

# ICC-ES Evaluation Report

**ESR-4056**

Reissued March 2024

This report also contains:

- CBC Supplement

Subject to renewal March 2025

- FBC Supplement

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<p><b>DIVISION: 06 00 00— WOOD, PLASTICS AND COMPOSITES</b></p> <p><b>Section: 06 05 73.13— Fire-Retardant Wood Treatment</b></p>	<p><b>REPORT HOLDER: PERFORMANCE FORMULATION SOLUTIONS, LLC</b></p> <p><b>ADDITIONAL LISTEES: THUNDERBOLT WOOD TREATING SERVICES</b></p>	<p><b>EVALUATION SUBJECT: FLAMETECH™ FIRE- RETARDANT-TREATED WOOD</b></p>	
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## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2021, 2018, 2015 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015 2012, 2009 and 2006 [International Residential Code \(IRC\)](#)

**Properties evaluated:**

- Flame spread
- Structural
- Corrosion
- Hygroscopicity
- Fire-resistance-rated Wall Assemblies

## 2.0 USES

FlameTech™ fire-retardant-treated wood is used in areas that are not exposed to the weather or wetting, but may be exposed to dampness where the code permits the use of wood or fire-retardant-treated wood.

## 3.0 DESCRIPTION

### 3.1 General:

FlameTech™ fire-retardant-treated wood is lumber and plywood impregnated with FlameTech™ fire-retardant chemicals by a pressure process.

FlameTech™ treatment of lumber of the following species is identified as being fire retardant:

Southern Pine Douglas Fir Spruce-Pine-Fir

FlameTech™ treatment of plywood fabricated with face and back veneers of the following species is identified as being fire retardant:

Douglas Fir Southern Pine

### 3.2 Flame Spread:

FlameTech™ fire-treated wood has a flame-spread index of 25 or less when subjected to ASTM E84 tests in accordance with IBC Section 2303.2 and 2021 IBC Section 2303.2.3 and shows no evidence of significant progressive combustion when the tests are continued for an additional 20-minute period.

### 3.3 Structural Strength and Durability:

The effects of FlameTech™ fire-retardant treatment on the strength of the treated lumber and plywood must be accounted for in the design of the wood members and their connections. Load duration factors greater than 1.6 are not permitted to be used in the design.

The strength properties of lumber when treated with FlameTech™ fire-retardant chemicals and used in applications at temperatures up to 100°F (38°C), are subjected to the design factors shown in [Table 1](#) of this report.

The strength properties of lumber when treated with FlameTech™ fire-retardant chemicals and used in applications at temperatures up to 150°F (66°C), are subject to the span limitations shown in [Table 2](#) of this report.

The strength properties of plywood, when treated with FlameTech™ fire-retardant chemicals and used in applications at temperatures up to 170°F (77°C), are subject to the span limitations shown in [Table 3](#) of this report.

### 3.4 Corrosion:

The corrosion rate of aluminum, carbon steel, galvanized steel, stainless steel, copper, or red brass in contact with wood is not increased by FlameTech™ fire-retardant treatment when the product is used as recommended by the manufacturer.

### 3.5 Hygroscopicity:

FlameTech™ treated wood qualifies as an Interior Type A (HT) fire-retardant wood in accordance with the American Wood Protection Association (AWPA) Standard U1, Commodity Specification H, Use Category UCFA.

## 4.0 DESIGN AND INSTALLATION

### 4.1 General:

Structural systems that include FlameTech™ fire-retardant-treated lumber or plywood must be designed and installed in accordance with the applicable code using the appropriate lumber design value adjustment factors and plywood spans from [Tables 1](#) and [2](#) of this report. Ventilation must be provided in accordance with the applicable codes.

The design value adjustment factors and plywood load and spans in [Tables 1](#) and [2](#) of this report are applicable under elevated temperatures resulting from cyclic climatic conditions. They are not applicable under continuous elevated temperatures resulting from manufacturing or other processes that require special consideration in design.

The treated lumber and plywood must only be used in areas (including attic spaces) where the lumber is exposed to temperatures of 150°F (66°C) or less and the plywood is exposed to temperatures of 170°F (76.5°C) or less.

Exposure to precipitation during storage or installation must be avoided. If material does become wet, it must be replaced or permitted to dry (maximum 19 percent moisture content for lumber and 15 percent moisture content for plywood) prior to covering or enclosure by wallboard or other construction materials (except for protection during construction).

### 4.2 Fasteners:

Fasteners used in FlameTech™ fire-retardant-treated wood must be galvanized steel, stainless steel, silicon bronze or copper, in accordance with 2021 IBC Section 2304.10.6.4 [2018 and 2015 IBC Section 2304.10.5 (2012, 2009 and 2006 IBC Section 2304.9.5)] and 2021, 2018, 2015, 2012 and 2009 IRC Section 317.3.4 (2006 IRC Section R319.3), and must be subject to the design value adjustments indicated in [Table 1](#) of this report.

