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RESEARCH REPORT: RR 26119
(CSI # 06 05 73)

REEVALUATION DUE

DATE: January 1, 2019

Issued Date: January 1, 2018

Code: 2017 LABC

GENERAL APPROVAL – General Approval – FlameTech™ Fire-Retardant-Treated Wood

DETAILS

FlameTech has been evaluated for use where the Los Angeles Building Code permits wood or fire-retardant treated wood and interior applications. Fire-retardant-treated lumber and plywood pressure treated with FlameTech water based interior fire retardant. FlameTech products are kiln dried after treatment to a moisture content of 19 percent for lumber and 15 percent for plywood. Solid dimensional lumber ranging from 2x4 to 2x16 inches in SPF, southern pine, Douglas fir, and other wood species as #2 and higher grades. Structural plywood ranging from 15/32 to 1-1/8 inches C-D Exposure 1 and higher grades.

DESIGN AND INSTALLATION

FlameTech treated lumber and plywood has a flame spread index of 25 or less and smoke developed index of 450 or less when tested in accordance with ASTM E84; exhibits no evidence of significant progressive combustion when continued for an additional 20-minute period and the flame front progression is less than 10-1/2 feet. Refer to Section 2303.2 of the 2017 Los Angeles Building Code (2017 LABC) and Section R802.1.5 of the 2017 Los Angeles Residential Code (2017 LARC). FlameTech treated lumber and plywood complies with ASTM E2768.

Span ratings and total allowable loads for treated plywood in roof sheathing and subfloor applications are provided in Table 2. Roof sheathing is recognized for temperatures up to 170°F.

Adjustment factors for treated lumber when used at or near room temperatures and for service temperatures to 150°F are provided in Tables 3 and 4, respectively.

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Performance Formulation Solutions, LLC
RE: FlameTech™ Fire-Retardant-Treated Wood

The performance of FlameTech fire-retardant-treated plywood has been evaluated to ASTM D5516 and lumber has been evaluated to ASTM D5664. Plywood maximum span ratings and allowable loads have been developed in accordance with ASTM D6305. Lumber treatment adjustment factors have been developed in accordance with ASTM D6841. The base design values for untreated lumber are published in ANSI/AWC NDS-2015 *National Design Specifications (NDS) for Wood Construction 2015 Edition*.

Use of FlameTech plywood as a component of a shear wall shall be allowed. Use of the AWC Special Design Provisions for Wind and Seismic (SDPWS) Section 4.3 or LABC Section 2306.3 is allowed when FlameTech Plywood minimum nominal thickness is increased by 1/8 inch for the tabulated allowable shear values.

Moisture content of FlameTech treated wood is less than 28 percent when tested at 92 percent relative humidity in accordance with ASTM D3201 and is therefore suitable for interior conditions. Refer to Section 2303.2.7 of the 2017 LABC and Section R802.1.5.9 of the 2017 LARC.

The corrosion rate of hot-dipped galvanized fasteners in contact with FlameTech treated wood is used in interior applications is evaluated in accordance with AWP A E12 and ICC-ES AC326.

FlameTech treated lumber and plywood have been tested in accordance with ASTM E119 as components of fire-resistance-rated wall assemblies for 1 hour and 2 hour ratings. See Intertek Design Listings FRCT/FRWT 60-01, FRCT/FRWT 60-02, FRCT/FRWT 120-01 and FRCT/FRWT 120-02 provided as attachments to this general approval.

One-Hour Exterior Wall Assembly: When used in Type III, Type IV, and Type V construction, 1 hour fire-resistance-rated assemblies incorporating FlameTech treated wood studs and plywood must be as described in Intertek Design Listing FRCT/FRWT 60-01 and FRCT/FRWT 60-02 (attached). The design values for the studs must be adjusted in accordance with Table 3 for service temperatures to 100°F. The allowable spans for the plywood must be in accordance with the spans listed in Table 2 for FlameTech wall/subfloor.

Two-Hour Exterior Wall Assembly: When used in Type III, Type IV, and Type V construction, 2 hour fire-resistance-rated assemblies incorporating FlameTech treated wood studs and plywood must be as described in Intertek Design Listing FRCT/FRWT 120-01 and FRCT/FRWT 120-02 (attached). The design values for the studs must be adjusted in accordance with Table 3 for service temperatures to 100°F. The allowable spans for the plywood must be in accordance with the spans listed in Table 2 for FlameTech wall/subfloor.

FlameTech treated lumber and plywood must be installed in accordance with the manufacturer's published installation instructions, the 2017 Los Angeles Building Code and this general approval. A copy of the manufacturer's instructions must be available on the jobsite during installation.

Exposure to precipitation during storage or installation shall be avoided. If material does become wet, it shall 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).

Fasteners, including nuts and washers shall be hot-dipped galvanized in accordance with FlameTech's published installation instructions.

