ICC-ES Evaluation Report

ESR-4244

Reissued August 2019

This report is subject to renewal August 2021.

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

REPORT HOLDER:

KOPPERS PERFORMANCE CHEMICALS

EVALUATION SUBJECT:

FLAMEPRO® FIRE-RETARDANT-TREATED WOOD

ADDITIONAL LISTEES:

BIEWER LUMBER

CULPEPER WOOD PRESERVERS

HIXSON LUMBER SALES

MAINE WOOD TREATERS, INC.

NORTHEASTERN TREATERS OF NY

SOLIDWOOD FOREST LTD.

WESTERN WOOD PRESERVING COMPANY

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- 2018, 2015, 2012, 2009 and 2006 *International Residential Code®* (IRC)

For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see ESR-4244 LABC and LARC Supplement.

Property evaluated:

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

2.0 USES

FlamePRO® 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:

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

FlamePRO® treatment of lumber of the following species is recognized as being fire retardant:

Southern Pine	Red Pine
Douglas Fir	Ponderosa Pine
Western Hemlock	White Fir
Alpine Fir	Hem Fir
Lodgepole Pine	Balsam Fir
White Spruce	Jack Pine
Spruce-Pine-Fir	Engelmann Spruce
Red Spruce	Black Spruce

FlamePRO® treatment of plywood fabricated with face and back veneers of the following species is recognized as being fire retardant:

Douglas Fir	Southern Pine

3.2 Flame Spread:

FlamePRO® fire-treated wood has a flame-spread index of 25 or less when subjected to ASTM E84 tests 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 FlamePRO® 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 as required by this section. Load duration factors greater than 1.6 are not permitted to be used in the design.

The strength properties of lumber when treated with FlamePRO® fire-retardant chemicals and used in applications at ambient temperatures up to 150°F (66°C), are subject to the design factors shown in Tables 1 and 2 of this report.

The strength properties of plywood, when treated with FlamePRO® 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 FlamePRO® fire-retardant

treatment when the product is used as recommended by the manufacturer.

3.5 Hygroscopicity:

FlamePRO® 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 FlamePRO® 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, 2 and 3 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, 2 and 3 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.

4.2 Fasteners:

Fasteners used in FlamePRO® fire-retardant-treated wood must be galvanized steel, stainless steel, silicon bronze or copper, in accordance with Section 2304.10.5 of the 2018 and 2015 IBC, Section 2304.9.5 of the 2012, 2009 and 2006 IBC, Section 317.3 of the 2018, 2015, 2012 and 2009 IRC, and Section R319.3 of the 2006 IRC, 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 FlamePRO® 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 FlamePRO® Wall/Subfloor.

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

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 FlamePRO® 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 FlamePRO® Wall/Subfloor.

When the fire-resistance rating is required from only the interior side, the wall must be constructed in accordance with Figure 3.

5.0 CONDITIONS OF USE

The FlamePRO® 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, 2 and 3 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 FlamePRO® treated wood must not be installed where it will be exposed to precipitation, direct wetting or regular condensation.

5.4 FlamePRO® treated wood must not be used in contact with the ground.

5.5 FlamePRO® lumber must not be ripped or milled as this will alter the surface-burning characteristics and invalidate the flame spread classification. Wall, Floor and Roof Framing, consisting of 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 and Underwriters Laboratory FR-S, Timber Products Inspection, Inc. (AA-696) or Southern Pine Inspection Bureau (AA-680).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Fire-retardant-treated Wood (AC66), dated June 2015, (Editorially revised April 2018).

7.0 IDENTIFICATION

7.1 Lumber and plywood treated with FlamePRO® 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 [Underwriters Laboratory FR-S, Timber Products Inspection, Inc. (AA-696) or Southern Pine Inspection Bureau (AA-680)]; the Koppers Performance Chemicals, or listee, name and location; the production plant identification; labeling information in accordance with Section 2303.2.4 of the 2018, 2015, 2012 and 2009 IBC and Section 2303.2.1 of the 2006 IBC or Section R802.1.5.4 of the 2018 and 2015 IRC or Section R802.1.3.4 of the 2012 and 2009 IRC or Section R802.1.3.1 of the 2006 IRC; and the evaluation report number (ESR-4244). Refer to Figure 1.

