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ICC-ES Evaluation Report
ESR-2100

Reissued February 2023
Revised November 2023
This report is subject to renewal February 2025.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 21 00—Thermal Insulation

REPORT HOLDER:

RHINO LININGS CORPORATION

EVALUATION SUBJECT:

RHINO LININGS THERMALGUARD OC.5R, THERMALGUARD OC.5, THERMALGUARD CC2 AND THERMALGUARD OC 500 SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2021, 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2021, 2018, 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2021, 2018, 2015, 2012 and 2009 *International Energy Conservation Code*® (IECC)

For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see ESR-2100 LABC and LARC Supplement.

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, ThermalGuard CC2 and ThermalGuard OC 500 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 for use in wall cavities, floor assemblies, and ceiling assemblies, when installed in accordance with Section 4.0.

Under the IRC and 2021, 2018 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 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, semi-rigid, 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^3) 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, semi-rigid, 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^3) 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, semi-rigid, 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^3) 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).

3.1.4 Rhino Linings ThermalGuard OC 500: Rhino Linings ThermalGuard OC 500 is a two-component, spray-applied, semi-rigid, 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^3) 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^3). There is no thickness limitation on the insulation when installed behind a code-prescribed 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^3). There is no thickness limitation on the insulation when installed behind a code-prescribed 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^3). There is no thickness limitation on the insulation when installed behind a code-prescribed thermal barrier.

3.2.4 Rhino Linings ThermalGuard OC 500: Rhino Linings ThermalGuard OC 500 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 0.45 pcf (7.2 kg/m^3). There is no thickness limitation on the insulation when installed behind a code-prescribed thermal barrier.

3.3 Thermal Resistance:

Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5, ThermalGuard CC2 and ThermalGuard OC 500 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^{-10} kg/Pa • s • m^2) and less than or equal to 1 perm (5.7 x 10^{-11} kg/Pa • s • m^2) 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 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) and 2021 and 2018 IBC Section 1202.3 (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 DC 315 Coating:

DC 315 Coating, manufactured by International Fireproof Technology, Inc. (ESR-3702), 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 one year when stored in factory-sealed containers at temperatures between 50°F (10°C) and 80°F (27°C).

3.7 ICP Construction FIRESHELL® F10E:

ICP Construction FIRESHELL® F10E coating, manufactured by ICP Construction (ESR-3997), 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 (7.2°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 outlets 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.

Rhino Linings ThermalGuard OC 500 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 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 thermal barrier, in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable. 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 thermal barrier, in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable. 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 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 thermal barrier, in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable. 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 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.

4.3.4 Rhino Linings ThermalGuard OC 500:

4.3.4.1 Application with a Prescriptive Thermal Barrier:

Rhino Linings ThermalGuard OC 500 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 thermal barrier, in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable. There is no thickness limit when installed behind a code-prescribed thermal barrier.

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 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 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*®) Section 701.
5. If hot work is to be performed, all necessary procedures, precautions and limitations must be observed in accordance with OSHA 1926 Subpart J Standard 1926.352 requirements for hot work (welding / cutting) performed in the vicinity of combustible materials.
6. An installation certificate with the following information must be posted at each entrance:

- Product name and installation thickness.
- Manufacturer name, address and contact information.
- Installation contractor name, address and contact information.
- A notice that the certificate is not to be removed or altered.
- Attestation that the product(s) have been installed in accordance with the manufacturer's installation instructions and the requirements of the evaluation report.
- A list of limitations for the space including the following:
  - Entry to the space is only to service utilities, and no storage is permitted.
  - FIRE SAFETY WARNING: If hot work is to be performed, all necessary procedures, precautions and limitations must be observed in accordance with OSHA 1926 Subpart J Standard 1926.352 requirements for hot work (welding / cutting) performed in the vicinity of combustible materials.

7. Attic ventilation is provided when required by 2021 and 2018 IBC Section 1202.2 (2015, 2012 and 2009 IBC Section 1203.2) or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4). Under-floor (crawl space) ventilation is provided when required by 2021, 2018 IBC Section 1202.4 [2015 IBC Section 1203.4 (2012 and 2009 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 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 2021, 2018, 2015 or 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2021 and 2018 IBC Section 1202.3 (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 thermal barrier. The ignition barrier prescribed in IBC Section 2603.4.1.6 and IRC Section R316.5.3 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 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 2021, 2018, 2015 or 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2021 and 2018 IBC Section 1202.2 (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. If hot work is to be performed, all necessary procedures, precautions and limitations must be observed in accordance with OSHA 1926 Subpart J Standard 1926.352 requirements for hot work (welding / cutting) performed in the vicinity of combustible materials.
6. An installation certificate with the following information must be posted at each entrance:
   - Product name and installation thickness.
   - Manufacturer name, address and contact information.
   - Installation contractor name, address and contact information.
   - A notice that the certificate is not to be removed or altered.
   - Attestation that the product(s) have been installed in accordance with the manufacturer's installation instructions and the requirements of the evaluation report.
   - A list of limitations for the space including the following:
     - Entry to the space is only to service utilities, and no storage is permitted.
     - FIRE SAFETY WARNING: If hot work is to be performed, all necessary procedures, precautions and limitations must be observed in accordance with OSHA 1926 Subpart J Standard 1926.352 requirements for hot work (welding / cutting) performed in the vicinity of combustible materials.
7. Attic ventilation is provided when required by 2021 and 2018 IBC Section 1202.2 (2015, 2012 and 2009 IBC

