

2018 Fire, Energy, and WUI Code Changes Related to Wood Construction

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Introduction

The 2018 *International Fire Code (IFC)*, 2018 *International Energy Conservation Code (IECC)*, and 2018 *International Wildland Urban Interface Code (IWUIC)* were all approved by the International Code Council (ICC) during their 2015/2016 code development cycle. This article outlines changes to all three codes as they relate to wood construction. Accompanying discussion of each code change is the ICC code change tracking number [bracketed] that can be used to search for more information on the ICC website (iccsafe.org). The Appendix to this paper, beginning on page 41, contains a strikethrough/underline format of changes where it is deemed helpful to understand the code changes outlined herein.

Approved Agencies

Certification report writing agencies were introduced into the definition of Approved Agency in the IECC. “Research reports” was removed from the proposed definition, as well as a requirement for accreditation by a national body, leaving “product certification” only. [ADM6-16 AMPC1]

International Energy Conservation Code – Residential

- Alters the reduced insulation in ceilings based on available space which complicates rafter sizing. [RE40-16, AMPC1]
- Reduces the stringency for compliance under

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the energy rating index (ERI) path and prohibits consideration of renewables in the ERI numbers unless the envelope is as good as the 2015 IECC. [RE173-16, AMPC1]

International Energy Conservation Code – Commercial

- Correlates U-factors to R-values in the associated tables; corrects U-factor requirements in IECC Table C402.1.4 to be consistent with the R-value requirements in IECC Table C402.1.3; the U-factor criteria in Table C402.1.4 for mass wall requirements for Climate Zone 7, Group R was corrected to make it consistent with other values for R-15.2 c.i. in Table C402.1.3 – it is 0.71 as can be seen from other cases where R-15.2 c.i. is prescribed; the U-factor criteria in Table C402.1.4 for mass floor requirements for

Climate Zone 6, Group R was corrected to make it consistent with other values for R-12.5 c.i. in Table C402.1.3 – it is 0.64 as can be seen from other cases where R-12.5 c.i. is prescribed. [CE69-16]

- Adds “Additional Efficiency Package” options which could add opportunities for wood construction. [CE230-16 AM]

International Fire Code

- Adds new conditions which trigger sprinkler requirements for multi-family residential attics in buildings equipped with NFPA 13R sprinkler systems. [F172-16 AM]
- Includes Type IV construction in an exception for reduced rating of fire barriers creating hazardous materials control areas in IFC 5003.8.3.4 and IBC 414.2.4. [F355-16]
- Adds a trigger for sprinkler systems in schools (Group E occupancies) when the fire area has an occupant load of 300 or more. [F157-16]
- Requires sprinkler protection for balconies in Type III and IV buildings having an NFPA 13R sprinkler system. [F170-16 AMPC1]
- Addresses fire protection on active construction sites. [F327-16 AM]
- Gives fire code officials the ability to require site security for buildings under construction during off work hours. [F329-16 AM]

International Wildland Urban Interface Code

- Permits the use of FRTW in Class 3 Ignition Resistant construction, consistent with current allowances for FRTW in Class 1 and 2 Ignition Resistant construction. [WUIC8-16]

Conclusion

The 2018 IFC, 2018 IECC, and 2018 IWUIC are all available from ICC (www.iccsafe.org) and represent the state-of-the-art for design and construction of buildings within their scope. Changes to wood provisions in most cases lead to more efficient use of wood in design and construction. In some situations, a building designer may want to use a more up-to-date code provision or

consensus standard than is recognized in the building code adopted by a jurisdiction. In those cases, building officials, in accordance with IFC Section 104.9, IECC C102, and IWUIC 105.3, are permitted to accept designs prepared in accordance with newer consensus reference standards. These “alternative materials, design and methods” provisions allow a jurisdiction to adopt new technologies in materials and building construction provided documentation is provided to the jurisdiction that is found to provide equivalency in quality, strength, durability and safety.