### 4.3 Use as a Component of Fire-resistance-rated Wall Assemblies:

**4.3.1 One-hour Exterior Wall Assemble:** In Type III, Type IV and Type V construction, the exterior wall assemblies must be constructed of FlameTech™ treated wood studs and plywood. The design values for the studs must be adjusted in accordance with [Tables 1](#) and [2](#). The allowable spans for the plywood sheathing must be in accordance with the spans given in [Table 3](#) for FlameTech™ Wall/Subfloor.

When the fire-resistance rating is required from only the interior side, the wall must be constructed in accordance with [Figure 2](#).

When the fire-resistance rating is required from the interior side and exterior side, the wall must be constructed in accordance with [Figure 3](#).

**4.3.2 Two-hour Exterior Wall Assembly:** In Type III, Type IV and Type V construction, the exterior wall assemblies must be constructed of FlameTech™ treated wood studs and plywood. The design values for the

studs must be adjusted in accordance with [Table 1](#). The allowable spans for the plywood sheathing must be in accordance with the spans given in [Table 3](#) for FlameTech™ Wall/Subfloor.

When the fire-resistance rating is required from only the interior side, the wall must be constructed in accordance with [Figure 4](#).

When the fire-resistance rating is required from the interior side (Two-hour) and exterior side (One-hour), the wall must be constructed in accordance with [Figure 5](#).

When the fire-resistance rating is required from the interior side and exterior side, the wall must be constructed in accordance with [Figure 6](#).

**4.4 Plywood Diaphragms and Shear Walls:**

Wood-frame diaphragms and shear walls must be constructed in accordance with 2021, 2018, 2015 and 2012 IBC Section 2306.2 and 2306.3 (2009 and 2006 IBC Section 2306.3 and 2306.4).

When FlameTech™ fire-retardant-treated plywood is used in a diaphragm or shear walls, the thickness must be 1/8-inch thicker than that determined for the tabulated allowable values contained in Sections 4.2 or 4.3 of ANSI/AWC Special Design Provisions for Wind and Seismic (SDPWS) or as shown in the tables referenced in 2021, 2018, 2015 and 2012 IBC Section 2306.2 or 2306.3 (2009 and 2006 IBC Section 2306.3 or 2306.4). Thickness to be used for FRT plywood compared to untreated plywood in diaphragm and shear walls are shown below:

FlameTech™ FRT Plywood Thickness (inches)	Untreated Plywood Thickness (inches)
19/32	7/16
19/32	15/32
5/8	1/2
23/32	19/32
3/4	5/8
7/8	23/32
7/8	3/4

**5.0 CONDITIONS OF USE:**

The FlameTech™ fire-retardant-treated wood 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 Strength calculations must be subject to the design factors or span ratings shown in [Tables 1](#) and [2](#) of this report.
- 5.2 The design value adjustment factors and span ratings given in this report must only be used for unincised dimension lumber and plywood of the species noted in this report.
- 5.3 FlameTech™ treated wood must not be installed where it will be exposed to precipitation, direct wetting or regular condensation.
- 5.4 FlameTech™ treated wood must not be used in contact with the ground.
- 5.5 FlameTech™ lumber must not be ripped or milled as this will alter the surface-burning characteristics and invalidate the flame spread classification. Framing, end cuts, holes, joints such as tongue and groove, bevel scarf and lap may be used.
- 5.6 Treatment is at the facilities of the listees noted in this report under a quality control program with inspections by ICC-ES.

**6.0 EVIDENCE SUBMITTED**

Data in accordance with the [ICC-ES Acceptance Criteria for Fire-retardant-treated Wood \(AC66\)](#), dated June 2015, editorially revised July 2022.

**7.0 IDENTIFICATION**

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4056) along with the name, registered trademark, or registered logo of the report holder or listee must be included in the product label. [Electronic labeling is the ICC-ES web address ([www.icc-es.org](http://www.icc-es.org)); specific URL related to the report; or the ICC-ES machine-readable code placed on the aforementioned items.]
- 7.2 In addition, lumber and plywood treated with FlameTech™ fire-retardant chemicals must be identified by the structural grade mark of an approved agency. In addition, all treated lumber and plywood must be stamped with the name of the inspection agency [Timber Products Inspection, Inc. (AA-696)]; the

Performance Formulation Solutions, LLC or listee, name and location; the production plant identification; labeling information in accordance with 2021, 2018, 2015, 2012 and 2009 Section 2303.2.4 (2006 IBC Section 2303.2.1) or 2021, 2018 and 2015 IRC Section R802.1.5.4 [2012 and 2009 IRC Section R802.1.3.4 (2006 IRC Section R802.1.3.1)] ; and the evaluation report number (ESR-4056). Refer to [Figure 1](#).

