2007/2008 PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE – BUILDING & ENERGY

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TENTATIVE ORDER OF DISCUSSION

2007/2008 PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE BUILDING & ENERGY

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.

IRC ENERGY

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- EC10-07/08, Part II
- EC11-07/08, Part II
- EC3-07/08, Part II
- EC5-07/08, Part II
- EC7-07/08, Part II

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- EC15-07/08, Part II
- EC18-07/08, Part II
- EC19-07/08, Part II
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- EC22-07/08, Part II
- EC23-07/08, Part II
- EC25-07/08, Part II
- EC28-07/08, Part II
- EC34-07/08, Part II
- EC36-07/08, Part II
- EC37-07/08, Part II
- EC42-07/08, Part II
- EC43-07/08, Part II
- EC45-07/08, Part II
- EC47-07/08, Part II
- EC48-07/08, Part II
- EC49-07/08, Part II
- EC50-07/08, Part II
- EC51-07/08, Part II
- EC56-07/08, Part II
- EC57-07/08, Part II
- EC58-07/08, Part II
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- EC62-07/08, Part II
- EC63-07/08, Part II
- EC64-07/08, Part II
- EC65-07/08, Part II

RE8-07/08
- FS177-07/08, Part III
- EC68-07/08, Part II
- EC69-07/08, Part II
- EC70-07/08, Part II
- EC71-07/08, Part II
- EC72-07/08, Part II
- EC74-07/08, Part II
- EC53-07/08, Part II
- EC78-07/08, Part II
- EC79-07/07, Part II
- EC80-07/08, Part II
- EC81-07/08, Part II
- EC83-07/08, Part II
- EC84-07/08, Part II
- EC96-07/08, Part II
- EC97-07/08, Part II
- RE3-07/08
- EC152-07/08, Part II

IRC BUILDING

- G105-07/08, Part II

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- G3-07/08, Part II
- G4-07/08, Part II

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- G6-07/08, Part III

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- G12-07/08, Part IV
- G16-07/08, Part VII
- G17-07/08, Part VI
- RB230-07/08

RB12-07/08
- S79-07/08, Part II

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- S15-07/08, Part II
- S82-07/08, Part II

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- S50-07/08, Part II

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- FS184 -07/08, Part II

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- G178-07/08, Part II

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- E143-07/08, Part II
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- E60-07/08, Part II

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- E85-07/08, Part II
- S72-07/08, Part II

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RB1–07/08
R101.2.1 (New), R102.8 (New)

Proponent: Marcelo M. Hirschler, GBH International, representing American Fire Safety Council

Add new text as follows:

R101.2.1 General. The provisions of this code shall be permitted to be supplemented by the provisions of the *International Wildland-Urban Interface Code* to provide for special regulations to mitigate the fire- and life-safety hazards of the wildland-urban interface areas in accordance with Section R102.8.

R102.8 Wildland-Urban Interface Areas The provisions of this code shall be permitted to be supplemented by the provisions of the *International Wildland-Urban Interface Code* for the construction, alteration, movement, repair, maintenance and use of one- and two-family dwellings and townhouses not more than three stories above-grade in height with a separate means of egress, and their accessory structures, where the following applies:

1. The applicable governmental jurisdiction has designated the area as a wildland-urban interface area, and
2. The *International Wildland-Urban Interface Code* has been adopted by reference by the applicable governmental jurisdiction in accordance with the jurisdiction's laws.

Reason: *The International Wildland-Urban Interface Code* is not actually referenced in the IRC but it should be referenced for the construction of buildings in areas designated by the local jurisdiction as wildland-urban interface areas, since construction of new buildings in such areas needs to comply with the IWUIC. The code committee explained in the last cycle that this requirement needs to be contained in the scoping provisions. Also, code committee members in the last cycle explained that two provisions must exist before the IWUIC is used: (1) the local jurisdiction must have designated the area as a wildland-urban interface area and (2) the local jurisdiction must have adopted the IWUIC. This proposal differs from both the proposal and the comment made in the previous cycle in that it includes a scope section and incorporates the key provisions.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB2–07/08
R102.7.1

Proponent: William Easterling, Grand Haven, MI, representing himself

Revise as follows:

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to the requirements for a new structure ~~without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated~~. Unless otherwise stated, portions of the existing structure not being altered or repaired need not comply with all of the requirements of this code. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

Reason: The proposed code change is for clarification by putting each unique requirement of the code in its own sentence. Without the current clarification a building official could conclude that proposed alterations or repairs to an existing structure need not comply with the requirements of the code unless specifically stated.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB3–07/08
102.7.1

Proponent: Phil Forner, Allendale, MI, representing himself

Revise as follows:

R102.7.1 Additions, alterations or repairs. Additions, alterations or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

> **Exception:** This section does not apply to Section R324 where making repairs or alterations below the design flood elevation in a flood hazard area that are not part of or does not constitute a substantial improvement or substantial damage.

Reason: The purpose of the code change proposal is to make it clear that for repairs and alterations; protection from flooding below the design flood elevation is not to be afforded the same minimum safety considerations as other hazards that become known after a structure is built and is being repaired or altered.

This code change proposal would allow existing materials that were not flood-resistant to be replaced with similar materials that are not flood-resistant below the design flood elevation; even in situations where non-substantial damage repairs caused by flooding are being made. Such a code change proposal may also violate Section R101.3 "to provide safety to fire fighters and emergency responders during emergency operations" by failing to require a flood-resistant material to be used when replacing floor sheathing and other replacement materials below the design flood elevation.

This code change is being substantiated by IRC Committee Interpretation 85-05. However please note that such a proposal may not be consistent with the intent of **44CFR60.3.3 – Floodplain Management Criteria for Flood-Prone Areas; which requires a local jurisdiction participating in FEMA's National Flood Insurance Program to** "Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding." Likewise such a code change may not be consistent with 44CFR60.1.d; where FEMA encourages jurisdictions to adopt more comprehensive floodplain management regulations such as what *International Residential Code* has already done with plain meaning of Section R102.1, R102.7.1, R301.2.4, and R324. 44CFR60.1.d states in part that: "Any community may exceed the minimum criteria under this part by adopting more comprehensive flood plain management regulations … Therefore, any flood plain management regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence".

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB4–07/08
R105.2

Proponent: Steve Hamblin, Clinton City, Layton City, Roy City, Ogden City, Marriott Staterville City, Morgan City, representing Utah Chapter of ICC

Revise as follows:

R105.2 (Supp) Work exempt from permit. Permits shall not be required for the following. Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed ~~120~~ 200 square feet (~~11.15~~ 18.58 m^2).
2. Fences not over 6 feet (1829 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.

8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.

(No change to remainder of section)

Reason: A number of shed manufacturing companies throughout the state are producing residential "storage" sheds which are 200 sq. ft. or less. These sheds are typically built to a standard which exceeds the minimum standards required by the IRC. Zoning requirements for the majority of jurisdictions throughout the state will accommodate the location for a 200 sq. ft. shed as easily as a 120 sq. ft. Review for zoning compliance is required regardless of whether a permit is required or not. Many permits currently being issued for sheds with an area between 120 and 200 sq. ft. are being issued based on a one time inspection fee. In most cases this ends up costing the jurisdiction money for providing up to two inspections plus administrative time. The inspections do not typically produce any structural violations. The only known argument for changing the existing 200 square feet maximum area to 120 was to make it consistent with the requirement in the IBC. Sheds which are provided to support a commercial business are typically provided with electrical lighting and outlets which would require a permit regardless of area. They may also be used for the storage of flammables and hazardous materials which would not normally occur in a residential setting. This request would not affect the current IBC requirement. Any shed, regardless of size, which is provided with any electrical, mechanical or plumbing system would still require a permit and inspections despite the proposed modification to Section R105.2, item1.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB5–07/08
R105.2

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R105.2 (Supp) Work exempt from permit. Permits shall not be required for the following. Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet (11.15 m_2).
2. Fences not over 6 feet (1829 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18 927 L) and t the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.
10. Decks and landings, including stairs or ramps serving them, which meet all of the following:
    - 10.1. Are not more than 30 inches above grade at any point
    - 10.2. Are not attached to a building, and
    - 10.3. Do not serve the exit door required by Section R311.4.

(Portions of section not shown remain unchanged)

Reason: The proposed amendment will exclude decks and landings from permits only when:

- no part of the deck floor or landing is more than 30 inches above grade
- the deck or landing has no roof (a deck by definition is a floor system and a deck or landing with a roof is considered a porch)
- the deck or landing is not attached to a building
- the deck or landing does not serve the main exit door

When this code change was submitted in the last cycle, the committee objected on two points:

- low decks should be regulated because they could be considered a gathering area and pose a hazard from collapse
- the proposal would exempt decks from meeting the structural requirements

The risk of injury from a collapse of a deck or landing that would be exempt from permits by this change will be slight. They are very near the ground to begin with. The code already exempts them from guard requirements making it more likely that one would be injured falling off such a deck as opposed to being injured from a collapse. Also, it is believed that a majority of all deck failures occur at the connection of the deck to the dwelling. The revision only covers decks or landings that are freestanding. Such a failure won't happen here. The code exempts certain swimming pools from permits. The drowning potential is significantly more serious than the potential of injury from one of these low decks or landings.

Also the proposal does not exempt decks or landings from meeting structural requirements as the committee suggests. It only exempts those that meet specific criteria from permits and inspections. R105.2 states that exemption from permitting does not allow construction that is not in conformance with the code so the owner still has an obligation to follow any applicable code requirements, just as they do for other exempt construction.

It has been suggested that perhaps there should be a size limit on these decks. Any such limit would be arbitrary and unjustifiable. We are talking residential decks here, not large assembly areas. Size limits are unnecessary.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB6–07/08
R105.2

Proponent: Scott Dornfeld, City of Delano, MN, representing Association of Minnesota Building Officials

Revise as follows:

R105.2 (Supp) Work exempt from permit. Permits shall not be required for the following. Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet (11.15 m^2).
2. Fences not over 6 feet (1829 mm) high.
3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.
5. Sidewalks and driveways.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.
10. <u>Decks that are not more than 30 inches above grade at any point, are not attached to a dwelling, and do not serve the exit door required by Section R311.4.</u>

(Portions of section not shown remain unchanged)

Reason: The proposed amendment will exclude decks from permits only when:

- no part of the deck floor is more than 30 inches above grade
- the deck has no roof (a deck by definition is a floor system)
- the deck is not structurally attached to the dwelling
- the deck does not serve the main exit door

When this code change was submitted in the last cycle, the committee objected on two points:

- low decks should be regulated because they could be considered a gathering area and pose a hazard from collapse
- the proposal would exempt decks from meeting the structural requirements

Without a doubt there is some hazard of collapse from any deck but in the case of these decks the hazard will be slight. The deck is very near the ground to begin with. The deck will not fall far if it should fail. The code already exempts these decks from guard requirements. Isn't it more likely that one would fall off such a deck as opposed to the deck collapsing? Wouldn't it seem that the potential for injury would be greater if one fell

off such a deck as having the deck fail underneath you? Also, it is believed that a majority of all deck failures occur at the connection of the deck to the dwelling. These decks are freestanding. Such a failure won't happen here.

The proposal did not exempt decks from meeting structural requirements as the committee suggests. It only exempts decks that meet specific criteria from permits and inspections. R105.2 states that exemption from permitting does not allow construction that is not in conformance with the code. So the owner still has an obligation to follow any applicable code requirements, just as they do for other exempt construction.

It has been suggested that perhaps there should be a size limit on these decks, why? Any such limit would be arbitrary and unjustifiable. We are talking residential decks here. Not large assembly areas. Size limits are unnecessary.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB7–07/08
R106.1.1

Proponent: Scott Beard, SE, City of Tacoma, WA

Revise as follows:

R106.1.1 Information on construction documents. Construction documents shall be drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official. All braced wall lines, both interior and exterior, shall be clearly identified on the construction drawings and all pertinent information including but not limited to bracing method, location and length of braced wall segments, foundation requirements, attachment schedule, and braced wall segment attachment at top and bottom of segment shall be clearly identified there on.

Reason: The purpose of this change is to add a new requirement to the IRC to benefit the builder and the building official alike. The proposal requires that the relevant wall bracing information required in Section R602.l0 be clearly marked on the construction drawings. Those parts of the wall system that are designated bracing panels have potentially different panel attachment schedules, foundation requirements and specific connection requirements to other parts of the building than do other exterior and interior walls. Not only are braced walls often different from other walls, they are always required in every code conforming structure. An extra burden is placed on our building officials and plan checkers when they have to try to figure out which walls the designer has intended for use as bracing. Requiring such details, as many professional home designers already provide, on all submittals will make the Building Official's, plan checker's, and inspector's job easier, level the playing field, and will insure that bracing is being considered during the design process. It will further ensure that the building's structural detailing is being done by the person being paid to draw the plans, and not by the plan checker. It will also make it easier for the builder to properly construct the required bracing on the job site when the details are clearly spelled out on the drawings. In the long run it will lead to better/stronger housing stock for little or no money.

On a more personal note, as a plan reviewer, I have noticed an increase in the complexity of prescriptive bracing since the days of the legacy codes. In many ways it is a good thing, as it provides many options to builders that never existed before. The problem with these extra options and flexibility is that it is often hard to tell which bracing option the builder had in mind. Not only do I risk incorrectly guessing the house designer's intent, but our field inspector can also guess wrong, as well as the field carpenter in his efforts to build it. Homes with "obvious" bracing are getting fewer and farther between. This code change can correct that, and result in few corrections and "re-do's" in the field.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB8–07/08
R106.2

Proponent: Rebecca Baker, Jefferson County, CO, Chair, ICC Ad Hoc Committee on the Administrative Provisions in the I-Codes (AHC-Admin)

Revise as follows:

R106.2 Site plan. The construction documents submitted with the application for permit shall be accompanied by a site plan showing the size and location of new construction and existing structures on the site and distances from lot lines. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. The building official is authorized to waive or modify the requirement for a site plan when the application for permit is for alteration or repair or when otherwise warranted.

Reason: Consistency and coordination among the I-Codes are cornerstones of the ICC Code Development Process. This holds true for not only the technical code provisions but also for the administrative code provisions as contained in Chapter 1 of all the I-Codes.

In response to concerns raised by the ICC membership since publication of the first editions of the I-Codes, the ICC Board established, for the 2006/2007 cycle, and extended, for the 2007/2008 cycle, the ICC Ad Hoc Committee on the Administrative Provisions in the I-Codes (AHC-Admin) to review Chapter 1 administrative provisions in the International Codes family and improve the correlation among the I-Codes through the code development process.

