IWUIC

2021 GROUP A PROPOSED CHANGES TO THE I-CODES

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Virtual Committee Action Hearings

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2021 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL FIRE CODE

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TENTATIVE ORDER OF DISCUSSION
2021 PROPOSED CHANGES TO THE INTERNATIONAL FIRE CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some F and PC code change proposals may not be included on this list, as they are being heard by another committee.

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WUIC1-21

IWUIC: SECTION 202

Proponents: Tony Crimi, representing North American Insulation Manufacturers Association (NAIMA), representing representing North American Insulation Manufacturers Association (NAIMA)

2021 International Wildland-Urban Interface Code

Revise as follows:

IGNITION-RESISTANT BUILDING MATERIAL. A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure ~~of burning embers and small flames,~~ as prescribed in Section 503.

Reason Statement: The current definition is misleading and conflicting within itself. It talks about materials being ignition resistant under worst-case fuel conditions, but then limits that to exposure to burning embers and small flames. It further limits that to the conditions specified in Section 503. If not previously, recent experience has certainly shown that there are worst case wildland fire exposure conditions than exposure to burning embers and small flames. There is a large body of work being done in the US and Internationally to better define more appropriate fire exposure conditions than those previously considered necessary. As written, this definition is incorrect.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal revises the defined term but does not add additional requirements.

WUIC2-21

IWUIC: 404.11 (New)

Proponents: Michael Cudahy, representing Self (mikec@cmservices.com)

2021 International Wildland-Urban Interface Code

Add new text as follows:

404.11 Water Supply Protection. Service lines shall be protected from backsiphonage by a dual check valve installed in a valve box as close as practicable to the water main.

Reason Statement: In large scale wildland-urban interface fires multiple buildings in one area are often destroyed, compromising the integrity of the water distribution systems. Large scale failure of plumbing systems causes systemic water pressure drops and hampers fire fighting efforts. The pressure drop also allows for back draft of toxic combustion gasses and runoff into the service and main lines, contaminating the water system, potentially for a significant period of recovery, even for buildings not directly impacted.
The installation of a simple check valve or other suitable back flow device on the service line would limit the systemic pressure drop and associated backsiphonage of combustion gasses and contaminated water into the potable water network, easing fire fighting efforts and recovery. There are inexpensive NSF-61 listed check valves which can be buried or otherwise protected that can serve this important function.

Cost Impact: The code change proposal will increase the cost of construction
The proposal would require the addition of a check valve or other device and a valve box on the building water service line, which would increase the cost of construction. NSF-61 listed check valves for example, would cost in the range of $30 to $200, depending on size and material, plus installation. An extra valve box would add between $20 and $200, plus installation.

WUIC3-21

IWUIC: 503.1, TABLE 503.1

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Wildland-Urban Interface Code

503.1 General. Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ignition-resistant materials shall comply with the requirements of Section 503.2.

Revise as follows:

TABLE 503.1
IGNITION-RESISTANT CONSTRUCTION[a]

	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
DEFENSIBLE SPACE[c]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]
Nonconforming	IR 2	IR 1	IR 1	IR 1 Rated ~~N.C.~~	IR 1 Rated ~~N.C.~~	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 N.C.
1.5 × Conforming	Not Required	IR 3	IR 3	IR 2	IR 2	IR 1

a. Access shall be in accordance with Section 403.

b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.

IR 1 = Ignition-resistant construction in accordance with Section 504.

IR 2 = Ignition-resistant construction in accordance with Section 505.

IR 3 = Ignition-resistant construction in accordance with Section 506.

Rated When exterior walls have a fire-resistance rating of not less than 1 hour, the exterior surfaces of such walls shall be noncombustible.

N.C. = ~~Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.~~

c. Conformance based on Section 603.

d. Conformance based on Section 404.

e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

Reason Statement: Table 503.1 has been in the IWUIC code since its first edition, in 2003, when no ignition resistant materials were allowed as alternatives to 1 hour fire resistance rated construction. In subsequent editions, including the 2021 edition, ignition resistant materials are allowed as alternates to a 1 hour fire resistant rated assembly. However, this table has not been updated and is no longer consistent. The table states that some IR1 areas must have fire resistant rated construction but section 503.2 describes all the types of ignition resistant materials that are allowed for IR1, IR2 and IR3 construction, and they include log wall construction (mentioned in the table for some instances) but also fire retardant-treated wood, and various other ignition resistant materials. Thus, assuming that all building elements (or even all walls) must comply with a fire resistance rating is incorrect and singling out "log wall" in the table is also incorrect.
Therefore, it is recommended that the note regarding "N.C." be revised to refer to "Rated" (or any other appropriate term) and to explain that, in some instances (the more severe environments), having a 1 hour fire resistance rated construction is not sufficient to prevent flame spread (upwards) along a wall, which is why having a covering that is noncombustible is important in WUI areas.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This clarifies an error in the code.

WUIC3-21

WUIC4-21

IWUIC: 503.2

Proponents: Tim Earl, representing GBH International (tearl@gbhinternational.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the following:

1. Material shall be tested ~~on all sides~~ with the extended ASTM E84 (UL 723) test or ASTM E2768~~, except panel products shall be permitted to test only the front and back faces~~. Panel products shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). Materials that, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, comply with the following:

   1.1. Flame spread. Material shall exhibit a *flame spread index* not exceeding 25 ~~and shall not show evidence of progressive combustion following the extended 30-minute test~~.

   1.2. Flame front. Material shall exhibit a flame front that does not progress more than $10^1/_2$ feet (3200 mm) beyond the centerline of the burner at any time during the ~~extended 30-minute~~ test.

   1.3. Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in the following standards, as applicable to the materials and the conditions of use:

      1.3.1. Method A " Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898, for fire-retardant-treated wood, wood-plastic composite and plastic lumber materials.

      1.3.2. ASTM D7032 for wood-plastic composite materials.

      1.3.3. ASTM D6662 for plastic lumber materials.

   1.4 Identification. Materials shall bear identification showing the fire test results.

   Exception: Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

2. Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.
3. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
4. Fire-retardant-treated wood *roof coverings*. *Roof assemblies* containing fire-retardant-treated wood shingles and shakes that comply with the requirements of Section 1505.6 of the International Building Code and classified as Class A *roof assemblies* as required in Section 1505.2 of the International Building Code.

Reason Statement: This proposed revision matches changes made to the IBC last cycle with regards to the extended E84 test.
Testing on all sides is unnecessary and impractical. For example, if a manufacturer ships a pallet of 2x4's to a lab for testing, how is a lab supposed to determine which side is "the same side" for different pieces? They can't. They just arbitrarily test one face during each test, but there is no way to know if it is the same face or the opposite face of the previous specimen. In reality, these products are treated in such a way that all sides are protected to the same degree anyway.

The second change is the elimination of the requirement to "not show evidence of significant progressive combustion" in 1.1. All labs which were polled at ASTM responded that they did not have any guidance on what that meant, and so they were simply interpreting it to mean no more than 10 1/2 feet, which is already stated in 1.2. Therefore, this requirement is being stricken everywhere it appears, including the IBC and NFPA 703.

Cost Impact: The code change proposal will decrease the cost of construction
This change will decrease costs by eliminating unnecessary testing of multiple sides of the same material.

WUIC5-21

IWUIC: 503.2

Proponents: Michael O'Brian, Chair, representing FCAC (fcac@iccsafe.org)

2021 International Wildland-Urban Interface Code

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the following:

1. Material shall be tested on the front and back faces ~~all sides~~ with the extended ASTM E84 or UL 723 ~~(UL 723)~~ test or with ASTM E2768~~, except panel products shall be permitted to test only the front and back faces.~~ Panel products shall be tested with a ripped or cut longitudinal gap of 1/8 inch (3.2 mm). Materials that, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, comply with the following:
   1.1. Flame spread. Material shall exhibit a *flame spread index* not exceeding 25 ~~and shall not show evidence of progressive combustion following the extended 30-minute test.~~
   1.2. Flame front. Material shall exhibit a flame front that does not progress more than $10^1/_2$ feet (3200 mm) beyond the centerline of the burner at any time during the extended 30-minute test.
   1.3. Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in the following standards, as applicable to the materials and the conditions of use:
      1.3.1. Method A " Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898, for fire-retardant-treated wood, wood-plastic composite and plastic lumber materials.
      1.3.2. ASTM D7032 for wood-plastic composite materials.
      1.3.3. ASTM D6662 for plastic lumber materials.
   1.4 Identification. Materials shall bear identification showing the fire test results.

