

August 18, 2020

**TO: PARTIES INTERESTED IN FACTORY-APPLIED FIRE-RETARDANT PENETRANT FOR WOOD STRUCTURAL PANELS AND SAWN LUMBER**

**SUBJECT: Proposed Acceptance Criteria for Factory-applied Fire-retardant Penetrant for Wood Structural Panels and Sawn Lumber, AC516-1020-R3**

**Hearing Information:**

WebEx Event Meetings

[Tuesday, October 6, 2020](#)

[Wednesday, October 7, 2020](#)

8:00 am Central Daylight Time

Click each date above to register.

Please register for *both* days

Dear Colleague:

You are invited to comment on a proposed new acceptance criteria, AC516-1020-R3, which will be discussed at the Evaluation Committee hearing noted above. The proponent for this criteria is Fire Retardant Coatings of Texas. An earlier draft criteria was posted for discussion for the June 2, 2020 Evaluation Committee hearing, but was withdrawn from the hearing agenda to allow the ICC-ES staff to address substantial constructive comments received during the public comment period. The enclosed draft criteria contains substantial revisions resulting from the earlier comments and subsequent discussions with proponent and other industry experts.

ICC-ES staff would like to highlight the following:

1. A new Section 3.3.1 has been added to the proposed criteria that addresses possible wetting of factory-applied fire-retardant penetrant treated wood during construction. The section is proposed by the proponent in consultation with an accredited laboratory experienced in conducting wetting tests. The test requires that the interior-use factory-applied fire-retardant wood be subject to a water spray rate of 5 gallons per hour per

square foot of surface for six hours. This volume of water represents an event of over 48 inches of direct rainfall (1 gallon of water is approximately 0.134 cubic feet). The wetting protocol, and subsequent drying, is required as pre-conditioning for the surface-burning tests of the treated wood structural panels and sawn lumber required under this criteria.

2. The effects of treatment on the wood mechanical properties for plywood and sawn lumber are addressed similar to the ICC-ES Acceptance Criteria for Fire-Retardant-Treated Wood, AC66. Specifically, the mechanical testing at specific temperature and humidity conditions is to be conducted, results analyzed, with resultant adjustment factors and/or revised load-span tables to be provided in the evaluation report.
3. Criteria is provided for the evaluation of oriented strand board (OSB) panels with factory-applied fire-retardant penetrant in this revised proposed acceptance criteria.
4. Section 3.2 provides requirements that wood structural panels tested for surface burning characteristics shall include both a 1/8-inch sawn or ripped gap (joint), and a 1/8-inch by 1/8-inch groove, each running lengthwise in the test tunnel. The 1/8-inch joint shall expose untreated panel edges, for the purpose of demonstrating that untreated cuts or ripped panel edges need no field treatment. The purpose of the groove, made after application of the factory-applied fire-retardant penetrant, is to demonstrate effective penetration into the wood substrate as well as providing adequate surface burning performance with minor surface damage.
5. The proposed criteria has been re-drafted to not detail the specific product uses that were included in earlier versions, but, rather to require equivalent performance as fire-retardant-treated wood under IBC Section 2303.2, in accordance with IBC Section 104.11 (Alternative materials, designs and methods of construction and equipment).
6. While the proposed criteria is modeled on AC66, Section 5.0, Quality Control, has been condensed. Section 5.0 of the proposed criteria provides general requirements and overall intent of the Quality Control Program that must be established by the proponent and submitted to ICC-ES.

You are invited to submit written comments on this or any other agenda item, or to register and attend the Evaluation Committee hearing by WebEx Event and present your views in person. If you wish to contribute to the discussion, please note the following:

1. Regarding written comments and presentations:
  - a. You should submit these via e-mail to [es@icc-es.org](mailto:es@icc-es.org) to be received by the applicable due date.
  - b. Comments are to be received by **September 10, 2020**. These written comments will be forwarded to the committee before the meeting and will also be posted on the ICC-ES web site shortly after the deadline for submission. Written comments that are not submitted by this deadline will not be considered at the meeting.

- c. Rebuttal comments, from the proponent noted in this letter, are to be received by **September 22, 2020**. They will be forwarded to the committee before the meeting, and will also be posted on the ICC-ES web site shortly after the deadline for submission. Written rebuttal comments that are not submitted by the deadline will not be considered at the meeting.
- d. Visual presentations, in PowerPoint format only, are to be received by **September 22, 2020**. These will be forwarded to the committee before the meeting, and will also be posted on the ICC-ES web site shortly after the deadline for submission. Presentations that are not submitted by the deadline cannot be viewed at the meeting. Note: Videos will not be posted on the web site.

Presentations will be retained with other records of the meeting.

- e. ICC-ES will post to the web site, on **September 29, 2020**, memos by the ICC-ES staff, responding to the previously received public comments.
  - f. If you miss the deadlines for submission of written comments and visual presentations, your verbal comments can be presented at the WebEx Event meeting.
  - g. Proposed criteria, written public comments, visual presentations, and responses by ICC-ES staff for this agenda item are all available on our website.
2. Regarding verbal comments and presentations:

Please plan to speak for not more than ten minutes. As noted above, visuals must be in PowerPoint format and will be shown during the WebEx Event meeting.

3. Keep in mind that all materials submitted for committee consideration are part of the public record and will not be treated as confidential. It is the presenter's responsibility to certify to ICC-ES staff that no materials infringe copyright.
4. Please do not communicate with committee members before the meeting about any items on the agenda.

We appreciate your interest in the work of the Evaluation Committee. If you have any questions, please contact me at (800) 423-6587, extension 5593, or William Gould, P.E., at extension 3205. You may also reach us by e-mail at [es@icc-es.org](mailto:es@icc-es.org).