Section 1203.2) or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3). Under-floor (crawl-space) ventilation is provided when required by 2021 and 2018 IBC Section 1202.4 [2015 IBC Section 1203.4 (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 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 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 2021, 2018, 2015 or 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2021 and 2018 IBC Section 1202.3 (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 $7^1/_2$ 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 thermal barrier as described in Section 4.3.1.1.

4.4.4 Rhino Linings Thermal Guard OC 500:

4.4.4.1 Application with a Prescriptive Ignition Barrier:

When the Rhino Linings ThermalGuard OC 500 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 thermal barrier as described in Section 4.3.4.1.

5.0 CONDITIONS OF USE

The Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5, ThermalGuard CC2 and ThermalGuard OC 500 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, ThermalGuard CC2 and ThermalGuard OC 500 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 and ThermalGuard OC 500 must be separated from the interior of the building by an approved thermal barrier. ThermalGuard OC.5 and ThermalGuard CC2 must be separated from the interior of the building by an approved 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 and ThermalGuard OC 500 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, ThermalGuard CC2 and ThermalGuard OC 500 must not exceed the thicknesses and densities noted in this report.

5.5 Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5, ThermalGuard CC2 and ThermalGuard OC 500 must be protected from the weather during and after application.

5.6 Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5, ThermalGuard CC2 and ThermalGuard OC 500 insulation must be applied by contractors certified by Rhino Linings Corporation.

5.7 Use of Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5, ThermalGuard CC2 and ThermalGuard OC 500 in areas where the probability of termite infestation is "very heavy" must be in accordance with IRC Section R318.4 or 2021, 2018, 2015 and 2009 IBC Section 2603.8 (2012 IBC Section 2603.9), as applicable.

5.8 Jobsite certification and labeling of the insulation must comply with 2021, 2018 and 2015 IRC Section N1101.10 [2012 IRC Section N1101.12 (2009 IRC Sections N1101.4 and N1101.4.1)] or 2021, 2018, 2015 and 2012 IECC Sections C303.1, R303.1 and R401.3 (2009 IECC Section 303.1 and 401.3), as applicable.

5.9 When installed in accordance with Section 4.4.2.2 or 4.4.3.2 of this report, the associated installation certificate(s) containing the required information referenced in Section 4.4.2 and 4.4.3 must be installed at each entrance to the crawlspace or attic, as applicable. The certificate(s) must be red in color and constructed of durable materials, such as metal, plastic, or laminated paper.

5.10 When used in unvented attics in accordance with Section 4.4.2.2 or 4.4.3.2 of this report, installation with a vapor diffusion port in accordance with 2021 IBC Section 1202.3, Item 5.2 or 2021 and 2018 IRC Section R806.5, Item 5.2 is outside the scope of this report.

5.11 A vapor retarder must be installed in accordance with the applicable code.

5.12 Components A and B are produced in Greenville, Texas and 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 June 2023.

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

7.1 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, ThermalGuard CC2 or ThermalGuard OC 500], 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).

International Fireproof Technology, Inc. , DC 315 coating is labeled with the manufacturer's name and address, the product name, the date of manufacture, the shelf life or expiration date, the manufacturer's instructions for application, and evaluation report number (ESR-3702).

ICP Construction Fireshell F10E coating is labeled with the manufacturer's name and address, the product name, the date of manufacture, the shelf life or expiration date, the manufacturer's instructions for application, and the evaluation report number (ESR-3997).

7.2 The report holder's contact information is the following:

RHINO LININGS CORPORATION
9747 BUSINESS PARK
SAN DIEGO, CALIFORNIA 92131
(858) 410-6007

TABLE 1—THERMAL RESISTANCE (*R*-VALUES[1,2])

THICKNESS (inches)	*R*-VALUE (°F•ft²•h/Btu)			
	THERMALGUARD OC.5R	THERMALGUARD OC.5	THERMALGUARD CC2	THERMALGUARD OC 500
1	4.3	3.8	6.5	3.5
2	8.5	7.2	13	6.6
3.0	12	11	19	9.6
3.5	14	12	22	11
4	16	14	25	13
4.5	18	16	28	14
5.0	20	18	31	16
5.5	22	19	34	17
6.0	24	21	37	19
6.5	26	23	40	20
7.0	28	25	43	22
7.5	30	26	46	23
8.0	32	28	49	25
9.0	36	32	56	28
10.0	40	35	62	31
11.0	44	39	68	34
11.5	46	40	71	35

For **SI:** 1 inch = 25.4 mm; 1°F•ft²•h/Btu = 0.176 110 °k•m²/W.
[1] *R*-values are calculated based on tested k values at a 1-inch and 4-inch (102 mm) thickness.
[2] *R*-values greater than 10 are rounded to the nearest whole number.