   Exception:
   Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.
2. Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.
3. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
4. Fire-retardant-treated wood *roof coverings*. *Roof assemblies* containing fire-retardant-treated wood shingles and shakes that comply with the requirements of Section 1505.6 of the International Building Code and classified as Class A *roof assemblies* as required in Section 1505.2 of the International Building Code.

Reason Statement: The IBC section on FRTW was amended to read as shown below and this brings consistency between IWUIC and IBC. The extended ASTM E84 test and ASTM E2768 both clarified that when the flame front does not progress more than 10 1/2 feet (3200 mm) beyond the centerline of the burners at any time during the test that means that there is no significant progressive combustion. ASTM E2768 is the extended ASTM E84 test for 30 minutes and applies to any material to make it an ignition resistant material.
It has been explained that testing of "all sides" with the ASTM E84 test does not make sense and that the key issue is the front and back faces. Also, structural panels need to be tested with a rip or gap to apply the fire test to any layer of the material that has a poorer fire performance but is not exposed otherwise.

IBC 2021 will read:

2303.2 Fire-retardant-treated wood. Fire-retardant-treated wood is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a listed flame spread index of 25 or less. Additionally, the ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10 1/2 feet (3200 mm) beyond the centerline of the burners at any time during the test.

2303.2.1 Pressure process. For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (345 kPa).

2303.2.2 Other means during manufacture. For wood products impregnated with chemicals by other means during manufacture, the treatment shall

be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an approved

method of protection as required in this section. 2303.2.3 Fire Testing of Wood Structural Panels Wood structural panels shall be tested with a ripped or cut longitudinal gap of 1/8" (3.2 mm).

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal merely correlates the IWUIC with the IBC requirements.

WUIC5-21

WUIC6-21

IWUIC: 503.2

Proponents: Christopher Athari, Hoover Treated Wood Products, representing Hoover Treated Wood Products (cathari@frtw.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the following:

1. Material shall be tested on all sides with the extended ASTM E84 (UL 723) test or ASTM E2768, except panel products shall be permitted to test only the front and back faces. Panel products shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). Materials that, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, comply with the following:

   1.1. Flame spread. Material shall exhibit a *flame spread index* not exceeding 25 and shall not show evidence of progressive combustion following the extended 30-minute test.

   1.2. Flame front. Material shall exhibit a flame front that does not progress more than $10^1/_2$ feet (3200 mm) beyond the centerline of the burner at any time during the extended 30-minute test.

   1.3. Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in the following standards, as applicable to the materials and the conditions of use:

      1.3.1. Method A " Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898, for fire-retardant-treated wood, wood-plastic composite and plastic lumber materials.

      1.3.2. ASTM D7032 for wood-plastic composite materials.

      1.3.3. ASTM D6662 for plastic lumber materials.

   1.4. Identification. Materials shall bear identification showing the fire test results.

   1.5. The use of paints, coating, stains, or other surface treatments is not an approved method of protection as required in this section.

   Exception: Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

2. Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.
3. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
4. Fire-retardant-treated wood *roof coverings*. *Roof assemblies* containing fire-retardant-treated wood shingles and shakes that comply with the requirements of Section 1505.6 of the International Building Code and classified as Class A *roof assemblies* as required in Section 1505.2 of the International Building Code.

Reason Statement: In response to the wildfire season of 2020, in wildfire-impacted communities, efforts are being made by manufacturers seeking approval for painted, coated, stains, or other surface-treated wood that require continuous maintenance in lieu of ignition-resistant building materials. This proposed addition will clarify that paints, coating, stains, and other types of products with vulnerable surface coatings are not approved for use as ignition-resistant building materials in the wildland-urban interface (WUI).
This language already exists in the International Building Code in Section 2303.2.2 for fire-retardant-treated wood (FRTW), which is one of the categories of ignition-resistant building materials in IWUIC (503.2#3). It is also in the 2021 IRC, Section R802.1.5.2. This language is also included in the Second Revision for the upcoming NFPA 1140 Standard for Wildland Fire Protection for FRTW. It is also in Chapters 7A and 23 of the California Building Code concerning FRTW.

Finally, note that the required testing referenced in 503.2#1 would require ignition-resistant building materials to undergo the same testing as FRTW.

Adding this proposed language to 503.2 adds clarity and conformity to codes affecting WUI communities and ensures that any ignition-resistant material will perform as well as FRTW.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This language has been in the IBC for two cycles and IRC for one, making it consistent throughout the codes.

WUIC7-21

IWUIC: 503.2, ASTM Chapter 07 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Wildland-Urban Interface Code

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the following:

1. Material shall be tested on all sides with the extended ASTM E84 (UL 723) test or ASTM E2768, except panel products shall be permitted to test only the front and back faces. Panel products shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). Materials that, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, comply with the following:

   1.1. Flame spread. Material shall exhibit a *flame spread index* not exceeding 25 and shall not show evidence of progressive combustion following the extended 30-minute test.

   1.2. Flame front. Material shall exhibit a flame front that does not progress more than $10^1/_2$ feet (3200 mm) beyond the centerline of the burner at any time during the extended 30-minute test.

   1.3. ~~Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in the following standards, as applicable to the materials and the conditions of use:~~

   The material shall also maintain its performance under conditions of use by meeting performance requirements for weathering, including exposure to temperature, moisture and ultraviolet radiation, in accordance with the following:

   1.3.1. ~~Method A " Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898, for fire-retardant-treated wood, wood-plastic composite and plastic lumber materials.~~

   Ignition resistant materials shall demonstrate compliance with the requirements of 503.2 Item 1 after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing" in ASTM D2898.

   1.3.2. ~~ASTM D7032 for wood-plastic composite materials.~~

   Wood-plastic composite materials shall demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354, at an incident heat flux of 50 kW/m2 in the horizontal orientation, then weathering in accordance with ASTM D7032, and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10% in peak rate of heat release when compared to the peak heat release rate of the non-weathered material.

   1.3.3. ~~ASTM D6662 for plastic lumber materials.~~

   Plastic lumber composite materials shall demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354, at an incident heat flux of 50 kW/m2 in the horizontal orientation, then weathering in accordance with ASTM D6662, and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10% in peak rate of heat release when compared to the peak heat release rate of the non-weathered material.

   1.4 Identification. Materials shall bear identification showing the fire test results.

   Exception: Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

2. Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.

3. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.

4. Fire-retardant-treated wood *roof coverings*. *Roof assemblies* containing fire-retardant-treated wood shingles and shakes that comply with the requirements of Section 1505.6 of the International Building Code and classified as Class A *roof assemblies* as required in Section 1505.2 of the International Building Code.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken PA 19428-2959

ASTM E1354-2017: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter

Staff Analysis: ASTM E1354-2017: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter is already referenced in the IBC and IFC. This is simply a new occurrence of the reference in the I-Codes.

Reason Statement: This code change revises the methods to evaluate the effects of weathering of wood-plastic composite materials or plastic lumber materials by utilizing the ASTM E1354 cone calorimeter fire test by means of a three step program:
1. testing the unweathered material,

2. then conduct the weathering per D7032 or D6662 as required in the code now, and

3, then test the weathered material again per ASTM E1354.

If the weathered material does not exhibit more than a 10% increase in peak rate of heat release, then the material demonstrates no or minimal effects on fire performance due to weathering.

The reason for a maximum 10% increase in peak rate of heat release is that 10% is the range of repeatability of the ASTM E1354 fire test, which is significantly better than that of the ASTM E84 test. The reason for choosing ASTM E1354 for the fire test is that it uses a much smaller test specimen than ASTM E84 (100 mm x 100 mm as opposed to 24 feet by 2 feet).The tests used in ASTM D6662 and in ASTM D7032 for weathering do not permit the large test specimens that are used in ASTM E84 testing. Note that ASTM E1354 is already referenced in the I-Codes.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will decrease the cost of construction
This proposal would reduce the time necessary and cost of testing decking products.