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

KOPPERS PERFORMANCE CHEMICALS
1016 EVEREE INN ROAD
GRIFFIN, GEORGIA 30224
(770) 233-4200
www.kopperspc.com

7.3 The Additional Listees' contact information is the following:

BIEWER LUMBER
524 EAST UNION STREET
SENECA, ILLINOIS 61360
(815) 357-6792
www.biewerlumber.com

CULPEPER WOOD PRESERVERS
POST OFFICE BOX 1148
CULPEPER, VIRGINIA 22701
(540) 825-5200
www.culpeperwood.com

HIXSON LUMBER SALES
POST OFFICE BOX 816028
DALLAS, TEXAS 75381
(972) 446-9000
www.hixsonlumbersales.com

MAINE WOOD TREATERS, INC.
POST OFFICE BOX 58
MECHANIC FALLS, MAINE 04256
(207) 345-8411
www.mainewoodtreaters.com

NORTHEASTERN TREATERS OF NY
796 SCHOHARLE TPKE
ATHENS, NEW YORK 12015
(518) 945-2660
www.netreaters.com

SOLIDWOOD FOREST LTD.
42611 OLD HOUSTON HIGHWAY
WALLER, TEXAS 77484
(281)351-9109

WESTERN WOOD PRESERVING COMPANY
POST OFFICE BOX 1250
SUMNER, WASHINGTON 98390
(253) 863-8191
www.westernwoodpreserving.com

7.4 The manufacturing locations are as follows:

BIEWER LUMBER:

BIEWER LUMBER
524 EAST UNION STREET
SENECA, ILLINOIS 61360

BIEWER LUMBER
6111 W MOUNT HOPE HWY
LANSING, MICHIGAN 48917

CULPEPER WOOD PRESERVERS:

CULPEPER WOOD PRESERVERS
208 FLINT LAKE ROAD
COLUMBIA, SOUTH CAROLINA 29223

CULPEPER WOOD PRESERVERS
10229 TIDEWATER TRAIL
FREDERICKSBURG, VIRGINIA 22408

CULPEPER WOOD PRESERVERS OF ORANGEBURG
860 CANNON BRIDGE ROAD
ORANGEBURG, SOUTH CAROLINA 29116

HIXSON LUMBER SALES:

HIXSON LUMBER SALES
5151 SOUTH LOOP EAST
HOUSTON, TEXAS 77233-0376

MAINE WOOD TREATERS, INC.:

MAINE WOOD TREATERS, INC.
58 WALKER ROAD
MECHANIC FALLS, MAINE 04256

NORTHEASTERN TREATERS OF NY

NORTHEASTERN TREATERS OF NY
796 SCHOHARLE TPKE
ATHENS, NEW YORK 12015

SOLIDWOOD FOREST LTD.

SOLIDWOOD FOREST LTD.
42611 OLD HOUSTON HIGHWAY
WALLER, TEXAS 77484

WESTERN WOOD PRESERVING COMPANY:

WESTERN WOOD PRESERVING COMPANY
1313 ZEHNDER STREET
SUMNER, WASHINGTON 98390

TABLE 1—STRENGTH DESIGN FACTORS FOR FlamePRO® FIRE RETARDANT TREATED LUMBER COMPARED TO UNTREATED LUMBER APPLICABLE AT SERVICE TEMPERATURES UP TO 100°F (38°C)

STRENGTH DESIGN FACTORS	SOUTHERN PINE	DOUGLAS FIR	SPRUCE-PINE-FIR	OTHER SPECIES
Modulus of Rupture (MOR)	0.82	1.00	0.95	0.82
Modulus of Elasticity (MOE)	0.87	1.00	0.94	0.87
Work to Maximum Load (WML)	0.72	0.93	0.90	0.72
Ultimate Tensile Strength (UTS)	0.99	1.00	0.98	0.98
Maximum Compressive Strength (MCS)	0.96	0.96	1.00	0.96
Ultimate Shear Strength (USS)	0.95	1.00	0.99	0.95
Fasteners/Connectors	0.90	0.90	0.90	0.90

TABLE 2—STRENGTH DESIGN FACTORS FOR FlamePRO® FIRE RETARDANT TREATED LUMBER COMPARED TO UNTREATED LUMBER APPLICABLE AT SERVICE TEMPERATURES UP TO 150°F (66°C) [1,2]