Yours very truly,



Jeff R. Filler, Ph.D., P.E.  
Senior Staff Engineer

JRF/lis

Encl.

cc: Evaluation Committee

## ICC EVALUATION SERVICE, LLC, RULES OF PROCEDURE FOR THE EVALUATION COMMITTEE

### 1.0 PURPOSE

The purpose of the Evaluation Committee is to review and approve acceptance criteria on which evaluation reports may be based.

### 2.0 MEMBERSHIP

**2.1** The Evaluation Committee has a membership of not fewer than nine, with one of the members named by the ICC-ES president each year to serve as the chairman–moderator.

**2.2** All members of the committee shall be representatives of a body enforcing regulations related to the built environment.

**2.3** Persons are appointed to the committee by the ICC-ES president, from among individuals who have formally applied for membership.

**2.4** The ICC-ES Board of Managers, using simple majority vote, shall ratify the nominations of the president.

**2.5** Committee membership is for one year, coinciding with the calendar year. Members may be renominated and reappointed, but no person shall serve for more than five consecutive terms.

**2.6** In the event that a member is unable to attend a committee meeting or complete a term on the committee, the ICC-ES president may appoint a replacement to fill in at the meeting or for the remainder of the member's term. Any replacement appointed for only one meeting must have prior experience as a member of the Evaluation Committee. Appointments under this section (Section 2.6) are subject to ratification as noted in Section 2.4.

### 3.0 MEETINGS

**3.1** The Evaluation Committee shall schedule meetings that are open to the public in discharging its duties under Section 1.0, subject to Section 3.0.

**3.2** All scheduled meetings shall be publicly announced. There shall be three meetings per year.

**3.3** More than half of the Evaluation Committee members, counting the chairman, shall constitute a quorum. A majority vote of members present is required on any action. To avoid any tie vote, the chairman may choose to exercise or not exercise, as necessary, his or her right to vote.

**3.4** In the absence of the chairman–moderator, Evaluation Committee members present shall elect an alternate chairman from the committee for that meeting. The alternate chairman shall be counted as a voting committee member for purposes of maintaining a committee quorum and to cast a tie-breaking vote of the committee.

**3.5** Minutes shall be kept and shall be the official record of each meeting.

**3.6** An electronic record of meetings may be made by ICC-ES if deemed necessary; no other audio, video, electronic recordings of the meetings will be permitted. Visual aids (including, but not limited to, charts, slides, videos, or presentation software) viewed at meetings shall be permitted only if the presenter provides ICC-ES before the presentation with a copy of the visual aid in a medium which can be retained by ICC-ES with its record of the meeting and which can also be provided to interested parties requesting a copy.

**3.7** Parties interested in the deliberations of the committee should refrain from communicating, whether in writing or verbally, with committee members regarding agenda items. All written communications and submissions regarding agenda items must be delivered to ICC-ES and shall be considered nonconfidential and available for discussion in open session of an Evaluation Committee meeting. Such materials will be posted on the ICC-ES web site ([www.icc-es.org](http://www.icc-es.org)) prior to the meeting. Comments and submissions not meeting the following deadlines will not be considered at the meeting:

- Initial comments on agenda items shall be submitted at least 28 days before the scheduled meeting.
- A rebuttal comment period shall follow, whereby rebuttal comments to the initial comments may be submitted by the proponent at least 21 days before the scheduled meeting.
- Those planning on giving a visual presentation at the meeting must submit their presentation, in PowerPoint format only, at least 10 days before the scheduled meeting.

The committee reserves the right to refuse recognition of communications which do not comply with the provisions of this section.

### 4.0 CLOSED SESSIONS

Evaluation Committee meetings shall be open except that at the discretion of the chairman, staff counsel may be necessary. Also, matters related to clients or potential clients covered by confidentiality requirements of ICC-ES Rules of Procedure for Evaluation Reports are discussed only during closed meetings.

### 5.0 ACCEPTANCE CRITERIA

**5.1** Acceptance criteria are established by the committee to provide a basis for issuing ICC-ES evaluation reports on products and systems under codes referenced in Section 2.0 of the Rules of Procedure for Evaluation Reports. They also clarify conditions of acceptance for products and systems specifically regulated by the codes.

Acceptance criteria may involve a product, material, or method of construction. Consideration of any acceptance criteria must be in conjunction with a current and valid application for an ICC-ES evaluation report, an existing ICC-ES evaluation report, or as otherwise determined by the ICC-ES President.

**EXCEPTIONS:** The following acceptance criteria are controlled by the ICC-ES executive staff and are not subject to committee approval:

- The Acceptance Criteria for Quality Documentation (AC10)
- The Acceptance Criteria for Test Reports (AC85)
- The Acceptance Criteria for Inspections and Inspection Agencies (AC304)

## 5.2 Procedure:

**5.2.1** Proposed acceptance criteria shall be developed by the ICC-ES staff and discussed in open session with the Evaluation Committee during a scheduled meeting, except as permitted in Section 4.0 of these rules.

**5.2.2** Proposed acceptance criteria shall be available to interested parties at least 30 days before discussion at the committee meeting.

**5.2.3** The committee shall be informed of all pertinent written communications received by ICC-ES.

**5.2.4** Attendees at Evaluation Committee meetings shall have the opportunity to speak on acceptance criteria listed on the meeting agenda, to provide information to committee members. In the interest of fairness, each person requesting to testify on a proposed acceptance criteria or proposed changes to an existing acceptance criteria will be given the same amount of time. The following time limits are established:

- a. For entities offering their first testimony on any item, a 10-minute limit applies. This time limit applies to both verbal testimony and/or visual presentations.
- b. Each person offering testimony may return to the microphone for one five-minute period to offer additional testimony and/or to rebut testimony given by others.
- c. Each person offering testimony on the staff recommendation, on each criteria, is allowed one, two-minute trip to the microphone.

