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# ESR-2100

Reissued 02/2017  
This report is subject to renewal 02/2018.

**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**  
**SECTION: 07 21 00—THERMAL INSULATION**

**REPORT HOLDER:**

## **RHINO LININGS CORPORATION**

**1002 WEST MAIN STREET  
RICHMOND, MISSOURI 64085**

**EVALUATION SUBJECT:**

**RHINO LININGS THERMALGUARD OC.5R, THERMALGUARD OC.5 AND THERMALGUARD CC2  
SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION**



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### DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

#### Section: 07 21 00—Thermal Insulation

#### REPORT HOLDER:

**RHINO LININGS CORPORATION**  
1002 WEST MAIN STREET  
RICHMOND, MISSOURI 64085  
(816) 776-3015

#### EVALUATION SUBJECT:

**RHINO LININGS THERMALGUARD OC.5R,  
THERMALGUARD OC.5 AND THERMALGUARD CC2  
SPRAY-APPLIED POLYURETHANE FOAM PLASTIC  
INSULATION**

### 1.0 EVALUATION SCOPE

#### 1.1 Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2015, 2012 and 2009 *International Energy Conservation Code*® (IECC)

#### Properties evaluated:

- Surface-burning characteristics
- Physical properties
- Thermal resistance (R-value)
- Attic and crawl space installation
- Vapor permeance
- Air permeability

#### 1.2 Evaluation to the following green standard:

- 2008 ICC 700 *National Green Building Standard*™ (ICC 700-2008)

#### Properties evaluated:

- See Section 2.0

### 2.0 USES

Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5 and ThermalGuard CC2 are used as nonstructural insulations on the interior of buildings of Type V-B construction (IBC) and structures built in accordance with the IRC. The insulation is recognized for use in wall cavities, floor assemblies, and ceiling assemblies, when installed in accordance with Section 4.0.

Under the IRC and 2015 IBC, Rhino Linings ThermalGuard OC.5 and ThermalGuard CC2 insulation may be used as air-impermeable insulation when installed in accordance with Sections 3.5 and 4.4. The insulation is recognized for use in attics and crawl spaces, when installed in accordance with Section 4.4.

The attributes of the insulation have been verified as conforming to the provisions of ICC 700-2008 Section 703.2.1.1.1(c) as an air impermeable insulation. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

### 3.0 DESCRIPTION

#### 3.1 General:

**3.1.1 Rhino Linings ThermalGuard OC.5R:** Rhino Linings ThermalGuard OC.5R is a two-component, spray-applied, semirigid, low-density, open-cell polyurethane foam plastic insulation. The foam plastic insulation is spray-applied in the field at a nominal density of 0.45 pcf (7.2 kg/m<sup>3</sup>) by combining a polymeric isocyanate (A component) with a proprietary resin (B component). The components have a shelf life of 90 days from the date of manufacture, when stored in the original, unopened containers at temperatures between 55°F and 85°F (12.5°C and 29.5°C).

**3.1.2 Rhino Linings ThermalGuard OC.5:** Rhino Linings ThermalGuard OC.5 is a two-component, spray-applied, semirigid, low-density, open-cell polyurethane foam plastic insulation. The foam plastic insulation is spray-applied in the field at a nominal density of 0.50 pcf (8.0 kg/m<sup>3</sup>) by combining a polymeric isocyanate (A component) with a proprietary resin (B component). The components have a shelf life of 90 days from the date of manufacture, when stored in the original, unopened containers at temperatures between 55°F and 85°F (12.5°C and 29.5°C).

**3.1.3 Rhino Linings ThermalGuard CC2:** Rhino Linings ThermalGuard CC2 is a two-component, spray-applied, semirigid, medium-density, closed-cell polyurethane foam plastic insulation. The foam plastic insulation is spray-applied in the field at a nominal density of 2.5 pcf (40.0 kg/m<sup>3</sup>) by combining a polymeric isocyanate (A component) with a proprietary resin (B component). The components have a shelf life of 90 days from the date of manufacture, when stored in the original, unopened containers at temperatures between 55°F and 85°F (12.5°C and 29.5°C).