WUIC7-21

WUIC8-21

IWUIC: 503.2

Proponents: John Woestman, Kellen Company, representing Composite Lumber Manufacturers Association (CLMA) (jwoestman@kellencompany.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the following:

1. Material shall be tested on all sides with the extended ASTM E84 (UL 723) test or ASTM E2768, except panel products shall be permitted to test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, comply with the following:

   1.1. Flame spread. Material shall exhibit a *flame spread index* not exceeding 25 and shall not show evidence of progressive combustion followir

   1.2. Flame front. Material shall exhibit a flame front that does not progress more than $10^1/_2$ feet (3200 mm) beyond the centerline of the burner a

   1.3. Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. M applicable to the materials and the conditions of use:

      1.3.1. Method A " Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898, for fire-retar

      1.3.2. ASTM D7032 for wood-plastic composite materials.

      1.3.3. ASTM D6662 for plastic lumber materials.

   1.4 Identification. Materials shall bear identification showing the fire test results.

   Exception: Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.(

2. Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.
3. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the Intern
4. Fire-retardant-treated wood *roof coverings*. *Roof assemblies* containing fire-retardant-treated wood shingles and shakes that comply with the re

Reason Statement: ASTM D2898 is not used to evaluate weathering of wood plastic composite materials nor plastic lumber. Item 1.3.2 includes the requirements for evaluating weathering of wood plastic composite materials. Item 1.3.3 includes the requirements for evaluating weathering of plastic lumber.
Wood plastic composite materials and plastic lumber are materials vulnerable to degradation by UV light, water exposure and drying, and thermal cycling. The weathering required by ASTM D7032 (for WPCs) and by ASTM D6662 (for plastic lumber) subjects WPCs and plastic lumber to these stressors for 2000 hours. ASTM D2898 Method A subjects fire-retardant-treated wood to 2016 hours water exposure and drying, and thermal cycling – but no UV exposure.

The current requirement to weather WPCs and plastic lumber to D2898 provides essentially no beneficial information not provided by weathering to ASTM D7032 (for WPCs) and by ASTM D6662 (for plastic lumber).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No changes to the cost of construction. Weathering wood plastic composites and plastic lumber to D2898 has not been a common practice.

WUIC9-21

IWUIC: 503.2, 503.2.1 (New), 503.2.2 (New), 503.2.2.1 (New), 503.2.3 (New), 503.2.4 (New), 503.2.4.1 (New), 503.2.4.2 (New), 503.2.4.3 (New), 503.2.4.4 (New)

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of therequirements in Sections 503.2.1 through 503.2.4. ~~following:~~

1. ~~Material shall be tested on all sides with the extended ASTM E84 (UL 723) test or ASTM E2768, except panel products shall be permitted to test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, comply with the following:~~

   ~~1.1. Flame spread. Material shall exhibit a *flame spread index* not exceeding 25 and shall not show evidence of progressive combustion followir~~

   ~~1.2. Flame front. Material shall exhibit a flame front that does not progress more than 10+½ feet (3200 mm) beyond the centerline of the burner a~~

   ~~1.3. Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. M applicable to the materials and the conditions of use:~~

      ~~1.3.1. Method A " Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898, for fire-retar~~

      ~~1.3.2. ASTM D7032 for wood-plastic composite materials.~~

      ~~1.3.3. ASTM D6662 for plastic lumber materials.~~

   ~~1.4 Identification. Materials shall bear identification showing the fire test results.~~

   ~~**Exception:** Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.~~

2. ~~Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.~~
3. ~~Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the Intern~~
4. ~~Fire-retardant-treated wood *roof coverings*. *Roof assemblies* containing fire-retardant-treated wood shingles and shakes that comply with the re~~

Add new text as follows:

503.2.1 Noncombustible material. Material that comply with the requirements for noncombustible materials in Section 202.

503.2.2 Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior useand meet the requirements of Section 2303.2 of the International Building Code shall be considered to comply with Section 503.2.

503.2.2.1 Weathering. Fire retardant treated wood shall demonstrate compliance with the requirements of Section 503.2.2 after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing" in ASTM D2898.

503.2.3 Fire-retardant-treated wood roof coverings. Roof assemblies containing fire-retardant-treated wood shingles and shakes that comply with the requirements of Section 1505.6 of the International Building Code and classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

503.2.4 Alternate ignition resistant material. Material shall exhibit a flame spread index of 25 or less when tested on the front and back faces in accordance with the ASTM E84 or UL 723 test. Additionally, the ASTM E84 or UL 723 test shall be continued for a 20-minute period and the flame front shall not progress more than 10 ½ feet (3200 mm) beyond the centerline of the burners at any time during the test on either the front or back faces. Panel products shall be tested with a ripped or cut longitudinal gap of 1/8 inch (3.2 mm).

Exceptions:

1. Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.
2. Materials complying with the requirements of ASTM E2768 on the front and back faces shall not be required to be tested in accordance with ASTM E84 or UL 723, but shall be required to demonstrate its performance after weathering.

503.2.4.1 Performance requirements for weathering. The material shall also maintain its performance under conditions of use by meeting performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) in accordance with Sections

503.2.4.2 through 503.2.4.4.

503.2.4.2 Alternate ignition resistant materials. Alternate ignition resistant materials shall demonstrate compliance with the requirements of Section 503.2.4 after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing" in ASTM D2898.

503.2.4.3 Wood-plastic composite materials. Wood-plastic composite materials shall demonstrate compliance with the requirements of Section 503.2.4 after weathering in accordance with ASTM D7032.

503.2.4.4 Plastic lumber materials. Plastic lumber materials shall demonstrate compliance with the requirements of Section 503.2.4 after weathering in accordance with ASTM D6662.

Reason Statement: This code change does 4 things, without changing any of the requirements:
1. It introduces into the IWUIC the same changes to eliminate the duplicate testing requirements for fire retardant treated wood (and, by extension, ignition resistant materials) already contained in the IBC and IRC.

2. This moves what used to be Items 2, 3, & 4 to be new sections 503.2.1, 503.2.2, and 503.2.3. These three provisions are easy to grasp but are somewhat obscured in the current text by the complexity of Item 1.

3. This adds to the item on fire retardant treated wood the same weathering requirements, under a new subsection, 503.2.4, that are presently hidden under item 1.

4. This reorganizes current Item 1 (proposed to be revised to a new section 503.2.4) to make the language (hopefully) clearer, without changing the requirements. The weathering requirements for the alternate ignition resistant materials are shown as new subsections.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is just an editorial rewrite to improve clarity in a complex section.

WUIC9-21

WUIC10-21

IWUIC: 503.3 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Wildland-Urban Interface Code

Add new text as follows:

503.3 Coated Wood Panels. Coated wood panels used as ignition resistant materials shall be listed and labeled in accordance with the requirements of Section 503.2, where tested on the front and back faces.

Reason Statement: No evidence exists that coatings are sufficiently durable to be permitted for outdoor use. At present the code is silent on whether fire-retardant coatings can, or not, be used outdoors, except for a prohibition to use them on decks (primarily because of the potential for erosion damage from frequent walking).
A relatively recent study by NIST investigated whether fire retardant coatings applied to wood products were able to continue being effective after being exposed to weather. The study was entitled “Effect of Fire-Retardant Coatings and Weathering on the Flammability of Wood-Based Materials in WUI Communities” and was authored by Laura Dubrulle, Mauro Zammarano, Douglas Fox, Rick Davis, Kathryn Butler, Erik Johnsson and Alexander Maranghides. It was presented at the 2019 BCC Research Conference on May 19-22, 2019, in San Antonio, TX and later published as NIST TN 2094 in 2020 (https://doi.org/10.6028/NIST.TN.2094). It studied 10 fire-retardant coatings (6 film-forming and 4 penetrating stains) and 5 top-coatings (although not necessarily those recommended by the coatings manufacturers specifically for use with their products). The fire properties were assessed by using the cone calorimeter (ASTM E1354, in the horizontal orientation and at 50 kW/m2 initial heat flux) and the wood used was red cedar (with the intent of simulating fences, for example). Weathering was done by exposure to “simulated rainwater” and by UV exposure. The conclusion was that none of the fire-retardant coatings investigated would provide adequate protection, on their own, for more than “a few weeks”. When used together with top-coatings, the protective effect was estimated to last “a few months”.

A durability of a few months is not sufficient to ensure adequate protection, since it is unlikely that homeowners will recoat outdoor products (including any wall materials, eaves, or soffits or even fences).The IBC recognizes fire-retardant treated wood in Chapter 23 and it has a clarifying statement in 2303.2.2 that states: “The use of paints, coating, stains or other surface treatments is not an approved method of protection as required in this section.” That clarification is fully appropriate since a coated wood product is not a product that complies with the requirements of a fire retardant treated wood product, which are clear in section 2303 and which require the product to be “impregnated” with chemical. Clearly, coatings do not impregnate the wood.This means that coated wood panels (i.e. panels with coatings that improve fire performance) are not recognized in the IBC code, other than in existing buildings. It is fully appropriate not to allow the application on site of a paint or coating intended to improved fire performance because such an application in a new building would not ensure a consistent application of a safe product.This proposal would incorporate into the IWUIC coated wood panels but only if they have been factory-produced and have been listed and labeled as having complied with the same fire safety requirements as fire retardant treated wood, including having been tested with the ripped or cut longitudinal gap. This proposal does not introduce any new standards not already in the IWUIC.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will increase the cost of construction
Factory produced wood panels will be more expensive than field applied coatings.