7.3 The report holder’s contact information is the following:

**PERFORMANCE FORMULATION SOLUTIONS, LLC**  
**3465 GRIBBLE ROAD**  
**MATTHEWS, NORTH CAROLINA 28104**  
**(980) 253-8880**  
[www.flametechnspects.com](http://www.flametechnspects.com)

7.4 The Additional Listees’ contact information is the following:

**THUNDERBOLT WOOD TREATING SERVICES**  
**3400 PATTERSON ROAD**  
**RIVERBANK, CALIFORNIA 95367**

7.5 The manufacturing locations are as follows:

**THUNDERBOLT WOOD TREATING SERVICES**  
**THUNDERBOLT WOOD TREATING SERVICES**  
**3400 PATTERSON ROAD**  
**RIVERBANK, CALIFORNIA 95367**

**TABLE 1—STRENGTH DESIGN FACTORS FOR FLAMETECH™ FIRE RETARDANT TREATED LUMBER COMPARED TO UNTREATED LUMBER APPLICABLE AT SERVICE TEMPERATURES UP TO 100°F (33°C)**

STRENGTH DESIGN FACTORS	SPECIES		
	Southern Pine	Douglas Fir	Spruce-Pine-Fir
Bending MOR, [F <sub>b</sub> ]	0.82	1.00	0.96
Bending MOE, [E]	0.87	0.99	0.93
Tension Parallel to Grain, [F <sub>t</sub> ]	0.98	1.00	0.99
Shear Parallel to Grain, [F <sub>v</sub> ]	0.95	1.00	1.00
Compression Parallel to Grain, [F <sub>c</sub> ]	0.96	0.96	0.99
Compression Perpendicular to Grain, [F <sub>c⊥</sub> ]	0.95	0.95	0.95
Fasteners/Connectors	0.90	0.90	0.90

**TABLE 2—STRENGTH DESIGN FACTORS FOR FLAMETECH™ FIRE RETARDANT TREATED LUMBER COMPARED TO UNTREATED LUMBER APPLICABLE AT SERVICE TEMPERATURES UP TO 150°F (66°C) <sup>1,2</sup>**

STRENGTH DESIGN FACTORS	SPECIES								
	Southern Pine			Douglas Fir			Spruce-Pine-Fir		
	Climate Zone			Climate Zone			Climate Zone		
	1A	1B	2	1A	1B	2	1A	1B	2
Bending MOR, [F <sub>b</sub> ]	0.82	0.82	0.82	1.00	1.00	1.00	0.91	0.93	0.95
Bending MOE, [E]	0.88	0.88	0.88	1.00	1.00	1.00	0.96	0.96	0.96
Tension Parallel to Grain, [F <sub>t</sub> ]	0.89	0.93	0.98	1.00	1.00	1.00	0.95	0.97	0.99
Shear Parallel to Grain, [F <sub>v</sub> ]	0.89	0.93	0.98	1.00	1.00	1.00	0.95	0.97	0.99
Compression Parallel to Grain, [F <sub>c</sub> ]	0.87	0.91	0.96	0.98	0.98	0.98	0.92	0.94	0.96
Fasteners/Connectors	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90

<sup>1</sup>Climate Zone definition:

Zone 1 – Minimum design roof live load or maximum ground snow load ≤ 20 psf (960 Pa)

Zone 1A – Southwest Arizona, Southeast Nevada (area Bounded by Las Vegas-Yuma-Phoenix-Tucson)

Zone 1B – All other qualifying areas of the United States

Zone 2 – Maximum ground snow load > 20 psf (960 Pa)

<sup>2</sup>Duration of load adjustments for snow load, 7-day (construction) loads, and wind loads as given in the *National Design Specification for Wood Construction*® (NDS) also apply.

**TABLE 3—MAXIMUM LOADS AND SPANS FOR FLAMETECH™ FIRE RETARDANT TREATED PLYWOOD AT SERVICE TEMPERATURES UP TO 170°F (77°C) <sup>1, 2, 3, 4, 5,6,7,8,9,10,11,12</sup>**

PANEL/SHEATHING THICKNESS	SPAN RATING FOR UNTREATED ROOF/SUB-FLOOR SHEATHING	FLAMETECH™ ROOF SHEATHING				FLAMETECH™ WALL OR SUBFLOOR
		Maximum Span (Inches)	Total Allowable Loads (psf)			Span (Inches)
			Climate Zone			
			1A	1B	2	
<sup>15</sup> / <sub>32</sub> , 1/2	32/16	24	29	42	60	16
<sup>19</sup> / <sub>32</sub> , 5/8	40/20	24	49	72	103	20
		32	28	41	58	20
<sup>23</sup> / <sub>32</sub> , 3/4	48/24	32	40	59	84	24
		48	18	26	37	24

**SI Unit Conversions:** 1 in = 25.4 mm 1 psf = 48 N/m<sup>2</sup>

<sup>1</sup>All loads are based on two-span condition with strength axis perpendicular to supports.