STRENGTH DESIGN FACTORS	Southern Pine			Douglas Fir			Spruce-Pine-Fir			Other Species		
	Climate Zone			Climate Zone			Climate Zone			Climate Zone		
	1A	1B	2	1A	1B	2	1A	1B	2	1A	1B	2
Modulus of Rupture (MOR)	0.82	0.82	0.82	0.88	0.93	0.98	0.81	0.87	0.93	0.81	0.82	0.82
Modulus of Elasticity (MOE)	0.87	0.87	0.87	1.00	1.00	1.00	0.94	0.94	0.94	0.87	0.87	0.87
Work to Maximum Load (WML)	0.69	0.70	0.71	0.92	0.93	0.93	0.69	0.77	0.87	0.69	0.70	0.71
Ultimate Tensile Strength (UTS)	0.70	0.84	0.96	1.00	1.00	1.00	0.81	0.90	0.97	0.70	0.84	0.96
Maximum Compressive Strength (MCS)	0.66	0.81	0.93	0.84	0.89	0.94	0.83	0.91	0.98	0.66	0.81	0.93
Ultimate Shear Strength (USS)	0.66	0.80	0.93	0.88	0.93	0.98	0.82	0.91	0.97	0.66	0.80	0.93
Fasteners/Connectors	0.66	0.81	0.90	0.84	0.89	0.90	0.83	0.90	0.90	0.66	0.81	0.90

[1] 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)

[2] Duration of load adjustments for snow loads, 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 FlamePRO® FIRE RETARDANT TREATED PLYWOOD AT SERVICE TEMPERATURES FROM > 100°F (38°C) UP TO 170°F (77°C) [1,2,3,4,5]

PANEL/SHEATHING THICKNESS	Span Rating for Untreated Roof/Sub-floor Sheathing	FlamePRO® Roof Sheathing Maximum Total Load (psf)				FlamePRO® Wall or Subfloor
		Span (Inches)	Climate Zone			Span (Inches)
			1A	1B	2	
15/32, 1/2	32/16	24	31	47	68	16
19/32, 5/8	40/20	24 32	48 27	74 42	107 60	20 20
23/32, 3/4	48/24	32 48	34 15	52 23	76 34	24 24
7/8		32 48	43 19	66 29	95 42	24 24
1		32 48	58 26	88 39	127 57	24 24
1 1/8		32 48	73 32	111 49	161 71	24 24

[1] For Surface Temperatures < 100°F, use Untreated Span Ratings

[2] Allowable total loads are for unsanded, Structural 1 & 2 Grade plywood, manufactured with Group 1 Species, stress grade S-2 (Fb=1650 psi), one-and-two span conditions.

[3] For allowable live loads, subtract dead loads (assumed to be 8 psf) from total loads listed above.

[4] 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)

[5] For other load conditions, contact manufacturer.