Time limits do not include time needed to answer questions from the staff and/or committee members. The chairman–moderator shall have limited authority to modify time limitations on testimony. The chairman–moderator shall also have the authority to adjust time limits as necessary in order to get through the hearing agenda.

Keeping of time for testimony by an individual will be by an automatic timing device. The time remaining shall be evident to the person testifying. Interruptions during testimony will not be tolerated. It is the responsibility of the chairman–moderator to maintain decorum and order during all testimony.

**5.3** Approval of any action on an acceptance criteria shall be as specified in Section 3.3 of these rules. Possible actions made by the Evaluation Committee include: Approval; Approval with Revisions; Disapproval; or Further Study. The Evaluation Committee must give the reason(s)

for any Disapproval or Further Study actions with specific recommendations.

**5.4** Actions of the Evaluation Committee may be appealed in accordance with the ICC-ES Rules of Procedure for Appeal of Acceptance Criteria or the ICC-ES Rules of Procedure for Appeals of Evaluation Committee Technical Decisions.

## 6.0 COMMITTEE BALLOTING FOR ACCEPTANCE CRITERIA

**6.1** Acceptance criteria may be revised without a public hearing following a 30-day public comment period and a majority vote for approval by the Evaluation Committee, when at the discretion of the ICC-ES executive staff, the subject is a revision that requires formal action by the Evaluation Committee.

**6.2** Negative votes must be based upon one or more of the following, for the ballots to be considered valid and require resolution:

- a. *Lack of clarity:* There is insufficient explanation of the scope of the acceptance criteria or insufficient description of the intended use of the product or system; or the acceptance criteria is so unclear as to be unacceptable. (The areas where greater clarity is required must be specifically identified.)
- b. *Insufficiency:* The criteria is insufficient for proper evaluation of the product or system. (The provisions of the criteria that are in question must be specifically identified.)
- c. *The subject of the acceptance criteria is not within the scope of the applicable codes:* A report issued by ICC-ES is intended to provide a basis for approval under the codes. If the subject of the acceptance criteria is not regulated by the codes, there is no basis for issuing a report, or a criteria. (Specifics must be provided concerning the inapplicability of the code.)
- d. *The subject of the acceptance criteria needs to be discussed in public hearings.* The committee member requests additional input from other committee members, staff or industry.

**6.3** An Evaluation Committee member, in voting on an acceptance criteria, may only cast the following ballots:

- Approved
- Approved with Comments
- Negative: Do Not Proceed

## 7.0 COMMITTEE COMMUNICATION

Direct communication between committee members, and between committee members and an applicant or concerned party, with regard to the processing of a particular acceptance criteria or evaluation report, shall take place only in a public hearing of the Evaluation Committee. Accordingly:

**7.1** Committee members receiving an electronic ballot should respond only to the sender (ICC-ES staff). Committee members who wish to discuss a particular matter with other committee members, before reaching a decision, should ballot accordingly and bring the matter to

**ICC EVALUATION SERVICE, LLC, RULES OF PROCEDURE FOR THE EVALUATION COMMITTEE**

the attention of ICC-ES staff, so the issue can be placed on the agenda of a future committee meeting.

**7.2** Committee members who are contacted by an applicant or concerned party on a particular matter that will be brought to the committee will refrain from private communication and will encourage the applicant or concerned party to forward their concerns through the ICC-

ES staff in writing, and/or make their concerns known by addressing the committee at a public hearing, so that their concerns can receive the attention of all committee members.■

*Revised August 2020*

# PROPOSED ACCEPTANCE CRITERIA FOR FACTORY APPLIED FIRE-RETARDANT PENETRANT FOR WOOD STRUCTURAL PANELS AND SAWN LUMBER

AC516

Proposed August 2020

## PREFACE

Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes. (Some reports may also reference older code families such as the BOCA National Codes, the Standard Codes, and the Uniform Codes.) Section 104.11 of the *International Building Code*® reads as follows:

The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

ICC-ES may consider alternate criteria for report approval, provided the report applicant submits data demonstrating that the alternate criteria are at least equivalent to the criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. ICC-ES retains the right to refuse to issue or renew any evaluation report, if the applicable product, material, or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause injury or unreasonable damage.

*Acceptance criteria are developed for use solely by ICC-ES for purposes of issuing ICC-ES evaluation reports*

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1    **1.0 INTRODUCTION**

2       **1.1 Purpose:** The purpose of this acceptance criteria is to establish requirements  
3 for a factory-applied fire-retardant penetrant for wood structural panels and sawn lumber  
4 to be recognized in an ICC Evaluation Service, LLC (ICC-ES) evaluation report under  
5 the 2018, 2015, 2012, and 2009 *International Building Code*<sup>®</sup> (IBC) and 2018, 2015,  
6 2012, and 2009 *International Residential Code*<sup>®</sup> (IRC). Bases of evaluation are IBC  
7 Section 104.11 and IRC Section R104.11.

8       **1.2 Scope:** This criteria addresses the fire performance, strength reduction  
9 characteristics, hygroscopicity, durability, and corrosion-of-metals properties of wood  
10 structural panels and sawn lumber with a factory-applied fire-retardant penetrant.

11       **1.3 Codes and Referenced Standards**

12               **1.3.1 Codes:** Code sections referenced in this criteria for the IBC and  
13 IRC are with respect to the 2018 editions. See Table 1 for section editions for earlier  
14 code editions.

15                       **1.3.1.1** 2018, 2015, 2012 and 2009 *International Building Code*<sup>®</sup>  
16 (IBC), International Code Council.