The AHC-Admin is submitting a series of code change proposals designed to provide consistent and correlated administrative provisions among the I-Codes. The intent of this correlation effort is not necessarily to have absolutely identical text in each of the I-Codes but, rather, text that has the same intent in accomplishing the administrative tasks among the I-Codes.

This proposal focuses on the requirements for site plan submittal and is being submitted by the AHC-Admin to correlate the IRC with current Section 106.2 of the *International Building Code* and *International Existing Building Code* and the changes that were approved in the 2006/2007 cycle to Section 106.3 of the *International Wildland-Urban Interface Code*.

The added text provides the building official with reasonable flexibility in determining when the scope or location of work makes the submittal of a site plan unnecessary.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB9–07/08
R106.3.1

Proponent: Tim Burke, Salt Lake City, UT, representing ICC Utah Chapter

Revise as follows:

R106.3.1 Approval of construction documents. When the building official issues a permit, the construction documents shall be approved, in writing or by a stamp which states "~~APPROVEDPLANS PER IRC SECTION R106.3.1~~ REVIEWED FOR CODE COMPLIANCE." One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or his or her authorized representative.

Reason: We think this phrase should be worded exactly the same in both codes. The current IRC (stricken out) phrase is a carryover from a legacy code. The changed wording that now appears in the IBC is preferable to the old text. We could not think of any reason why the stamp for residential jobs should be worded differently from a stamp for any other job. One stamp could be used in for the building inspection department instead of two.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB10–07/08
R108.6 (New)

Proponent: Rebecca Baker, Jefferson County, CO, Chair, ICC Ad Hoc Committee on the Administrative Provisions in the I-Codes (AHC-Admin)

Add new text as follows:

R108.6 Work commencing before permit issuance. Any person who commences any work on a building, structure, electrical, gas, mechanical or plumbing system before obtaining the necessary permits shall be subject to a fee established by the applicable governing authority that shall be in addition to the required permit fees.

Reason: Consistency and coordination among the I-Codes are cornerstones of the ICC Code Development Process. This holds true for not only the technical code provisions but also for the administrative code provisions as contained in Chapter 1 of all the I-Codes.

In response to concerns raised by the ICC membership since publication of the first editions of the I-Codes, the ICC Board established, for the 2006/2007 cycle, and extended, for the 2007/2008 cycle, the ICC Ad Hoc Committee on the Administrative Provisions in the I-Codes (AHC-Admin) to review Chapter 1 administrative provisions in the International Codes family and improve the correlation among the I-Codes through the code development process.

The AHC-Admin is submitting a series of code change proposals designed to provide consistent and correlated administrative provisions among the I-Codes. The intent of this correlation effort is not necessarily to have absolutely identical text in each of the I-Codes but, rather, text that has the same intent in accomplishing the administrative tasks among the I-Codes.

This proposal focuses on work commencing before permit issuance and is being submitted by the AHC-Admin to correlate the IRC with current Section 108.4 of the *International Building Code* and *International Existing Building Code* and with the changes that were approved in the 2006/2007 cycle to Section 112 of the *International Fire Code* and Section 110 of the *International Wildland-Urban Interface Code* (see *Supplement to the International Codes/2007)*.

The proposed section recognizes that costs are incurred (i.e., inspection time and administrative) when investigating a project which has commenced work without having obtained a permit. This allows the jurisdiction to recover these costs by establishing a fee, which should be in addition to that collected when the required permit is issued.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB11–07/08

R301.1.1, R301.2.1.1, R301.2.2.3.1, R301.2.2.3.5, Chapter 43

Proponent: Bonnie Manley, American Iron and Steel Institute (AISI)

1. Revise as follows:

R301.1.1 (Supp) Alternative provisions. As an alternative to the requirements in Section R301.1 the following standards are permitted subject to the limitations of this code and the limitations therein. Where engineered design is used in conjunction with these standards the design shall comply with the *International Building Code*.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual* (WFCM).
2. American Iron and Steel Institute (AISI) *Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings* ~~(COFS/PM) *with Supplement to Standard for Cold-Formed Steel Framing-Prescriptive Method for One- and Two-Family Dwellings*~~ *(AISI S230)*.
3. ICC-400.

R301.2.1.1 (Supp) Design criteria. In regions where the basic wind speeds from Figure R301.2(4) equal or exceed 100 miles per hour (45 m/s) in hurricane-prone regions, or 110 miles per hour (49 m/s) elsewhere, the design of buildings shall be in accordance with one of the following methods. The elements of design not addressed by those documents in Items 1 through 4 shall be in accordance with this code.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM); or
2. *Southern Building Code Congress International Standard for Hurricane Resistant Residential Construction* (SSTD 10); or
3. *Minimum Design Loads for Buildings and Other Structures* (ASCE-7); or
4. American Iron and Steel Institute (AISI), *Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings* ~~*(COFS/PM) with Supplement to Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings*~~ (AISI S230).
5. Concrete construction shall be designed in accordance with the provisions of this code.
6. Structural insulated panels shall be designed in accordance with the provisions of this code.

R301.2.2.3.1 (Supp) Height limitations. Wood framed buildings shall be limited to three stories above grade or the limits given in Table R602.10.1. Cold-formed steel framed buildings shall be limited to two stories above grade in accordance with ~~COFS/PM~~ AISI S230. Mezzanines as defined in Section R202 shall not be considered as stories. Structural insulated panel buildings shall be limited to two stories above grade.

R301.2.2.3.5 Cold-formed steel framing in Seismic Design Categories D_0, D_1 and D_2. In Seismic Design Categories D_0, D_1 and D_2 in addition to the requirements of this code, cold-formed steel framing shall comply with the requirements of ~~COFS/PM~~ AISI S230.

2. Revise standard in Chapter 43 as follows:

AISI

~~PM-2001~~ S230-07 Standard for Cold-formed Steel Framing-Prescriptive Method for One- andTwo-family Dwellings ~~(including 2004 Supplement)~~

Reason: This code change for IRC Section R301 updates the references to AISI S230, *Standard for Cold-Formed Steel Framing -- Prescriptive Method for One- and Two-Family Dwellings*. Major changes between the 2004 AISI-PM and the 2007 edition of AISI S230 include the following:

- Numerical Designation: A new numeric ANSI designation system was initiated for the 2007 editions of the AISI standards. It is intended to simplify the referencing of the documents in this growing series of codes and standards. The new designation for AISI-PM is AISI S230.
- Section A1, Scope: The allowable number of stories in AISI S230 was increased from two to three stories and provisions for such were added throughout the standard. Additionally, the maximum story height was defined. Language was also added to better describe how to handle an irregularity in a high seismic or high wind area that is isolated to a portion of a building.
- Section A2, Definitions: Definitions for most terms used in this standard were removed from this section and centralized in AISI S200, *North American Standard for Cold-Formed Steel Framing – General Provisions*, which is referenced in AISI S230. Definitions for seismic design category D_0 and wind exposures B, C and D were added and the definition for seismic design category D_1 was revised, to be in accordance with the IRC/IBC.
- Section A3, Referenced Documents: The referenced document listing was updated to include the 2007 editions of AISI S100 (*North American Specification for the Design of Cold-Formed Steel Structural Members*), AISI S200, AISI S201 (*North American Standard for Cold-Formed Steel Framing – Product Data*) and AISI S214 (*North American Standard for Cold-Formed Steel Framing – Truss Design*). Also, ASCE 7-05, various ASTM and other references were updated. Reference to the applicable standard for anchor bolts, ASTM F1554-04, was added.
- Section A4, Limitations of Framing Members: Language was updated to reflect the new AISI S201 and ASTM A1003 standards. Provisions for hole reinforcement were added and provisions for hole patching were revised, based on available research and engineering judgment.
- Section B2, Bearing Stiffeners: Requirements for C-shaped and track bearing stiffeners were revised, based on available research and engineering judgment. Provisions were added for clip angle bearing stiffeners, based on a recent testing program at the University of Waterloo.
- Section B4, Anchor Bolts: Provisions were added regarding anchor bolt washers in high wind areas and high seismic areas.
- Section D2, Floor to Foundation or Structural Wall Connection: Provisions were added to allow a single joist with bearing stiffeners in lieu of double joists on foundation walls parallel to the joist span.
- Section E2, Wall to Foundation or Floor Connection: Provisions were added for anchoring gable endwalls, based on a study at the University of Missouri-Rolla.
- Section E3, Wall Stud Sizes: Tables were updated to the latest editions of AISI S100, AISI S211 (*North American Standard for Cold-Formed Steel Framing – Wall Stud Design*) and ASCE 7. Provisions were added for sizing wall studs in gable endwalls, based on a study at the University of Missouri-Rolla.
- Section E7, Headers: Tables were updated to the latest editions of AISI S100, AISI 212 (*North American Standard for Cold-Formed Steel Framing – Header Design*) and ASCE 7. Tables were added for grade 50 members. Provisions were added for single L-headers and inverted L-header assemblies. Clarification was made that provisions for head tracks also apply to sill tracks. Provisions were added for sizing and installing headers in gable endwalls, based on a study at the University of Missouri-Rolla.
- Section E11, Braced Walls In High Wind Areas and High Seismic Areas: Provisions were revised to clarify that braced wall length adjustment factors based upon edge screw spacing less than 4 inches are not applicable to type II braced walls.
- Section F3, Roof Rafters: Tables were updated to the latest editions of AISI S100, AISI S210 (*North American Standard for Cold-Formed Steel Framing – Floor and Roof System Design*) and ASCE 7. Tables were added for grade 50 members. Limits were set on the rake overhang in gable endwalls, based on a study at the University of Missouri-Rolla.
- Section F4, Hip Framing: A new section was added to address hip framing, based on a study at the University of Missouri-Rolla.
- Section F6, Ceiling and Roof Diaphragms: Ceiling diaphragm design and installation requirements were added for gable endwalls, based on a study at the University of Missouri-Rolla.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB12–07/08
R301.2.1.1

Proponent: Gary J. Ehrlich, PE, National Association of Home Builders

Revise as follows:

R301.2.1.1 (Supp) Design criteria. In regions where the basic wind speeds from Figure R301.2(4) equal or exceed ~~100 miles per hour (45 m/s) in hurricane prone regions, or~~ 110 miles per hour (49 m/s) ~~elsewhere~~, the design of buildings shall be in accordance with one of the following methods. The elements of design not addressed by those documents in Items 1 through 4 shall be in accordance with this code.

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM); or
2. *Southern Building Code Congress International Standard for Hurricane Resistant Residential Construction* (SSTD 10); or
3. *Minimum Design Loads for Buildings and Other Structures* (ASCE-7); or

4. American Iron and Steel Institute (AISI), *Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings (COFS/PM) with Supplement to Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings*.
5. Concrete construction shall be designed in accordance with the provisions of this code.
6. Structural insulated panels shall be designed in accordance with the provisions of this code.

Reason: As justification for their IRC code change (RB31-04/05) introducing the additional 100mph limit, IBHS noted four issues: roof sheathing nails, wind bracing requirements, toe-nailed uplift connections, and wall-to-wall connections at the floor line. In lieu of pursuing the individual modifications needed to resolve these issues within the IRC, the proponent simply lowered the ceiling for using prescriptive design provisions along the Atlantic Coast. We believe this was an excessive solution to the problem and not supported by the observed performance of housing properly constructed using any edition of the IRC and subject to extreme wind events. At no time during the code cycle did the proponents ever provide to the committee or the assembly documented evidence of failures of structures constructed to the IRC provisions. Nor did they provide technical justification in the form of engineering calculations or structural research to support their contentions. However, the code development cycle coincided with the 2004 Florida hurricanes and Hurricanes Katrina and Rita, so there was significant political and emotional pressure on the code development community to increase the stringency of building codes, whether or not they were technically justified or appropriately targeted to the risk of severe wind events in those areas subjected to the new provisions.

In both the 2004/2005 and 2006/2007 cycles, individual changes were implemented which address issues raised by IBHS. The minimum roof sheathing nailing was increased from 6d to 8d common nails for all roofs and the nail spacing in the gable and eave end zones was increased for dwellings in the 100mph region. The work of the ICC Ad-Hoc Committee on Wall Bracing in the 2006/2007 cycle resulted in a number of clarifications and improvements to the braced wall provisions. In particular, changes to the continuous sheathed method clarified return corner and uplift restraint requirements and added limits on mixing of continuous sheathing with other methods in high-wind regions. Additional changes proposed by the Ad-Hoc Committee for this cycle will further refine and revise the wall bracing provisions to insure braced wall lines are properly located, detailed and constructed and that braced wall segments are properly anchored to foundations and fastened to wall and roof framing.

The 2004/2005 change raises questions regarding the age of the damaged structures used for justifying the code change. The FEMA Summary Reports on Building Performance from the 2004 hurricane season and from Hurricane Katrina in 2005 indicated that structures built to the 2000 and 2003 IRC performed extremely well. The 2004 hurricane report stated (p.13), “no structural failures were observed to structures designed and constructed to the wind design requirements of…the 2000 IBC/IRC…” The Hurricane Katrina report stated (p.4-8), “Most structural failures observed by the MAT appeared to be the result of inadequate design and construction methods commonly used before IBC 2000 and IRC 2000 were adopted and enforced.” In addition, a study conducted by the Texas Windstorm Insurance Association after Hurricane Rita showed there was substantially less damage and substantially fewer insurance claims in those areas where the 2000 or 2003 IBC and IRC were adopted and enforced.

Estimates performed by NAHB staff show that complying with the SSTD-10 and WFCM provisions can add as much as $10,000 to the cost of a home, making it extremely difficult to construct affordable housing along the Atlantic and Gulf coasts and placing an onerous burden on builders and homeowners, particularly on first-time home buyers. This added cost of construction will have the effect of keeping residents of these coastal areas in older homes which do not have the robust construction provided by the IRC prescriptive provisions and which will be substantially more susceptible to structural failures, water infiltration and damage to personal property in high wind events. NAHB asks for your support of this proposal.