WUIC11-21

IWUIC: 504.5

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (estafford@ibhs.org); Milad Shabanian, Insurance Institute for Business and Home Safety, representing Insurance Institute for Business and Home Safety (mshabanian@ibhs.org)

2021 International Wildland-Urban Interface Code

Revise as follows:

504.5 Exterior walls. Exterior surfaces of exterior walls shall be noncombustible for a minimum of 6 inches vertically from horizontal surfaces such as ground or attached decking. Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.
2. *Approved noncombustible* materials.
3. Heavy timber or *log wall construction*.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
5. Ignition-resistant materials complying with Section 503.2 on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

Reason Statement: Buildings located in Wildland Urban Interface (WUI) areas can be ignited through three main mechanisms: Wind-blown embers, radiant heat, and direct flame contact [1]. A previous study shows that embers (firebrands) are the most common cause of building ignitions during a wildfire [2]. The ember distribution around a building strongly depends on wind flow, which changes drastically around vertical objects as the wind's kinetic energy is converted to high-pressure points. IBHS lab studies and field investigations identified that one of the most vulnerable locations is at the base of the exterior walls [3]. Where embers accumulate, they are typically in direct contact or close proximity to the exterior walls. Embers are hot, and transfer heat to the surfaces they are in contact with. There is a high potential that embers will ignite combustible surfaces that they are in direct or close contact with. This issue is more critical for construction located in the Class 1 Ignition-Resistant (IR1) category. In this class, exterior walls are particularly vulnerable to exposure from flames or prolonged exposure to radiant heat, such as from burning vegetation, a neighboring home or outbuilding, and embers. Protecting exterior walls with a 6-inch noncombustible material from horizontal surfaces will minimize the chance of ignition of any part of the exterior wall assembly from embers, thereby minimizing the chance of fire spread to the potentially weaker components of the wall. A required 6-in vertical noncombustible zone at the base of the wall is important because embers accumulate in that area (see picture) due to wind flow around the building (eddies created by blockage flow) and crevices [90-degree corner] tend to trap the embers. The 6 inches of noncombustible material on exterior walls is also required in NFPA 1144 [4]. In the photographs below, the top photograph illustrates the ember distribution around a building tested at the IBHS research center [5] and performance of the exterior walls with and without 6-inch vertical separation. In the bottom photograph, note that ignition did not occur on the wall section where there was a 6-inch vertical separation between the ground and the start of the combustible siding material.

Accumulation of embers at the base of the exterior wall.

Ignition of wall section where combustible siding material extended to the ground.

Bibliography: [1] Caton, S. E., Hakes, R. S., Gorham, D. J., Zhou, A., & Gollner, M. J. (2017). Review of pathways for building fire spread in the wildland urban interface part I: exposure conditions. Fire technology, 53(2), 429-473.
[2] Mell WE, Manzello SL, Maranghides A et al (2010) The wildland–urban interface fire problem—current approaches and research needs. Int J Wildland Fire 19:238. doi:10.1071/WF07131

[3] Quarles S, Leschak P, Cowger R et al (2012) Lessons learned from Waldo Canyon: fire adapted communities mitigation assessment team findings. Insurance Institute of Business & Home Safety, Richburg https://fireadapted.org/wp-content/uploads/2018/06/waldo-canyon-report.pdf

[4] National Fire Protection Association (2018) NFPA 1144 Standard for reducing structure ignition hazards from wildland fire.

[5] Quarles S (2017) Vulnerability of Vents to Wind-Blown Embers. Insurance Institute of Business & Home Safety, Richburg. https://ibhs.org/wp-content/uploads/wpmembers/files/Vulnerability-of-Vents-to-Wind-Blown-Embers_IBHS.pdf

Cost Impact: The code change proposal will increase the cost of construction
Construction costs may increase for certain materials and construction types but the impact will be minimal.

WUIC12-21

IWUIC: 504.2, 505.2, 506.2, ASTM Chapter 07 (New)

Proponents: Tony Crimi, representing North American Insulation Manufacturers Association (NAIMA), representing representing North American Insulation Manufacturers Association (NAIMA)

2021 International Wildland-Urban Interface Code

Revise as follows:

504.2 Roof assembly. Roofs shall have a *roof assembly* that complies with a Class A rating when tested in accordance with ASTM E108 or UL 790. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq. ft. (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.
4. Class A roof assemblies include a cap sheet of not less than 1 in. (25 mm) thick mineral wool board complying with ASTM C726 is installed between the roofing material and the combustible roof deck.

505.2 Roof assembly. Roofs shall have a *roof assembly* that complies with not less than a Class A rating when tested in accordance with ASTM E108 or UL 790, or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Exception: Class A roof assemblies include a cap sheet of not less than 1 in. (25 mm) thick mineral wool board complying with ASTM C726 is installed between the roofing material and the combustible roof deck.

506.2 Roof assembly. Roofs shall have a *roof assembly* that complies with not less than a Class B rating when tested in accordance with ASTM E108 or UL 790 or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Exception: Class A roof assemblies include a cap sheet of not less than 1 in. (25 mm) thick mineral wool board complying with ASTM C726 is installed between the roofing material and the combustible roof deck.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken PA 19428-2959

ASTM C726-17: Standard Specification for Mineral Wool Roof Insulation Board

Staff Analysis: ASTM C726-17: Standard Specification for Mineral Wool Roof Insulation Board, is already referenced in the IBC. This is simply a new occurrence of the reference in the I-Codes.

Reason Statement: The proposal provides an additional option to install mineral fiber board Cap sheets based on ASTM C726 compliance. This ASTM specification covers the composition and physical properties of mineral fiber insulation board used above structural roof decks as a base for built-up roofing and single ply membrane systems in building construction. The standard specification covers mineral wool roof insulation used as a base for systems such as single-ply, polymer-modified bitumen and built-up roof.
ASTM C726 is already referenced in Chapter 15 of the IBC

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an additional option to install a mineral wool cap sheet, but adds no requirements.

WUIC13-21

IWUIC: 504.5, 504.5.1 (New), 504.5.2 (New), 504.5.3 (New), 504.5.4 (New), ASTM Chapter 07 (New)

Proponents: William Koffel, representing Fire Safe North America (wkoffel@koffel.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

504.5 Exterior walls. ~~Exterior walls~~*Exterior wall coverings* or *exterior wall assemblies* of buildings or structures shall ~~be constructed with one of the following methods:~~ comply with Sections 504.5.1 and 504.5.2.

1. ~~Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.~~
2. ~~*Approved noncombustible* materials.~~
3. ~~Heavy timber or *log wall construction.*~~
4. ~~Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~
5. ~~Ignition-resistant materials complying with Section 503.2 on the exterior side.~~

Such materials shall extend from the top of the foundation to the underside of the roof sheathing.

Add new text as follows:

504.5.1 Flame propagation of exterior wall coverings or exterior wall assemblies. *Exterior wall coverings* or *exterior wall assemblies* shall be constructed of *noncombustible materials* or *ignition-resistance materials*.

Exceptions:

1. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*
2. *Approved wall coverings* or *exterior wall assemblies* that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance shown in Section 504.5.3.
3. Combustible components conforming to Section 1402.5 of the *International Building Code*.

504.5.2 Flame impingent of exterior wall coverings or exterior wall assemblies. Exterior walls shall have a *fire resistance rating* of not less than 1-hour when tested in accordance with ASTM E119 or UL 263 from the exterior side.

Exceptions: Any of the following shall be deemed to meet the assembly performance criteria and the intent of this section:

1. Heavy timber or log wall construction.
2. Wall assemblies that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance in Section 504.5.4.

504.5.3 Conditions of acceptance for flame propagation. Testing in accordance with ASTM E2707 in Section 504.5.1 shall not exhibit flame propagation to the top of the test specimen during the full duration of the test when tested with a modified flame exposure of 100kW.