17                       **1.3.1.2** 2018, 2015, 2012 and 2009 *International Residential*  
18 *Code*<sup>®</sup> (IRC), International Code Council.

19               **1.3.2 Standards:** Sections of standards referenced in this criteria are for  
20 the standard editions noted for the 2018 IBC and 2018 IRC in Table 1. See Table 2 for  
21 editions of referenced standards applicable to the earlier editions of the IBC and IRC.



22                           **1.3.2.1** ANSI/AWC *National Design Specification® for Wood*  
23 *Construction* (NDS) and *Supplement*, American Wood Council.

24                           **1.3.2.2** ASTM International

25                           **1.3.2.2.1** ASTM D2898 Standard Test Methods for  
26 Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.

27                           **1.3.2.2.2** ASTM D2915 Standard Practice for Sampling and  
28 Data-analysis for Structural Wood and Wood-Based Products.

29                           **1.3.2.2.3** ASTM D3201 Standard Test Method for  
30 Hygroscopic Properties of Fire-Retardant Wood and Wood-Based Products.

31                           **1.3.2.2.4** ASTM D5516 Standard Test Method for Evaluating  
32 the Flexural Properties of Fire-Retardant-Treated Softwood Plywood Exposed to  
33 Elevated Temperatures.

34                           **1.3.2.2.5** ASTM D5664 Standard Test Method for Evaluating  
35 the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength  
36 Properties of Fire-Retardant Treated Lumber.

37                           **1.3.2.2.6** ASTM D6305 Standard Practice for Calculating  
38 Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof  
39 Sheathing.

40                           **1.3.2.2.7** ASTM D6841 Standard Practice for Calculating  
41 Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber.

42                           **1.3.2.2.8** ASTM D7857 Standard Test Method for Evaluating  
43 the Flexural Properties and Internal Bond Strength of Fire-Retarded Mat-Formed Wood  
44 Structural Composite Panels Exposed to Elevated Temperatures.

45                           **1.3.2.2.9** ASTM E84 Standard Test Method for Surface Burning  
46 Characteristics of Building Materials.

47                           **1.3.2.2.10** ASTM E119 Standard Test Methods for Fire Tests of  
48 Building Construction and Materials.

49                           **1.3.2.3** AWWA E12 Standard Method of Determining Corrosion of  
50 Metals in Contact with Treated Wood, American Wood-Preservers' Association.

51                           **1.3.2.4** UL LLC:

52                           **1.3.2.4.1.**    UL 263 Standard for Fire Tests of Building  
53 Construction and Materials.

54                           **1.3.2.4.2.**    UL 723 Standard Test for Surface Burning  
55 Characteristics of Building Materials.

56                           **1.3.2.5** U.S. Department of Commerce:

57                           **1.3.2.5.1.**    PS 1 Structural Plywood.

58                           **1.3.2.5.2.**    PS 2 Performance Standard for Wood-based  
59 Structural-use Panels.

## 60       **1.4 Definitions**

61                           **1.4.1 Factory Applied Fire-Retardant Penetrant:** The factory applied  
62 fire-retardant penetrant is a proprietary formulation that is applied to all sides of the  
63 wood structural panels and all faces of sawn lumber that chemically penetrates the  
64 wood to impart fire-retarding qualities to the wood substrate.

65                           **1.4.2 Retention Rate:** The rate of retention of factory-applied fire-  
66 retardant penetrant required in the approved quality documentation necessary to  
67 achieve the fire-retardant performance requirements as defined in Section 2303.2 of

68 the IBC and Section R802.1.5 of the IRC and additional requirements detailed in this  
69 criteria.

## 70 **2.0 BASIC INFORMATION**

71 **2.1 General:** The applicant for an evaluation report addressing factory-applied  
72 fire-retardant penetrant for wood structural panels and sawn lumber shall submit the  
73 following information:

74 **2.1.1 Product Description:** Basic information on the fire-retardant  
75 penetrant including, at a minimum, method of retarding fire, pre-conditions of substrate,  
76 method of applying penetrant, measure of retention, drying or post-treatment, and product  
77 uses.

78 **2.1.2 Quality Control Manual:** Manufacturer's application manual (for  
79 treatment plant/applicator).

80 **2.1.3 Source of Treatment Chemical:** Treatment chemical  
81 manufactured by listee or report holder, or by third party.

82 **2.1.4 Installation Instructions and Field Preparation:** Product  
83 limitations, recommendations for fasteners and contact metals, limitations on boring,  
84 notching, cutting, ripping, and field repair, as applicable.

85 **2.1.5 Packaging and Identification:** Details and method of identification  
86 of treated product, wood-based substrate, and the product label shall be submitted.  
87 Product identification shall comply with the product identification provisions of the ICC-  
88 ES Rules of Procedure for Evaluation Reports and Section 6.11 of this criteria.

89 **2.2 Testing Laboratories:** Testing laboratories shall comply with Section 2.0 of  
90 the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES

91 Rules of Procedure for Evaluation Reports.

92       **2.3 Test Reports:** Test reports shall comply with AC85.

93       **2.4 Product Test Sampling:** Test samples shall be prepared and/or obtained  
94 under the supervision of the accredited inspection agency and shall be declared and  
95 verified as representative of the standard product. The testing agency shall be provided  
96 with the sample preparation and treating methods, solution analysis, and solution  
97 retention.

98       **2.5 Qualification Test Plan:** A qualification test plan shall be submitted to and  
99 approved by ICC-ES staff prior to any testing being conducted.