Bibliography: FEMA, *Summary Report on Building Performance, 2004 Hurricane Season*, FEMA 490, Washington, DC, March 2005.
FEMA, *Summary Report on Building Performance, Hurricane Katrina*, FEMA 548, Washington, DC, April 2006.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:				
	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB13–07/08
Table R301.2(1)

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise footnote g to table as follows:

TABLE R301.2(1) (Supp)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

(Portions of table not shown remain unchanged)

a. Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The weathering column shall be filled in with the weathering index (i.e., “negligible,” “moderate” or “severe”) for concrete as determined from the Weathering Probability Map [Figure R301.2(3)]. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.
b. The frost line depth may require deeper footings than indicated in Figure R403.1(1). The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.
c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.

d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [FigureR301.2(4)].Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.
e. The outdoor design dry-bulb temperature shall be selected from the columns of 97 1/2-percent values for winter from Appendix D of the *International Plumbing Code*. Deviations from the Appendix D temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official.
f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.
g. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of all currently effective FIRMs and FBFMs, or other flood hazard map adopted by the ~~community~~ authority having jurisdiction, as ~~may be~~ amended.
h. In accordance with Sections R905.2.7.1, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."
i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99%) value on the National Climatic Data Center data table "Air Freezing Index- USA Method (Base 32°)" at www.ncdc.noaa.gov/fpsf.html.
j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°)" at www.ncdc.noaa.gov/fpsf.html.
k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with "Yes." Otherwise, the jurisdiction shall indicate "No" in this part of the table.

Reason: The purpose of this code change is to clarify the code so that Table 301.2(1) is properly completed with the required information. The Flood Insurance Study includes information that is necessary for proper interpretation of flood hazard areas and flood elevations that are shown on flood hazard maps. The code should specifically cite the Flood Insurance Study prepared for the adopting jurisdiction, and to recognize that many local jurisdictions have multiple map panels that may have more than one date. The code should cite every effective map, which is best done by citing all panels by number and date.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB14–07/08

R301.2.1.5, R301.2.1.5.1 (New), Table R301.2.1.5.1 (New), Figures R301.2.1.5.1(1) through R301.2.1.5.1(3) (New)

Proponent: Scott Beard, Se, City of Tacoma, WA, representing Structural Engineers Association of Washington

1. Revise as follows:

R301.2.1.5 (Supp) Topographic wind effects. In areas designated in Table R301.2(1) as having local historical data documenting structural damage to buildings due to wind speed-up at isolated hills, ridges and escarpments that are abrupt changes from the general topography of the area, topographic wind effects shall be considered in the design of the building in accordance with Section R301.2.1.5.1 or in accordance with the provisions of ASCE 7.

In these designated areas, topographic wind effects shall apply only to buildings sited on the top half of an isolated hill, ridge or escarpment where all of the following conditions exist:

1. The average slope of the top half of the hill, ridge or escarpment is 10 percent or greater.
2. The hill, ridge or escarpment is 60 feet (18 288 mm) or greater in height for Exposure B, 30 feet (9144 mm) or greater in height for Exposure C, and 15 feet (4572 mm) or greater in height for Exposure D.
3. The hill, ridge or escarpment is isolated or unobstructed by other topographic features of similar height in the upwind direction for a distance measured from its high point of 100 times its height or 2 miles, whichever is less.
4. The hill, ridge or escarpment protrudes by a factor of two or more above the height of other upwind topographic features located in any quadrant within a radius of 2 miles measured from its high point.

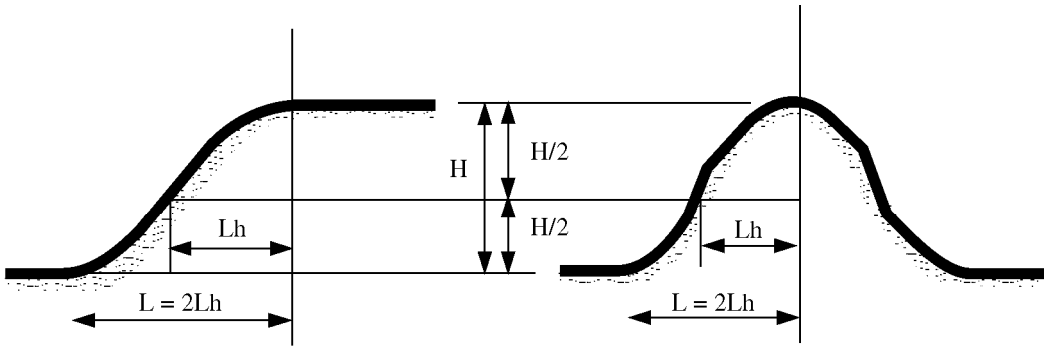
2. Add new text, table and figures as follows:

R301.2.1.5.1 Simplified topographic wind speedup method. As an alternative to the ASCE 7 topographic wind provisions, the provisions of R301.2.5.1 may be used to design for wind speed up effects, where required by R301.2.1.5.

Structures located on the top half of hills, ridges, or escarpments meeting the conditions of R301.2.1.5 shall be designed for an increased basic wind speed as determined by Table R301.2(4). In the high side of and escarpment, the increased basic wind speed shall extend horizontally downwind from the edge of the escarpment 1.5 times the horizontal length of the upwind slope (1.5L) or 6 times the height of the escarpment (6H), whichever is greater.

TABLE R301.2.1.5.1
BASIC WIND SPEED MODIFICATION FOR TOPOGRAPHIC WIND SPEED EFFECT

BASIC WIND SPEED FROM FIGURE R301.2(4)	AVERAGE SLOPE OF THE TOP HALF OF HILL, RIDGE OR ESCARPMENT						
	0.10	0.125	0.15	0.175	0.20	0.23	0.25 or greater
	Required Basic Wind Speed, Modified for Topographic Wind Speed Up:						
85	100	100	100	110	110	110	120
90	100	100	110	110	120	120	120
100	110	120	120	130	130	130	140
110	120	130	130	140	140	150	150
120	140	140	150	150	N/A	N/A	N/A
130	150	N/A	N/A	N/A	N/A	N/A	N/A



Note: H/2 determines the measurement point for Lh. L is twice Lh.

FIGURE R301.2.1.5.1(1)
TOPOGRAPHIC FEATURES FOR WIND SPEED-UP EFFECT

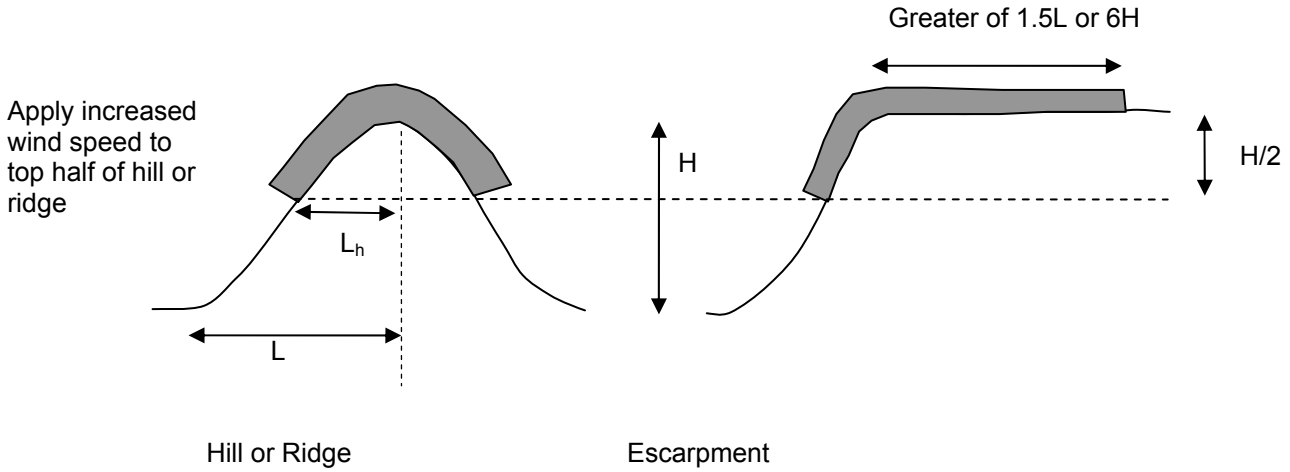


FIGURE R301.2.1.5.1(2)
ILLUSTRATION OF WHERE ON A TOPOGRAPHIC FEATURE, WIND SPEED INCREASE IS APPLIED

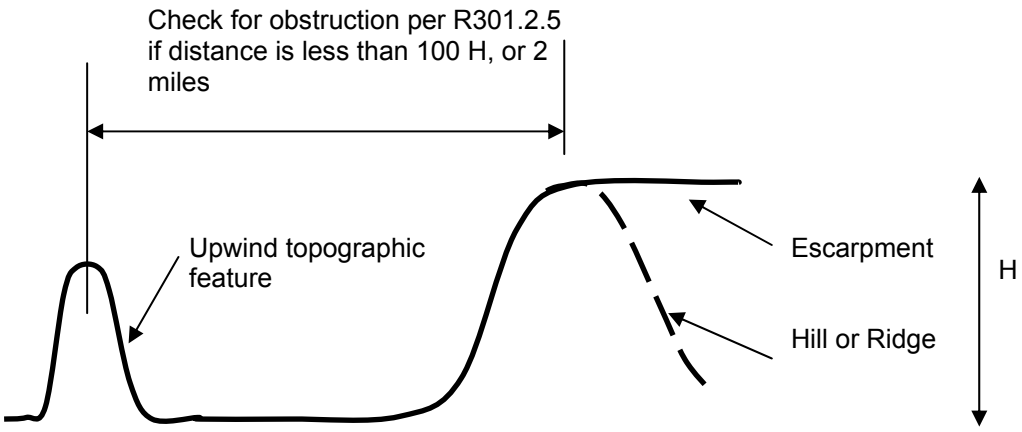


FIGURE R301.2.1.5.1(3)
ILLUSTRATION OF UPWIND OBSTRUCTION

Reason: New, in the most recent code supplement, are the triggers for when Topographic Wind Speed Up effects are required to be designed for. The provision adding that section to the Supplement was written by the National Association of Home Builders, and was supported the Structural Engineer's Association.

The code, as currently written, requires design by ASCE 7, when Topographic Wind Speed Up effects are required. Triggering ASCE 7, unfortunately, requires engineering design of the structure.

What is proposed is an alternate simplified method of designing for Topographic Wind Speed Up effects, which can be used with the prescriptive methods, and thus does not require engineering design. It is also easier to apply this method to a house structure than the ASCE 7 method, so if engineering design is desired for some other reason, the design process will require less engineering time.

The methodology proposed is a outgrowth of the wind simplification process developed during the creation of ATC-61, The Rapid Wind Solutions Methodology, and this current code cycle's attempt at simplifying the wind design process in the IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB15–07/08
R202

Proponent: Maureen Traxler, City of Seattle, WA, representing Washington Association of Building Officials Technical Code Development Committee

Revise definition as follows:

STORY ABOVE GRADE <u>PLANE</u> (Supp). Any story having its finished floor surface entirely above grade <u>plane</u>, except that a basement shall be considered as a story above grade <u>plane</u> where the finished surface of the floor above the basement meets any one of the following:

1. Is more than 6 feet (1829 mm) above grade plane.
2. Is more than 6 feet (1829 mm) above the finished ground level for more than 50 percent of the total building perimeter.
3. Is more than 12 feet (3658 mm) above the finished ground level at any point.

Reason: RB2-06/07 changed the scope of the IRC to be buildings with "three stories above grade <u>plane</u>" instead of "three stories above grade" in order to bring the IRC and IBC into consistency. To complete the move to consistency, it is also necessary to revise the definition of "story above grade" to use the same terminology.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB16–07/08
R301.2.4

Proponent: William Easterling, Grand Haven, MI, representing himself

Revise as follows:

R301.2.4 (Supp) Floodplain construction. Buildings and structures ~~constructed~~ located in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1) shall be designed and constructed in accordance with Section R324. ~~**Exception:**~~ Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with *Flood Resistant Design and Construction* (ASCE 24).

Reason: The purpose of the proposed code change is to clarify the two different requirements of this code section by using consistent language and proper format. An existing building or structure located in a flood hazard area and not just constructed in a flood hazard area is subject to the requirements of Section R324 as is a building or structure located in a floodway is subject to the requirements of ASCE 24. The additional requirements for floodways over flood hazard areas should be identified as such and not as an exception to the requirements for flood hazard areas. Likewise the minimum requirements of Section R324 should not be waived by exception, but maintained as a minimum requirement for building and structures located in a flood hazard area that may also be a floodway. Any conflicts between R324 and ASCE 24 are addressed by Section R102.1.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB17–07/08
R202, Table R301.5, R313.2

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing Virginia Building Code Officials Association (VBCOA)

1. Revise definition as follows:

ATTIC. The unfinished space between the ceiling ~~joists~~ assembly of the top story and the roof ~~rafters~~ assembly.

2. Add new definition as follows:

LOFT. A finished or unfinished area, not considered a story, with an occupiable space complying with all of the following requirements:

1. The occupiable floor area is at least 70 sqare feet, measured between areas that are at least 5 feet tall,
2. The occupiable area has headroom of at least 7' clearance for at least 50% of the occupiable floor area,
3. The occupiable floor width does not exceed 70% of the total width of the structure,
4. The occupiable area is designed to comply with Table R301.5,
5. The space has no exterior walls, and is enclosed by the roof assembly above, knee walls (if applicable) on the sides, and the floor-ceiling assembly below,

3. Revise table as follows:

TABLE R301.5 (Supp)
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
~~Attics with limited storage~~[b, g, h] Attics without storage[b]	~~20~~ 10
~~Attics without storage~~[b] Attics with limited storage[b, g]	~~10~~ 20
Lofts and attics with walk-up stairs	30
Balconies (exterior) and decks [e]	40
Fire escapes	40
Guardrails and handrails [d]	200-~~i~~ h
Guardrails in-fill components [f]	50 ~~i~~ h
Passenger vehicle garages [a]	50 [a]
Rooms other than sleeping rooms	40
Sleeping rooms	30
Stairs	40 [c]

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm2, 1 pound = 4.45 N.

a Elevated garage floors shall be capable of supporting a 2,000-pound load applied over a 20-square-inch area.
b. Attics without storage are those where the maximum clear height between joist and rafter is less than 42 inches, or where there are not two or more adjacent trusses with the same web configuration capable of containing a rectangle 42 inches high by 2 feet wide, or greater, located within the plane of the truss. For attics without storage, this live load need not be assumed to act concurrently with any other live load requirements.
c. Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.
d. A single concentrated load applied in any direction at any point along the top.
e. See Section R502.2.2 for decks attached to exterior walls.
f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.
g. For attics with limited storage and constructed with trusses, this live load need be applied only to those portions of the bottom chord where there are two or more adjacent trusses with the same web configuration capable of containing a rectangle 42 inches high or greater by 2 feet wide or greater, located within the plane of the truss. The rectangle shall fit between the top of the bottom chord and the bottom of any other truss member, provided that each of the following criteria is met:

    1. The attic area is accessible by a pull-down stairway or framed opening in accordance with Section R807.1; and
    2. The truss has a bottom chord pitch less than 2:12.
    3. Required insulation depth is less than the bottom chord member depth.