### 3.2 Surface-burning Characteristics:

**3.2.1 Rhino Linings ThermalGuard OC.5R:** Rhino Linings ThermalGuard OC.5R has a flame-spread index of 25 or less and a smoke-developed index of 450 or less, when tested in accordance with ASTM E84 (UL 723), at a maximum thickness of 5.5 inches (140 mm) and a nominal density of 0.45 pcf (7.2 kg/m<sup>3</sup>). There is no thickness limitation on the insulation when installed behind a code-prescribed 15-minute thermal barrier.

**3.2.2 Rhino Linings ThermalGuard OC.5:** Rhino Linings ThermalGuard OC.5 has a flame-spread index of 25 or less and a smoke-developed index of 450 or less, when tested in accordance with ASTM E84 (UL 723), at a maximum thickness of 4.0 inches (102 mm) and a nominal density of 0.50 pcf (8.0 kg/m<sup>3</sup>). There is no thickness limitation on the insulation when installed behind a code-prescribed 15-minute thermal barrier.

**3.2.3 Rhino Linings ThermalGuard CC2:** Rhino Linings ThermalGuard CC2 has a flame-spread index of 25 or less and a smoke-developed index of 450 or less, when tested in accordance with ASTM E84 (UL 723), at a maximum thickness of 4.0 inches (102 mm) and a nominal density of 2.65 pcf (42.4 kg/m<sup>3</sup>). There is no thickness limitation on the insulation when installed behind a code-prescribed 15-minute thermal barrier.

### 3.3 Thermal Resistance:

Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5 and ThermalGuard CC2 have the thermal resistances (*R*-values), at a mean test temperature of 75°F ± 5°F, as shown in Table 1.

### 3.4 Vapor Permeance (Rhino Linings ThermalGuard CC2 only):

Rhino Linings ThermalGuard CC2 has a vapor permeance of greater than 0.1 perms (5.7 x 10<sup>-10</sup> kg/Pa • s • m<sup>2</sup>) and less than or equal to 1 perm (5.7 x 10<sup>-11</sup> kg/Pa • s • m<sup>2</sup>) when applied at a minimum of 1.5 inches (38 mm) thickness and may be used where a Class II vapor retarder is required by the code.

### 3.5 Air Permeability (Rhino Linings ThermalGuard OC.5 and ThermalGuard CC2 only):

Rhino Linings ThermalGuard OC.5 and ThermalGuard CC2 are considered air-impermeable insulations in accordance with 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) and 2015 IBC Section 1203.3 at the following minimum thicknesses, based on testing in accordance with ASTM E2178:

- ThermalGuard OC.5: 5.5 inches (140 mm)
- ThermalGuard CC2: 1 inch (25.4 mm)

### 3.6 DC315 Intumescent Coating:

DC315 Intumescent Coating, manufactured by International Fireproof Technology, Inc., is a single-component, water-based, liquid-applied intumescent coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of two years when stored in factory-sealed containers at temperatures between 41°F (5°C) and 95°F (35°C).

### 3.7 TPR<sup>2</sup> FIRESHIELD® F10E:

TPR<sup>2</sup> FIRESHIELD® F10E intumescent coating, manufactured by TPR<sup>2</sup> Corporation, is a proprietary, water-based, one-part, nonflammable coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of 12 months when stored in factory-sealed containers at temperatures between 45°F (7°C) and 95°F (35°C).

## 4.0 INSTALLATION

### 4.1 General:

Installation of Rhino Linings ThermalGuard insulations must comply with this report, the manufacturer's published installation instructions, and the applicable code. The manufacturer's installation instructions and this report must be strictly adhered to, and a copy of the manufacturer's published installation instructions and this evaluation report must be available at the jobsite at all times during installation.