### 100 **3.0 TEST AND PERFORMANCE REQUIREMENTS**

101       **3.1 General:** Reports of the following tests on wood treated with factory-applied  
102 fire-retardant penetrant for which evaluation is sought shall be submitted:

103       **3.2 Surface Burning Characteristics:** The surface burning characteristics  
104 (flame spread and smoke-developed index) of wood structural panels and sawn lumber  
105 with factory-applied fire-retardant penetrant shall be determined in accordance with  
106 ASTM E84 or UL 723 conducted after the durability requirements of Section 3.3.1  
107 (interior use) or 3.3.2 (exterior use) as applicable. The flame spread index shall be 25  
108 or less and there shall be no evidence of significant progressive combustion when the  
109 test is continued for an additional 20-minute period. Additionally, the flame front shall  
110 not progress more than 10 feet-6 inches (3200 mm) beyond the centerline of the burners  
111 at any time during the test. The smoke-developed index shall be 450 or less.

112               Test specimens for wood structural panels with factory-applied fire-  
113 retardant penetrant shall be constructed with a ripped or cut gap (joint) of 1/8 inch (3.2

114 mm), running the length of the tunnel. The joint shall be made with ripped or cut panel  
115 edges exposing edge surfaces not directly treated with the factory-applied fire-retardant  
116 penetrant.

117 Test specimens for wood structural panels with factory-applied fire-retardant penetrant  
118 shall also be constructed with at least one 1/8-inch (3.2 mm) wide by 1/8-inch (3.2 mm)  
119 deep cut (groove) running the length of the tunnel and exposed to the fire. The cut  
120 (groove) shall be made in the panel specimens after application of the factory-applied  
121 fire-retardant penetrant.

122 **3.3 Durability:** Wood structural panels and sawn lumber with factory-applied  
123 fire-retardant penetrant treated wood shall be tested for durability according to interior  
124 or exterior use as follows:

125 **3.3.1 Interior Use:** To address wetting during construction, wood  
126 structural panels and sawn lumber with factory-applied fire-retardant penetrant intended  
127 for interior use shall be subject to wetting at a rate of 5 gallons per hour per square foot  
128 of surface continuously for 6 hours with the surface oriented at an angle of 70-80  
129 degrees (nearly vertical). Wetted test specimens shall be dried in accordance with the  
130 conditioning requirements of the ASTM E84 or UL 723 tests. The wetting and drying  
131 requirements shall be conducted on all interior-use products prior to the surface-burning  
132 tests required under this criteria.

133 **3.3.2 Exterior Use (Optional):** Wood structural panels and sawn lumber  
134 with factory-applied fire-retardant penetrant intended for use in exterior applications  
135 shall be subject to the requirements of ASTM D2898 and Section 2303.2.6 IBC or  
136 Section R802.1.5.8 IRC.

137           **3.4 Mechanical Properties:** The following tests shall be conducted to  
138 determine the effects of factory-applied fire-retardant penetrant on the mechanical  
139 properties of wood structural panels and sawn lumber. Results of such tests shall be  
140 used to determine adjustments to strength properties and/or re-determination of span  
141 ratings in accordance with Sections 4.1.1 and 4.1.2 of this criteria. In no case shall  
142 factory-applied fire-retardant penetrant be considered to increase mechanical properties  
143 (strength and stiffness properties) of wood structural panels and sawn lumber.

144           **3.4.1 Factory-Applied Fire-Retardant Penetrant for Wood Structural**  
145 **Panels:** Wood structural panels with factory-applied fire-retardant penetrant shall be  
146 tested separately for effects on strength and stiffness properties in accordance with  
147 ASTM D5516 for plywood and effects on strength and stiffness properties and internal  
148 bond in accordance with ASTM D7857 for OSB, including effects of temperature and  
149 humidity associated with intended use(s) for which evaluation is sought. Data from such  
150 tests shall be used to determine adjustment values, or maximum spans and loads, or  
151 both, in accordance with ASTM D6305, for non-span-rated plywood, in accordance with  
152 Section 4.1.1. For span-rated plywood and OSB, results of tests conducted on plywood  
153 and OSB shall be used to determine the need for re-qualification of treated OSB, in  
154 accordance with Section 4.1.2. Tests of wood structural panels shall be conducted on  
155 all wood species for which evaluation is sought.

156           **Exception:** The results of tests conducted on Douglas Fir and Southern  
157 Pine plywood, an OSB manufactured primarily with Aspen, and an OSB manufactured  
158 primarily with Southern Pine shall be considered as being representative for all species  
159 of wood structural panels for effects on mechanical properties.

160                   **3.4.2 Factory-Applied Fire-Retardant Penetrant for Sawn Lumber:**

161       Sawn lumber with factory-applied fire-retardant penetrant shall be tested for effects on  
162       mechanical properties in accordance with ASTM D5664. Data from such tests shall be  
163       used to determine modification factors in accordance with ASTM D6841, and shall take  
164       into consideration temperature, humidity, climate conditions, and end use. See Section  
165       4.2. Strength and stiffness properties tests of sawn lumber shall be conducted on all  
166       wood species for which evaluation is sought.

167                   **Exception:** The results of tests conducted on Southern Pine, Douglas Fir,  
168       and either White Spruce or a Spruce/Fir mixture are permitted to be used together as  
169       being representative of all lumber species. A Spruce/Fir mixture can be obtained by  
170       obtaining Canadian Spruce-Pine-Fir and removing the Lodgepole and Jack Pine which  
171       can be visually segregated from the remaining Spruces and Firs. Under this exception,  
172       the lowest of the property median treatment ratios obtained from the three species in  
173       accordance with Section 4.3.1 shall be used with any untested softwood species.

