

**ICC-ES Evaluation Report****ESR-2672**

Reissued September 1, 2013

This report is subject to renewal April 1, 2014.

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**DIVISION: 04 00 00—MASONRY**  
**Section: 04 51 00—Flue Liner Masonry**  
**Section: 04 53 00—Castable Refractory Masonry**

**REPORT HOLDER:**

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**EVALUATION SUBJECT:****GUARDIAN CHIMNEY LINER®****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2012, 2009 and 2006 *International Residential Code*® (IRC)
- 2012, 2009 and 2006 *International Mechanical Code*® (IMC)

**Properties evaluated:**

Physical properties

**2.0 USES**

Guardian Chimney Liner® is used as a chimney flue liner in masonry chimneys for low-heat, residential-type appliances, in all types of construction in accordance with IBC Section 2113.11.1, item 2; IRC Section R1003.11.1, item 2; or IMC Section 801.16.1, item 2. The lining system is used for the natural draft venting of Category I gas-fired, Type L vented oil-fired, and solid-fuel-fired appliances in which the maximum continuous flue-gas outlet temperatures do not exceed 1000°F (538°C). The system is used for new and existing masonry chimneys and with chimney connectors complying with IMC Section 803.10.3 that pass through a wall or partition constructed of combustible material to reach a masonry chimney.

**3.0 DESCRIPTION**

Guardian Chimney Liner® consists of a proprietary formulation (Guardian Formula) of lightweight cementitious material with lightweight aggregates, a rubber form and spacers. The minimum thickness of the Guardian Chimney Liner® is 3/4 inch (19.1 mm).

**4.0 INSTALLATION****4.1 General:**

The Guardian Chimney Liner® is cast-in-place around a temporary rubber form that is inflated with air to resist the pressure of the cementitious material during curing of the liner system. Prior to installation, the chimney must be inspected from foundation to chimney cap to determine the condition of the stack, presence of any obstructions, adjoining flues, any structural deterioration and required minimum flue size. See Section 5.9 for additional inspection requirements.

Adjoining flue passageways in the same chimney must be separated by a chimney liner. Minimum 4-inch-wide (102 mm) masonry wythes must be installed in accordance with the applicable code between adjacent flues to limit the number of flues to two in any group of adjoining flues.

The chimney termination (flue-gas outlet of the chimney cap) must extend not less than 3 feet (914 mm) above the highest point of the roof penetration and not less than 2 feet (610 mm) higher than any portion of the building within 10 feet (3048 mm) horizontally.

**4.2 Application:**

The entire chimney must be thoroughly cleaned to remove any loose material. All openings such as cleanouts and thimbles are temporarily closed off. A temporary rubber form is inserted into the chimney with spacers to hold the form at the proper location within the chimney. The spacers are either field-cast from the Guardian Chimney Liner® material to a size of 1 inch by 2 inches (25.4 mm by 51 mm), or field-formed from 14 gauge steel wire. When the form and spacers are properly located and installed within the chimney, the form is inflated to a maximum pressure of 30 psi (206.8 kPa).

The Guardian Formula is prepared by mixing a 60-pound (27.2 kg) bag of formula with approximately 5 gallons (18.9 L) of potable water. The material must be mixed until the consistency of the material is homogeneous. The temperature of the mix before placement must be a minimum of 40°F (4°C). Before placement of the Guardian Formula, the interior of the chimney must be moistened for proper adhesion. The material is pumped and/or placed into the void between the chimney and the form to achieve a minimum cured thickness of 3/4 inch (19.1 mm). During the pumping process, the hose is moved around the perimeter of the void to ensure consistent coverage. Once the Guardian Formula is placed, it must be allowed to cure for 24 hours at a temperature of not less than 40°F (4°C).

After a minimum of a 12-hour cure period, the form is deflated and removed along with the devices used to temporarily close off openings such as cleanouts and thimbles.

