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# ICC-ES Report

## ESR-2847

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Reissued 09/2015  
This report is subject to renewal 09/2017.

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

**REPORT HOLDER:**

**LAPOLLA INDUSTRIES, INC.**

**15402 VANTAGE PARKWAY E  
HOUSTON, TEXAS 77032**

**EVALUATION SUBJECT:**

**FOAM-LOK FL500 (ALSO KNOWN AS AIRTIGHT OC, GUARDFOAM 55 OC OR OPEN  
CELL RETROFIT FOAM) SPRAY FOAM INSULATION**



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# ICC-ES Evaluation Report

**ESR-2847**

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

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**EVALUATION SUBJECT:**

**FOAM-LOK FL500 (ALSO KNOWN AS AirTight OC,  
GUARDFOAM 55 OC OR OPEN CELL RETROFIT FOAM)  
SPRAY FOAM INSULATION**

**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2012 and 2009 *International Building Code*® (IBC)
- 2012 and 2009 *International Residential Code*® (IRC)
- 2012 and 2009 *International Energy Conservation Code*® (IECC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

- Other Codes (see Section 8.0)

**Properties evaluated:**

- Surface-burning characteristics
- Physical properties
- Thermal resistance (*R*-values)
- Air permeability
- Attic and crawl space installation
- Fire-resistance-rated construction

**2.0 USES**

Foam-LOK FL500 (also known as AirTight OC, GUARDFOAM 55 OC or Open Cell Retrofit Foam) spray foam insulation is used as a nonstructural thermal insulating material in buildings of Type V construction under the IBC and dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies or ceiling assemblies and in attic and crawl space applications as described in Section 4.4. Foam-LOK FL500 spray foam insulation may be used as an air-impermeable insulation. Foam-LOK FL500 may also be used in fire-resistance-

rated wall assemblies when constructed in accordance with Section 4.5 of this report.

**3.0 DESCRIPTION**
**3.1 Foam-LOK FL500:**

Foam-LOK FL500 spray foam insulation is a low-density, cellular polyurethane foam plastic that is installed as a nonstructural component of floor/ceiling and wall assemblies. The material is a two-component, open-cell, one-to-one-by-volume spray foam with a nominal density of 0.5 pcf. The polyurethane foam is produced in the field by combining an isocyanate "A" component and a polymeric resin "B" component. The components have a shelf life of six months when stored in factory-sealed containers at temperatures between 50°F and 80°F (10°C and 27°C). The insulation liquid components are supplied in nominally 55-gallon drums.

**3.2 Surface-burning Characteristics:**

The insulation at a maximum thickness of 5.6 inches (142 mm) and a nominal density of 0.5 pcf, has a flame-spread index of 25 or less and smoke-developed index of 450 or less when tested in accordance with ASTM E84.

**3.3 Thermal Resistance (*R*-values):**

The insulation has thermal resistance (*R*-values), at a mean temperature of 75°F (24°C), as shown in Table 1.

**3.4 Air Permeability:**

Foam-LOK FL500 spray foam insulation at a minimum thickness of 4<sup>1</sup>/<sub>2</sub> inches (114 mm) is considered air-impermeable in accordance with IRC Section R806.4, based on testing in accordance with ASTM E283.

**3.5 FIRE-LOK / DC 315 Fireproof Paint for Foam:**

FIRE-LOK / DC 315, manufactured by International Fireproof Technology, Inc., is a water-based coating supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of twenty four months when stored in a factory-sealed container at temperatures between 50°F and 80°F (10°C and 26.7°C).

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

Foam-LOK FL500 spray foam insulation must be installed in accordance with the manufacturer's published installation instructions, the applicable code and this report. A copy of the manufacturer's published installation instructions must be available at all times on the jobsite during installation.

**4.2 Application:**

The insulation is spray-applied on the jobsite using a

volumetric positive displacement pump as identified in the LAPOLLA application instructions. The Foam-LOK FL500 resin "B" component must be stored at temperatures between 50°F (10°C) and 80°F (27°C). The insulation is used in areas where the maximum ambient temperature is equal to or less than 180°F (82°C). The foam plastic must not be used in electrical outlet or junction boxes or in contact with water. The foam plastic must not be sprayed onto a substrate that is wet, or covered with frost or ice, loose scales, rust, oil, or grease. The insulation must be protected from the weather during and after application. The Foam-LOK FL500 insulation may be spray-applied in one pass up to the maximum thicknesses specified in Section 4.3.