<sup>2</sup>Panel edge supports shall be required for roof sheathing. Panel edge clips when used shall be installed as follows: One midway between supports for 24-inch and 32-inch spans, two at 1/3-points between supports for 48-inch spans. Clips must be manufactured for the plywood thickness.

<sup>3</sup>Fastener size and spacing shall be as required in accordance with the IBC or IRC for untreated plywood of the same thickness.

<sup>4</sup>For low-sloped or flat roofs with membrane or built-up roofing having a perm rating of less than 0.2; use rigid insulation having a minimum R-value of 4.0 between the sheathing and the roofing, or use the next thicker panel than the tabulated for the span and load (example; <sup>19</sup>/<sub>32</sub> for 24; <sup>23</sup>/<sub>32</sub> for 32); and use a continuous ceiling air barrier and vapor retarder with a perm rating of less than 0.2 on the bottom of the roof framing above the ceiling.

<sup>5</sup>FlameTech™ fire-retardant-treated plywood must not be used as roof sheathing if a radiant shield is used beneath the roof sheathing.

<sup>6</sup>The total allowable load is the sum of the live load and dead loads at maximum span. For allowable live loads, subtract dead (assumed to be 8 psf) from the total loads listed.

<sup>7</sup>The <sup>15</sup>/<sub>32</sub> and 1/2-inch plywood is limited to 4-ply. <sup>19</sup>/<sub>32</sub> and 5/8-inch plywood is limited to performance rated 4-ply and 5-ply. <sup>23</sup>/<sub>32</sub> and 3/4-inch plywood is limited to performance rated 5-ply and 7-ply.

<sup>8</sup>Uniform load deflection limitations 1/180 of span under live load plus dead load and 1/240 under live load only.

<sup>9</sup>Subfloor is limited to 100 psf Maximum Load.

<sup>11</sup>Climate Zone definitions:

Zone 1 – Minimum design roof live load or maximum ground snow load ≤ 20 psf (960 Pa)

Zone 1A – Southwest Arizona, Southeast Nevada (Area Bounded by Las Vegas-Yuma-Phoenix-Tucson)

Zone 1B – All other qualifying areas of the United States

Zone 2 – Maximum ground snow load > 20 psf (960 Pa)

<sup>12</sup>For other load conditions, contact manufacturer.

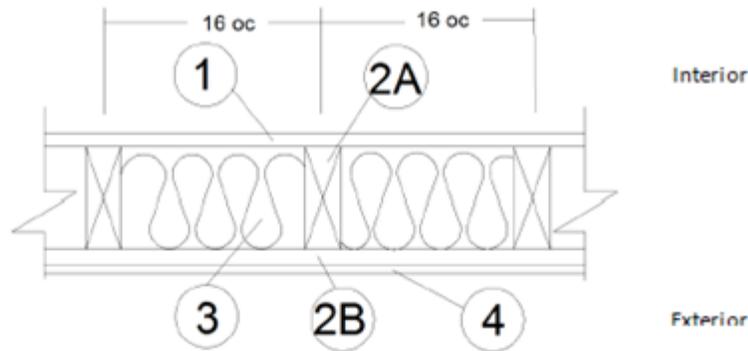
	<p style="text-align: center;"><b>FLAMETECH</b>                  CLASS A RATED  <b>FIRE RETARDANT TREATED LUMBER</b>                  SPECIES: XXXXXXXXX                  DRYING METHOD: KDAT                  Evaluated to <b>ASTM D5664 &amp; D6841</b>                  Service conditions of &lt;100° F and &lt;150° F</p>
<p>Performance Formulation                  Solutions, LLC                  3465 Gribble Road                  Matthews, NC 28104                  Treated by: XXXXXXXXXX                  XXXXXXXXXX, XX</p>	<p style="text-align: center;"><b>SURFACE BURNING CHARACTERISTICS</b>                  ASTM E-84 (Extended) &amp; ASTM E2768                  FLAMESPREAD: &lt; 25                  SMOKE DEVELOPMENT INDEX: &lt; 200</p> <p style="text-align: center;">QC Monitored by TPI                  Produced in Accordance with AWPA U1 (UCFA) Standards</p>
<p><b>Refer to ICC-ES Report ESR-4056 for Compliance</b></p>	

	<p style="text-align: center;"><b>FLAMETECH</b>                  CLASS A RATED  <b>FIRE RETARDANT TREATED PLYWOOD</b>                  SPECIES: XXXXXXXXX                  DRYING METHOD: KDAT                  Evaluated to <b>ASTM D5516 &amp; D6305</b>                  Service conditions of ≤ 100°F and ≤ 170°F</p>
<p>Performance Formulation                  Solutions, LLC                  3465 Gribble Road                  Matthews, NC 28104                  Treated by: XXXXXXXXXX                  XXXXXXXXXX, XX</p>	<p style="text-align: center;"><b>SURFACE BURNING CHARACTERISTICS</b>                  ASTM E-84 (Extended) &amp; ASTM E2768                  FLAMESPREAD: &lt; 25                  SMOKE DEVELOPMENT INDEX: &lt; 50</p> <p style="text-align: center;">QC Monitored by TPI                  Produced in Accordance with AWPA U1 (UCFA) Standards</p>
<p><b>Refer to ICC-ES Report ESR-4056 for Compliance</b></p>	