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Appendix A: 2018 IFC, IECC, and IWUIC Changes Related to Wood Construction – Strikethrough/Underline Format

ICC Code Change Tracking Number	Strikethrough/Underline Text																		
ADM6-16 AMPC1	<p>IECC R202 DEFINITIONS APPROVED AGENCY. An established and recognized agency that is regularly engaged in conducting tests, or furnishing inspection services, <u>or furnishing product certification</u>, where such agency has been approved by the building official.</p>																		
RE40-16 AMPC1	<p>IECC R402.2.2 Ceilings without attic spaces. Where Section R402.1.2 would require insulation levels above <u>greater than R-30 in the ceiling</u> and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30. <u>Insulation shall extend over the top of the wall plate to the eaves outer edge of such plate and shall not be compressed.</u> This reduction of insulation from the requirements of Section R402.1.2 shall be limited to 500 square feet or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the U-factor alternative approach in Section R402.1.4 and the total UA alternative in Section R402.1.5.</p>																		
RE173-16 AMPC1	<p>IECC TABLE R406.4 (N1106.4) MAXIMUM ENERGY RATING INDEX</p> <table border="1"> <thead> <tr> <th>CLIMATE ZONE</th> <th>ENERGY RATING INDEX^a</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>52 <u>57</u></td> </tr> <tr> <td>2</td> <td>52 <u>57</u></td> </tr> <tr> <td>3</td> <td>51 <u>57</u></td> </tr> <tr> <td>4</td> <td>54 <u>62</u></td> </tr> <tr> <td>5</td> <td>55 <u>61</u></td> </tr> <tr> <td>6</td> <td>54 <u>61</u></td> </tr> <tr> <td>7</td> <td>53 <u>58</u></td> </tr> <tr> <td>8</td> <td>53 <u>58</u></td> </tr> </tbody> </table> <p>a. <u>When on-site renewable energy is included for compliance using the ERI analysis per Section R406.4, the building shall meet the mandatory requirements with Section R406.2 and the building thermal envelope shall be greater than or equal to levels of efficiency and Solar Heat Gain Coefficient in Table R402.1.2 or Table R402.1.4.</u></p>	CLIMATE ZONE	ENERGY RATING INDEX ^a	1	52 <u>57</u>	2	52 <u>57</u>	3	51 <u>57</u>	4	54 <u>62</u>	5	55 <u>61</u>	6	54 <u>61</u>	7	53 <u>58</u>	8	53 <u>58</u>
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<p>CE230-16 AS</p>	<p>IECC C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS PACKAGES</p> <p>C406.1 Requirements. Buildings shall comply with at least one of the following:</p> <ol style="list-style-type: none"> 1. More efficient HVAC performance in accordance with Section C406.2. 2. Reduced lighting power density system in accordance with Section C406.3. 3. Enhanced lighting controls in accordance with Section C406.4. 4. On-site supply of renewable energy in accordance with Section C406.5. 5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Section C406.6. 6. High-efficiency service water heating in accordance with Section C406.7. 7. Enhanced envelope performance in accordance with Section C406.8. 8. Reduced air infiltration in accordance with Section C406.9 <p>Add new text as follows:</p> <p>C406.8 Enhanced envelope performance. <u>The total UA of the building thermal envelope as designed shall be not less than 15 percent below the total UA of the building thermal envelope in accordance with Section C402.1.5.</u></p> <p>C406.9 Reduced air infiltration. <u>Air infiltration shall be verified by whole building pressurization testing conducted in accordance with ASTM E779 or ASTM E1827 by an independent third party. The measured air leakage rate of the building envelope shall not exceed 0.25 cfm/ft² under a pressure differential of 0.3 in. water, with the calculated surface area being the sum of the above and below grade building envelope. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the code official and the building owner.</u></p> <p>Exception. <u>For buildings having over 250,000 square feet of conditioned floor area, air leakage testing need not be conducted on the whole building where testing is conducted on representative above-grade sections of the building. Tested areas shall total not less than 25 percent of the conditioned floor area and shall be tested in accordance with this section.</u></p>
<p>F157-16 AMPC1</p>	<p>IFC 903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:</p> <ol style="list-style-type: none"> 1. Throughout all Group E fire areas greater than 12,000 square feet in area. 2. <u>The Group E fire area is located on a floor other than a level of exit discharge serving such occupancies.</u> <p>Exception: <u>In buildings where every classroom has not fewer than one exterior exit door at ground level, an automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area.</u></p> <ol style="list-style-type: none"> 3. <u>The fire area has an occupant load of 300 or more.</u>