TABLE 2—USE OF INSULATION WITHOUT A PRESCRIPTIVE THERMAL BARRIER[1]

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)[2]	MINIMUM APPLICATION RATE OF FIRE-PROTECTIVE COATING	MAY BE LEFT EXPOSED AS AN INTERIOR FINISH	TESTS SUBMITTED
ThermalGuard OC.5	7 1/2	11 1/2	Fireshell F10E 17 wet mils [11 dry mils]	1.16 gal / 100 ft^2	Yes	NFPA 286
	7 1/2	11 1/2	DC315 18 wet mils [13 dry mils]	1.12 gal / 100 ft^2	Yes	NFPA 286
ThermalGuard CC2	7 1/2	9 1/2	Fireshell F10E 18 wet mils [12 dry mils]	1.23 gal / 100 ft^2	Yes	NFPA 286

For **SI:** 1 inch = 25.4 mm; 1 mil = 0.0254 mm; 1 gallon = 3.38 L; 1 ft^2 = 0.093 m^2.

[1]See Section 4.3.3.2
[2]See Sections 3.6 and 3.7

TABLE 3—USE OF INSULATION IN ATTICS AND CRAWL SPACES WITHOUT A PRESCRIPTIVE IGNITION BARRIER[1]

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) [2]	MINIMUM APPLICATION RATEOF THE FIRE-PROTECTIVE COATING	TESTS SUBMITTED (AC377)
ThermalGuard OC.5	7 1/2	9 1/2	Fireshell F10E 6 wet mils [4 dry mils]	0.41 gal/100 ft^2	Appendix X
ThermalGuard CC2	7/2	9 1/2	Fireshell F10E 5 wet mils [3 dry mils]	0.27 gal/100 ft^2	Appendix X
	7 1/2	11 1/2	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^2 = 0.093 m^2.

[1]See Section 4.4.3.2
[2]See Section 3.7

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 21 00—Thermal Insulation

REPORT HOLDER:

RHINO LININGS CORPORATION

EVALUATION SUBJECT:

RHINO LININGS THERMALGUARD OC.5R, THERMALGUARD OC.5, THERMALGUARD CC2 AND THERMALGUARD OC 500 SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Rhino Linings ThermalGuard foam plastic insulations, described in ICC-ES evaluation report ESR-2100, have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Rhino Linings ThermalGuard foam plastic insulations, described in Sections 2.0 through 7.0 of the evaluation report ESR-2100, comply with the LABC Chapter 26, and the LARC Section R316, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Rhino Linings ThermalGuard foam plastic insulations described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-2100.
- The design, installation, conditions of use and identification of the Rhino Linings ThermalGuard foam plastic insulations are in accordance with the 2018 *International Building Code*® (IBC) and 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report ESR-2100.

This supplement expires concurrently with the evaluation report, reissued February 2023 and revised November 2023.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 21 00—Thermal Insulation

REPORT HOLDER:

RHINO LININGS CORPORATION

EVALUATION SUBJECT:

RHINO LININGS THERMALGUARD OC.5R, THERMALGUARD OC.5, THERMALGUARD CC2 AND THERMALGUARD OC 500 SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5, ThermalGuard CC2 and ThermalGuard OC 500, described in ICC-ES evaluation report ESR-2100, have also been evaluated for the codes noted below.

Applicable code editions:

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of the State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code* (CRC)
- 2019 *California Energy Code* (CEC)

2.0 CONCLUSIONS

2.1 CBC and CRC:

The Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5, ThermalGuard CC2 and ThermalGuard OC 500, described in Sections 2.0 through 7.0 of the evaluation report ESR-2100, comply with the 2019 CBC and CRC, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report.

2.1.1 OSHPD: The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA: The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 CEC:

The Rhino Linings ThermalGuard OC.5R, ThermalGuard OC.5, ThermalGuard CC2 and ThermalGuard OC 500, described in Sections 2.0 through 7.0 of the evaluation report ESR-2100, comply with the 2019 CEC, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report.

2.2.1 Conditions of Use:

In accordance with Section 110.8 of the 2019 California Energy Code, verification of certification by the Department of Consumer Affairs, Bureau of Household Goods and Services, must be provided to the code official, demonstrating that the insulation conductive thermal performance is approved pursuant to the California Code of Regulations, Title 24, Part 12, Chapters 12-13, Article 3, “Standards for Insulating Material.” Certification can be verified with the DCA Bureau of Household Goods and Services using the following link to the bureau’s Directory of Certified Insulation Materials: https://bhgs.dca.ca.gov/consumers/ti_directory.pdf

This supplement expires concurrently with the evaluation report, reissued February 2023 and revised November 2023.