    The bottom chords of trusses meeting the above criteria for limited storage shall be designed for the greater of the actual imposed dead load or 10 psf, uniformly distributed over the entire span.

~~h. Attic spaces served by a fixed stair shall be designed to support the minimum live load specified for sleeping rooms.~~
~~i.~~ h. Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

4. Revise as follows:

R313.2 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional story of the dwelling, including basements but not including crawl spaces and <u>in lofts, but not in</u> uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

When more than one smoke alarm is required to be installed within an individual dwelling unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

Reason:

1. Updating the definition of "attic". This change is submitted to make the definition of "attic" more inclusive. Many attics are created by the space inside a roof truss. Trusses are made up of top and bottom chords and not roof rafters and ceiling joists. See attached picture.
2. Adding a new definition of "loft". In general the IRC is tacit about how to handle walk-up attics, room trusses, or the infamous attic-finished-off-to-create-a-third-floor situation, sometimes called a "half story" or "finished attics" (an oxy-moron). In fact contractors frequently provide the gyp board and leave it laying on attic floor for the homeowner to finish off the space at a later time!

Historical perspective:

- The 1995 CABO provides no definition of "attic", and only refers to it in terms of the size of an access panel required.
- The 1996 BOCA define an "attic" as: "The space between the ceiling beams of the top story and the roof rafters".
- The 2000 IRC added the word "unfinished" to the definition in BOCA, and changed "beams" to "joists".

This proposal provides a new term, "loft", which defines "occupiable" space that may or may not be finished off, but has the potential of being finished off. "Occupiable" space has the same requirements as "habitable" space without using the term "habitable". This has been intentionally done because the space, in many cases, is "potentially" habitable when the homeowner finishes it off in the future.

"Loft" vs "attic":

- "Loft" may be finished off or has the potential of being finished off, an "attic" is always "unfinished" by definition.
- "Loft" is not a story, as currently in the code, an "attic" would become a story when finished off (and hence where the problem arises!).
- A "loft" has to have "occupiable" space that could be used as living space. An "attic" does not have to have any special size or space.
- "Loft" and "attic" are both intended to be the space between the ceiling assembly and the roof assembly.

3. In order to clarify the live load requirements for a "loft", Table R301.5 has been amended to show the minimum acceptable live load for a loft and attic with walk-up stairs is 30 psf. Trusses are typically designed within their software to be 40psf (see attached picture).
4. Changing Table R301.5 eliminates the need for footnote h.
5. R313, Smoke Alarm section is amended to incorporate "lofts" as one place where smoke detectors are required.

This change is necessary because homeowners, plan reviewers, contractors, and inspectors have been misapplying the definition of "attic" because there is no current word that defines a finished "attic". I contemplated just changing the meaning of "attic" by deleting the word "unfinished" from the definition, but the roots of the definition are too spread out throughout the code. This change gives everyone a word that fills in the language gap.

Job	Truss	Truss Type	Qty	Ply	
CHUCKB	T1	ATTIC	1	1	Job Reference (optional)

BSOP, PETERSBURG, VA 23804, BONNIE LOGAN — 6.400 s Sep 7 2006 MiTek Industries, Inc. Tue May 29 13:01:06 2007 Page 1

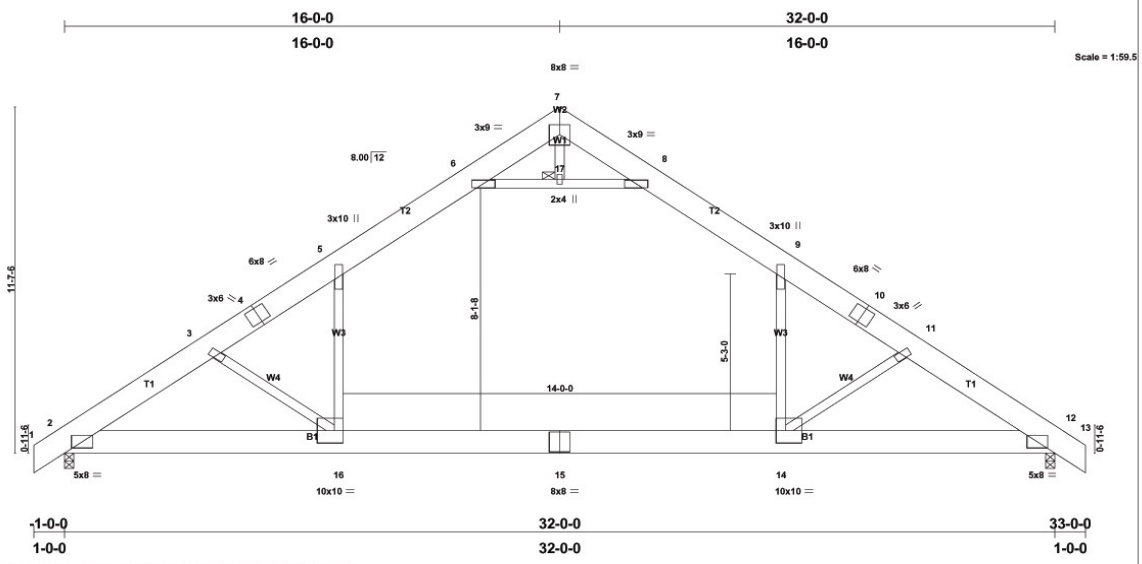


Plate Offsets (X,Y): [14:0-3-8,0-5-0], [16:0-3-8,0-5-0]

LOADING (psf)		SPACING	2-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL	20.0	Plates Increase	1.00	TC	0.95	Vert(LL)	-0.42	14-16	>911	360	MT20	244/190
TCDL	10.0	Lumber Increase	1.00	BC	0.78	Vert(TL)	-0.69	14-16	>548	240		
BCLL	0.0 *	Rep Stress Incr	YES	WB	0.42	Horz(TL)	0.05	12	n/a	n/a		
BCDL	10.0	Code	IRC2003/TPI2002	(Matrix)		Wind(LL)	0.08	16	>999	240	Weight: 330 lb	

LUMBER
TOP CHORD 2 X 10 SYP No.1
BOT CHORD 2 X 10 SYP No.1
WEBS 2 X 4 SYP No.2 *Except*
W4 2 X 4 SYP No.3, W4 2 X 4 SYP No.3, W2 2 X 4 SYP No.3

BRACING
TOP CHORD Structural wood sheathing directly applied.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.
JOINTS 1 Brace at Jt(s): 17

REACTIONS (lb/size) 2=2052/0-3-8, 12=2052/0-3-8
Max Horz 2=-242(load case 2)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-2=0/31, 2-3=-3392/0, 3-4=-3002/0, 4-5=-2876/0, 5-6=-2075/0, 6-7=0/712, 7-8=0/712, 8-9=-2075/0, 9-10=-2876/0, 10-11=-3002/0, 11-12=-3392/0, 12-13=0/31
BOT CHORD 2-16=0/2699, 15-16=0/2157, 14-15=0/2157, 12-14=0/2699
WEBS 6-17=-3124/0, 8-17=-3124/0, 5-16=0/1444, 9-14=0/1444, 3-16=-765/107, 11-14=-765/109, 7-17=0/433

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-02; 90mph; h=0ft; TCDL=6.0psf; BCDL=6.0psf; Category II; Exp C; enclosed; MWFRS; Lumber DOL=1.00 plate grip DOL=1.00.
3) This truss requires plate inspection per the Tooth Count Method when this truss is chosen for quality assurance inspection.
4) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-6-0 tall by 1-0-0 wide will fit between the bottom chord and any other members.
5) Ceiling dead load (5.0 psf) on member(s). 5-6, 8-9, 6-17, 8-17
6) Bottom chord live load (40.0 psf) and additional bottom chord dead load (5.0 psf) applied only to room. 14-16
7) This truss is designed in accordance with the 2003 International Residential Code sections R502.11.1 and R802.10.2 and referenced standard ANSI/TPI 1.

LOAD CASE(S) Standard

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB18–07/08
Table R301.5

Proponent: Kirk Grundahl, PE, WTCA, representing the Structural Building Components Industry

Revise table footnote as follows:

TABLE R301.5 (Supp)
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

a. through f. (No change to current text)

g. For attics with limited storage and constructed with trusses, this live load need be applied only to those portions of the bottom chord where there are two or more adjacent trusses with the same web configuration capable of containing a rectangle 42 inches high or greater by 2 feet wide or greater, located within the plane of the truss. The rectangle shall fit between the top of the bottom chord and the bottom of any other truss member, provided that each of the following criteria is met:

1. The attic area is accessible by a pull-down stairway or framed opening in accordance with Section R807.1; and
2. The truss has a bottom chord pitch less than 2:12.
3. Required insulation depth is less than the bottom chord member depth.

The bottom chords of trusses meeting the above criteria for limited storage shall be designed for the ~~greater of the~~ actual imposed dead load or 10 psf, uniformly distributed over the entire span.

h. and i. (No change to current text)

(Portions of table and footnotes not shown remain unchanged)

Reason: This proposal clarifies that the bottom chords of these trusses are to be designed to for a uniformly distributed actual imposed dead load or 10 psf.

It makes no good sense for Table 1607.1 and Table 301.5 to be different in the application of truss bottom chord loading. The goal is to provide a uniform loading approach that will be consistently applied in the marketplace.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB19–07/08
Table R301.7

Proponent: Charles S. Bajnai, Chesterfield County, VA, representing Virginia Building Code Officials Association (VBCOA)

Revise table as follows:

TABLE R307.1 (Supp)
ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[a, b, c, d]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Rafters having slopes greater than 3/12 with no finished ceiling attached to rafters	L/180
Interior walls and partitions	H/180
Floors and plastered ceilings	L/360
All other structural members	L/240
Exterior walls with plaster or stucco finish	H/360
Exterior walls — wind loads[a] with brittle finishes	H240
Exterior walls — wind loads[a] with flexible finishes	H120[d]
Veneer masonry walls	L/600

a. The wind load shall be permitted to be taken as 0.7 times the component and cladding loads for the purpose of the determining deflection limits herein.

b. For cantilever members, *L* shall be taken as twice the length of the cantilever.
c. For aluminum structural members or panels used in roofs or walls of sunroom covers, not supporting edge of glass or sandwich panels, the total load deflection additions or patio shall not exceed L/60. For sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed L/120.
d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of H/180.

Reason: This change is intended to make the IRC clearer.
The allowable deflection specification for masonry veneer, L/600, is from Section Chapter 703.7.2. This information should be added to this table because it is buried in Chapter 7 and frequently missed. This is the logical place to find it, and in this case, redundancy is a good thing.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB20–07/08
R302.1

Proponent: Daniel J. Kress, Town of Irondequoit, NY, representing Finger Lakes Building Officials Association

Revise as follows:

R302.1 (Supp) Exterior walls. Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1.

Exceptions:

1. Walls, projections, openings, or penetrations in walls perpendicular to the line used to determine the fire separation distance.
2. Walls of dwellings and accessory structures located on the same lot.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.
4. Detached garages accessory to a dwelling located within 2 feet (610 mm) of a lot line are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.
6. <u>Decks attached to townhouses or attached two-family dwellings with walls that are fire-resistance rated shall maintain not less than 3 feet separation between the deck and any interior lot line, or a fire barrier having the same fire-resistance rating as the party wall shall be provided along the lot line.</u>

Reason: The purpose of this proposed code change is not to change, but rather to clarify, the existing provisions of this section of the IRC, which do not specifically mention decks or in any way differentiate between a deck and the exterior walls of a house. At present it is therefore not clear whether decks are subject to the same requirements for their location on the lot, or whether they are not subject to said requirements due to the fact that decks do not have walls. While decks are generally constructed of combustible materials, they do not present the same fire load as a structure with walls; therefore, proximity to the property line does not present the same potential fire hazard as a structure with walls. Where fire-rated construction is presently required, as in the case of townhouses and attached two-family dwellings, minimum distance separation or fire-rated construction will still be required. Clarification of this requirement will better enable consistent enforcement of these provisions.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB21–07/08
R302, R309, R311, R315, R317, R502.13

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

SECTION R302
~~EXTERIOR WALL LOCATION~~ FIRE RESISTIVE CONSTRUCTION

R302.1 (Supp) Exterior walls. Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1.

Exceptions:

1. Walls, projections, openings, or penetrations in walls perpendicular to the line used to determine the fire separation distance.
2. Walls of dwellings and accessory structures located on the same lot.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.
4. Detached garages accessory to a dwelling located within 2 feet (610 mm) of a lot line are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1
EXTERIOR WALLS (Supp)
(No change to current text)

~~R317.2~~ R302.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section ~~R302~~ R302.1 for exterior walls.

Exception: A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section ~~R317.3~~ R302.4.

~~R317.2.1~~ R302.2.1 Continuity. The fire-resistance-rated wall or assembly separating townhouses shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures.

~~R317.2.2~~ R302.2.2 Parapets. Parapets constructed in accordance with Section ~~R317.2.3~~ R302.2.3 shall be constructed for townhouses as an extension of exterior walls or common walls in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.
2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.

   Exception: A parapet is not required in the two cases above when the roof is covered with a minimum class C roof covering, and the roof decking or sheathing is of noncombustible materials or approved fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of 5/8-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by a minimum of nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a minimum distance of 4 feet (1220 mm) on each side of the wall or walls.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher roof deck shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides.

~~R317.2.3~~ **R302.2.3 Parapet construction.** Parapets shall have the same fire-resistance rating as that required for the supporting wall or walls. On any side adjacent to a roof surface, the parapet shall have noncombustible faces for the uppermost 18 inches (457 mm), to include counterflashing and coping materials. Where the roof slopes toward a parapet at slopes greater than two units vertical in 12 units horizontal (16.7-percent slope), the parapet shall extend to the same height as any portion of the roof within a distance of 3 feet (914 mm), but in no case shall the height be less than 30 inches (762 mm).

~~R317.2.4~~ **R302.2.4 Structural independence.** Each individual townhouse shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common 2-hour fire-resistance-rated wall as provided in Section ~~R317.2~~ R302.2.