FIGURE 1—LUMBER AND PLYWOOD STAMPS

FlameTech™ SAMPLE LABELS

**Fire Retardant Wood FlameTech™ Lumber and Plywood**  
**ASTM E119 Rating: 1 Hour Load Bearing (2015 NDS – F<sub>c</sub> 0.96 for FRWT)**  
**Rated from One Side (Interior Side Only)**



**1. GYPSUM BOARD (Interior):** One layer Type X, complying with ASTM C1396, min. 5/8 in. thick, 4 ft. wide applied vertically, fastened to framing. Joints covered with paper tape and joint compound. Fasteners covered with joint compound. Min. #6 × 1-5/8 in. long Type S or W screws, spaced max. 6 in. on center (oc).

**2. CERTIFIED MANUFACTURER:** Performance Formulation Solutions, LLC

**CERTIFIED PRODUCT:** FlameTech™

**2A. CERTIFIED MODEL:** FlameTech Lumber

FlameTech Lumber is min. 2×4 in. nominal wood studs spaced 16 in. oc, or 2×6 in. nominal wood studs spaced 24 in. oc, double top plates and single bottom plate fastened together with 16d common nails (3-1/2 in. × 0.162 in.), 16d box nails (3-1/2 in. × 0.135 in.), or 12d ring nails (3-1/4 in. × 0.135 in.).

**2B. CERTIFIED MODEL (Exterior):** FlameTech Plywood

FlameTech Plywood, min. 15/32 in. thick, is applied vertically over the specified framing with min. 2-3/8 in. long, 0.113 in. diameter nails, spaced max. 8 in. oc around the perimeter and max. 12 in. oc in the field. Horizontal joints must be blocked.

**3. INSULATION:** Fiberglass Class A batt insulation, min. 3-1/2 in. thick, R-13 friction fit between the studs. If 2×6 in. nominal wood studs are used, fiberglass batt insulation shall be min. 5-1/2 in. thick.

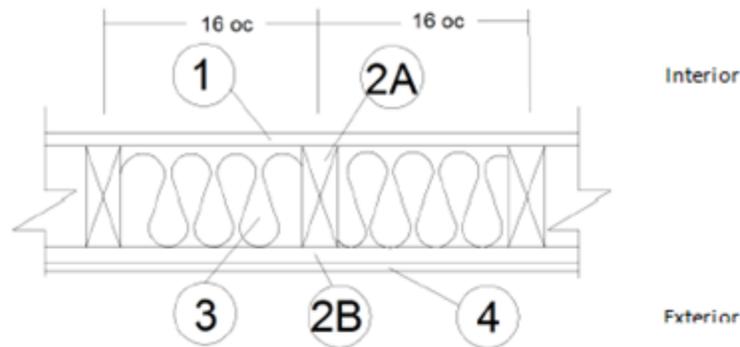
**4. EXTERIOR FACINGS (Optional):** Materials installed in accordance with manufacturer's installation instructions:

- Masonry brick veneer or concrete
- Portland cement or synthetic stucco systems with self-furring metal lath or adhesive base coat
- Hardboard, wood structural panel, plywood, or fiber-cement siding
- Metal siding
- Vinyl siding – exterior plastic

**FIGURE 2—ONE-HOUR FIRE RESISTANCE ASSEMBLY**

**SI Units: 1 inch = 25.4 mm**

**Fire Retardant Wood FlameTech™ Lumber and Plywood**  
**ASTM E119 Rating: 1 Hour Load Bearing (2015 NDS – F<sub>c</sub> 0.96 for FRWT)**  
**Rated from Both Sides (Interior and Exterior Sides)**



**1. GYPSUM BOARD (Interior):** One layer Type X, complying with ASTM C1396, min. 5/8 in. thick, 4 ft. wide applied vertically, fastened to framing. Joints covered with paper tape and joint compound. Fasteners covered with joint compound. Min. #6 × 1-5/8 in. long Type S or W screws, spaced max. 6 in. on center (oc).

**2. CERTIFIED MANUFACTURER:** Performance Formulation Solutions, LLC

**CERTIFIED PRODUCT:** FlameTech™

**2A. CERTIFIED MODEL:** FlameTech Lumber

FlameTech Lumber is min. 2×4 in. nominal wood studs spaced 16 in. oc, or 2×6 in. nominal wood studs spaced 24 in. oc, double top plates and single bottom plate fastened together with 16d common nails (3-1/2 in. × 0.162 in.), 16d box nails (3-1/2 in. × 0.135 in.), or 12d ring nails (3-1/4 in. × 0.135 in.).