### 4.2 Application:

**4.2.1 General:** Rhino Linings ThermalGuard foam plastic insulations are applied at the jobsite using spray equipment specified by the manufacturer, which mixes components A and B at a one-to-one ratio. The insulation must not be installed in areas having a maximum service temperature greater than 180°F (82°C). The insulation must be applied when the ambient and substrate temperatures are above 32°F (0°C) and below 110°F (43°C). The substrates to which the insulation is applied must be clean, dry and free of frost, ice, loose debris, or contaminants that will interfere with adhesion of the spray foam insulation. The foam plastic must not be sprayed into electrical outlet or junction boxes or used in contact with water or soil. The foam plastic insulation must be protected from the weather during and after application.

Rhino Linings ThermalGuard OC.5R foam plastic insulation may be installed at a maximum thickness of 6 inches (152 mm) in one pass. Each pass of insulation must be allowed to cure for a minimum of 20 minutes prior to application of a subsequent pass.

Rhino Linings ThermalGuard OC.5 foam plastic insulation may be installed at a maximum thickness of 6 inches (152 mm) in one pass. Each pass of insulation must be allowed to cure for a minimum of 15 minutes prior to application of a subsequent pass.

Rhino Linings ThermalGuard CC2 foam plastic insulation may be installed at a maximum thickness of 4 inches (102 mm) in one pass. Each pass of insulation must be allowed to cure for a minimum of 15 minutes prior to application of a subsequent pass.

### 4.3 Thermal Barrier:

#### 4.3.1 ThermalGuard OC.5R:

**4.3.1.1 Application with a Prescriptive Thermal Barrier:** Rhino Linings ThermalGuard OC.5R insulation must be separated from the interior of the building by an approved thermal barrier, such as 1/2-inch (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier, in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable. Exception: Within an attic or crawl space, installation must be in accordance with Section 4.4. There is no thickness limit when installed behind a code-prescribed thermal barrier.

#### 4.3.2 ThermalGuard OC.5:

**4.3.2.1 Application with a Prescriptive Thermal Barrier:** Rhino Linings ThermalGuard OC.5 insulation must be separated from the interior of the building by an approved thermal barrier, such as 1/2-inch (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier, in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable. Exception: Within an attic or crawl space, installation must be in accordance with Section 4.4. There is no thickness limit when installed behind a code-prescribed thermal barrier.

**4.3.2.2 Application without a Prescriptive Thermal Barrier:** Rhino Linings ThermalGuard OC.5 may be

installed without the prescriptive 15-minute thermal barrier when the installation complies with one of the assemblies described in Table 2.

The Rhino Linings ThermalGuard OC.5 insulation must be covered on all surfaces with the coating listed. The application of the coating must be in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean and free of dirt, loose debris and other substances that could interfere with the adhesion of the coating.

#### 4.3.3 Rhino Linings ThermalGuard CC2:

**4.3.3.1 Application with a Prescriptive Thermal Barrier:** Rhino Linings ThermalGuard CC2 insulation must be separated from the interior of the building by an approved thermal barrier, such as 1/2-inch (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier, in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable. Exception: Within an attic or crawl space, installation must be in accordance with Section 4.4. There is no thickness limit when installed behind a code-prescribed thermal barrier.

**4.3.3.2 Application without a Prescriptive Thermal Barrier:** Rhino Linings ThermalGuard CC2 may be installed without the prescriptive 15-minute thermal barrier when the installation complies with the assembly described in Table 2.

The Rhino Linings ThermalGuard CC2 insulation must be covered on all surfaces with the coating listed. The application of the coating must be in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean and free of dirt, loose debris and other substances that could interfere with the adhesion of the coating.

#### 4.4 Ignition Barrier – Attics and Crawl Spaces:

##### 4.4.1 Rhino Linings ThermalGuard OC.5R:

**4.4.1.1 Application with a Prescriptive Ignition Barrier:** When the Rhino Linings ThermalGuard OC.5R insulation is installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable code and must be installed in a manner so that the foam plastic insulation is not exposed. The attic or crawl space must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.1.