~~SECTION R317~~
~~DWELLING UNIT SEPARATION~~

~~R317.1~~ **(Supp) R302.3 Two-family dwellings.** Dwelling units in two-family dwellings shall be separated from each other by wall and/or floor assemblies having not less than a 1-hour fire-resistance rating when tested in accordance with ASTM E 119 or UL 263. Fire-resistance- rated floor-ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.
2. Wall assemblies need not extend through attic spaces when the ceiling is protected by not less than 5/8-inch (15.9 mm) Type X gypsum board and an attic draft stop constructed as specified in Section R502.12.1 is provided above and along the wall assembly separating the dwellings. The structural framing supporting the ceiling shall also be protected by not less than 1/2 -inch (12.7 mm) gypsum board or equivalent.

~~R317.1.1~~ **R302.3.1 Supporting construction.** When floor assemblies are required to be fire-resistance-rated by Section ~~R317.1~~ R302.3, the supporting construction of such assemblies shall have an equal or greater fire-resistive rating.

~~R317.3~~ **R302.4 Rated penetrations.** Penetrations of wall or floor/ceiling assemblies required to be fire-resistance rated in accordance with Section ~~R317.1 or R317.2~~ R302.2 or R302.3 shall be protected in accordance with this section.

~~R317.3.1~~ **(Supp) R302.4.1 Through penetrations.** Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section ~~R317.3.1.1 or R317.3.1.2~~ R302.4.1.1 or R302.4.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be protected as follows:

1. In concrete or masonry wall or floor assemblies where the penetrating item is a maximum 6 inches (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (92 900 mm2), concrete, grout or mortar is permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating.
2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 or UL 263 time temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire resistance rating of the construction penetrated.

~~R317.3.1.1~~ **R302.4.1.1 Fire-resistance-rated assembly.** Penetrations shall be installed as tested in the approved fire resistance-rated assembly.

~~R317.3.1.2~~ R302.4.1.2 **Penetration firestop system.** Penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (3 Pa) and shall have an F rating of not less than the required fire-resistance rating of the wall or floor/ceiling assembly penetrated.

~~R317.3.2~~ **(Supp)** R302.4.2 **Membrane penetrations.** Membrane penetrations shall comply with Section ~~R317.3.1~~ R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be so installed such that the required fire resistance will not be reduced.

Exceptions:

1. Membrane penetrations of maximum 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0103 m^2) in area provided the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m^2) in any 100 square feet (9.29 m^2) of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm). Such boxes on opposite sides of the wall shall be separated by one of the following:
   1.1. By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual non-communicating stud cavities;
   1.2. By a horizontal distance of not less than the depth of the wall cavity when the wall cavity is filled with cellulose loose-fill, rockwool or slag mineral wool insulation;
   1.3. By solid fire blocking in accordance with Section ~~R602.8.1~~ R302.11;
   1.4. By protecting both boxes with listed putty pads; or
   1.5. By other listed materials and methods.
2. Membrane penetrations by listed electrical boxes of any materials provided the boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise. Such boxes on opposite sides of the wall shall be separated by one of the following:
   2.1. By the horizontal distance specified in the listing of the electrical boxes;
   2.2. By solid fire blocking in accordance with Section ~~R602.8~~ R302.11;
   2.3. By protecting both boxes with listed putty pads; or
   2.4. By other listed materials and methods.
3. The annular space created by the penetration of a fire sprinkler provided it is covered by a metal escutcheon plate.

~~**R309.1 Garage penetrations**~~ **(Supp)** **R302.5 Dwelling/garage opening/penetration protection.** Openings and penetrations through the walls or ceilings separating the dwelling from the garage shall be in accordance with Sections ~~R309.1.1 through R309.1.3~~ R302.5.1 through R302.5.3.

~~**R309.1.1**~~ **(Supp)** **R302.5.1 Opening protection.** Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than 1 3/8 inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches (35 mm) thick, or 20-minute fire-rated doors.

~~**R309.1.2**~~ **(Supp)** **R302.5.2 Duct penetration.** Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other approved material and shall have no openings into the garage.

~~**R309.1.3**~~ **(Supp)** **R302.5.3 Other penetrations.** Penetrations through the separation required in Section R309.2 shall be protected as required by Section ~~R602.8~~ R302.11, Item 4.

~~**R309.2 Garage separation**~~ **(Supp)** **R302.6 Dwelling/garage fire separation.** The garage shall be separated as required by Table ~~R309.2~~ R302.6. Openings in garage walls shall comply with Section ~~R309.1~~ R302.5. This provision does not apply to garage walls that are perpendicular to the adjacent dwelling unit wall.

TABLE ~~R309.2~~ (Supp) R302.6
DWELLING/GARAGE FIRE/SEPARATION

(Portions of table not shown remain unchanged)

~~**R311.5.2**~~ **(Supp)** **R302.7 Under stair protection.** Enclosed accessible space under stairs shall have walls, under stair surface and any soffits protected on the enclosed side with 1/2-inch (12.7 mm) gypsum board.

R302.8 Foam plastics. For requirements for foam plastics see section R314.

~~**SECTION R315 (Supp)**~~
~~**FLAME SPREAD AND SMOKE DEVELOPMENT**~~

R302.9 Flame spread and smoke developed-index for wall and ceiling finishes. Flame spread and smoke density for wall and ceiling finishes shall be in accordance with R302.9.1 through R302.9.4.

~~**R315.1 Wall and ceiling.**~~ **(Supp) R302.9.1 Flame spread.** Wall and ceiling finishes shall have a flame-spread classification of not greater than 200.

Exception: Flame-spread requirements for finishes shall not apply to trim defined as picture molds, chair rails, baseboards and handrails; to doors and windows or their frames; or to materials that are less than 1/28 inch (0.91 mm) in thickness cemented to the surface of walls or ceilings.

~~**R315.2**~~ **R302.9.2 Smoke-developed index.** Wall and ceiling finishes shall have a smoke-developed index of not greater than 450.

~~**R315.3**~~ **(Supp) R302.9.3 Testing.** Tests shall be made in accordance with ASTM E 84 or UL 723.

~~**R315.4**~~ **(Supp) R302.9.4 Alternate test method.** As an alternate to having a flame-spread classification of not greater than 200 and a smoke developed index of not greater than 450 when tested in accordance with ASTM E 84, wall and ceiling finishes, other than textiles, shall be permitted to be tested in accordance with NFPA 286. Materials tested in accordance with NFPA 286 shall meet the following criteria:

During the 40 kW exposure, the interior finish shall comply with Item 1. During the 160 kW exposure, the interior finish shall comply with Item 2. During the entire test, the interior finish shall comply with Item 3.

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. During the 160 kW exposure, the interior finish shall comply with the following:
   2.1. Flame shall not spread to the outer extremity of the sample on any wall or ceiling.
   2.2. Flashover, as defined in NFPA 286, shall not occur.
3. The total smoke released throughout the NFPA 286 test shall not exceed 1,000 m^2.

R302.10 Flame spread and smoke developed index for insulation. Flame spread and smoke developed index for insulation shall be in accordance with R302.10.1 through R302.10.5.

~~**R316.1**~~ **(Supp) R302.10.1 Insulation.** Insulation materials, including facings, such as vapor retarders or vapor permeable membranes installed within floor-ceiling assemblies, roof-ceiling assemblies, wall assemblies, crawl spaces and attics shall have a flame-spread index not to exceed 25 with an accompanying smoke-developed index not to exceed 450 when tested in accordance with ASTM E 84 or UL 723.

Exceptions:

1. When such materials are installed in concealed spaces, the flame spread and smoke-developed limitations do not apply to the facings, provided that the facing is installed in substantial contact with the unexposed surface of the ceiling, floor or wall finish.
2. Cellulose loose-fill insulation, which is not spray applied, complying with the requirements of Section ~~R316.3~~ R302.l0.3, shall only be required to meet the smoke developed index of not more than 450.

~~**R316.2**~~ **(Supp) R302.10.2 Loose-fill insulation.** Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Sections ~~R316.1 and R316.4~~ R302.10.1 and R302.10.4 when tested in accordance with CAN/ULC S102.2.

Exception: Cellulose loose-fill insulation shall not be required to comply with the flame spread index requirement of CAN/ULC S102.2, provided such insulation complies with the requirements of Section ~~R316.3~~ R302.10.3.

~~**R316.3**~~ **R302.10.3 Cellulose loose-fill insulation.** Cellulose loose-fill insulation shall comply with CPSC 16 CFR, Parts 1209 and 1404. Each package of such insulating material shall be clearly labeled in accordance with CPSC 16 CFR, Parts 1209 and 1404.

~~R316.4~~ R302.10.4 **Exposed attic insulation.** All exposed insulation materials installed on attic floors shall have a critical radiant flux not less than 0.12 watt per square centimeter.

~~R316.5~~ R302.10.5 **Testing.** Tests for critical radiant flux shall be made in accordance with ASTM E 970.

~~R602.8~~ **(Supp)** R302.11 **Fireblocking ~~required~~.** Fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top story and the roof space.

Fireblocking shall be provided in wood-frame construction in the following locations.

1. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs; as follows:
   1.1. Vertically at the ceiling and floor levels.
   1.2. Horizontally at intervals not exceeding 10 feet (3048 mm).
2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.
3. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section ~~R311.2.2~~ R302.7.
4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an approved material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E 136 requirements.
5. For the fireblocking of chimneys and fireplaces, see SectionR1003.19.
6. Fireblocking of cornices of a two-family dwelling is required at the line of dwelling unit separation.

~~R602.8.1~~**(Supp)**R302.11.1 **Fireblocking materials.** Except as provided in Section ~~R602.8~~ R302.11, Item 4, fireblocking shall consist of the following materials:

1. 2-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25.4 mm) nominal lumber with broken lap joints.
3. One thickness of 23/32-inch (18.3 mm) wood structural panels with joints backed by 23/32-inch (18.3 mm) wood structural panels.
4. One thickness of 3/4-inch (19.1 mm) particleboard with joints backed by 3/4-inch (19.1 mm) particleboard.
5. 1/2-inch (12.7 mm) gypsum board.
6. /4-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place.

~~R602.8.1.1~~ **(Supp)** R302.11.1.1 **Batts or blankets of mineral or glass fiber.** Batts or blankets of mineral or glass fiber or other approved nonrigid materials shall be permitted for compliance with the 10-foot (3048 mm) horizontal fireblocking in walls constructed using parallel rows of studs or staggered studs.

~~R602.8.1.1~~ R302.11.1.2 **Unfaced fiberglass.** Unfaced fiberglass batt insulation used as fireblocking shall fill the entire cross section of the wall cavity to a minimum height of 16 inches (406 mm) measured vertically. When piping, conduit or similar obstructions are encountered, the insulation shall be packed tightly around the obstruction.

~~R602.8.1.3~~ **(Supp)** R302.11.1.3 **Loose-fill insulation material.** Loose-fill insulation material shall not be used as a fireblock unless specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.

~~R602.8.1.2~~ R302.11.2 **Fireblocking integrity.** The integrity of all fireblocks shall be maintained.

~~R502.12~~ R302.12 **Draftstopping ~~required~~.** When there is usable space both above and below the concealed space of a floor/ceiling assembly, draftstops shall be installed so that the area of the concealed space does not exceed 1,000 square feet (92.9 m^2). Draftstopping shall divide the concealed space into approximately equal areas. Where the assembly is enclosed by a floor membrane above and a ceiling membrane below draftstopping shall be provided in floor/ceiling assemblies under the following circumstances:

1. Ceiling is suspended under the floor framing.
2. Floor framing is constructed of truss-type open-web or perforated members.

~~R502.12.1~~ **R302.12.1 Materials.** Draftstopping materials shall not be less than 1/2-inch (12.7 mm) gypsum board, 3/8-inch (9.5 mm) wood structural panels, 3/8-inch (9.5 mm) Type 2-M-W particleboard or other approved materials adequately supported. Draftstopping shall be installed parallel to the floor framing members unless otherwise approved by the building official. The integrity of all draftstops shall be maintained.

~~**SECTION R808**~~
~~**INSULATION CLEARANCE**~~

~~**R808.1**~~ **R302.13 Combustible insulation clearance.** Combustible insulation shall be separated a minimum of 3 inches (76 mm) from recessed luminaires, fan motors and other heat-producing devices.

Exception: Where heat-producing devices are listed for lesser clearances, combustible insulation complying with the listing requirements shall be separated in accordance with the conditions stipulated in the listing.

Recessed luminaires installed in the building thermal envelope shall meet the requirements of Section N1102.4.3.

(Renumber subsequent sections)

R502.13 Fireblocking required. Fireblocking shall be provided in accordance with Section ~~R602.8~~ R302.11.

Reason: The IBC has one chapter, Chapter 7, which contains nearly all of the requirements for fire-resistive construction. In the IRC, fire-resistive construction requirements are spread throughout the document and in no particular order. For example, fireblocking is found in the chapter on walls even though it applies to many locations other than walls. This proposal combines the fire-resistive requirements or references to sections with fire-resistive requirements into one section. There is no need to search through the entire document to find fire-resistive requirements. They should all be found in one location just as they are in the IBC. This proposal is almost entirely editorial. In almost all instances, the sections have been simply renumbered for their new location. The other changes that have been made include:

- Re-titling the section "Fire Resistive Construction".
- Renumbering of sections throughout.
- Editorial title changes in a few sections.
- Adding the words "and roof" to R302.2.4(3).
- Previous section R602.8.1.2 which was a subsection of "Materials" has been renumbered to be a subsection of "Fireblocking" which is more appropriate.

Again, this is intended to be largely an editorial revision to group like regulations into one section for ease of use of the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB22–07/08
R202

Proponent: Thomas Meyers, CBO, City of Central, CO, representing himself

Revise definition as follows:

FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. To the closest interior lot line; or
2. To the centerline of a street, an alley or public way.~~; or~~
3. ~~To an imaginary line between two buildings on the lot~~.

The distance shall be measured at a right angle from the face of the wall.

Reason: The IRC was modified to add the IBC's fire separation distance definition by a public comment to the First Draft of the IRC (202-23 at the 1998 IRC hearing in Kansas City). This was done to provide language consistency between the IRC and the IBC.