**2B. CERTIFIED MODEL (Exterior):** FlameTech Plywood

FlameTech Plywood, min. 15/32 in. thick, is applied vertically over the specified framing with min. 2-3/8 in. long, 0.113 in. diameter nails, spaced max. 8 in. oc around the perimeter and max. 12 in. oc in the field. Horizontal joints must be blocked.

**INSULATION:** Fiberglass Class A batt insulation, min. 3-1/2 in. thick, R-13 friction fit between the studs. If 2×6 in. nominal wood studs are used, fiberglass batt insulation shall be min. 5-1/2 in. thick.

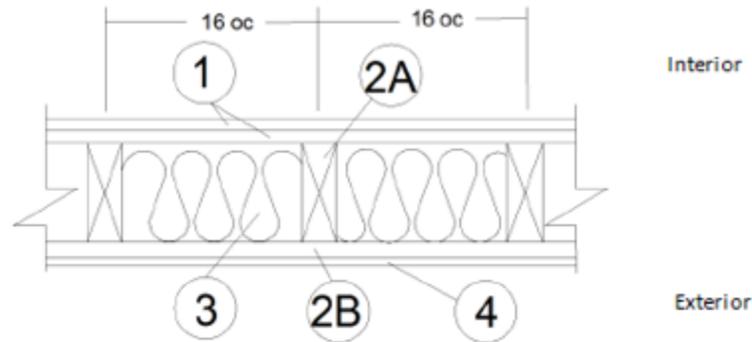
**4. EXTERIOR FACINGS:** Materials installed in accordance with manufacturer’s installation instructions:

- 3/4 in. thick cement plaster (1:4 ratio of cement to sand for scratch coat and 1:5 ratio for brown coat)
- Nominal 2.7 in. thick solid brick fastened using min. 22 GA wall ties
- Nominal 2.3 in. thick hollow brick fastened using min. 22 GA wall ties

**FIGURE 3—ONE-HOUR FIRE RESISTANCE ASSEMBLY**

SI Units: 1 inch = 25.4 mm

**Fire Retardant Wood FlameTech™ Lumber and Plywood**  
**ASTM E119 Rating: 2 Hour Load Bearing (2015 NDS – F<sub>c</sub> 0.96 for FRWT)**  
**Rated from One Side (Interior Side Only)**



**1. GYPSUM BOARD (Interior):** Two layers USG Firecode® C Core, complying with ASTM C1396, min. 5/8 in. thick, 4 ft. wide applied vertically, fastened to framing. Face layer joints staggered with base layer and covered with paper tape and joint compound.

**FASTENERS (Not Shown):**

- A. FACE LAYER – Min. #6 × 2 in. long Type S or W screws spaced max. 8 in. on center (oc) and heads covered with joint compound.
- B. BASE LAYER – Min. #6 × 1-5/8 in. long Type S or W screws, spaced max. 6 in. oc.

**2. CERTIFIED MANUFACTURER:** Performance Formulation Solutions, LLC

**CERTIFIED PRODUCT:** FlameTech™

**2A. CERTIFIED MODEL:** FlameTech Lumber

FlameTech Lumber is min. 2×4 in. nominal wood studs spaced 16 in. oc, or 2×6 in. nominal wood studs spaced 24 in. oc, double top plates and single bottom plate fastened together with 16d common nails (3-1/2 in. × 0.162 in.), 16d box nails (3-1/2 in. × 0.135 in.), or 12d ring nails (3-1/4 in. × 0.135 in.).

**2B. CERTIFIED MODEL (Exterior):** FlameTech Plywood

FlameTech Plywood, min. 15/32 in. thick, applied vertically over the specified framing with min. 2-3/8 in. long, 0.113 in. diameter nails, spaced max. 8 in. oc around the perimeter and max. 12 in. oc in the field. Horizontal joints must be blocked.

**3. INSULATION:** Fiberglass Class A batt insulation min. 3-1/2 in. thick R-13 friction fit between the studs. If 2×6 in. nominal wood studs are used, fiberglass batt insulation shall be min. 5-1/2 in. thick.