The approval is subject to the following conditions:

1. Installation must comply with this general approval, the manufacturer's published installation instructions and the 2017 Los Angeles Building Code. In the event of a conflict, this report governs.
2. All strength calculations shall be subject to the design value adjustment factors or span ratings shown in Tables 2 through 4, and only be used for unincised dimensional lumber and plywood of the species noted in this report.
3. FlameTech treated lumber shall not be ripped or milled as this will alter the surface-burning characteristics and invalidate the flame spread classification. Framing end cuts and holes are permitted.
4. FlameTech treated lumber and plywood shall not be used in contact with the ground.
5. The values in Tables 2 through 4 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 which shall require special consideration in design, which is not within the scope of this general approval.
6. FlameTech treated lumber and plywood is manufactured at the facility of the listee noted in this report under a quality control program with inspections by Intertek Testing Services NA, Inc.
7. FlameTech treated lumber and plywood must bear the structural grade mark of an approved agency. In addition, labeling is provided on each plywood panel and lumber piece with the following information:
 - The product name (FlameTech)
 - Name and address of the treater
 - Species of wood treated;
 - Flame spread and smoke-developed indices;
 - The Los Angeles Research Report No. 26119

Table 1: Properties Evaluated

Property	2017 LABC Section	2015 LARC Section
Surface burning characteristics	2303.2	R802.1.5
Strength adjustments for plywood	2303.2.5.1	R802.1.5.6
Strength adjustments for lumber	2303.2.5.2	R802.1.5.7
Hygroscopicity	2303.2.7	R802.1.5.9
Corrosion	2304.10.5.4	R317.3.4
Fire Resistance	703.2	R302

Table 2: FlameTech Treated Plywood Maximum Spans and Allowable Loads

Performance Category	Untreated Span Rating	Treated Plywood				
		Maximum Span ⁽⁴⁾ (in.)	Roof Sheathing			Subfloor Maximum Span ⁽⁵⁾ (in.)
			Total Allowable Loads ^(1,2,3) (psf)			
			Climate Zone			
		1A	1B	2		
15/32, ½	32/16 ⁽⁶⁾	24	18	36	59	16
19/32, 5/8	40/20 ⁽⁶⁾	24	30	62	100	20
		32	17	35	56	
23/32, ¾	48/24 ⁽⁷⁾	32	25	51	81	24
		48	11	23	36	
7/8	60/32 ⁽⁷⁾	48	18	38	61	-
1-1/2	60/32 ⁽⁷⁾	48	18	38	61	-

1. Load and span ratings developed in accordance with ASTM D5516 and calculated in accordance with AST D6305
2. The total allowable load is the sum of the live and dead loads at maximum span.
3. Uniform load deflection limitations 1/180 of span under live load plus dead load, 1/240 under live load only.
4. For roof slopes less than 3:12, the next panel thickness greater than required for the span shall be specified.
5. Limited to 100 psf maximum live load.
6. Plywood conforming to US DOC PS 1 or PS 2 minimum of 4 plies.
7. Plywood conforming to US DOC PS 1 or PS2 minimum of 5 plies.

Table 3: Flame Tech Treated Lumber Adjustment Factors When Used at or Near Room Temperatures

Property	Lumber Treatment Adjustment Factors ^(1,2)			
	SPF	Southern Pine	Douglas Fir	Other Wood Species
Bending MOR	0.95	0.82	1.00	0.82
Bending MOE	1.00	0.87	0.99	0.87
Tension Parallel to Grain	0.95	0.98	1.00	0.98
Shear Parallel to Grain	1.00	0.95	1.00	0.95
Compression Parallel to Grain	0.96	0.96	0.96	0.96
Compression Perpendicular to Grain ⁽³⁾	0.95	0.95	0.96	0.95
Fasteners / connectors ⁽⁴⁾	0.90	0.90	0.90	0.90

1. Results of matched treated and untreated tests after conditioning at nominal room temperatures (72°F) for service temperatures up to 100°F.
2. Treatment adjustment factors for test data developed in accordance with ASTM D5664 and calculated in accordance with ASTM D6841.
3. Compression perpendicular assigned according to ASTM D6841, Section 9.5.
4. Fastener/connection assigned according to ASTM D6841, Section 9.6.

Table 4: FlameTech Treated Lumber Adjustment Factors for Service Temperatures to 150°F

Property	Lumber Treatment Adjustment Factors ⁽¹⁾											
	SPF			Southern Pine			Douglas Fir			Other Wood Species		
	Climate Zone											
	1A	1B	2	1A	1B	2	1A	1B	2	1A	1B	2
Bending MOR	0.94	0.95	0.96	0.81	0.81	0.81	1.00	1.00	1.00	0.81	0.81	0.81
Bending MOE	0.98	0.98	0.98	0.88	0.88	0.88	1.00	1.00	1.00	0.88	0.88	0.88
Tension Parallel to Grain	0.91	0.91	0.91	0.93	0.96	0.99	1.00	1.00	1.00	0.93	0.96	0.99
Shear Parallel to Grain	0.98	0.99	1.00	0.88	0.91	0.94	1.00	1.00	1.00	0.88	0.91	0.94
Compression Parallel to Grain	0.94	0.95	0.96	0.89	0.92	0.95	0.96	0.96	0.96	0.89	0.92	0.95
Compression Perpendicular to Grain ⁽²⁾	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fasteners / connectors ⁽³⁾	0.90	0.90	0.90	0.9	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90

1. Treatment adjustment factors for test data developed in accordance with ASTM D5664 and calculated in accordance with ASTM D6841.
2. Compression perpendicular assigned according to ASTM D6841, Section 9.5.
3. Fastener/connection assigned according to ASTM D6841, Section 9.6.