504.5.4 Conditions of acceptance for flame impingement. Testing in accordance with ASTM E2707 in Section 504.5.2 shall comply with all of the following:

1. Not exhibit evidence of glowing combustion on the interior surface of the assembly during the full duration of the test.
2. Have no evidence of flame penetration through the wall assembly during the full duration of the test.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken PA 19428-2959

ASTM E2707-15: Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2707-15:Standard Test Method for Determining Fire

Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: This proposal reorganizes section 504.5 and adds a new performance option to address the potential for flame propagation on an exterior wall. There is a need to evaluate two separate and distinct aspects of fire safety pertaining to exterior walls. This proposal separates the requirements for flame impingement into an exterior wall from the flame spread across an exterior wall. The proposed language maintains the provisions that address fire migrating to the interior of an *exterior wall*, while adding language that addresses the tendency for flames to spread across the exterior of an *exterior wall*.The reorganization separates the requirements for protection against flame impingement from flame propagation. Flame propagation is addressed currently addressed by ASTM E136 (noncombustibility) and by extended ASTM E84 provisions. It then creates a separate section to address flame impingement by referencing ASTM E119 and ASTM E2707 as currently exists. ASTM E2707 Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure was adapted from the California State Fire Marshal Standard 12-7A Materials and Construction Methods for Exterior Wildfire Exposure that is referenced in the Chapter 7A [SFM] Materials and Construction Methods for Exterior Wildfire Exposure within the California Building Code.

With respect to the five methods current accepted, they are all incorporated into the reorganization. The first method is in the charging language to Section 504.5.2. The second method is included in the charging language to Section 504.5.1. The third method (heavy timber) is moved to an Exception in Section 504.5.2. The fourth method (fire retardant treated wood) is moved to an Exception in Section 504.5.1. The fifth method is moved to the charging language in Section 504.5.1.

The additional option being proposed is to utilize a modified ASTM E2707 test to address flame propagation. Testing has been conducted both in a 2011 Research program conducted at UL, as well as in 2019 and 2020 as part of work being done through ASTM Committee E05. The ASTM activity has been dormant since early 2020 due to the current restrictions. Multiple assemblies have been successfully tested to date, including some with wood and vinyl siding. The UL research report is available at https://ulfirefightersafety.org/research-projects/residential-attic-fire-mitigation-tactics-and-exterior-fire-spread-hazards.html.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
All of the compliance methods currently permitted by the Code are retained with an additional method added. As such, there is no impact on the cost of construction.

WUIC13-21

WUIC14-21

IWUIC: 504.10, 505.10, 506.5 (New)

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (estafford@ibhs.org); Milad Shabanian, Insurance Institute for Business and Home Safety, representing Insurance Institute for Business and Home Safety (mshabnaian@ibhs.org)

2021 International Wildland-Urban Interface Code

Revise as follows:

504.10 Vents. Attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with *noncombustible* corrosion-resistant mesh with openings not to exceed ~~1/4 inch (6.4 mm)~~ 1/8-inch (3.2 mm), or shall be designed and *approved* to prevent flame or ember penetration into the structure.

505.10 Vents. Attic ventilation openings, foundation or underfloor vents or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with *noncombustible* corrosion-resistant mesh with openings not to exceed ~~1/4 inch (6.4 mm)~~ 1/8-inch (3.2 mm) or shall be designed and *approved* to prevent flame or ember penetration into the structure.

Add new text as follows:

506.5 Vents. Attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8-inch (6.4 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.

Reason Statement: In 2013, IBHS conducted a study on the vulnerability of vents to wind-blown embers [1]. According to this research, the 1⁄4-inch mesh screening has a poor performance in comparison with 1⁄8-. and 1⁄16-inch. This research shows that embers also can enter smaller screening, such as 1⁄8- and 1⁄16-inch but cannot easily ignite even the finer fuels. 1⁄16-inch mesh screening resist better against entry of wind-blown embers; however, this size screening is more easily plugged with wind-blown debris and is easily painted over.
Consequently, installing 1/8-inch mesh screening is proposed in wildland urban interface (WUI) areas, as it effectively reduces the number and size of embers entering the attic. It's important to note that 1/8-inch screening only minimizes the size and number of embers and does not eliminate them entirely; making it very important to reduce what's stored in the attic and crawl space [1].

Table 1 provides a short summary on performance of different mesh sizes tested at IBHS research center. NFPA 1144 also requires that, at a minimum, vents be covered by 1/8-inch mesh screening.

Vent Function	Location	Vent Type	Vent Description	Relative Performance
Inlet	Under-eave	Open-eave	¼-in. square mesh screening	Poor
		Soffit	⅛-in. square mesh screening[1]	Best
Outlet	Gable end	Mesh	¼-in. square mesh screening	Poor
			⅛-in. square mesh screening	Fair
			⅛-in. diamond mesh screening	Fair
			1/16-in. square mesh screening	Good
		Wildfire-resistant vent	Baffled-design wildfire-resistant vent with ⅛-in. diamond mesh backing	Good
			Honeycomb mesh, wildfire-resistant vent with 1/16-in. square mesh backing	Good
	Through-roof off-ridge	Generic	¼-in. square mesh screening	Poor
		Turbine	No screen	Good
		Wildfire-resistant vent	Louvers and steel wool fill	Best
	Through-roof ridge	Miami-Dade wind-driven-rain-compliant	External baffles present	Best
		Non-Miami-Dade wind-driven-rain-compliant	External baffles removed	Fair

[1]Soffited construction is best. Though this study used ¼-in. mesh, ⅛-in. mesh is recommended.

Bibliography: [1] Quarles S (2017) Vulnerability of Vents to Wind-Blown Embers. Insurance Institute of Business & Home Safety, Richburg. https://ibhs.org/wp-content/uploads/wpmembers/files/Vulnerability-of-Vents-to-Wind-Blown-Embers_IBHS.pdf

Cost Impact: The code change proposal will increase the cost of construction
The cost increase associated with requiring a screen mesh size of 1/8-inch over 1/4-inch will be minimal. The cost increase associated with requiring noncombustible screens on vents for IR3 construction will vary depending on the number of ventilation openings and other factors, but the cost of the screen material will be minimal.

WUIC14-21

WUIC15-21

IWUIC: 504.10, 504.10.1 (New), 504.10.1, 505.10, 505.10.1 (New), 505.10.1, 506.5 (New), ASTM Chapter 07 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Wildland-Urban Interface Code

Revise as follows:

504.10 Vents. ~~Attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with *noncombustible* corrosion-resistant mesh with openings not to exceed 1/4 inch (6.4 mm), or shall be designed and *approved* to prevent flame or ember penetration into the structure.~~ Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical wall, shall be in accordance with Section 504.10.1 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

Add new text as follows:

504.10.1 Requirements. Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

Revise as follows:

~~**504.10.1**~~ **504.10.2 Vent locations.** Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

505.10 Vents. ~~Attic ventilation openings, foundation or underfloor vents or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with *noncombustible* corrosion-resistant mesh with openings not to exceed 1/4 inch (6.4 mm) or shall be designed and *approved* to prevent flame or ember penetration into the structure.~~ Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical wall, shall be in accordance with Section 505.10.1 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

Add new text as follows:

505.10.1 Requirements. Ventilation openings shall be fully covered with listed vents tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

Revise as follows:

~~**505.10.1**~~ **505.10.2 Vent locations.** Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

Add new text as follows:

506.5 Vents. Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm), or shall be designed and approved to prevent flame or ember penetration into the structure.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken PA 19428-2959

ASTM E2886/E2886M-20: Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement

Staff Analysis: A review of the standard proposed for inclusion in the code, E2886/E2886M-20, Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement:

Photo shows IBHS research on vent intrusion from embers.

The main thrust of this proposal is to make the vent screens smaller for homes constructed in wildland hazard zones. The current code limits the screen size to no larger than ¼". This was put in to the code as a starting point, and was not based on any testing. Testing using an ember generator was undertaken, and it was shown that 1/4' vents did not prevent fire ignition. screening at 1/8' or 1/16" was effective at preventing ember intrusion.[1]In 2013, IBHS conducted a study on the vulnerability of vents to wind-blown embers. It demonstrated that 1/4 inch openings are not sufficiently small to prevent the penetration of flames via the vents. Therefore it is important to modify the section to get better protection. Even the use of 1/8 inch openings only minimizes the size and number of embers and does not eliminate them entirely; making it very important to reduce what's stored in the attic and crawl space. The same information has been gathered as a result of the wildfires in California.

A link to a key IBHS publication follows:https://ibhs.org/wp-content/uploads/wpmembers/files/Vulnerability-of-Vents-to-Wind-Blown-Embers_IBHS.pdf

NFPA's Standard for Reducing Structure Ignition Hazards from Wildland Fire [NFPA 1144-2018] has, since at least 2008, set minimum requirements for screen size for attic vents at 1/8" maximum diameter openings, see Sec. 5.3.3 (1) based on the same testing mentioned above. (Note that NFPA 1144 will become part of NFPA 1140 in the next edition.)