#### 4.3 Thermal Barrier:

##### 4.3.1 Application with a Prescriptive Thermal Barrier:

The Foam-LOK FL500 spray foam insulation must be separated from the interior of the building by an approved thermal barrier of 1/2-inch-thick (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R316.4, as applicable. Thicknesses of up to 12 inches (305 mm) for ceiling cavities and 12 inches (305 mm) for wall cavities are recognized based on room corner fire testing in accordance with NFPA 286, when the insulation is covered with minimum 1/2-inch-thick (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, the applicable code.

##### 4.3.2 Application without a Prescriptive Thermal Barrier:

The prescriptive 15-minute thermal barrier may be omitted when installation is in accordance with this section. The insulation and FIRE-LOK / DC 315 coating, described in Section 3.5, may be spray-applied to the interior facing of walls, the underside of roof sheathing, and in crawl spaces, and may be left exposed as an interior finish without the prescribed 15-minute thermal barrier. The thickness of the foam applied to the underside of roof sheathing must not exceed 1 1/4 inches (286 mm). The thickness of the foam applied to vertical wall surfaces must not exceed 5 1/4 inches (133 mm). The foam plastic must be covered on all exposed surfaces with the FIRE-LOK / DC 315 coating at a minimum wet film thickness of 20-mil (0.51 mm) [dry film thickness of 13 mils (0.33 mm) or 1 gallon ( 3.8 L) per 80 square feet (7.4 m<sup>2</sup>)]. The FIRE-LOK / DC 315 coating must be applied over the Foam-LOK FL 500 insulation 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 any other substances that could interfere with adhesion of the coating.

#### 4.4 Use in Attics and Crawl Spaces:

##### 4.4.1 Application with a Prescriptive Ignition Barrier:

When the spray-applied insulation is installed within attics and crawl spaces, where entry is made only to service utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 or 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.

##### 4.4.2 Application without a Prescriptive Ignition Barrier:

Foam-LOK FL500 spray-applied polyurethane foam insulation may be installed in attics and crawl spaces as described in Sections 4.4.2 and 4.4.3 without the ignition barriers described in IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, subject to the

following conditions:

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

In attics, the insulation may be spray-applied to the underside of roof sheathing or roof rafters, and/or to vertical surfaces; and in crawl spaces, the insulation may be spray-applied to the underside of floors and/or vertical surfaces. The thickness of the foam plastic, applied to the underside of the top of the space, must not exceed 1 1/2 inches ( 292 mm). The thickness of the foam plastic applied to vertical surfaces must not exceed 5 1/2 inches (140 mm). The foam plastic must be covered on all exposed surfaces with the FIRE-LOK / DC 315 coating, described in Section 3.5, at a minimum wet film thickness of 4 mils (0.10 mm) (dry film thickness of 3 mils (0.08 mm) or 1 gallon (3.8 L) per 400 square feet (37.1 m<sup>2</sup>)). The FIRE-LOK / DC 315 coating must be applied over the Foam-LOK FL 500 insulation 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 any other substances that could interfere with adhesion of the coating. The coating must be applied when ambient and substrate temperatures are a minimum of 50°F time. The assembly described in this section may be installed in unvented attics in accordance with IRC Section R806.4, when the foam plastic is applied to a minimum depth of 4 1/2 inches (114 mm).

**4.4.3 Use on Attic Floors:** Foam-LOK FL500 (also known as AirTight OC, GUARDFOAM 55 OC or Open Cell Retrofit Foam) spray-applied polyurethane foam insulation may be installed at a maximum thickness of 5 1/2 inches ( 140 mm) between the joists in an attic floor. The insulation must be covered with FIRE-LOK / DC 315 coating applied as described in Section 4.4.2. The insulation must be separated from the interior of the building by an approved thermal barrier.

#### 4.5 One-hour Fire-resistance-rated Exterior Wall Assemblies (Non-load-bearing):

Foam-LOK FL500 insulation may be used as a component of one-hour fire-resistance-rated, non-load-bearing wall assemblies as described in Section 4.5.1 or 4.5.2.