##### 4.4.2 Rhino Linings ThermalGuard OC.5:

**4.4.2.1 Application with a Prescriptive Ignition Barrier:** When the Rhino Linings ThermalGuard OC.5 insulation is installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable code and must be installed in a manner so that the foam plastic insulation is not exposed. The attic or crawl space must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.1.

**4.4.2.2 Application without a Prescriptive Ignition Barrier:** Rhino Linings ThermalGuard OC.5 insulation may be installed within an attic or crawl space without a prescriptive ignition barrier when all of the following conditions apply:

1. Entry to the attic or crawl space is only for the service of utilities and no storage is permitted.
2. There are no interconnected attic or crawl space areas.
3. Air in the attic or crawl space is not circulated to other parts of the building.
4. Combustion air is provided in accordance with IMC (International *Mechanical Code*<sup>®</sup>) Section 701.
5. Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with Section R806.4 of IRC. Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.

In attics and crawl spaces, Rhino Linings ThermalGuard OC.5 insulation may be spray-applied to the underside of the roof sheathing and/or rafters, and to the vertical walls and the underside of floors as described in Table 3. The thickness of the foam plastic applied to the underside of the roof sheathing and to vertical wall surfaces must not exceed the thickness set forth in Table 3. The coating must be applied over all surfaces of the Rhino Linings ThermalGuard OC.5 insulation to the thickness set forth in Table 3 in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris and other substances that could interfere with adhesion of the coating. The coating is applied in one coat with low-pressure airless spray equipment. The attic or crawl space must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.1.

Rhino Linings ThermalGuard OC.5 insulation, when used as air impermeable insulation, may be installed in unvented attics as described in this section in accordance with 2015 or 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2015 IBC Section 1203.3. The minimum thickness shall be as set forth in Section 3.5.

**4.4.2.3 Use on Attic Floors:** Rhino Linings ThermalGuard OC.5 insulation may be installed at a maximum thickness of 7 1/2 inches (191 mm) between joists of the attic floor when installation is in accordance with Section 4.4.2.2. The insulation must be separated from the area beneath the attic by an approved 15-minute thermal barrier. The ignition barrier prescribed in IBC Section 2603.4.1.6 and IRC Section R316.5 may be omitted.

##### 4.4.3 Rhino Linings ThermalGuard CC2:

**4.4.3.1 Application with a Prescriptive Ignition Barrier:** When the Rhino Linings ThermalGuard CC2 insulation is installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable code and must be installed in a manner so that the foam plastic insulation is not exposed. The attic or crawl space must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.1.

Rhino Linings ThermalGuard CC2 insulation, when used as air impermeable insulation, may be installed in unvented attics as described in this section in accordance with 2015 or 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2015 IBC Section 1203.3. The minimum thickness shall be as set forth in Section 3.5.

**4.4.3.2 Application without a Prescriptive Ignition Barrier:** Rhino Linings ThermalGuard CC2 may be installed within an attic or crawl space without a prescriptive ignition barrier when all of the following conditions apply and the application complies with either Section 4.4.3.2.1 or 4.4.3.2.2:

1. Entry to the attic or crawl space is only for the service of utilities and no storage is permitted.
2. There are no interconnected attic or crawl space areas.
3. Air in the attic or crawl space is not circulated to other parts of the building.
4. Combustion air is provided in accordance with IMC (International Mechanical Code®) Section 701.
5. Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2015 IBC Section 1203.3. Under-floor (crawl-space) ventilation is provided when required by 2015 IBC Section 1303.4 (2012 and 2009 IBC Section 1203.3) or IRC Section R408.1, as applicable.

