed, name of laboratory,
12 testing dates, and test results. The report for "other"
13 insulation products regulated by part 7640.0130, subpart 8, must
14 also include the products' Material Safety Data Sheet;

15 [For text of items G to I, see M.R.]

16 [For text of subp 3, see M.R.]

17 7640.0160 APPLICATION AND INSTALLATION STANDARDS.

18 Subpart 1. **Applicability.** Industry members, including
19 industry members who offer insulation installation services for
20 new and existing residential buildings, shall comply with this
21 part.

22 An installer of an insulation the manufacture of which is
23 completed at the jobsite who significantly alters the
24 manufacturer's installation instructions becomes a manufacturer
25 for the purpose of Minnesota Rules, chapter 7640.

26 Subp. 2. **Application and inspection.**

27 A. Industry members installing insulation shall
28 follow manufacturer's written application instructions.

29 B. When installing insulation in attic areas, the
30 installer shall locate flush and recessed light fixtures, and
31 other heat producing appurtenances, and shall comply with
32 National Electrical Code, section 410-66, subsections A and B.

33 C. Installation of cellulosic and mineral fiber in
34 loose-fill form must be in conformance with ASTM standard C
35 1015, including part 7.7.2.

1 D. Installation of reflective insulation must be in
2 conformance with ASTM standard C 727.

3 E. Installers of urea formaldehyde foam insulation
4 shall conform with Minnesota Statutes, section 325F.18, and
5 Minnesota Rules, parts 4620.1600 to 4620.2100.

6 F. State and local agencies using appropriated
7 federal funds and persons contracting with state or local
8 agencies with respect to work performed under the contracts
9 shall comply with Code of Federal Regulations, title 40, part
10 248, Guideline for Federal Procurement of Building Products
11 Containing Recovered Materials.

12 Subp. 3. **Manufacturer's installation or application**
13 **instructions.** Manufacturers shall provide installation and
14 application instructions that comply with this subpart:

15 [For text of items A and B, see M.R.]

16 C. Installation instructions for products whose
17 manufacture is completed at the jobsite must address the quality
18 assurance program required by part 7640.0130, subpart 2, item D;
19 ambient temperature during application; and actions necessary to
20 facilitate curing or drying.

21 7640.0180 INCORPORATIONS BY REFERENCE AND CITATIONS.

22 [For text of subpart 1, see M.R.]

23 Subp. 2. **ASTM.** The following ASTM standards are
24 incorporated by reference:

25 [For text of items A to C, see M.R.]

26 D. ASTM C 272-53 (reapproved 1980), Standard Test
27 Method for Water Absorption of Core Materials for Structural
28 Sandwich Constructions.

29 E. ASTM C 516-80 (reapproved 1985), Standard
30 Specification for Vermiculite Loose-Fill Thermal Insulation.

31 F. ASTM C 518-85, Standard Test Method for Steady
32 State Heat Flux Measurements and Thermal Transmission Properties
33 by Means of the Heat Flow Meter Apparatus.

34 G. ASTM C 549-81 (reapproved 86), Standard
35 Specification for Perlite Loose Fill Insulation.

1 H. ASTM C 553-70 (reapproved 1977), Standard
2 Specification for Mineral Fiber Blanket and Felt Insulation
3 (Industrial Type).

4 I. ASTM C 578-87A, Standard Specification for
5 Preformed, Cellular Polystyrene Thermal Insulation.

6 J. ASTM C 591-85, Standard Specification for Unfaced
7 Preformed Rigid Cellular Polyurethane Thermal Insulation.

8 ~~K. ASTM C 612-83, Standard Specification for Mineral~~
9 ~~Fiber-Block-and-Board Thermal Insulation.~~

10 ~~E. K.~~ K. ASTM C 665-88, Standard Specification for
11 Mineral Fiber Blanket Thermal Insulation for Light Frame
12 Construction and Manufactured Housing.

13 ~~M. L.~~ L. ASTM C 727-72 (reapproved 1978), Standard
14 Recommended Practice for Use of Reflective Insulation in
15 Building Constructions.

16 ~~N. M.~~ M. ASTM C 739-88, Standard Specification for
17 Cellulosic Fiber (wood-base) Loose-Fill Thermal Insulation.

18 ~~O. N.~~ N. ASTM C 764-88, Standard Specification for
19 Mineral Fiber Loose-Fill Thermal Insulation.

20 ~~P. O.~~ O. ASTM C 951-83, Standard Specification for
21 Urea-Formaldehyde-Based, Foam in Place Insulation.

22 ~~Q. P.~~ P. ASTM C 976-82, Standard Test Method for Thermal
23 Performance of Building Assemblies by Means of a Calibrated Hot
24 Box.

25 ~~R. Q.~~ Q. ASTM C 1014-88, Standard Specification for
26 Spray-Applied Mineral Fiber Thermal or Acoustical Insulation.

27
28 ~~S. R.~~ R. ASTM C 1015-84, Standard Practice for
29 Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal
30 Insulation.

31 ~~Φ. S.~~ S. ASTM C 1029-85, Standard Specification for
32 Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.

33 T. ASTM C 1114-89, Standard Test Method for
34 Steady-State Thermal Transmission Properties by Means of the
35 Thin-Heater Apparatus.

36 U. ASTM C 1126-89, Standard Specification for Faced

1 or Unfaced Rigid Cellular Phenolic Thermal Insulation.

2 V. ASTM D 2842-69 (reapproved 1975), Standard Test
3 Method for Water Absorption of Rigid Cellular Plastics.

4 W. ASTM E 84-84 Revision A, Surface Burning
5 Characteristics of Building Materials.

6 X. ASTM E 408-71 (reapproved 1985), Standard Test
7 Methods for Total Normal Emittance of Surfaces Using Inspection
8 Meter Techniques.

9 Y. ASTM E 605-77 (reapproved 1982), Thickness and
10 Density of Sprayed Fire-Resistive Material Applied to Structural
11 Members.

12 Z. ASTM E 736-86, Test for Cohesion/Adhesion of
13 Sprayed Fire Resistive Materials Applied to Structural Members.

14 [For text of subp 2a, see M.R.]

15 Subp. 3. **Other incorporation and citations.** The following
16 non ASTM standards are also incorporated by reference:

17 A. ASHRAE Handbook of Fundamentals, (1989 Edition)
18 by the American Society of Heating, Refrigerating and Air
19 Conditioning Engineers, Inc., chapter 22, tables 1 and 2.

20 [For text of item B, see M.R.]

21 C. Code of Federal Regulations, title 16, part 460,
22 Labeling and Advertising of Home Insulation.

23 [For text of items D to J, see M.R.]

24 K. Code of Federal Regulations, title 40, part 248,
25 Guideline for Federal Procurement of Building Insulation
26 Products Containing Recovered Materials.

27 L. Underground Space Center, University of Minnesota;
28 Building Foundation Design Handbook; Prepared for Oak Ridge
29 National Laboratory; May 1988, Table 7-4.

30 [For text of subp 4, see M.R.]

31

32 REPEALER. Minnesota Rules, part 7640.0110, subpart 5, is
33 repealed.