The Guardian Formula must terminate at approximately 1 to 3 inches (25 to 76 mm) below the chimney top. Minimum  $\frac{3}{4}$ -inch-thick (19.1 mm) circular clay tile, with an inside diameter equal to that of the Guardian Chimney Liner<sup>®</sup>, must be installed using refractory mortar. The circular clay tile must extend at least 2 inches (51 mm) above the mortar on top of the chimney. The refractory mortar must be used to fill around the circular clay tile and extend 3 to 4 inches (76 to 102 mm) above the chimney top without decreasing the size of the flue opening. A chimney cap, complying with the applicable requirements of the code for the type of appliance being used, must be installed in accordance with the chimney cap manufacturer's published installation instructions and the applicable code.

The chimney liner and refractory mortar must be cured for not less than 72 hours after the chimney liner is installed, prior to use of the appliance.

## 5.0 CONDITIONS OF USE

The Guardian Chimney Liner<sup>®</sup> described in this report complies with, or is 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 Installation must comply with this report, the applicable code and the report holder's published installation instructions. In the event of a conflict between the report holder's published installation instructions and this report, this report governs.
- 5.2 When installed in accordance with this report, the report holder's published installation instructions and the applicable code, the exterior of the masonry chimney with the Guardian Chimney Liner<sup>®</sup> may be in contact with combustibles in accordance to IBC Section 2113.19 Exception 1, IRC Section 1003.18 Exception 1 and the Exception to IMC Section 801.18.4.
- 5.3 The Guardian Chimney Liner<sup>®</sup> must be installed from a point not less than 8 inches (203 mm) below the lowest inlet or, in the case of fireplaces, from the top of the smoke chamber to a point above the enclosing walls. The circular clay tile above the liner must extend to a point at least 2 inches (51 mm) above the chimney crown.
- 5.4 Installation of the Guardian Chimney Liner<sup>®</sup> must not reduce the minimum required opening area of the chimney flue passageway.
- 5.5 All thimbles not utilized must be removed and filled with masonry.

5.6 Offset in the chimney liner is outside the scope of this report.

5.7 The Guardian Chimney Liner<sup>®</sup> must be installed by installers trained and approved by Firesafe Industries.

5.8 Application of the Guardian Chimney Liner<sup>®</sup> formula is restricted to ambient, surface and formula temperatures of 40°F (4°C) or greater.

5.9 A special inspection report verifying all of the installation requirements must be prepared and submitted to the code official for approval. The report must be prepared by a registered design professional when required by the jurisdiction in which the project is located. The inspection must include a visual inspection to verify that all wythes and stacks are sound and have been repaired, where necessary, all voids have been filled and any point work has been completed prior to installation of the Guardian Chimney Liner<sup>®</sup>. The inspection must include verification that a smoke test has been conducted and any leakage has been repaired in accordance with the liner manufacturer's published installation instructions. The inspection must also verify that the Guardian Chimney Liner<sup>®</sup> installation is continuous. The inspection must address seismic reinforcing and anchorage of the chimney in accordance with IBC Sections 2113.3 and 2113.4, or IRC Sections R1001.3 and R1001.4, as applicable, or installation is limited to buildings constructed in Seismic Design Categories A, B and C. The special inspection report must include results of all elements of the inspection.

5.10 The chimney liner materials are produced in Donora, Pennsylvania, under a quality control program with inspections by Guardian Fire Testing Laboratories, Inc.

## 6.0 EVIDENCE SUBMITTED

- 6.1 Manufacturer's published installation instructions.
- 6.2 Reports of tests in accordance with UL 1777, including flue gases elevated temperature testing.
- 6.3 Reports of tests in accordance with ASTM C495 for compressive strength, abrasion, resistance to the action of acids and freeze/thaw.
- 6.4 Quality documentation.

## 7.0 IDENTIFICATION

All Guardian Chimney Liner<sup>®</sup> packaging must be marked with the report holder's name (Firesafe Industries) and address, the name of the product (Guardian Chimney Liner<sup>®</sup>), the inspection agency name (Guardian Fire Testing Laboratories, Inc.) and the evaluation report number (ESR-2672).