**4.4.3.2.1 Application with Coating:** In attics and crawl spaces, Rhino Linings ThermalGuard CC2 insulation may be spray-applied to the underside of the roof sheathing and/or rafters, and to the vertical walls and the underside of floors as described in Table 3. The thickness of the foam plastic applied to the underside of the roof sheathing and to vertical wall surfaces must not exceed the thickness set forth in Table 3. The coating must be applied over all surfaces of the Rhino Linings ThermalGuard OC.5 insulation to the thickness set forth in Table 3 in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris and other substances that could interfere with adhesion of the coating. The coating is applied in one coat with low-pressure airless spray equipment. The attic or crawl space must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.1.

**4.4.3.2.2 Application without Coating:** In attics and crawl spaces, Rhino Linings ThermalGuard CC2 insulation may be spray-applied to the underside of the roof sheathing and/or rafters, and to the vertical walls and the underside of floors as described in Table 3. The thickness of the foam plastic applied to the underside of the roof sheathing and to vertical wall surfaces must not exceed the thickness set forth in Table 3. The insulation may be left exposed without an ignition barrier or coating. The attic or crawl space must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.1.

Rhino Linings ThermalGuard CC2 insulation, when used as air impermeable insulation, may be installed in unvented attics as described in this section in accordance with 2015 or 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2015 IBC Section 1203.3. The minimum thickness shall be as set forth in Section 3.5.

**4.4.3.3 Use on Attic Floors:** Rhino Linings ThermalGuard CC2 insulation may be installed at a maximum thickness of 7½ inches (191 mm) between joists of the attic floor. The installation may be with or without an ignition barrier or coating (see Table 3). The insulation must be separated from the area beneath the attic by an approved 15-minute thermal barrier as described in Section 4.3.1.1.

## 5.0 CONDITIONS OF USE

The Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5 and ThermalGuard CC2 foam plastic insulations described in this report comply with, or are a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5 and ThermalGuard CC2 must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. If there is a conflict between the installation instructions and this report, this report governs.
- 5.2** Rhino Linings ThermalGuard OC.5R must be separated from the interior of the building by an approved 15-minute thermal barrier. ThermalGuard OC.5 and ThermalGuard CC2 must be separated from the interior of the building by an approved 15-minute thermal barrier, except when installed in accordance with Section 4.3.2.2 or 4.3.3.2, respectively.
- 5.3** Rhino Linings ThermalGuard OC.5R must be separated from the interior of attics or crawl spaces by an approved ignition barrier. Rhino Linings ThermalGuard OC.5 and ThermalGuard CC2 must be separated from the interior of attics or crawl spaces by an approved ignition barrier, except when installed in accordance with Section 4.4.2.2, 4.4.2.3, 4.4.3.2 or 4.4.3.3, for the respective insulations and applications.
- 5.4** Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5 and ThermalGuard CC2 must not exceed the thicknesses and densities noted in this report.
- 5.5** Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5 and ThermalGuard CC2 must be protected from the weather during and after application.
- 5.6** Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5 and ThermalGuard CC2 insulation must be applied by contractors certified by Rhino Linings Corporation.
- 5.7** Use of Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5 and ThermalGuard CC2 in areas where the probability of termite infestation is "very heavy" must be in accordance with IRC Section R318.4 or 2015 or 2009 IBC Section 2603.8 (2012 IBC Section 2603.9), as applicable.
- 5.8** Jobsite certification and labeling of the insulation must comply with 2015 IRC Section N1101.10, 2012 IRC Section N1101.14 (2009 IRC Sections N1101.4 and N1101.4.1) or 2015 or 2012 IECC Sections C303.1, R303.1 and R401.3 (2009 IECC Section 303.1 and 401.3) (2009 IECC Sections 303.1.1 and 303.1.2), as applicable.
- 5.9** A vapor retarder must be installed in accordance with the applicable code.
- 5.10** Components A and B are produced in Richmond, Missouri, under a quality-control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

- 6.1** Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated May 2015.
- 6.2** Reports of room corner fire testing in accordance with NFPA 286.