174                   **3.5 Hygroscopic Properties:** Wood structural panels (plywood and OSB) and  
175       sawn lumber with factory-applied fire-retardant penetrant shall be tested in accordance  
176       with ASTM D3201, and be subject to the requirements of Section 2303.2.7 of the IBC  
177       or Section R802.1.5.9 of the IRC. Each wood species for which evaluation is sought  
178       shall be tested.

179                   **EXCEPTION:** Wood structural panels (plywood and OSB) and sawn  
180       lumber with factory-applied fire-retardant penetrant sought for evaluation for use only in  
181       exterior applications shall not be required to be tested for hygroscopic properties.

182                   **3.6 Corrosion of Fasteners and Connectors**

183                   **3.6.1 Fasteners:** Fasteners used with factory-applied fire-retardant  
184 penetrant treated wood in exterior applications or wet or damp locations shall be  
185 corrosion resistant subject to the requirements of Section 2304.10.5.3 and Section  
186 R317.3.3 of the IRC. Fasteners used with factory-applied fire-retardant penetrant  
187 treated wood for interior application shall be subject to the requirements of Section  
188 2304.10.5.3 and Section R317.3.3 of the IRC unless recommendations otherwise are  
189 provided for the evaluation report by an accredited third-party test laboratory or an  
190 independent wood scientist/engineer based on testing in accordance with the ICC-ES  
191 Acceptance Criteria for Corrosion-Resistant Fasteners and Evaluation of Corrosion  
192 Effects of Wood Treatments, AC257.

193                   **3.6.2 Connectors:** Connectors used with factory-applied fire-retardant  
194 penetrant treated wood in exterior applications or wet or damp locations shall be  
195 corrosion resistant subject to the requirements of IBC Section 2304.10.5.1 and Section  
196 R317.3. Corrosion testing of metals in contact with factory-applied fire-retardant  
197 penetrant for wood structural panels and sawn lumber used in interior applications shall  
198 be conducted in accordance with the procedures in AWWA E12. Metals tested shall  
199 represent metals of typical applications and those to be identified in the evaluation  
200 report. Tests of benchmark (comparison) products shall be conducted to provide the  
201 basis for statements in the evaluation report. A minimum of 10 replicate tests of each  
202 metal with the treated product and its benchmark is required. Assessments against  
203 benchmarks shall be evaluated by comparison of average corrosion rates calculated  
204 from weight-loss measurements in accordance with AWWA E12 Section 9. Statements  
205 for the evaluation report shall be provided by an accredited third-party test laboratory or



206 an independent wood scientist/engineer based on analysis and conclusions drawn from  
207 test data and other relevant documentation and provided for review by ICC-ES.

208 **3.7 Fire-resistance-rated Assemblies (Optional):** When wood structural  
209 panels or sawn lumber with factory-applied fire-retardant penetrant for wood structural  
210 panels or sawn lumber are used as components of a fire-resistance-rated wall, floor-  
211 ceiling, or roof-ceiling assembly; the assembly shall be tested in accordance with ASTM  
212 E119 or UL 263. The fire-resistance-rated assembly shall be completely described in  
213 the test report specifying the hourly fire-resistance rating.

214 **3.8 Shear Walls (Optional):** Use of wood structural panels with factory-  
215 applied fire-retardant penetrant as a component of a shear wall shall be documented by  
216 either structural analysis or full-scale load testing. Details of the shear wall assemblies  
217 and any allowable load adjustments shall be included in the evaluation report. The  
218 structural analysis shall be prepared by an independent third party. Prior to full-scale  
219 load testing, a test plan shall be submitted to ICC-ES staff in accordance with Section  
220 2.5 of this criteria.

## 221 **4.0 ANALYSIS**

### 222 **4.1 Factory-Applied Fire-Retardant Penetrant for Wood Structural Panels:**

223 **4.1.1** Bending strength design value treatment adjustment factors for  
224 factory-applied fire-retardant penetrant for non-span-rated plywood structural panels shall  
225 be determined in accordance with ASTM D6305 using results from tests specified in  
226 Section 3.4.1. Treatment adjustment factors shall be applied cumulatively with other  
227 relevant adjustment factors from the NDS, including the NDS temperature factor.  
228 Treatment adjustment factors shall consider the wood species and climatological location

229 where wood structural panels with factory-applied fire-retardant penetrant will be used.  
230 The initial treatment (IT) effect as determined by ASTM D6305, shall be used as the  
231 reduction factor for non-span-rated plywood structural panels not subject to elevated  
232 temperature exposures. The total allowable roof sheathing load (live load plus dead load)  
233 shall be determined in accordance with ASTM D6305 for each wood species of non-span-  
234 rated wood structural panels tested, based on the design value treatment adjustment  
235 factors. Recommended uniform live loads for factory-applied fire-retardant penetrant for  
236 non-span-rated structural panels used in roofing and subfloor applications shall be  
237 provided.

238 **4.1.2** Data from tests of plywood in accordance with ASTM D5516 and  
239 OSB in accordance with ASTM D7857 shall be used to determine if the factory-applied  
240 fire-retardant penetrant adversely affects span-rated wood structural panels, in  
241 accordance with Section 4.1.3. Properties to be considered for plywood shall be bending  
242 strength and bending stiffness. Properties to be considered for OSB shall be bending  
243 strength, bending stiffness, work-to-maximum load, and internal bond. If the test results  
244 determine that the required properties of span-rated wood structural panels are not  
245 adversely affected by the factory-applied fire-retardant penetrant, no further testing is  
246 required. If the test results determine that any of the properties are adversely affected by  
247 the factory-applied fire-retardant penetrant, re-qualification in accordance with DOC PS-  
248 2 shall be required. In this case, the original trademark of the wood structural panels shall  
249 be obliterated and replaced with the new trademark resulting from the re-qualification in  
250 accordance with DOC PS-2 for panels treated with the fire-retardant penetrant.