ASTM E2886 was included for applications in the high hazard and moderate hazard zones, but not in the lowest hazard zones, where a simpler prescriptive approach is used instead of a performance approach. Thus, the proposal recommends the performance approach for the more severe IR1 and IR2 areas (i.e. ignition resistant construction classes 1 and 2), which have the same requirements in the present code (albeit insufficient ones). It recommends a simpler, and probably cheaper, prescriptive approach (1/8 inch openings in vents) for IR3 (ignition resistant construction class 3), which has no requirements now, but should have them.

As seen in the fires in Santa Rosa, and Paradise (in California), structure ignition from embers can involve structures not in a high hazard zone. In these zones, the use of vents tested to the ASTM standard would help prevent structure ignition in both of the zones. Because ASTM E2886

includes the information to be assessed but does not include performance criteria for failure, the provisions found in 504.10.1 and 505.10.1 provide the information needed to address the performance of vents under the test.

In recognition of that, the California Wildland chapter (Chapter 7A of the California Building Code) has adopted a performance standard approach instead of a prescriptive approach. It uses ASTM E2886, a consensus standard developed by ASTM E5 (committee on fire standards) to assess the performance of vents to protect against ember penetration. It is important to point out that (like most ASTM E5 standards), ASTM E2886 does not have pass/fail criteria but it notes the information needed to be reported and this was adopted as pass/fail criteria by the California code. Note also that this proposal recommends that the vents be listed for the application and that multiple manufacturers already list such systems, for California.

The ASTM standard proposed was issued by ASTM committee E05 on Fire Standards and complies with ICC CP 28. It is fully written in mandatory language and was issued by a consensus standards organization.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at:

https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac

Bibliography: 1 National Fire Protection Association. "NFPA 1144 Standard for reducing structure ignition hazards from wildland fire." 2018.

Cost Impact: The code change proposal will increase the cost of construction
Requiring listed vents will increase the cost of construction. Requiring vent screens with smaller openings will also increase the cost of construction.

WUIC15-21

WUIC16-21

IWUIC: 602.2 (New)

Proponents: Thomas Daly, HSCG, representing AH&LA (thomas.daly@myhscg.com)

2021 International Wildland-Urban Interface Code

Add new text as follows:

602.2 Exposure sprinklers. Where new buildings are required to be provided with automatic sprinkler systems, are of Type IV or Type V construction in accordance with the *International Building Code* and are constructed in 'High" or "Extreme" fire hazard severity zones per Section 502.1 of this code, exterior exposure fire sprinkler protection shall be provided in accordance with Sec. 903.3.1 of the *International Building Code*.

Reason Statement: 1. Background

Based on Verisk's 2019 *Wildfire Risk Analysis,*[1] 4.5 million U.S. structures were identified at 'high' or 'extreme' risk of wildfire, with more than 2 million in California alone.

The impact of wildfires on structures is detailed in the Insurance Information Institutes study at **https://www.iii.org/fact-statistic/facts-statistics-wildfires.**

Risk turned to reality in October 2017 when the 'Tubbs' wildfire in Sonoma, Napa and Lake counties in California destroyed 5,643 structures, half of which were homes, according to Cal FIRE.

The following year two California wildfires (Carr fire, July 23, 2018 and Mendocino Complex fire, July 27, 2018), collectively, destroyed 329 commercial structures and 8,900 homes.

In November 2018, the Camp fire in Butte County California, the deadliest and most destructive in California history[2], killed 85 residents and destroyed 18,804 structures with the towns of Paradise and Concow completely destroyed.

The Camp fire from space November 8, 2018

In October 2019 the Kincade wildfire in Sonoma County California destroyed another 120 structures. Included in the Tubbs fire losses were fully sprinklered (internal) hotels of Type V construction located in a 'high wildfire hazard zone' (Santa Rosa) with no sprinkler system impairments lost due to the exposure to these wildfires

.

Hilton Sonoma Wine Country hotel October 8, 2017 (sprinklered)

2. Rationale

At present neither the IFC, IWUIC nor NFPA 13 require exposure sprinklers for new construction, regardless of the type of construction nor location within a wildfire hazard zone, although NFPA 13 (2016) provides design requirements if exposure protection is utilized. The 2018 IBC, see Sec. 903.3.1.2.1, requires exposure sprinklers and design guidance only for balconies and decks for Type V construction *sleeping* and *dwelling units* [Group R], but not for other occupancy types. NFPA 13 (2016), see Sections 7.7; 8.3.4.3 & 11.3.2, provides sufficient guidance on the design parameters for exposure protection sprinklers[3]. Exposure sprinklers will mitigate the effect of exposure fires on buildings so equipped. Extended coverage ordinary hazard (ECOH) closely spaced sidewall exposure sprinklers will throw up to 24ft. horizontally, see for example TYCO Model SW-24, see data sheet at https://www.tyco-fire.com/index.php?P=detailprod&S=2300, providing an effective water curtain at the building perimeter.Historically, exposure sprinklers have been used for commercial building loading docks to address exterior fire exposures, such as vehicle fires, arson and dumpster fires. Dry sidewall, extended coverage, closely spaced sprinklers are routinely used on loading docks to provide such protection.**Two Elk Lodge, Vail Mountain, CO., exposure sprinklers installed after an exterior domestic terrorism arson fire destroyed this Type IV building in October 1998. The original building had a wet-pipe (interior only) sprinkler system.**

3. Research

The effect of exposure sprinklers protecting structures in wind-driven wildfires[4] have been positive, see the University of Minnesota study, *'External Sprinkler Systems and Defensible Space: Lessons Learned from the Ham Lake Fire and the Gunflint Trail',* April 15, 2008.

Even rudimentary non-engineered rooftop sprinklers have proven effective in protecting homes, when all around them burned, see the Paradise CA., experience in the November 2018 Camp fire https://www.washingtonpost.com/national/how-they-survived-owners-of-the-few-homes-left-standing-around-paradise-calif-took-critical-steps-to-ward-off-wildfires/2018/11/30/db323782-f34b-11e8-80d0-f7e1948d55f4_story.html.

[1] https://www.verisk.com/insurance/campaigns/location-fireline-state-risk-report/

[2] https://en.wikipedia.org/wiki/Camp_Fire_(2018)

[3] See also, '*Sprinkler Age*', October 23, 2019, American Fire Sprinkler Association, https://sprinklerage.com/exposure-protection/ for exposure sprinkler installation details.

[4] https://wildfiretoday.com/documents/Outdoor_sprinkler_systems_effectiveness.pdf

Cost Impact: The code change proposal will increase the cost of construction
This change will marginally impact (increase) the cost of only commercial building construction but is limited to only new construction, only non-fire resistive construction, only buildings in 'Extreme' or 'High' wildfire hazard zones and only for those buildings otherwise requiring automatic sprinkler protection.

WUIC16-21

WUIC17-21

IWUIC: [A] 107.6, SECTION 202, 405.2, 603.2.1, 604.2, 604.3, A102.2, A102.3, A104.4, A104.7.1, A105.4.2, A106.2, A107.3, E106.1, APPENDIX F, SECTION F101, F101.1, G101.3.5

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

[A] 107.6 Other data and substantiation. Where required by the *code official*, the plans and specifications shall include classification of fuel loading, fuel model light, medium or heavy, and substantiating data to verify classification of ~~fire-resistive~~ vegetation as having a lower probability of igniting or spreading fire in a manner acceptable to the code official.

FUEL MODIFICATION. A method of modifying fuel load by ~~reducing the amount of nonfire-resistive vegetation or~~ altering the type and quantity of vegetation to reduce the fuel load.

405.2 Content. The plan shall be based on a site-specific wildfire risk assessment that includes considerations of location, topography, aspect, ~~flammable~~ vegetation, including the need to dispose of dead vegetation, climatic conditions and fire history. The plan shall address water supply, access, building ignition and fire-resistance factors, fire protection systems and equipment, *defensible space* and vegetation management.

603.2.1 Responsible party. Persons owning, leasing, controlling, operating or maintaining buildings or structures requiring defensible spaces are responsible for modifying or removing ~~nonfire-resistive~~ vegetation on the property owned, leased or controlled by said person.

604.2 Modified area. ~~Nonfire-resistive vegetation or growth~~ Vegetation particularly prone to ignition or fire spread, such as dead vegetation, shall be kept clear of buildings or structures, in accordance with Section 603, in such a manner as to provide a clear area for fire suppression operations.

604.3 Responsibility. Persons owning, leasing, controlling, operating or maintaining buildings or structures are responsible for maintenance of *defensible spaces*. Maintenance of the *defensible space* shall include modifying or removing ~~nonfire-resistive~~ vegetation and keeping leaves, needles and other dead vegetative material regularly removed from roofs of buildings and structures.