FlamePRO® Sample Labels

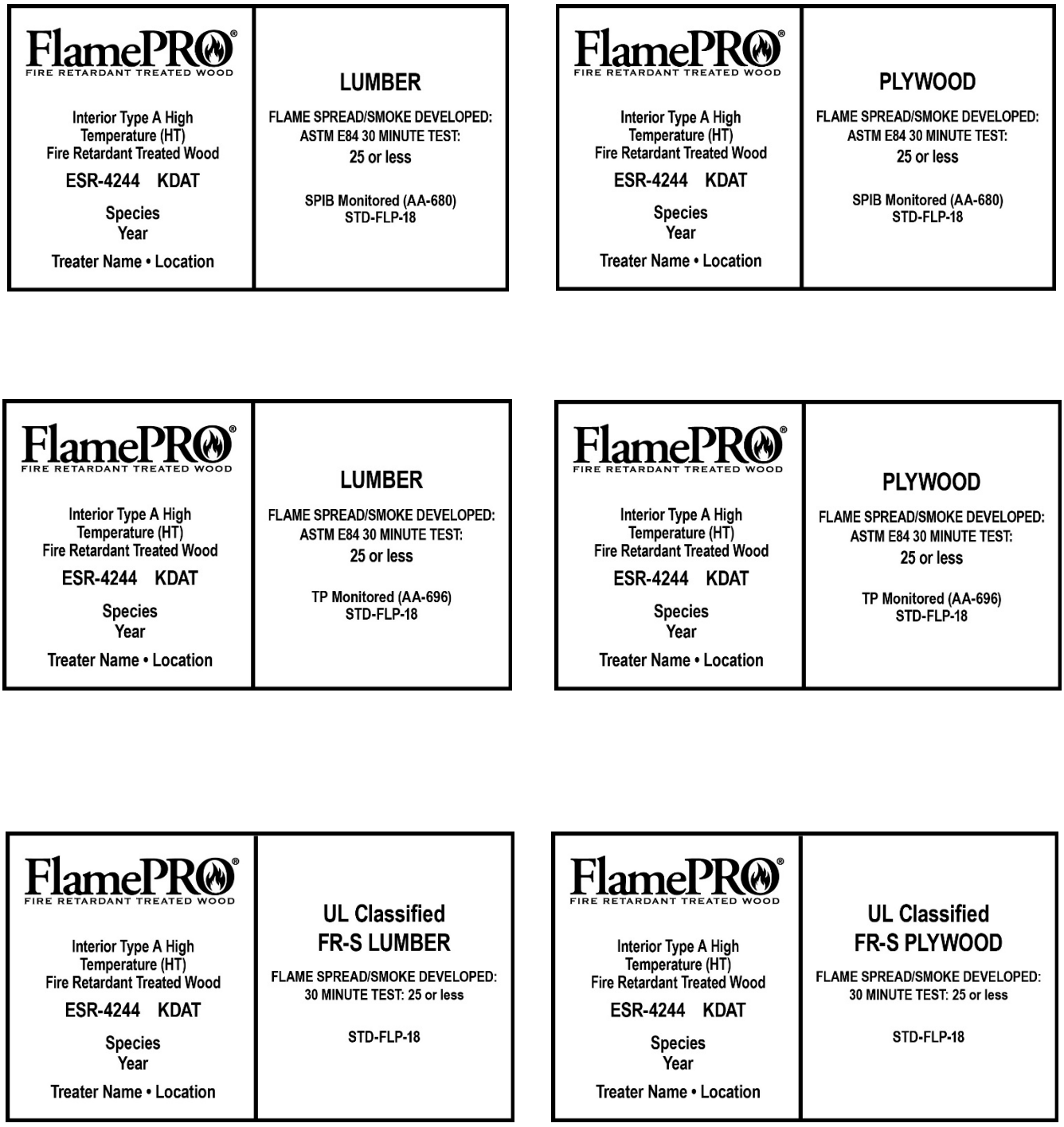


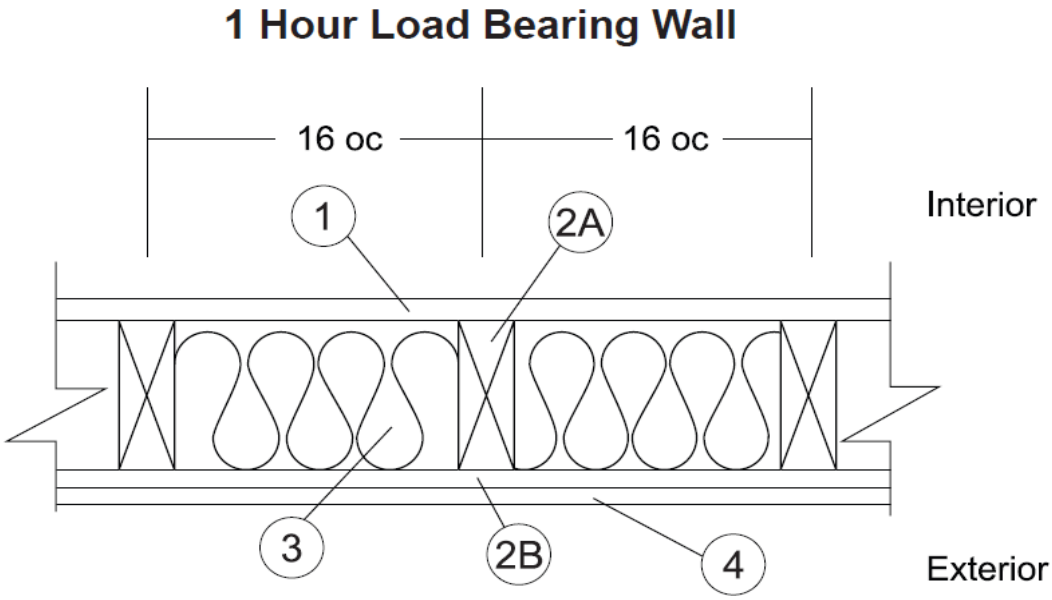
FIGURE 1—LUMBER AND PLYWOOD STAMPS

Fire Retardant Wood FlamePRO® Lumber and Plywood

ASTM E119 Rating: 1 Hour Load Bearing (2015 NDS – F 0.96 for FRWT)

Rated from One Side (Interior Side Only)

FIGURE 2—ONE-HOUR FIRE RESISTANCE ASSEMBLY



1. **GYPSUM BOARD [Interior): One layer Type C USG Firecode® C Core complying with ASTM C1396, min. $^{5}/_{8}$ in. thick, 4 feet wide applied vertically, fastened to framing. Joints 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 (o.c.) 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. o.c.