251                   4.1.3 The evaluation of adverse effects on bending strength, bending  
252 stiffness, work-to-maximum load, and internal bond, as required by Section 4.1.2, on  
253 span-rated wood structural panels with factory-applied fire-retardant penetrant shall be  
254 conducted using data obtained from tests conducted in accordance with ASTM D5516 or  
255 ASTM D7857, as applicable. Comparisons of data for treated and untreated panels shall  
256 be compared for each the temperature and humidity conditions to be included in the  
257 evaluation report in accordance with the following:

258

259

$$M_m \geq M_c \left( 1 - \frac{tV}{\sqrt{N}} \right) \quad (\text{Eq. 1})$$

260

where:

261

$M_m$  = average property of treated group for a specific temperature and  
262 humidity condition in the evaluation report

263

$M_c$  = average property of the control (untreated) group for the same  
264 condition as  $M_m$

265

$t$  = student t statistic with 95 percent confidence;  $t = 2.045$  for 30  
266 specimens (29 degrees of freedom) (Table 1 of ASTM D2915)

267

$V$  = coefficient of variation for the mechanical property of the control  
268 (untreated) group at the same condition as  $M_m$ ;  $V \leq 0.2$  (when  $V$  is greater  
269 than 0.2, use 0.2 in the calculation)

270

$N$  = sample size for the control group;  $N \geq 30$ .

271

272                   **Condition of Acceptance:** For acceptance of no adverse effects of the  
273 factory-applied fire-retardant penetrant on the span-rated wood structural panel, Equation  
274 (1) must be satisfied for all temperature humidity conditions and stated in the evaluation  
275 report.

## 276                   **4.2 Factory- Applied Fire-Retardant Penetrant for Sawn Lumber**

277                   **4.2.1** The design value treatment adjustment factors for factory-applied  
278 fire-retardant penetrant for sawn lumber shall be determined in accordance with ASTM  
279 D6841 using results from tests specified in Section 3.4.2 of this criteria, except as limited  
280 in Sections 4.3.2 and 4.2.3. Treatment adjustment factors shall consider the wood species  
281 and climatological location where sawn lumber with factory-applied fire-retardant  
282 penetrant will be used. The initial treatment (IT) effect as determined by ASTM D6841  
283 shall be used as the reduction factor for non-span-rated wood structural panels not  
284 subject to elevated temperature exposures.

285                   **4.2.2** The adjustment factor for fastener loads for each sawn lumber wood  
286 species shall be the lower of the ratio for maximum stress in compression parallel to grain  
287 and the ratio for maximum stress in horizontal shear, determined in accordance with  
288 ASTM D5664, or 0.90, whichever is lower, unless fastener tests are conducted on sawn  
289 lumber with factory-applied fire-retardant penetrant.

290                   **4.2.3** The adjustment factor for compression perpendicular to grain design  
291 values shall be 0.95 unless compression perpendicular to grain tests are conducted on  
292 sawn lumber with factory-applied fire-retardant penetrant.

## 293                   **5.0 QUALITY CONTROL**

294           **5.1 Factory-Applied Fire-Retardant Penetrant (Chemical):** Factory-applied  
295 fire-retardant penetrant (chemical) shall be manufactured under an approved quality  
296 control program with inspections by ICC-ES or by a properly accredited inspection agency  
297 that has a contractual relationship with ICC-ES. When the factory-applied fire-retardant  
298 penetrant (chemical) is manufactured by a party other than listee or report holder,  
299 documentation in accordance with the ICC-ES Acceptance Criteria for Quality  
300 Documentation (AC10), Section 1.4.4.4. shall be required.

301           **5.2 Treatment Plant:** Factory-applied fire-retardant penetrants shall be applied  
302 to wood structural panels and sawn lumber at treatment plants under an approved quality  
303 assurance program, with inspections conducted by ICC-ES or an approved agency  
304 having a contractual relationship with ICC-ES. Inspections and inspection agencies shall  
305 comply with the ICC-ES Acceptance Criteria for Inspections and Third-party Inspection  
306 Agencies (AC304). Ongoing follow-up inspections by ICC-ES or an approved agency  
307 having a contractual relationship with ICC-ES are required under this criteria for each  
308 treatment facility.

309           **5.3 Third-Party Inspection Agency:** An accredited third-party inspection  
310 agency shall be employed by the listee or report holder to conduct inspections on a  
311 monthly or more frequent basis. Reports of such inspections shall be audited by ICC-ES  
312 or an approved agency having a contractual relationship with ICC-ES on a quarterly basis  
313 as part of the ongoing inspection program under this criteria.

314           **5.4 Quality Control Program:** A Quality Control Program shall be developed  
315 by the report holder or listee in coordination with the independent accredited third-party  
316 inspection agency. The Quality Control Program shall relate treatment formulation,

317 method of treatment, application and retention rates at qualification to ongoing quality  
318 control monitoring. Ongoing quality control shall include, at a minimum, chemical  
319 formulation verification, retention rate, bench fire tests, necessary record-keeping, and  
320 periodic third-party testing to verify the surface-burning characteristics (ASTM E84 or UL  
321 723) and verification of the effects on mechanical properties, as detailed in the approved  
322 Quality Control Documentation. Each treatment facility shall be subject to a Quality  
323 Control Program. The Quality Control Program shall be submitted to and subject to  
324 review by ICC-ES as a part of evaluation process.

## 325 **6.0 EVALUATION REPORT REQUIREMENTS**

326 The following are the conditions of use for wood structural panels and sawn lumber with  
327 a factory-applied fire-retardant penetrant addressed by this acceptance criteria:

328 **6.1** Span-rated wood structural panels with a factory-applied fire-retardant  
329 penetrant must be subject to the use and modified loads and span information determined  
330 from Section 4.1.2 and applicable only to the wood structural panels identified in the  
331 evaluation report.