A102.2 Clearance of brush or vegetative growth from roadways. The *code official* is authorized to require areas within 10 feet (3048 mm) on each side of portions of fire apparatus access roads and driveways to be cleared of all vegetation ~~nonfire-resistive vegetation growth~~.

Exception: Single specimens of trees, ornamental vegetative fuels or cultivated ground cover, such as green grass, ivy, succulents or similar plants used as ground cover, provided they do not form a means of readily transmitting fire.

A102.3 Clearance of vegetation ~~brush and vegetative growth~~ from electrical transmission and distribution lines. Clearance of vegetation ~~brush and vegetative growth~~ from electrical transmission and distribution lines shall be in accordance with Sections A102.3.1 through A102.3.2.3.

Exception: Sections A102.3.1 through A102.3.2.3 do not authorize persons not having legal right of entry to enter on or damage the property of others without consent of the owner.

A104.4 Smoking. Where required by the *code official*, signs shall be posted stating NO SMOKING. Persons shall not smoke within 15 feet (4572 mm) of combustible materials or ~~nonfire-resistive~~ vegetation.

Exception: Places of habitation or in the boundaries of established smoking areas or campsites as designated by the *code official*.

A104.7.1 General. Persons shall not build, ignite or maintain any outdoor fire of any kind for any purpose in or on any *wildland-urban interface area*, except by the authority of a written permit from the *code official*.

Exception: Outdoor fires within inhabited premises or designated campsites where such fires are in a permanent barbecue, portable barbecue, outdoor fireplace, incinerator or grill and are not less than 30 feet (9144 mm) from any combustible material or ~~nonfire-resistive~~ vegetation.

A105.4.2 Separation. A clear space of not less than 40 feet (12 192 mm) shall be provided between piles. The clear space shall not contain combustible material or ~~nonfire-resistive~~ vegetation.

A106.2 Ashes and coals. Ashes and coals shall not be placed, deposited or dumped in or on *wildland-urban interface areas*.

Exceptions:

1. In the hearth of an established fire pit, camp stove or fireplace.
2. In a noncombustible container with a tightfitting lid, which is kept or maintained in a safe location not less than 10 feet (3048 mm) from ~~nonfire-resistive~~ vegetation or structures.
3. Where such ashes or coals are buried and covered with 1 foot (305 mm) of mineral earth not less than 25 feet (7620 mm) from ~~nonfire-resistive~~ vegetation or structures.

A107.3 Fuel modification area. Water storage and pumping facilities shall be provided with a *defensible space* of not less than 30 feet (9144 mm) clear of ~~nonfire-resistive~~ vegetation , ~~or growth~~ around and adjacent to such facilities .Persons owning, controlling, operating or maintaining water storage and pumping systems requiring this *defensible space* are responsible for clearing and removing ~~nonfire-resistive~~ vegetation , particularly dead and dying vegetation, and maintaining the *defensible space* on the property owned, leased or controlled by said person in a manner acceptable to the code official.

E106.1 General. After a person has researched a specific jurisdictional area, the facts should be incorporated into a written document that reflects how these facts relate to the *code official*s specific needs. The following is an exhibit that incorporates one such report. It should be reviewed as an example of how a relationship can be drawn between specific facts, fire protection problems and specific code modifications. It should be noted that this is an example only.

EXHIBIT 1 — Findings

The **[INSERT TITLE: ADMINISTRATOR]** does herewith make findings that certain climatic, topographic or geological features exist in the **[INSERT NAME: JURISDICTION]**, and that those features can, under certain circumstances, affect emergency services. Further, certain code amendments are made to the **[INSERT: INTERNATIONAL FIRE CODE]** and **[INSERT: INTERNATIONAL BUILDING CODE]** that are aimed at mitigating, to the extent possible, the impact of those features.

Finding 1

That the **[INSERT NAME: JURISDICTION]** is situated on the slopes of and at the base of the **[INSERT: NAME OF MOUNTAINS]**. Mountains, with drainages from the **[INSERT: DIRECTION]** portion ofthe district, including **[INSERT: IDENTIFY LOCAL CREEKS/STREAMS/RIVERS]**, which, when flooded, could result in conditions rendering fire department vehicular traffic access unduly burdensome or impossible.

Further, the flood conditions described above carry the potential for overcoming the ability of the fire department to aid or assist in fire control, evacuations, rescues and the emergency task demands inherent in such situations. The potential for the aforementioned flooding conditions to result in limiting fire department emergency vehicular traffic, with resulting overtaxing fire department personnel, may further cause a substantial or total lack of protection against fire for the buildings and structures located within the jurisdiction.The aforementioned conditions support the imposition of fire protection requirements greater than those set forth in the **[INSERT: INTERNATIONAL BUILDING CODE OR INTERNATIONALFIRE CODE]**.

Finding 2

That the **[INSERT NAME: JURISDICTION]** is situated near **[INSERT: NUMBER OF FAULTS]** major faults, each capable of generating earthquakes of significant magnitude. These are the **[INSERT: NAME OF FAULTS]**. These faults are subject to becoming active at any time; the **[INSERT NAME: JURISDICTION]** is particularly vulnerable to devastation should such an earthquake occur.

The potential effects of earthquake activity include isolating the **[INSERT NAME: JURISDICTION]** from the surrounding area and restricting or eliminating internal circulation due to the potential for collapsing of highway overpasses and underpasses, along with other bridges in the district, or an earthslide, and the potential for vertical movement rendering surface travel unduly burdensome or impossible.

Additional potential situations inherent in such an occurrence include loss of the **[INSERT NAME: JURISDICTION]** watersources; **[INSERT: IDENTIFICATION OF LOCAL SOURCES]** would be expected to suffer damage, along with the local reservoirs and water mains; broken natural gas mains causing structure and other fires; leakage of hazardous materials; the need for rescues from collapsed structures; and the rendering of first aid and other medical attention to large numbers of people.The protection of human life and the preservation of property in the event of such an occurrence support the imposition of fire protection requirements greater than those set forth in the **[INSERT: INTERNATIONAL BUILDING CODE OR INTERNATIONAL FIRE CODE]**.

Finding 3

That the **[INSERT NAME: JURISDICTION]** includes **[INSERT: IDENTITY OF MAJOR TRANSPORTATION ROUTES]**. **[INSERT: IDENTITY OF ROUTE]** is designated by the **[INSERT NAME: JURISDICTION]** as an approved transportation route for highly toxic and radioactive materials. The potential for release or threatened release of a hazardous material along one of these routes is highly probable given the volume transported daily. Incidents of this nature will normally require all available emergency response personnel to prevent injury and loss of life and to prevent, as far as practicable, property loss. Emergency personnel responding to such aforementioned incidents may be unduly impeded and delayed in accomplishing an emergency response as a result of this situation, with the potential result of undue and unnecessary risk to the protection of life and public safety and, in particular, endangering residents and occupants in buildings or structures without the protection of automatic sprinklers. The aforementioned problems support the imposition of fire protection requirements greater than those set forth in the **[INSERT: INTERNATIONAL BUILDING CODE OR INTERNATIONAL FIRE CODE]**.

Finding 4

The seasonal climatic conditions during the late summer andfall create numerous serious difficulties regarding the control of and protection against fires in the **[INSERT NAME: JURISDICTION]**.The hot, dry weather typical of this area in summer and fall, coupled with **[INSERT: IDENTITY OF ADDITIONAL CLIMATIC CONDITIONS]** frequently results in wildfires that threaten or could threaten the **[INSERT NAME: JURISDICTION]**. Although some code requirements, such as fire-resistive roof classification, have a direct bearing on building survival in a wildland fire situation, others, such as residential automatic sprinklers, may also have a positive effect. In dry climate on low humidity days, many materials are much more easily ignited. More fires are likely to occur and any fire, once started, can expand extremely rapidly. Residential automatic sprinklers can arrest a fire starting within a structure before the fire is able to spread to adjacent brush and structures.

Seasonal winds also have the potential for interfering with emergency vehicle access, delaying or making impossible fire responses, because of toppling of extensive plantings of **[INSERT: TYPE OF TREES]** trees. The trees are subject to uprooting in strong winds due to relatively small root bases compared to the tree itself.The aforementioned problems support the imposition of fire protection requirements greater than those set forth in the **[INSERT: INTERNATIONAL BUILDING CODE OR INTERNATIONAL FIRE CODE]**.

Finding 5

The **[INSERT NAME: JURISDICTION]** is a **[INSERT: DESCRIBE TYPE OF REGION]** and experiences water shortages from time to time. Those shortages can have a severely adverse effect on water availability for fire fighting.