**4. EXTERIOR FACINGS (Optional):** Materials installed in accordance with manufacturer's installation instructions:

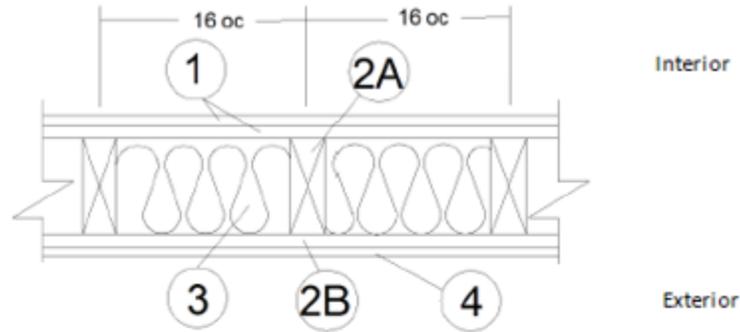
- Masonry brick veneer or concrete
- Portland cement or synthetic stucco systems with self-furring metal lath or adhesive base coat
- Hardboard, wood structural panel, plywood, or fiber-cement siding
- Metal siding
- Vinyl siding – exterior plastic

**FIGURE 4—TWO-HOUR FIRE RESISTANCE ASSEMBLY**

**SI Units: 1 inch = 25.4 mm**

**Fire Retardant Wood FlameTech™ Lumber and Plywood**

**ASTM E119 Rating: 2 Hour Load Bearing from the Interior and 1 Hour Load Bearing from the Exterior  
(2015 NDS – F<sub>c</sub> 0.96 for FRWT)**



1. **GYPSUM BOARD (Interior):** Two layers USG Firecode® C Core, complying with ASTM C1396, min. 5/8 in. thick, 4 ft. wide applied vertically, fastened to framing. Face layer joints staggered with base layer and covered with paper tape and joint compound.

**FASTENERS (Not Shown):**

- A. **FACE LAYER** – Min. #6 × 2 in. long Type S or W screws spaced max. 8 in. on center (oc) and heads covered with joint compound.
  - B. **BASE LAYER** – Min. #6 × 1-5/8 in. long Type S or W screws, spaced max. 6 in. oc.
2. **CERTIFIED MANUFACTURER:** Performance Formulation Solutions, LLC

**CERTIFIED PRODUCT:** FlameTech™

**2A. CERTIFIED MODEL:** FlameTech Lumber

FlameTech Lumber is min. 2×4 in. nominal wood studs spaced 16 in. oc, or 2×6 in. nominal wood studs spaced 24 in. oc, double top plates and single bottom plate fastened together with 16d common nails (3-1/2 in. × 0.162 in.), 16d box nails (3-1/2 in. × 0.135 in.), or 12d ring nails (3-1/4 in. × 0.135 in.).

- 2B. **CERTIFIED MODEL (Exterior):** FlameTech Plywood

FlameTech Plywood, min. 15/32 in. thick, applied vertically over the specified framing with min. 2-3/8 in. long, 0.113 in. diameter nails, spaced max. 8 in. oc around the perimeter and max. 12 in. oc in the field. Horizontal joints must be blocked.

3. **INSULATION:** Fiberglass Class A batt insulation min. 3-1/2 in. thick R-13 friction fit between the studs. If 2×6 in. nominal wood studs are used, fiberglass batt insulation shall be min. 5-1/2 in. thick.

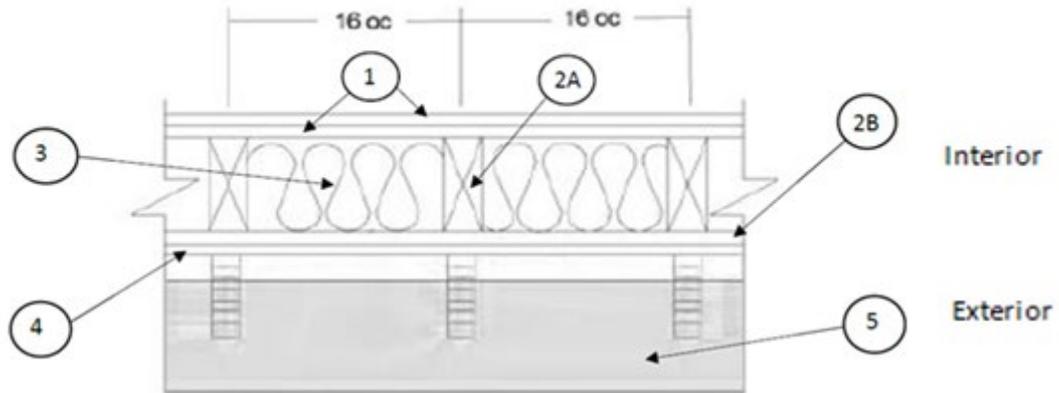
4. **EXTERIOR FACINGS:** Materials installed in accordance with manufacturer’s installation instructions:

- 3/4 in. thick cement plaster (1:4 ratio of cement to sand for scratch coat and 1:5 ratio for brown coat)
- Nominal 2.7 in. thick solid brick fastened using min. 22 GA wall ties
- Nominal 2.3 in. thick hollow brick fastened using min. 22 GA wall ties

**FIGURE 5—TWO-HOUR FIRE RESISTANCE ASSEMBLY**

**SI Units: 1 inch = 25.4 mm**

**Fire Retardant Wood FlameTech™ Lumber and Plywood**  
**ASTM E119 Rating: 2 Hour Load Bearing**  
**Rated from Both Sides (Interior and Exterior Sides)**



**1. GYPSUM BOARD (Interior):** Two layers Type X complying with ASTM C1396 min. 5/8 in. thick, 4 ft. wide applied vertically, fastened to framing. Face layer joints staggered with base layer and covered with paper tape and joint compound.