##### 4.5.1 One-hour Wood-framed Wall Assembly:

**4.5.1.1 Interior and Exterior Face:** One layer of 5/8-inch-thick (15.9 mm), Type X gypsum board, complying with ASTM C36 or ASTM C1396, installed with the long edge parallel to the studs on both sides of nominal 2-inch by 6-inch wood, No. 2 Grade, Southern Yellow Pine, studs spaced 16 inches (406 mm) on center. The gypsum board is secured with 1 1/4-inch-long (32 mm) Type W drywall screws spaced 8 inches (203 mm) on center along the perimeter and in the field. Gypsum board joints must be taped and joints and fastener heads treated with joint compound to Level 2 finish in accordance with ASTM C840 or GA-216.

**4.5.1.2 Stud Cavity:** Nominally 5<sup>1</sup>/<sub>2</sub>-inch-thick FL500 foam insulation is spray-applied in all stud cavities.

**4.5.2 One-hour Steel-framed Wall Assembly:**

**4.5.2.1 Interior and Exterior Face:** Two layers of 5<sup>5</sup>/<sub>8</sub>-inch-thick (15.9 mm), Type X gypsum board, complying with ASTM C36 or ASTM C1396, is installed on both sides of 3<sup>5</sup>/<sub>8</sub>-inch-deep (92 mm), No. 20 gage, galvanized steel studs spaced 24 inches (610 mm) on center. The base layer of the gypsum board is installed with the long edge parallel to the studs and secured with No. 6 by 1<sup>1</sup>/<sub>4</sub>-inch-long (32 mm), self-drilling drywall screws 8 inches (203 mm) on center along the perimeter and 12 inches (305 mm) on center in the field of the wallboard. The face layer of the wallboard is secured with No. 6 by 1<sup>7</sup>/<sub>8</sub>-inch-long (48 mm), self-drilling drywall screws 8 inches (203 mm) on center along the perimeter and in the field of the wallboard. The joints must be staggered from the base layer the face layer and from interior to exterior face of the assembly. Gypsum board joints must be taped and joints and fastener heads treated with joint compound to Level 2 finish in accordance with ASTM C840 or GA-216.

**4.5.3 Stud Cavity:** Nominally 3<sup>5</sup>/<sub>8</sub>-inch-thick Foam-LOK FL500 foam insulation is spray-applied in all stud cavities.

**5.0 CONDITIONS OF USE**

The Foam-LOK FL500 (also known as AirTight OC, GUARDFOAM 55 OC or Open Cell Retrofit Foam) spray foam insulation 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 This evaluation report and the manufacturer's published installation instructions, when required by the code official, must be submitted at the time of permit application.
- 5.2 The Foam-LOK FL500 spray foam insulation must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. If there are conflicts between this report and the manufacturers' published installation instructions, this report governs.
- 5.3 The insulation must be separated from the interior of the building by an approved 15-minute thermal barrier, except when installation is as described in Section 4.3.2 or 4.4.2.
- 5.4 The insulation must not exceed the nominal density and thicknesses noted in Sections 3.2, 4.3, 4.4, and 4.5.
- 5.5 The insulation must be protected from the weather during and after application.
- 5.6 The insulation must be applied by contractors certified by LAPOLLA Industries, Inc.
- 5.7 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IRC Section R318.4 or IBC Section 2603.8, as applicable.
- 5.8 The insulation has been evaluated only for use in Type V construction under the IBC and in dwellings under the IRC.
- 5.9 Jobsite certification and labeling of the insulation must comply with IRC Sections N1101.4 and N1101.4.1, 2012 IECC Sections C303.1.1, C303.1.2, R303.1.1, R303.1.2 and IECC Sections 102.1.1, and 102.1.11 as applicable.

5.10 A vapor retarder must be installed as required by the applicable code.

5.11 The components of the insulation are produced in Houston, Texas, 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 November 2012, including tests in accordance with Appendix X of AC377.
- 6.2 Reports of air leakage tests in accordance with ASTM E283.
- 6.3 Reports of room corner fire testing in accordance with NFPA 286.
- 6.4 Reports of testing in accordance with ASTM E970.
- 6.5 Reports of testing in accordance with ASTM E119.

**7.0 IDENTIFICATION**

Components for Foam-LOK FL500 spray foam insulation are identified with the manufacturer's name (LAPOLLA Industries, Inc.), address and telephone number; the product name (Foam-LOK FL500/AirTight OC/GUARDFOAM 55 OC/Open Cell Retrofit Foam); mixing instructions; the density; the flame-spread and smoke-development indices; the shelf life and production date or the expiration date; and the evaluation report number (ESR-2847).