Considerable confusion has resulted over the intended or unintended application of the "imaginary line" concept contained in the Fire Separation Distance definition for structures built under the IRC. The IBC contains provisions within the text of the document that clearly indicates how the imaginary line is to be applied. IBC Section 704.3 specifically directs the user to either place an imaginary line between two or more buildings located on a lot to address wall and opening protection. As an alternative, one can eliminate the imaginary line and assess the individual buildings as an aggregate of one "single" building to determine total area. This is necessary to ensure that no individual structure or aggregate of structures exceed the allowable area for a single building as prescribed in IBC Chapter 5.

The IRC completely lacks this level of direction to the user within the text of the code. The IRC does not contain any building area or height limits aside from the 3 story limitation within the scoping provisions. Therefore, the concept of the imaginary line is completely unnecessary in the IRC for the reasons that it is used in the IBC.

Some have argued that the imaginary line should be used to separate buildings inhabited by different tenants on a lot not having property boundaries. This premise is NOT embodied in the IBC, nor is it appropriate for the IRC. The IBC does not mandate the use of imaginary line assessment unless an aggregate of buildings exceeds the area limits of Chapter 5. This occurs (or doesn't occur) regardless of what individual parties share the buildings on a lot.

If the intent of the membership is to create a special level of protection using the concept of the imaginary line, a code change is required to add language outside the fire separation distance definition to clearly tell the user how to apply the concept. In the meantime, the best solution is to completely eliminate "imaginary line" from the definition.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:				
	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB23–07/08
Table R302.1, R317.2

Proponent: Thomas Meyers, CBO, City of Central, CO, representing himself

Revise as follows:

TABLE R302.1 (Supp)
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour tested in accordance with ASTM E 119 or UL 263 with exposure from both sides	0 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet
	(Not fire-resistance rated)	0 hours	5 feet
Openings in walls	Not allowed	N/A	< 3 feet
	25% Maximum of Wall Area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R317.3	< 5 feet
		Non required	5 feet

R317.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance rated wall assemblies meeting the requirements of Section R302 for exterior walls.

Exception: A common 2-hour fire-resistance-rated wall tested in accordance with ASTM E 119 or UL 263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section R317.3.

Reason: Currently the IRC lacks definitive methodology for determining the efficacy of code required fire resistance rated assemblies for exterior walls and townhouse common wall separations. The IRC currently only requires a two family dwelling separation to meet the requirements of ASTM E 119 or UL 263 in Section R317.1. This change creates assessment standards consistency between all IRC sections requiring fire resistance rated walls.

This change is not intended to limit fire resistance rated assemblies solely to the test criteria contained in these standards. Section R104.11 still allows the building official to approve alternative fire resistance methodologies such as those described in IBC Section 703.3. This would still allow a builder to use acceptable engineering analysis, calculations in accordance with IBC Section 721 or prescriptive assemblies permitted by IBC Section 720 as alternatives to the standards contained within the IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:				
	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB24–07/08
Table R302.1

Proponent: William Clayton, City of Westminster, CO, representing himself

Revise table as follows:

TABLE R302.1 (Supp)
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour with exposure from both sides	~~0~~ < 5 feet
	(Not fire-resistance rated)	0 hours	≥ 5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	≥ 2 feet to 5 feet
	(Not fire-resistance rated)	0 hours	5 feet
Openings in walls	Not allowed	N/A	< 3 feet
	25% Maximum of Wall Area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R317.3	< 5 feet
		Non required	5 feet

Reason: The table is currently not in alignment with the body of the code in Section R302.1. This change will make this table and the section much easier to use and understand. By adding the information shown it will alleviate any discrepancy and add clarity and simplicity for the code user. As a plans analyst, one of the most common discussions we have with designers and builders revolves around the exterior wall requirements. This change will provide the designer and code official a much easier table to understand and make it easier to use. Either this or the companion change to R302.1 will stand on its' own, however the two together really add clarity to the provision. The rest of the table remains unchanged in this proposal and is therefore not included in this submittal.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB25–07/08
R302 (New)

Proponent: Anthony C. Apfelbeck. City of Altamonte Springs Building/Fire Safety Division, Altamonte Springs, FL

Add new section as follows:

SECTION R302
FIRE APPARATUS ACCESS ROADS

R302.1 Fire apparatus access roads. Fire apparatus access roads shall be provided in accordance with Section 503 of the *International Fire Code*.

Reason: There is no reference within the IRC to the fire apparatus access roads of Section 503 contained within the IFC. This creates the potential for a builder, owner or designer to overlook the required IFC fire apparatus access road requirements. Insertion of this language does not change the requirement as an IRC building is already required to comply with the IFC for areas outside of ht structure. However, it will ensure the requirements of this section are not missed in the design phase.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB26–07/08
R325 (New)

Proponent: Chad Lawry, Fire Marshal's Office, City of Vancouver, WA, representing City of Vancouver Firefighters

Add new section as follows:

SECTION R325
FIRE DEPARTMENT EMERGENCY ACCESS AND WATER SUPPLY

R325.1 Fire department emergency access and water supply. Fire department emergency access provisions and water supply for fire protection shall be as approved by the fire code official.

Reason: The IRC is intended to be a stand alone code. Some building officials have stated that none of the provisions of the Fire Code apply to projects constructed under the IRC since it is a stand alone code. Clarification is needed to eliminate confusion as it pertains to the applicability of the Fire Code.

A formal interpretation from ICC was requested from, and given by the ICC. They stated that "the IRC is intended to apply to the built environment and that the provisions of the Fire Code should not be excluded, especially as it pertains to emergency access and water supply for fire protection."

This code change will provide clarification of the applicability of the Fire Code and provide local control of emergency access and water supply requirements.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB27–07/08
R302 (New)

Proponent: Anthony C. Apfelbeck. City of Altamonte Springs Building/Fire Safety Division, Altamonte Springs, FL

Add new section as follows:

SECTION R302
FIRE PROTECTION WATER SUPPLIES

R302.1 Fire protection water supplies. Fire protection water supply shall be provided in accordance with Section 508 of the *International Fire Code*.

Reason: There is no reference within the IRC to the fire protection water supply requirements of section 508 contained within the IFC. This creates the potential for a builder, owner or designer to overlook the IFC fire protection water supply requirements. Insertion of this language does not change a current requirement as the IFC does apply to the area outside of the IRC structure. However, inclusion of this language will ensure the requirements of this section are not missed in the design phase.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB28–07/08
R303.4 through R303.4.2 (New)

Proponent: Steve Ferguson, American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

THIS PROPOSAL IS ON THE AGENDA OF THE IRC PLUMBING/MECHANICAL CODE DEVELOPMENT COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

Add new text and table as follows:

R303.4 Mechanical ventilation. Each dwelling unit shall be provided with a mechanical exhaust system, supply system, or combination thereof to provide whole-building ventilation with outdoor air.

Exception: Dwelling units in climate zones 1 and 2 where refrigeration cooling is not installed.

R303.4.1 Mechanical ventilation rate. The required ventilation system shall provide outdoor air at a rate not less than determined in accordance with Table R303.4.1.

TABLE R303.4.1
MECHANICAL VENTILATION AIR REQUIREMENTS (cfm)

FLOOR AREA (square feet)	BEDROOMS				
	0-1	2-3	4-5	6-7	>7
< 1500	30	45	60	75	90
1501-3000	45	60	75	90	105
3001-4500	60	75	90	105	120
4501-6000	75	90	105	120	135
6001-7500	90	105	120	135	150
> 7500	105	120	135	150	165

R303.4.2 System design. Bathroom and toilet room exhaust fans shall be permitted to be part of such a system. Outdoor air ducts connected to the return side of an air handler shall be considered to be supply ventilation where the air handler's manufacturers' requirements for minimum return air temperature are met.

(Renumber subsequent sections)

Reason: The purpose of this proposal is to provide modest levels of continuous mechanical ventilation in detached one- and two-family houses and low-rise townhouses in order to provide minimum levels of ventilation.

For health and safety reasons, minimum ventilation is necessary to provide acceptable indoor air quality. Modern homes are much tighter than the building stock and do not provide adequate ventilation through air leakage or infiltration. Occupants do not operating windows to provide minimum ventilation levels. Providing continuous mechanical ventilation is required to provide minimum ventilation rates in current construction..

Ventilation is used to control pollutant concentrations in buildings. These pollutants are emitted from building materials, consumer products, and from occupants themselves. Continuous mechanical ventilation reduces these large concentrations and reduces the large exposures for building occupants.

Because of the effects it has on health, comfort, and serviceability, indoor air quality in our homes is becoming of increasing concern to many people. According to the American Lung Association elements within our homes have been increasingly recognized as threats to our respiratory health. The Environmental Protection Agency lists poor indoor air quality as the forth-largest environmental threat to our country. Asthma is leading serious chronic illness of children in the U.S. moisture-related construction defects and damage are on the increase in new houses. Minimum residential ventilation can improve many of these indoor air quality problems.

ASHRAE Standard 62.2-2007 is the only national consensus standard on residential ventilation rates. ASHRAE, the American Society of Heating, Refrigerating and Air-conditioning Engineers, has been setting minimum ventilation rates for buildings for over 100 years in order to provide acceptable indoor air quality. The rates in this proposal are the minimum rates as incorporated in the current version of standard 62.2. As an ANSI standard, these rates represent the consensus of a balanced committee and have undergone extensive public review.

Sherman and Hodgson (2002) have shown that the rates in this proposal are barely sufficient to dilute the typical amount of formaldehyde emitted in typical new construction. The consensus of knowledgeable and balanced experts supports the ventilation rates in Standard 62.2-2007. Several states have adopted similar ventilation requirements (e.g. MN, ME or WA) or are in the process of adopting similar ventilation standards (e.g. CA)

Price and Sherman (2006) have shown that occupants of new homes do not operate their windows and doors sufficiently to meet minimum ventilation requirements through controlled openings. While there are 20% of the population who would manage their windows effectively during mild periods, the vast majority of occupants keep their windows closed most of the time and do not get sufficient ventilation from window and door operation.

Sherman and Chan (2006) have reviewed air tightness data. New houses are substantially tighter than the existing stock and do not get enough ventilation through air infiltration and air leakage to meet minimum rates. Walker and Sherman (2006) have shown that the energy costs of meeting ASHRAE Standard 62.2 would be substantially higher for a house that was leaky enough to meet it through infiltration.

Bibliography: ASHRAE Standard 62.2-2007 *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*

Price, P.N. and M.H. Sherman **"Ventilation Behavior and Household Characteristics in New California Houses,"** April 2006. LBNL-59620 http://epb.lbl.gov/Publications/lbnl-59620.pdf

Sherman, M. H. and A.T. Hodgson. **"Formaldehyde as a Basis for Residential Ventilation Rates",** 2002 LBNL-49577. http://epb.lbl.gov/Publications/lbnl-49577.pdf

Walker, I. S. and M. H. Sherman **"Evaluation of Existing Technologies for Meeting Residential Ventilation Requirements."**2006, LBNL-59998. http://epb.lbl.gov/Publications/lbnl-59998.pdf

Sherman, M.H., Chan W. R., "Building Airtightness: Research and Practice" in *Building Ventilation: the state of the art,* (Santamouris, Wouters, Eds) Earthscan ISBN-13: 978-1-84407-130-2 pp. 137-162, 2006, http://epb.lbl.gov/Publications/lbnl-53356.pdf

Cost Impact: The code change proposal will increase the cost of construction modestly by requiring a mechanical fan system rated for continuous operation.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB29–07/08
R303.8

Proponent: Mark Riley, City of Troy, MI, representing Mechanical Inspectors of Michigan

Revise as follows:

R303.8 Required heating. When the winter design temperature in Table R301.2(1) is below 60_F (16_C), every dwelling unit shall be provided with heating facilities capable of maintaining a minimum room temperature of 68°F (20°C) at a point 3 feet (914 mm) above the floor and 2 feet (610 mm) from exterior walls in all habitable rooms, bathrooms and toilet rooms at the design temperature. The installation of one or more portable space heaters shall not be used to achieve compliance with this section.

Reason: Though the code has no definition of habitable rooms, but has a definition for *habitable space*. This definition does not include bathrooms and toilet rooms as a habitable space. This would create confusion on whether bathroom or toilet room would be required to be heated. With this code change this would clear up any confusion or loop holes not requiring heating in such rooms, which would be required in to prevent freezing of plumbing systems, and comfort of the homeowner. This code change language is taken from the text of the *International Property Maintenance Code*. Right now the way the IRC reads a building with unheated bathrooms would pass the heating requirements of the IRC but would be in violation of the IPMC (Section 602.2) Should not the IRC be as stringent as the IPMC. ?

Cost Impact: This code change proposal will increase the cost of construction, however it is currently common industry practice to provide heat to bathrooms and toilet rooms.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB30–07/08
R305.1

Proponent: Gary J. Ehrlich, PE, National Association of Home Builders

Revise as follows:

R305.1 (Supp) Minimum height. Habitable space, hallways, bathrooms, toilet rooms, laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm).

Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
2. Bathrooms shall have a minimum ceiling height of 6 feet 8 inches (2036 mm) ~~over the fixture and~~ at the center of the front clearance area for fixtures as shown in Figure R307.1. The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a minimum ceiling height of 6 feet 8 inches (2036 mm) above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.

Reason: Exception #4 was added during the 2001 code cycle (RB21-01) for the primary purpose of allowing an existing bathroom to be renovated or a new bathroom added in an existing structure without requiring the ceiling be raised to 7'-0". This was done to mitigate the need to remove an existing ceiling and/or cut floor or roof framing to accommodate the minimum height. The proponent also acknowledged the desire to preserve the ability to construct a sloped ceiling while maintaining an acceptable clearance over sinks & toilets. However, the phrasing of the exception removed the ability to use the current sloped ceiling requirements of Exception #3 to construct a powder room or half-bath under a new or existing stairway with no justification the existing sloped ceiling requirements were inadequate.

The revised text is taken from Indiana State amendment 675 IAC 14-4.3-24, adopted June 2005. The amended requirement insures that there is enough clearance to stand in front of the sink or to use the toilet in a small bathroom, but allows the ceiling to slope over the sink or toilet itself down to the 5'-0" minimum height permitted at the wall using Exception #3. A similar amendment was adopted in South Carolina in February 2007.