Fires starting in sprinklered buildings are typically controlled by one or two sprinkler heads, flowing as little as 13 gallons per minute (0.82 L/s) each. Hose streams used by engine companies on well-established structure fires operate at about 250 gallons per minute (15.8 L/s) each, and the estimated water need for a typical residential fire is 1,250 to 1,500 gallons per minute (78.9 to 94.6 L/s), according to the Insurance Services Office. Under circumstances such as earthquakes, when multiple fires start within the community, the limited water demands of residential automatic sprinklers would control and extinguish many fires before they spread from building to building.In such a disaster, water demands needed for conflagration fire fighting probably would not be available.
The aforementioned problems support the imposition offire protection requirements greater than those set forth in the **[INSERT: INTERNATIONAL BUILDING CODE OR INTERNATIONAL FIRE CODE]**.

Finding 6

The topography of the **[INSERT NAME: JURISDICTION]** presents problems in delivery of emergency services, including fire protection. Hilly terrain has narrow, winding roads with little circulation, preventing rapid access and orderly evacuation. Much of these hills are covered with highly combustible ~~nonfire-resistive~~ natural vegetation. In addition to access and evacuation problems, the terrain makes delivery of water extremely difficult.Some hill areas are served by water pump systems subject to failure in fire, high winds, earthquake and other power failure situations.
The aforementioned problems support the imposition offire protection requirements greater than those set forth in the **[INSERT: INTERNATIONAL BUILDING CODE OR INTERNATIONAL FIRE CODE]**.

SUMMARY

Efforts to produce comprehensive findings of fact cannot be underestimated. It is an essential step for fire protection professionals to take before risking the proposal to modify a model code with a requirement that is unique to that community. Done properly, a findings-of-fact document will not only support the adoption of a local modification, it may make it virtually impossible to ignore the need without creating a community consequence.

APPENDIX F
CHARACTERISTICS OF ~~FIRE-RESISTIVE~~ VEGETATION WITH LOWER POTENTIAL FOR IGNITION OR FIRE SPREAD

SECTION F101 GENERAL.

Revise as follows:

F101.1 Characteristics of ~~fire-resistive~~ vegetation with lower potential for ignition or fire spread. All plants will burn under extreme fire weather conditions such as drought. However, plants burn at different intensities and rates of consumption. ~~Fire-resistive plants~~ Plants with lower potential for ignition or fire spread burn at a relatively low intensity, slow rates of spread and with short flame lengths. Dead or dying vegetation of any kind is particularly prone to ignite or spread fire. The following are characteristics of vegetation with lower potential for ignition and fire spread ~~fire-resistive vegetation~~:

1. Growth with little or no accumulation of dead vegetation (either on the ground or standing upright).
2. Nonresinous plants (willow, poplar or tulip trees).
3. Low volume of total vegetation (for example, a grass area as opposed to a forest or shrub-covered land).
4. Plants with high live fuel moisture (plants that contain a large amount of water in comparison to their dry weight).
5. Drought-tolerant plants (deeply rooted plants with thick, heavy leaves).
6. Stands without ladder fuels (plants without small, fine branches and limbs between the ground and the canopy of overtopping shrubs and trees).
7. Plants requiring little maintenance (slow-growing plants that, when maintained, require little care).
8. Plants with woody stems and branches that require prolonged heating to ignite.

G101.3.5 Shelter in place. Developments in the wildland-urban interface may be designed to allow occupants to “Shelter in place.” Use of this design alternative should include ignition-resistant construction, access, water supply, automatic sprinkler systems, provisions for and maintenance of defensible space, and a Fire Protection Plan.A Fire Protection Plan describes ways to minimize the fire problems created by a specific project or development. The purpose for the Fire Protection Plan is to reduce the burden and impact of the project or development on the community’s fire protection delivery system. The plan may utilize components of land use, building construction, vegetation managementand other design techniques and technologies. It should include specific mitigation measures consistent with the unique problems resulting from the location, topography, geology, ~~flammable~~ vegetation and climate of the proposed site. The plan shall be consistent with this code, and approved by the fire *code official*. The cost of preparation and review is to be borne by the project or development proponent.

Reason Statement: This proposal eliminates a misleading term "fire resistive vegetation" and refers either to combustible vegetation or to noncombustible vegetation.
Note that the term "fire resistive" is associated with "fire resistance ratings" and that no combustible vegetation will be able to exhibit any fire resistance rating.

Noncombustible vegetation is basically composed of rocks or such materials.

This proposal is basically editorial as it does not change requirements but makes them clearer.

The proposal refers throughout to vegetation less likely to lead to severe fires (lower potential for ignition or fire spread) and points out that the type of vegetation permitted is up to the discretion of the fire code official.

The proposal also notes that dead or dying vegetation is particularly dangerous and should be minimized (or eliminated) as much as possible.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Basically editorial changes.

WUIC17-21

WUIC18-21

IWUIC: 603.2.3.1 (New)

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2021 International Wildland-Urban Interface Code

Add new text as follows:

603.2.3.1 Combustible mulch. The required defensible space shall be kept free of combustible materials used for mulch such as small pieces of bark or pine needles.

Reason Statement: This proposal is primarily a clarification. The code clearly contemplates that ground cover materials in the required defensible space must not be capable of transmitting fire to any structure. Additionally, the 2018 IWUIC Commentary more explicitly clarifies that combustible mulch should not be used in the required defensible space [1]. The following is an excerpt from the commentary to Section 603.2.3 from the 2018 IWUIC Commentary:
"A common practice in many areas is to rake the pine needles, or pine straw, together and use them as a type of mulch. This is often placed around the trunk of a tree or along the exterior wall of the building. This practice is not in concert with creating a defensible space. Pine needles will carry fire to the structure. Many structures have been ignited simply from a cigarette discarded into this pine straw. The pine straw smolders and ignites, then ignites the structure itself. In a wildland fire situation, an ember can land in the pine straw and smolder even after the fire has passed, later igniting and consuming the structure. See Commentary Figure 603.2.3."

Based on post-fire investigations, combustible mulch such as bark and rubber are not recommended near structures in wildland-urban interface areas. Burning mulch can ignite adjacent building materials and can result in fire spread to the structure. The photographs below relate to investigations of buildings in Paradise, CA after the devastating 2018 Camp Fire. These pictures show damage to windows due to the direct contact with flames produced by burning combustible mulch. In both cases, the fire did not spread vertically as the cladding system was noncombustible. However, the direct flame contact caused failures of the glazing. Tests performed at the IBHS research center confirmed that flammable debris on the ground near the building ignited and caused a rapid upward flame to spread on the side of the house [2]. There are also other studies investigated the flammability of different types of mulches. In these experimental studies, most of the dried fuel beds were observed to achieve glowing or flaming ignition [3-6]. According to the conducted studies, shredded rubber, pine needles, and shredded western red cedar demonstrated the most hazardous fire behavior [6].

Failure of the outer layer of a double-glazed window

Complete failure of the glazing

Bibliography: [1] International Code Council (ICC) (2018) International Wildland Urban Interface Code (IWUIC) and Commentary.
[2] Quarles, S., Leschak, P., Cowger, R., Worley, K., Brown, R., Iskowitz, C., 2012. Lessons Learned from Waldo Canyon: Fire Adapted Communities Mitigation Assessment Team Findings. https://fireadapted.org/wp-content/uploads/2018/06/waldo-canyon-report.pdf

[3] Manzello, S.L., Cleary, T.G., Shields, J.R., Yang, J.C., 2006a. On the ignition of fuel beds by firebrands. Fire Mater. 30, 77–87. doi:10.1002/fam.901. https://onlinelibrary.wiley.com/doi/abs/10.1002/fam.901

[4] Manzello, S.L., Cleary, T.G., Shields, J.R., Yang, J.C., 2006b. Ignition of mulch and grasses by firebrands in wildland–urban interface fires. Int. J. Wildl. Fire 15, 427. doi:10.1071/WF06031 http://www.mariloureiro.net/ciencia/firebrand/f06031.pdf

[5] Steward, L.G., Sydnor, T.D., Bishop, B., 2003. The ease of ignition of 13 Landscape Mulches. Journal of Arboriculture 29(6) 317-321. http://ucanr.edu/sites/UrbanHort/files/117293.pdf [Last Accessed Jan. 05, 2021]

[6] Quarles, S. and Smith, E., 2004, The combustibility of landscape mulches. University of Nevada Cooperative Extension. https://ucanr.edu/sites/MarinMG/files/321642.pdf [Last Accessed Jan. 05, 2021]

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification.

WUIC18-21