<p>F170-16 AMPC1</p>	<p>IFC 903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units and sleeping units where <u>either of the following conditions exist:</u></p> <ol style="list-style-type: none"> <u>1. The building is of Type V construction, provided there is a roof or deck above, or</u> <u>2. Exterior balconies, decks and ground floor patios of dwelling units and sleeping units are constructed in accordance with Section 1406.3 exception 3 of the <i>International Building Code</i>.</u> <p>Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch to 6 inches below the structural members and a maximum distance of 14 inches below the deck of the exterior balconies and decks that are constructed of open wood joist construction.</p>
<p>F172-16 AM</p>	<p>IFC 903.3.1.2.3 Attics Attic protection shall be provided as follows:</p> <ol style="list-style-type: none"> <u>1. Attics that are used or intended for living purposes or storage shall be protected by an automatic sprinkler system.</u> <u>2. Where fuel-fired equipment is installed in an unsprinklered attic, at least one quick-response intermediate temperature sprinkler shall be installed above the equipment.</u> <u>3. Where located in a building of Type III, Type IV or Type V construction designed in accordance with Section 510.2 or Section 510.4 of the <i>International Building Code</i>, attics not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet above the lowest level of required fire department vehicle access:</u> <ol style="list-style-type: none"> <u>3.1. Provide automatic sprinkler system protection.</u> <u>3.2. Construct the attic using noncombustible materials.</u> <u>3.3. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the <i>International Building Code</i>.</u> <u>3.4. Fill the attic with noncombustible insulation.</u> <p><u>The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance. For the purpose of this measurement, required fire vehicle access roads shall include only those roads that are necessary for compliance with Section 503.</u></p> <ol style="list-style-type: none"> <u>4. Group R-4 Condition 2 occupancy attics not required by Item 1 to have sprinklers shall comply with one of the following:</u> <ol style="list-style-type: none"> <u>4.1. Provide automatic sprinkler system protection.</u> <u>4.2. Provide a heat detector system throughout the attic that is arranged to activate the building fire alarm system in accordance with Section 907.2.10.</u> <u>4.3. Construct the attic using noncombustible materials.</u> <u>4.4. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the <i>International Building Code</i>.</u>

<p>F172-16 AM (continued)</p>	<p>4.5. Fill the attic with noncombustible insulation.</p> <p>903.2.8.3 Group R-4 Condition 2. An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4 Condition 2 occupancies. Attics shall be protected in accordance with Section 903.2.8.3.1 or 903.2.8.3.2.</p> <p>903.2.8.3.1 Attics used for living purposes, storage or fuel-fired equipment. Attics used for living purposes, storage or fuel-fired equipment shall be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2.</p> <p>903.2.8.3.2 Attics not used for living purposes, storage or fuel-fired equipment. Attics not used for living purposes, storage or fuel-fired equipment shall be protected in accordance with one of the following:</p> <ol style="list-style-type: none"> 1. Attics protected throughout by a heat detector system arranged to activate the building fire alarm system in accordance with Section 907.2.10. 2. Attics constructed of noncombustible materials. 3. Attics constructed of fire-retardant-treated wood framing complying with Section 2303.2 of the International Building Code. 4. The automatic sprinkler system shall be extended to provide protection throughout the attic space.
<p>F327-16 AM</p>	<p>IFC 3309.1 Emergency telephone. Emergency telephone facilities with ready access ready access shall be provided in an approved location at the construction site <u>or an approved equivalent means of communication shall be provided.</u> The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone <u>or where an equivalent means of communication has been approved the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks and in the construction site office.</u></p>
<p>F329-16 AS</p>	<p>IFC 3304.5.1 Fire watch during combustible construction. Where required by the fire code official, a fire watch shall be provided during non-working hours for construction that <u>exceeds 40 feet in height above the lowest adjacent grade.</u></p>
<p>WUIC8-16 AS</p>	<p>IWUIC 506.3 Underfloor enclosure. Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls.</p> <p>Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance rated construction, <u>fire-retardant-treated wood, or heavy timber construction. Fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.</u></p>

Code change jargon explained:

ADM###-16 XX – this is a specific, unique code change from the 2016 hearing cycle. The last two to four characters describe whether the code change was accepted by the committee reviewing the code change: (1) as submitted, (2) as modified by the committee, or (3) as modified at the public comment hearing.

AS – Code change approved as originally written and submitted

AM – Code change modified by the committee

AMPC – Code change modified by public comment at the public comment hearings