This change will preserve the ability of builders to construct bathrooms under stairs in new and existing houses. This means that builders will not have to relocate a proposed bathroom to other locations on the floor, causing additional expense to homeowners and possibly reducing the square footage available for living rooms, bedrooms, dens, or other principal spaces. NAHB asks for your support of this proposal.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB31–07/08
R306.3, R306.4, R306.5 (New)

Proponent: Paul Rimel, City of Staunton, VA, representing Virginia Plumbing & Mechanical Inspectors Association

1. Delete and substitute as follows:

~~**R306.3 Sewage disposal.** All plumbing fixtures shall be connected to a sanitary sewer or to an approved private sewage disposal system.~~

~~**R306.4Water supply to fixtures.** All plumbing fixtures shall be connected to an approved water supply. Kitchen sinks, lavatories, bathtubs, showers, bidets, laundry tubs and washing machine outlets shall be provided with hot and cold water.~~

R306.3 Automatic clothes washers. Each dwelling unit shall be provided with an automatic clothes washer connection.

R306.4 Sewage disposal. All plumbing fixtures shall be connected to a sanitary sewer or to an approved private sewage disposal system.

2. Add new text as follows:

R306.5 Water supply to fixtures. All plumbing fixtures shall be connected to an approved water supply. Kitchen sinks, lavatories, bathtubs, showers, bidets, laundry tubs and washing machine outlets shall be provided with hot and cold water.

Reason: Although public laundries are available, one & two family dwellings and townhouses should be provided with an automatic clothes washer connection. Just because a clothes washer connection is provided within a dwelling does not mean property owners and tenants won't be able to utilize public laundry facilities. They will also not need to purchase a clothes washer if they choose not to do so. Clothes washer connections are already provided in nearly all one & two family dwellings and townhouses. Washing machine connections should be installed at the time of initial construction rather than necessitating retrofits in newly constructed dwellings.

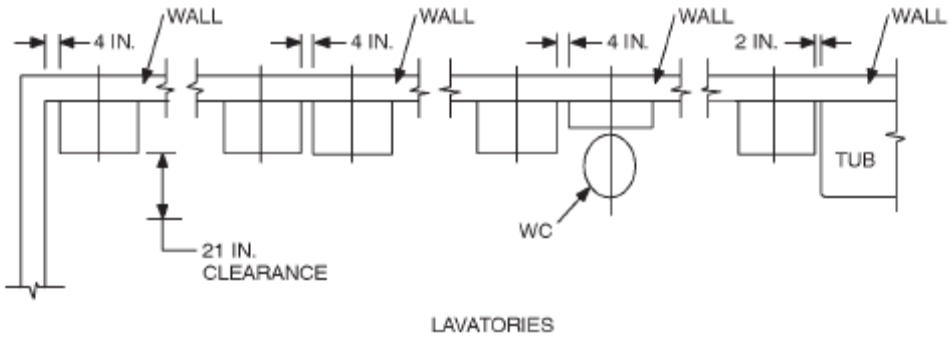
Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB32–07/08
Figure R307.1

Proponents: Jud Collins, JULYCO, representing himself/Guy Tomberlin, Fairfax County, VA, representing The Virginia Plumbing and Mechanical Inspectors Association and the Virginia Building and Code Officials Association

Delete portion of figure as follows:



No change to the remaining portions of Figure R307.1.

Reason: (COLLINS) There is not any text in the IRC to support the clearances shown for what appears to be lavatories. As such, Figure R307.1 is the only place that indicates any dimensions for lavatory clearances. Until someone includes text in the IRC governing clearances for lavatories, this portion of the figure needs to be removed from the code.

(TOMBERLIN) All of the measurements in this illustration except the clearance in front of the lavatory are not required by any code text what so ever located in the IRC. Many users of the IRC utilize the drawings in the IRC for enforcement and installation practices and in this case the enforcement of these particular dimensions is unfounded and not valid because of the lack of text to support them.

The clearance provision for the lavatory is located in Section P 2705.1 #5 and needs no illustration to further define how to take this basic measurement.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB33–07/08
R307.1

Proponent: Bob Gardner, Building Department, City of Thornton, CO, representing Colorado Chapter of ICC

Revise as follows:

R307.1 (Supp) Space required. Fixtures shall be spaced in accordance with Figure R307.1, and in accordance with the requirements of Section P2705.1.

Exception: Lavatories installed in vanities, cabinets, or countertops.

Reason: The proper installation for lavatories installed in vanities or counter tops requires the lavatory to be centered in the cabinet and with some of the oval and wider styles available in today's market place, there are cases where the 4 inch space cannot be maintained to a side wall or from lavatory to lavatory.

If the reason for the four inch clearance is accessibility or usability, the requiring of an individual to install a smaller lavatory into the same size vanity or cabinet is not going to change the accessibility to the center of the lavatory. In addition, in many hall bathroom installations the vanity or cabinet is already as large as can fit in the space and still maintain the other required fixture clearances. If the reason for the four inch clearance is sustainability, the smaller rim and lip of a counter mounted lavatory does not require four inches to properly clean where free standing lavatories use deep sides that would require additional space to maintain.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB34–07/08
R308.3, R308.4

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.3 (Supp) Human impact loads. Individual glazed areas, including glass mirrors in hazardous locations such as those indicated as defined in Section R308.4, shall pass the test requirements of Section R308.3.1.

Exceptions:

1. Louvered windows and jalousies shall comply with Section R308.2.
2. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
3. Glass unit masonry complying with Section R610.

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in ~~swinging doors except jalousies~~ all fixed and operable panels of swinging, sliding, and bifold doors.

Exceptions:

1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
2. Decorative glazing.

~~2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.~~
~~3. Glazing in storm doors.~~
~~4. Glazing in all unframed swinging doors.~~

~~6~~ 2. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.

Exceptions:

1. Decorative glazing.
2. When there is an intervening wall or other permanent barrier between the door and the glazing.
3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position.
4. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.

~~7~~ 3. Glazing in an individual fixed or operable panel~~, other than those locations described in Items 5 and 6 above,~~ that meets all of the following conditions:

~~7~~ 3.1. ~~Exposed~~ The exposed area of an individual pane is larger than 9 square feet (0.836 m^2) and;
~~7~~ 3.2. ~~Bottom~~ The bottom edge of the glazing is less than 18 inches (457 mm) above the floor and;
~~7~~ 3.3 ~~Top~~ The top edge of the glazing is more than 36 inches (914 mm) above the floor and;
~~7~~ 3.4 One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the glazing.

Exceptions:

1. Decorative glazing.
2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.
3. Outboard panes in insulating glass units and other multiple glazed panels when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.

~~8~~ 4. All glazing in railings regardless of ~~an~~ area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.

5. Glazing in ~~doors and~~ enclosures for or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers~~. Glazing in any part of a building wall enclosing these compartments~~ where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.

Exception: Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the waters edge of a hot tub, whirlpool, or bathtub.

~~9~~ 6. Glazing in walls and fences ~~enclosing~~ adjacent to indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm), measured horizontally and in a straight line, of the water's edge. This shall apply to single glazing and all panes in multiple glazing.

~~10~~ 7. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the ~~glass~~ glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

Exceptions:

1. When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.
2. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.5.6 and R312 and the plane of the glazing is more than 18 inches (457 mm) from the railing; or
3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 38 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a guard.

~~11.~~ 8. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the ~~glass~~ glazing is less than 60 inches (1524 mm) above the nose of the tread.

Exceptions:

1. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with R311.5.6 and R312 and the plane of the glass is more than 18 inches (457 mm) from the railing; or
2. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 38 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a guard.

~~**Exception:** The following products, materials and uses are exempt from the above hazardous locations:~~

~~1. Openings in doors through which a 3-inch (76 mm) sphere is unable to pass.~~
~~2. Decorative glass in Items 1, 6 or 7.~~
~~3. Glazing in Section R308.4, Item 6, when there is an intervening wall or other permanent barrier between the door and the glazing.~~
~~4. Glazing in Section R308.4, Item 6, in walls perpendicular to the plane of the door in a closed position, other than the wall toward which the door swings when opened, or where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in these applications shall comply with Section R308.4, Item 7.~~
~~5. Glazing in Section R308.4, Items 7 and 10, when a protective bar is installed on the accessible side(s) of the glazing 36 inches ± 2 inches (914 mm ± 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in height.~~
~~6. Outboard panes in insulating glass units and other multiple glazed panels in Section R308.4, Item 7, when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.~~
~~7. Louvered windows and jalousies complying with the requirements of Section R308.2.~~
~~8. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.~~
~~9. Safety glazing in Section R308.4, Items 10 and 11, is not required where:~~
~~9.1. The side of a stairway, landing or ramp has a guardrail or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1013 and 1607.7 of the *International Building Code*; and~~
~~9.2. The plane of the glass is more than 18 inches (457 mm) from the railing; or~~
~~9.3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the floor and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as the protective bar.~~
~~10. Glass block panels complying with Section R610.~~

Reason: This is one of the more difficult and confusing sections of the IRC to use. Exceptions to the rules are not listed after the rule but following the entire section where they can be overlooked. Furthermore, it is necessary to read through all of the exceptions to find any that might apply to the rule being used. There are conflicting rules where one rule will require one dimension and another rule requires a different dimension. Measuring locations vary even within the same rule. And some rules are exempted in every application making them always moot. The modifications found herein are intended to be largely editorial. They are intended to relocate the exception beneath the applicable rule, eliminate unnecessary language, and eliminate conflicts. Also please note that numbering of the items has been changed so that similar rules are grouped together. Following is a point by point explanation of what is proposed.

R308.3 (Supp) Human impact loads. Individual glazed areas, including glass mirrors in hazardous locations such as those indicated as defined in Section R308.4, shall pass the test requirements of Section R308.3.1.

Exceptions:

1. Louvered windows and jalousies shall comply with Section R308.2.
2. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
3. Glass unit masonry complying with Section R610.

Exception 7 at the end of R308.4 is being deleted as it is already listed as exception 1 here. Two exceptions that were deleted from the end of Section R308.4 (8 and 10) have been relocated to this section as being more appropriate. While glass unit masonry is masonry and not glazing and could conceivably be deleted, it is listed in the current text and continued here. This format is consistent with the IBC.

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in ~~swinging doors except jalousies~~ all fixed and operable panels of swinging, sliding, and bifold doors.

All of the door types listed in 2, 3, and 4 below are incorporated into a single item. References to jalousies are removed as they are already listed in exception 1 in R308.3.

Exceptions:

1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
2. Decorative glazing.

These exceptions are relocated from exceptions 1 and 2 at the end of the section.

~~2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.~~
~~3. Glazing in storm doors.~~
~~4. Glazing in all unframed swinging doors.~~

These doors are covered in 1 above.

~~6~~ 2. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.

Exceptions:

1. Decorative glazing.

Relocated from exception 2 at the end of the section.

2. When there is an intervening wall or other permanent barrier between the door and the glazing.

Relocated from exception 3 at the end of the section.

3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position.

Relocated from exception 4 at the end of the section. This has also been reworded to enable the section to be better understood.

4. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.

Relocated from exception 4 at the end of the section.

~~7~~ 3. Glazing in an individual fixed or operable panel~~, other than those locations described in Items 5 and 6 above,~~ that meets all of the following conditions:

~~7~~3.1. ~~Exposed~~ The exposed area of an individual pane is larger than 9 square feet (0.836 m^2).
~~7~~3.2. ~~Bottom~~ The bottom edge of the glazing is less than 18 inches (457 mm) above the floor.
~~7~~3.3 ~~Top~~ The top edge of the glazing is more than 36 inches (914 mm) above the floor.
~~7~~3.4 One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the glazing.

The changes in this section are editorial except that 7.4 gives more definitive instruction on how the measurement should be taken.

Exceptions:

1. Decorative glazing.

Relocated from exception 2 at the end of the section.

2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.

Relocated from exception 5 at the end of the section. This exception formerly used the tem "protective bar" to identify the method use to prevent contact with the glass. The term "protective bar" has been replaced with the more generic term "horizontal rail". Including the word "protective" seems to imply the use of judgment on the part of the building official that the bar must be installed in a particular manner that results in a certain outcome. That is not the case and the term is editorially changed.

3. Outboard panes in insulating glass units and other multiple glazed panels when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.

Relocated from exception 6 at the end of the section.

~~8~~ 4. All glazing in railings regardless of ~~an~~ area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.

Renumbered but otherwise unchanged except for a minor editorial

5. Glazing in ~~doors and~~ enclosures for or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers~~. Glazing in any part of a building wall enclosing these compartments~~ where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.

Exception: Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the waters edge of a hot tub, whirlpool, or bathtub.

Doors are covered in 1 above. This section includes a new exception to address the matter hot tubs, whirlpools, or bathtubs adjacent or near windows but not in an "enclosure".

~~9~~ 6. Glazing in walls and fences ~~enclosing~~ adjacent to indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm), measured horizontally and in a straight line, of the water's edge. This shall apply to single glazing and all panes in multiple glazing.

Use of the term "enclosing" implies that the wall completely encloses the pool or tub. The pool or tub may be on an open patio adjacent a window or the pool or tub may just have a wall on one or two sides thus the amendment using the term "adjacent".

~~10~~ 7. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the ~~glass~~ glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

Exceptions:

1. When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.

This exception is relocated from exception 5 at the end of the section. Exception 5 exempts safety glazing if a "protective bar" is installed 34 to 38 inches above the floor. The term "protective bar" has been replaced with the more generic term "rail". Including the word "protective" seems to imply the use of judgment on the part of the building official that the bar must be installed in a particular manner that results in a certain outcome. That is not the case and the term is editorially changed.

2. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with R311.5.6 and R312 and the plane of the glazing is more than 18 inches (457 mm) from the railing; or

Relocated from exception 9 at the end of the section.

3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 38 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a guard.

Relocated from exception 9 at the end of the section.

~~11~~ 8. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the ~~glass~~ glazing is less than 60 inches (1524 mm) above the nose of the tread.

Exceptions:

1. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with R311.5.6 and R312 and the plane of the glass is more than 18 inches (457 mm) from the railing; or

Relocated from exception 9 at the end of the section.

2. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 38 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a guard.

Relocated from exception 9 at the end of the section.

~~**Exception:** The following products, materials and uses are exempt from the above hazardous locations:~~

~~1. Openings in doors through which a 3-inch (76-mm) sphere is unable to pass.~~

Relocated as exception 1 to 1 above.

~~2. Decorative glass in Items 1, 6 or 7.~~

Relocated as exception 2 to 1 above and exception 2 to renumbered 6, and 7 above.

~~3. Glazing in Section R308.4, Item 6, when there is an intervening wall or other permanent barrier between the door and the glazing.~~

Relocated as exception 2 to renumbered 6 above.