FIRE-LOK / DC 315 coating is identified with the manufacturer's name (International Fireproof Technology, Inc.) and address, the product trade name and use instructions.

**8.0 OTHER CODES**

In addition to the codes referenced in Section 1.0, the products described in this report were evaluated for compliance with the requirements of the following codes:

- 2006 *International Building Code*<sup>®</sup> (2006 IBC)
- 2006 *International Residential Code*<sup>®</sup> (2006 IRC)
- 2006 *International Energy Conservation Code*<sup>®</sup> (2006 IECC)

The products comply with the above-mentioned codes as described in Sections 2.0 through 7.0 of this report, with the revisions noted below:

- **Application with a Prescriptive Thermal Barrier:** See Section 4.3.1, except the approved thermal barrier must be installed in accordance with Section R314.4 of the 2006 IRC.
- **Application with a Prescriptive Ignition Barrier:** See Section 4.4.1 except attics must be vented in accordance with Section 1203.2 of the 2006 IBC, and crawl space ventilation must be in accordance with Section 1203.3 of the 2006 IBC or 2006 IRC Section R408, as applicable. Additionally, an ignition barrier must be installed in accordance with Sections R314.5.3 or R314.5.4 of the 2006 IRC, as applicable.
- **Application without a Prescriptive Ignition Barrier:** See Section 4.4.2, except attics must be vented in accordance with Section 1203.2 of the 2006 IBC, and crawl space ventilation must be in accordance with Section 1203.3 of the 2006 IBC or 2006 IRC Section R408, as applicable. Combustion air is provided in accordance with Sections 701 and 703 of the 2006 IECC.

- **Protection against Termites:** See Section 5.7, except use of the insulation in areas where the probability of termite infestation is “very heavy”, must be in accordance with Section R320.5 of the 2006 IRC.
- **Jobsite Certification and Labeling:** See Section 5.9,

except jobsite certification and labeling must comply with Sections 102.1.1 and 102.1.11, as applicable, of the 2006 IECC.

**TABLE 1—THERMAL RESISTANCE (R-VALUES)**

THICKNESS (inches)	R-VALUE (°F.ft <sup>2</sup> .h/Btu)
1	3.8
2	7.6
3	11.3
3.5	13.2
4	15.0
5	18
6	21.8
7	25.5
8	29
9	32.8
10	36.4
11	40
12	43.7

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 1- and 4-inch thicknesses.

**ICC-ES Evaluation Report****ESR-2847 FBC Supplement**

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**Section: 07 21 00—Thermal Insulation****REPORT HOLDER:****LAPOLLA INDUSTRIES, INC.**  
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**HOUSTON, TEXAS 77032**  
**(281) 219-4100**  
[www.lapolla.com](http://www.lapolla.com)**EVALUATION SUBJECT:****FOAM-LOK FL500 (ALSO KNOWN AS AirTight OC, GUARDFOAM 55 OC OR OPEN CELL RETROFIT FOAM) SPRAY  
FOAM INSULATION****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that Foam-Lok FL500 (also known as AirTight OC, GUARDFOAM 55 OC or Open Cell Retrofit Foam) spray foam insulation, recognized in ICC-ES master report ESR-2847, has also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2010 *Florida Building Code—Building*
- 2010 *Florida Building Code—Residential*

**2.0 CONCLUSIONS**

The Foam-Lok FL500 (also known as AirTight OC, GUARDFOAM 55 OC or Open Cell Retrofit Foam) spray foam insulation, described in Sections 2.0 through 7.0 of the master evaluation report ESR-2847, complies with the 2010 *Florida Building Code—Building* and the 2010 *Florida Building Code—Residential*, provided the design and installation are in accordance with the *International Building Code*® provisions noted in the master report.

Use of the Foam-Lok FL500 (also known as AirTight OC, GUARDFOAM 55 OC or Open Cell Retrofit Foam) spray foam insulation for compliance with the High-Velocity Hurricane Zone provisions of the 2010 *Florida Building Code—Building* and the 2010 *Florida Building Code—Residential* has not been evaluated, and is outside the scope of this evaluation report.

For products falling under Florida Rule 9N-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the master report, reissued September 2015.