**FASTENERS (Not Shown):**

- A. **FACE LAYER** – Min. #6 x 2 in. long Type S or W screws spaced max. 8 in. on center (oc) and heads covered with joint compound.
- B. **BASE LAYER** – Min. #6 x 1-5/8 in. long Type S or W screws, spaced max. 6 in. oc.

**2. CERTIFIED MANUFACTURER:** Performance Formulation Solutions, LLC

**CERTIFIED PRODUCT:** FlameTech™

**2A. CERTIFIED MODEL:** FlameTech Lumber FlameTech Lumber is min. 2x4 in. nominal wood studs spaced 16 in. oc, or 2x6 in. nominal wood studs spaced 24 in. oc, double top plates and single bottom plate fastened together with 16d common nails (3-1/2 in. x 0.162 in.), 16d box nails (3-1/2 in. x 0.135 in.), or 12d ring nails (3-1/4 in. x 0.135 in.).

**2B. CERTIFIED MODEL (Exterior):** FlameTech Plywood FlameTech Plywood, min. 15/32 in. thick, applied vertically over the specified framing with min. 2-3/8 in. long, 0.113 in. diameter nails, spaced max. 8 in. oc around the perimeter and max. 12 in. oc in the field. Horizontal joints must be blocked.

**3. INSULATION:** Fiberglass Class A batt insulation min. 3-1/2 in. thick R-13 friction fit between the studs. If 2x6 in. nominal wood studs are used, fiberglass batt insulation shall be min. 5-1/2 in. thick.

**4. GYPSUM BOARD (Exterior):** One-layer Type X complying with ASTM C1396 min. 5/8 in. thick, 4 ft. wide applied vertically, fastened to framing. Face layer joints staggered with base layer and covered with paper tape and joint compound. Fasteners covered with joint compound. Min. #6 x 2 in. long Type 2 or W screws, spaced max 6 in. oc.

**5. EXTERIOR FACING:** Materials installed in accordance with manufacturer's installation instructions: 2-1/4-in. x 3-3/4-in. clay faced brick with cored holes fastened using minimum 20 GA galvanized wall ties attached to each stud with 8d coated nails, 2-3/8-in. long, 0.113-in. shank, 9/32-in. head, at every 6th course of bricks.

**FIGURE 6—TWO-HOUR FIRE RESISTANCE ASSEMBLY**

SI Units: 1 inch = 25.4 mm

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES  
Section: 06 05 73.13—Fire-Retardant Wood Treatment

**REPORT HOLDER:**

PERFORMANCE FORMULATION SOLUTIONS, LLC

**EVALUATION SUBJECT:**

FLAMETECH™ FIRE-RETARDANT-TREATED WOOD

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that FlameTech™ fire-retardant-treated wood, described in ICC-ES evaluation report ESR-4056, has also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2022 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 State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 California Residential Code (CRC)

**2.0 CONCLUSIONS****2.1 CBC:**

The FlameTech™ fire-retardant-treated wood, described in Sections 2.0 through 7.0 of evaluation report ESR-4056, complies with CBC, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report.

The products have not been evaluated under Chapter 7A for use in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

**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 CRC:**

The FlameTech™ fire-retardant-treated wood, described in Sections 2.0 through 7.0 of evaluation report ESR-4056, complies with the CRC, provided the design and installation are in accordance with the 2021 *International Residential Code*® (IRC) provisions noted in the evaluation report.

The products have not been evaluated under CRC Section R337 for use in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

This supplement expires concurrently with the evaluation report, reissued March 2024.

**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**  
**Section: 06 05 73.13—Fire-Retardant Wood Treatment**

**REPORT HOLDER:****PERFORMANCE FORMULATION SOLUTIONS, LLC****EVALUATION SUBJECT:****FLAMETECH™ FIRE-RETARDANT-TREATED WOOD****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that FlameTech™ fire-retardant-treated wood, described in ICC-ES evaluation report ESR-4056, has also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2023 *Florida Building Code—Building*
- 2023 *Florida Building Code—Residential*

**2.0 CONCLUSIONS**

The FlameTech™ fire-retardant-treated wood, described in Sections 2.0 through 7.0 of the evaluation report ESR-4056, complies with the *Florida Building Code—Building* and *Florida Building Code—Residential*. The design requirements shall be determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-4056 for the 2021 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the FlameTech™ fire-retardant-treated wood has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential*.

For products falling under Florida Rule 61G20-3, 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 evaluation report, reissued March 2024.