2. **CERTIFIED MANUFACTURER:**
   Koppers Performance Chemicals

   CERTIFIED PRODUCT: FlamePRO®

   2A. CERTIFIED MODEL: FlamePRO® Lumber
   FlamePRO® Lumber is min. 2x4 in. nominal wood studs, spaced max. 16 in. o.c., double top plates and single bottom plate fastened together with 16d common nails.

   2B. CERTIFIED MODEL (Exterior): Flame PRO® Plywood
   FlamePRO® 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. o.c. around the perimeter and max. 12 in. o.c. in the field. Horizontal joints must be blocked.

3. **INSULATION: Class A Fiberglass 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. **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**

Fire Retardant Wood FlamePRO® Lumber and Plywood
ASTM E119 Rating: 2 Hour Load Bearing (2015 NDS – F 0.96 for FRWT)
Rated from One Side (Interior Side Only)

2 Hour Load Bearing Wall

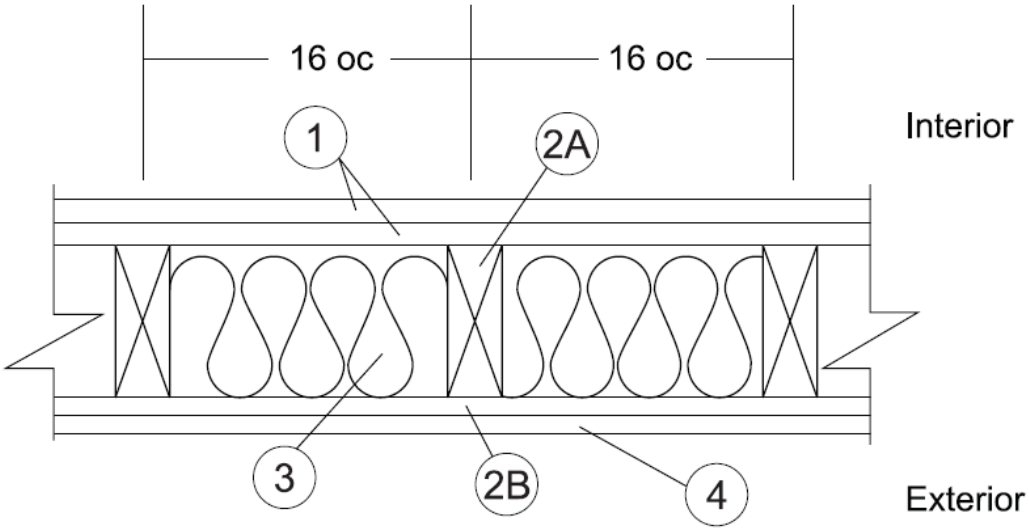


FIGURE 3—TWO-HOUR FIRE RESISTANCE ASSEMBLY

1. **GYPSUM BOARD [Interior): Two layers Type C USG Firecode® C Core complying with ASTM C1396, min. $^{5}/_{8}$ in. thick, 4 feet 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 (o.c.) 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. o.c.

2. **CERTIFIED MANUFACTURER:**
   Koppers Performance Chemicals

   CERTIFIED PRODUCT: FlamePRO®

   2A. CERTIFIED MODEL: FlamePRO® Lumber
   FlamePRO® Lumber is min. 2x4 in. nominal wood studs, spaced max. 16 in. o.c., double top plates and single bottom plate fastened together with 16d common nails.

   2B. CERTIFIED MODEL (Exterior): FlamePRO® Plywood
   FlamePRO® 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. o.c. around the perimeter and max. 12 in. o.c. in the field. Horizontal joints must be blocked.

3. **INSULATION: Class A Fiberglass 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. **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**

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ESR-4244 LABC and LARC Supplement

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This report is subject to renewal August 2021.

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REPORT HOLDER:

KOPPERS PERFORMANCE CHEMICALS

EVALUATION SUBJECT:

FLAMEPRO® FIRE-RETARDANT-TREATED WOOD

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that FlamePRO® fire-retardant-treated wood, described in ICC-ES master evaluation report ESR-4244, has 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:

- 2017 *City of Los Angeles Building Code* (LABC)
- 2017 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The FlamePRO® fire-retardant-treated wood, described in Sections 2.0 through 7.0 of the master evaluation report ESR-4244, complies with the LABC Chapter 23, and the LARC Chapter 8, and is subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The FlamePRO® fire-retardant-treated wood described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the master evaluation report ESR-4244.
- The design, installation, conditions of use and identification of the FlamePRO® fire-retardant-treated wood are in accordance with the 2015 *International Building Code®* (2015 IBC) and the 2015 *International Residential Code®* (2015 IRC) provisions noted in the master evaluation report ESR-4244 as applicable.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the master report, reissued August 2019.