6.3 Reports of air permeance testing in accordance with ASTM E2178.

6.4 Reports of fire testing in accordance with Appendix X of AC377.

**7.0 IDENTIFICATION**

Containers of the A and B components of the spray-applied foam plastic insulation are identified with the manufacturer's name (Rhino Linings Corporation) and

address, the product name [ThermalGuard OC.5R, ThermalGuard OC.5 or ThermalGuard CC2], the product type (component A or B), the shelf life expiration date, the lot number, density, flame spread and smoke developed indices and the evaluation report number (ESR-2100).

Intumescent coatings are identified with the manufacturer's name and address, the product trade name and use instructions.

**TABLE 1—THERMAL RESISTANCE (R-VALUES<sup>1,2</sup>)**

THICKNESS (inches)	R-VALUE (°F·ft <sup>2</sup> ·h/Btu)		
	THERMALGUARD OC.5R	THERMALGUARD OC.5	THERMALGUARD CC2
1	4.3	3.8	6.5
2	8.5	7.2	23
3.0	12	11	19
3.5	14	12	22
4	16	14	25
4.5	18	16	28
5.0	20	18	31
5.5	22	19	34
6.0	24	21	37
6.5	26	23	40
7.0	28	25	43
7.5	30	26	46
8.0	32	28	49
9.0	36	32	56
10.0	40	35	62
11.0	44	39	68
11.5	46	40	71

For SI: 1 inch = 25.4 mm; 1°F·ft<sup>2</sup>·h/Btu = 0.176 110 °K·m<sup>2</sup>/W.

<sup>1</sup> R-values are calculated based on tested k values at a 1-inch and 4-inch (102 mm) thickness.

<sup>2</sup> R-values greater than 10 are rounded to the nearest whole number.

**TABLE 2—USE OF INSULATION WITHOUT A PRESCRIPTIVE THERMAL BARRIER**

INSULATION TYPE	MAXIMUM THICKNESS (in) (Wall Cavities)	MAXIMUM THICKNESS (in) (Ceilings, Underside of Roof Sheathing / Rafters & Floors)	FIRE-PROTECTIVE COATING MINIMUM THICKNESS & TYPE (Applied to all Foam Surfaces)	MINIMUM APPLICATION RATE OF FIRE-PROTECTIVE COATING	MAY BE LEFT EXPOSED AS AN INTERIOR FINISH	TESTS SUBMITTED
ThermalGuard OC.5	7½	11½	Fireshell F10E 17 wet mils [11 dry mils]	1.16 gal / 100 ft <sup>2</sup>	Yes	NFPA 286
	7½	11½	DC315 18 wet mils [13 dry mils]	1.12 gal / 100 ft <sup>2</sup>	Yes	NFPA 286
ThermalGuard CC2	7½	9½	Fireshell F10E 18 wet mils [12 dry mils]	1.23 gal / 100 ft <sup>2</sup>	Yes	NFPA 286

**TABLE 3—USE OF INSULATION IN ATTICS AND CRAWL SPACES WITHOUT A PRESCRIPTIVE IGNITION BARRIER**

INSULATION TYPE	MAXIMUM THICKNESS (in) (Wall Cavities and Attic Floors)	MAXIMUM THICKNESS (in) (Underside of Roof Sheathing/Rafters)	FIRE-PROTECTIVE COATING MINIMUM THICKNESS AND TYPE (Applied to all Exposed Foam Surfaces)	MINIMUM APPLICATION RATE OF THE FIRE-PROTECTIVE COATING	TESTS SUBMITTED (AC377)
ThermalGuard OC.5	7½	9½	Fireshell F10E 6 wet mils [4 dry mils]	0.41 gal/100 ft <sup>2</sup>	Appendix X
ThermalGuard CC2	7½	9½	Fireshell F10E 5 wet mils [3 dry mils]	0.27 gal/100 ft <sup>2</sup>	Appendix X
	7½	11½	No covering required	N/A	Appendix X

For SI: 1 inch = 25.4 mm; 1 mil = 0.0254 mm; 1 gallon = 3.38 L; 1 ft<sup>2</sup> = 0.93 m<sup>2</sup>.