332 **6.2** The use and design of non-span-rated wood structural panels and sawn  
333 lumber with a factory-applied fire-retardant penetrant must be subject to the design value  
334 adjustment factors determined in accordance with this criteria and limited to the species  
335 evaluated.

336 **6.3** The exposure limitations of the wood structural panels and sawn lumber with  
337 a factory-applied fire-retardant penetrant shall be defined in the evaluation report, either  
338 interior or exterior.

339           **6.4** The evaluation report shall detail requirements for fasteners and connectors  
340 used with the factory-applied fire-retardant penetrant treated wood, based on Section 3.6  
341 of this criteria.

342           **6.5** The use of wood structural panels and sawn lumber with factory-applied fire-  
343 retardant penetrant in contact with the ground has not been evaluated and is outside the  
344 scope of the evaluation report.

345           **6.6** The evaluation report shall note that sawn lumber with a factory-applied fire-  
346 retardant penetrant must not be ripped along the face or milled as this may create an  
347 exposed untreated face and alter the surface-burning characteristics.

348           **6.7** The evaluation report shall note that exposure to precipitation during storage  
349 or installation shall be avoided. If material does become wet, it must be dried to a moisture  
350 content of not greater than 16 percent for wood structural panels and 19 percent for sawn  
351 lumber, prior to covering or enclosure by wallboard or other construction materials.

352           **6.8** The evaluation report shall note that the design value adjustment factors for  
353 sawn lumber and wood structural panel spans in the evaluation report are applicable  
354 under elevated temperatures resulting from cyclic climatic conditions; design value  
355 adjustment factors are not applicable under continuous elevated temperatures resulting  
356 from manufacturing or other processes, which require special consideration in design,  
357 and are not within the scope of the evaluation report.

358           **6.9** The evaluation report shall note that the design value adjustment factors are  
359 to be applied cumulatively with all other applicable adjustment factors from the NDS,  
360 including the NDS temperature factor.

361           **6.10** Fire-resistance-rated assemblies qualified in accordance with Section 3.7 of  
362 this criteria must be fully described in the evaluation report

363           **6.11** Identification of wood structural panels and sawn lumber with factory-applied  
364 fire-retardant penetrant shall be as follows. An ink stamp marking shall identify factory-  
365 applied fire-retardant penetrant wood. The ink stamp shall be a legible marking. At least  
366 one mark shall be applied to every piece of lumber or wood structural panel except for  
367 sawn lumber with cross-sectional dimensions less than 1 by 2 inches (25.4 by 50.8 mm),  
368 where one mark may be applied to a bundle of not more than 20 board feet (0.37 m<sup>3</sup>).  
369 The marking shall be issued by a properly accredited inspection agency having a  
370 contractual relationship with ICC-ES.

371           The marking shall contain the information required by Section 2303.2.4 of the  
372 IBC or Section R802.1.5.4 IRC, and shall include the following additional information:

- 373           1.     ICC-ES evaluation report number.
- 374           2.     ASTM E84 or UL 723 10-minute test indices (flame spread and smoke  
375 developed), and statement indicating no evidence of significant progressive  
376 combustion when the test is extended to 30 minutes.
- 377           3.     Name or identification number and location of factory-applied fire-retardant  
378 penetrant treater.
- 379           4.     A code or means of enabling traceability of manufacturing required by the  
380 approved quality control program. ■



**TABLE 1 - REFERENCED CODE SECTIONS BY CODE EDITION**

| CODE EDITION |          |          |          |
|--------------|----------|----------|----------|
| IBC SECTIONS |          |          |          |
| 2018         | 2015     | 2012     | 2009     |
| 2303.2       | 2303.2   | 2303.2   | 2303.2   |
| 2304.10      | 2304.10  | 2304.9   | 2304.9   |
| IRC SECTIONS |          |          |          |
| R317.3       | R317.3   | R317.3   | R319.3   |
| R802.1.5     | R802.1.5 | R802.1.3 | R802.1.3 |

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**TABLE 2 – STANDARDS EDITIONS BY CODE EDITION**

| STANDARD     | CODE                                   |   |  |                |
|--------------|--|---|--|----------------|
|              | 2018 IBC & IRC                         | 2015 IBC & IRC                            | 2012 IBC & IRC                             | 2009 IBC & IRC |
| ANSI/AWC NDS | 2018                                   | 2015                                      | 2012                                       | 2005           |
| ASTM D2898   | -10                                    |   | -08e01                                     | -07            |
| ASTM D3201   | -13                                    |   | -08a                                       | -07            |
| ASTM D5516   | -09                                    |   |  | -03            |
| ASTM D5664   | -10                                    |   | -08  | -02            |
| ASTM D6305   | -08(2015) <sup>e1</sup>                |   | -08  | -02e1          |
| ASTM D6841   |  | -08                                       |  | -03            |
| ASTM D7857   |  |   | -16  |                |
| ASTM E84     | -16                                    | -13a                                      | -09  | -07            |
| ASTM E119    | -16                                    | -12a                                      | -08a                                       | -07            |
| AWPA E12     |  |   | -15  |                |
| DOC PS 1     |  | -09                                       |  | -07            |
| DOC PS 2     |  | -10                                       |  | -04            |
| UL 263       | -11 with revisions through June 2015   | -11                                       | -03 with revisions up through October 2007 | -03            |
| UL 723       | -08 with revisions through August 2013 | -08 with revisions through September 2010 | -08  | -03            |

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Note: where a single year edition is shown it shall be considered applicable to all code editions listed.