~~4. Glazing in Section R308.4, Item 6, in walls perpendicular to the plane of the door in a closed position, other than the wall toward which the door swings when opened, or where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in these applications shall comply with Section R308.4, Item 7.~~

Relocated as exception 3 to renumbered 6 above.

~~5. Glazing in Section R308.4, Items 7 and 10, when a protective bar is installed on the accessible side(s) of the glazing 36 inches ± 2 inches (914 mm ± 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in height.~~

Relocated as exception 2 to renumbered 7 and as exception 1 to renumbered 10 above.

~~6. Outboard panes in insulating glass units and other multiple glazed panels in Section R308.4, Item 7, when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.~~

Relocated as exception 3 to renumbered 7 above.

~~7. Louvered windows and jalousies complying with the requirements of Section R308.2.~~

This exception has been deleted. It already exists in R308.3.

~~8. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.~~

Relocated to R308.3.

~~9. Safety glazing in Section R308.4, Items 10 and 11, is not required where:~~
~~9.1. The side of a stairway, landing or ramp has a guardrail or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1013 and 1607.7 of the *International Building Code*; and~~
~~9.2. The plane of the glass is more than 18 inches (457 mm) from the railing; or~~
~~9.3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the floor and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as the protective bar.~~

Relocated as exceptions 2 and 3 to renumbered 10 and as exceptions 1 and 1 to renumbered 11 above.

~~10. Glass block panels complying with Section R610.~~

Relocated to section R308.3.

In order to appreciate the impact of the changes, the proposal is repeated here with underlining and over struck language removed.

R308.3 (Supp) Human impact loads. Individual glazed areas, including glass mirrors in hazardous locations such as those indicated as defined in Section R308.4, shall pass the test requirements of Section R308.3.1.

Exceptions:
1. Louvered windows and jalousies shall comply with Section R308.2.
2. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
3. Glass unit masonry complying with Section R610.

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in all fixed and operable panels of swinging, sliding, and bifold doors.
   Exceptions:
   1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
   2. Decorative glazing.

~~2. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.~~

   Exceptions:
   1. Decorative glazing.
   2. When there is an intervening wall or other permanent barrier between the door and the glazing.
   3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position.
   4. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.

3. Glazing in an individual fixed or operable panel that meets all of the following conditions:
   3.1. The exposed area of an individual pane is larger than 9 square feet (0.836 m^2).
   3.2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor.
   3.3 The top edge of the glazing is more than 36 inches (914 mm) above the floor.
   3.4 One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the glazing.

   Exceptions:
   1. Decorative glazing.
   2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.

3. Outboard panes in insulating glass units and other multiple glazed panels when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.

4. All glazing in railings regardless of area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.

~~5. Glazing in enclosures for or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.~~

Exception: Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the waters edge of a hot tub, whirlpool, or bathtub.

6. Glazing in walls and fences adjacent to indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm), measured horizontally and in a straight line, of the water's edge. This shall apply to single glazing and all panes in multiple glazing.

7. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

Exceptions:

1. When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.
2. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with R311.5.6 and R312 and the plane of the glazing is more than 18 inches (457 mm) from the railing; or
3. **When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 38 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a guard.**

~~8. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glazing is less than 60 inches (1524 mm) above the nose of the tread.~~

Exceptions:

1. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with R311.5.6 and R312 and the plane of the glass is more than 18 inches (457 mm) from the railing; or
2. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 38 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a guard.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB35–07/08

R308.3, R308.4

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.3 (Supp) Human impact loads. Individual glazed areas, including glass mirrors in hazardous locations such as those indicated as defined in Section R308.4, shall pass the test requirements of Section R308.3.1.

Exceptions:

1. Louvered windows and jalousies shall comply with Section R308.2.
2. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
3. Glass unit masonry complying with Section R610.

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in ~~swinging doors except jalousies~~ all fixed and operable panels of swinging, sliding, and bifold doors.

Exceptions:

1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
2. Decorative glazing.

~~2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.~~
~~3. Glazing in storm doors.~~
~~4. Glazing in all unframed swinging doors.~~

~~6~~ 2. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.

Exceptions:

1. Decorative glazing.
2. When there is an intervening wall or other permanent barrier not less than 36 inches in height between the door and the glazing and extending a minimum of 36 inches from the plane of the wall containing the glazing.
3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position.
4. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.
5. Glazing that is adjacent to the fixed panel of patio doors.

~~7~~ 3. Glazing in an individual fixed or operable panel~~, other than those locations described in Items 5 and 6 above,~~ that meets all of the following conditions:

~~7~~3.1. ~~Exposed~~ The exposed area of an individual pane is larger than 9 square feet (0.836 m^2).
~~7~~3.2. ~~Bottom~~ The bottom edge of the glazing is less than 18 inches (457 mm) above the floor.
~~7~~3.3 ~~Top~~ The top edge of the glazing is more than 36 inches (914 mm) above the floor.
~~7~~3.4 One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a /straight line, of the glazing.

Exceptions:

1. Decorative glazing.
2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.
3. Outboard panes in insulating glass units and other multiple glazed panels when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.

~~8~~ 4. All glazing in railings regardless of ~~an~~ area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.

~~5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any part of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.~~

~~9~~ 5. Glazing comprising a wall, in ~~walls and~~ a wall, or in a fence~~s~~ enclosing or adjacent to indoor and outdoor swimming pools, hot tubs, ~~and~~ spas, whirlpools, saunas, steam rooms, bathtubs, and showers where the bottom edge of the glazing is less than 60 inches (1524 mm) above a standing or walking surface ~~and within 60 inches (1524 mm) horizontally of the water's edge~~. This shall apply to single glazing and all panes in multiple glazing.

Exception: Glazing more than 60 inches (1524 mm) measured horizontally and in a straight line of the water's edge for hot tubs, whirlpools, bathtubs, and swimming pools.

~~10~~ 6. Glazing adjacent to stairways~~, landings~~ and ramps ~~within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface~~.

Exceptions:

1. Glazing that is 36 inches (914 mm) or more horizontally from the walking surface.
2. Glazing that is 36 inches (914 mm) or more above the plane of the adjoining walking surface.
3. Glazing separated from the walking surface by one of the following installed on the accessible side(s) of the glazing:
   - 3.1. A rail installed 34 to 38 inches (864 mm to 965 mm) above the plane of the adjoining walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in cross sectional height.
   - 3.2. A handrail complying with R311.5.6.
   - 3.3 A guard complying with R312.
4. Glazing adjacent to stairway and ramp landings or floors shall comply with R308.4 (11).

~~11~~ 7. Glazing adjacent to stairway~~s~~ and ramp landings or floors within 60 inches (1524 mm) horizontally of the ~~bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread~~ nosing of the bottom tread in a run of stairs or the lower terminus of a ramp.

Exception:

1. Glazing more than 36 inches above the surface of the landing or floor.
2. Glazing separated from the walking surface on the accessible side(s) by a guard complying with R312 and the glazing is more than 18 inches (914 mm) from the guard.

~~**Exception:** The following products, materials and uses are exempt from the above hazardous locations:~~

~~1. Openings in doors through which a 3-inch (76 mm) sphere is unable to pass.~~
~~2. Decorative glass in Items 1, 6 or 7.~~
~~3. Glazing in Section R308.4, Item 6, when there is an intervening wall or other permanent barrier between the door and the glazing.~~
~~4. Glazing in Section R308.4, Item 6, in walls perpendicular to the plane of the door in a closed position, other than the wall toward which the door swings when opened, or where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in these applications shall comply with Section R308.4, Item 7.~~
~~5. Glazing in Section R308.4, Items 7 and 10, when a protective bar is installed on the accessible side(s) of the glazing 36 inches ± 2 inches (914 mm ± 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in height.~~
~~6. Outboard panes in insulating glass units and other multiple glazed panels in Section R308.4, Item 7, when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.~~
~~7. Louvered windows and jalousies complying with the requirements of Section R308.2.~~
~~8. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.~~
~~9. Safety glazing in Section R308.4, Items 10 and 11, is not required where:~~
   - ~~9.1. The side of a stairway, landing or ramp has a guardrail or handrail, including balusters or in fill panels, complying with the provisions of Sections 1013 and 1607.7 of the *International Building Code*; and~~
   - ~~9.2. The plane of the glass is more than 18 inches (457 mm) from the railing; or~~
   - ~~9.3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the floor and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as the protective bar.~~

~~10. Glass block panels complying with Section R610.~~

Reason: AMBO has submitted six proposals for changes to section R308 on safety glazing. Multiple submittals exist in order to separate what might be controversial issues from those less controversial. However, if the IRC Committee is inclined to agree with all six of the proposals, they have been combined here into one proposal and, if approved, AMBO would withdraw the other five. Since the other six proposals all contain explanations for the changes, those explanations are not repeated here. To fully appreciate the impact of the changes, the amended text is repeated here with underlining and over-struck language removed.

R308.3 Human impact loads. Individual glazed areas, including glass mirrors in hazardous locations such as those indicated as defined in Section R308.4, shall pass the test requirements of CPSC 16 CFR, Part 1201. Glazing shall comply with CPSC 16 CFR, Part 1201 criteria for Category I or Category II as indicated in Table R308.3.

Exceptions:
1. Louvered windows and jalousies shall comply with Section R308.2.
2. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
3. Glass unit masonry complying with Section R610.

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in all fixed and operable panels of swinging, sliding, and bifold doors.

   Exceptions:
   1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
   2. Decorative glazing.

2. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.

   Exceptions:
   1. Decorative glazing.
   2. When there is an intervening wall or other permanent barrier not less than 36 inches in height between the door and the glazing and extending a minimum of 36 inches from the plane of the wall containing the glazing.
   3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position.
   4. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.
   5. Glazing that is adjacent to the fixed panel of patio doors.

3. Glazing in an individual fixed or operable panel that meets all of the following conditions:
   3.1. The exposed area of an individual pane is larger than 9 square feet (0.836 m^2).
   3.2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor.
   3.3 The top edge of the glazing is more than 36 inches (914 mm) above the floor.
   3.4 One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the glazing.

   Exceptions:
   1. Decorative glazing.
   2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.
   3. Outboard panes in insulating glass units and other multiple glazed panels when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.

4. All glazing in railings regardless of ~~an~~ area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
5. Glazing comprising a wall, in a wall, or in a fence~~s~~ enclosing or adjacent to indoor and outdoor swimming pools, hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, and showers where the bottom edge of the glazing is less than 60 inches (1524 mm) above a standing or walking surface. This shall apply to single glazing and all panes in multiple glazing.

   Exception: Glazing more than 60 inches (1524 mm) measured horizontally and in a straight line of the water's edge for hot tubs, whirlpools, bathtubs, and swimming pools.

6. Glazing adjacent to stairways and ramps.

   Exceptions:
   1. Glazing that is 36 inches (914 mm) or more horizontally from the walking surface.
   2. Glazing that is 36 inches (914 mm) or more above the plane of the adjoining walking surface.
   3. Glazing separated from the walking surface by one of the following installed on the accessible side(s) of the glazing:
      3.1. A rail installed 34 to 38 inches (864 mm to 965 mm) above the plane of the adjoining walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in cross sectional height.
      3.2. A handrail complying with R311.5.6.
      3.3. A guard complying with R312.
   4. Glazing adjacent to stairway and ramp landings or floors shall comply with R308.4 (11).

7. Glazing adjacent to stairway and ramp landings or floors within 60 inches (1524 mm) horizontally of the nosing of the bottom tread in a run of stairs or the lower terminus of a ramp.

   Exception:
   1. Glazing more than 36 inches above the surface of the landing or floor.

2. Glazing separated from the walking surface on the accessible side(s) by a guard complying with R312 and the glazing is more than 18 inches (914 mm) from the guard.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB36–07/08
R308.4

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in swinging doors except jalousies.
2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
3. Glazing in storm doors.
4. Glazing in all unframed swinging doors.
5. ~~Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any part of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.~~

~~6.~~ 5. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.

~~7.~~ 6. Glazing in an individual fixed or operable panel, other than those locations described in Items 5 and 6 above, that meets all of the following conditions:
   - ~~7.1.~~ 6.1. Exposed area of an individual pane larger than 9 square feet (0.836 m_2).
   - ~~7.2.~~ 6.2. Bottom edge less than 18 inches (457 mm) above the floor.
   - ~~7.3.~~ 6.3. Top edge more than 36 inches (914 mm) above the floor.
   - ~~7.4.~~ 6.4. One or more walking surfaces within 36 inches (914 mm) horizontally of the glazing.

~~8.~~ 7. All glazing in railings regardless of an area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.

~~9.~~ 8. Glazing comprising a wall, in ~~walls and fences~~ a wall or in a fence enclosing or adjacent to indoor and outdoor swimming pools, hot tubs, ~~and~~ spas, whirlpools, saunas, steam rooms, bathtubs and showers where the bottom edge of the glazing is less than 60 inches (1524 mm) above a standing or walking surface ~~and within 60 inches (1524 mm) horizontally of the water's edge~~. This shall apply to single glazing and all panes in multiple glazing.

> **Exception:** Glazing more than 60 inches (1524 mm) measured horizontally and in a straight line of the water's edge for hot tubs, whirlpools, bathtubs, and swimming pools.

~~10.~~ 9. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

~~11.~~ 10. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread.

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. through 10. (No change to current text)

Reason: There is much unnecessary duplication in these two sections. This proposal editorially combines the two sections into one section to reduce confusion and improve uniformity. The proposal also recognizes new designs involving glass walls (sometimes the glazing isn't in the wall, it is the wall) and glazing in a wall adjacent to a pool, hot tub, and other water basins but that do not enclose the basin. The revised first sentence

would then read: "Glazing comprising a wall, in a wall, or in a fence enclosing or adjacent to indoor and outdoor swimming pools, hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, and showers where the bottom edge of the glazing is less than 60 inches (1524 mm) above a standing or walking surface."

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB37–07/08
R308.4

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. through 8. (No change to current text)
9. Glazing in walls ~~and fences~~ enclosing indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm) horizontally of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
10. and 11. (No change to current text)

Reason: Permits are not required for fences six feet in height or less so there is no opportunity to regulate any glazing in fences. Permits are not required for pools smaller than a certain size so again there is no opportunity to regulate glazing in fences. Furthermore, glazing is not regulated in fencing if it is in a gate or adjacent a gate or if it meets the size and location requirements for other locations requiring safety glazing. It should be no different here. It would be a very uncommon practice to install a window in a fence. Fences are usually installed for privacy, not to allow the world a view.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB38–07/08
R308.4

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. through 9. (No change to current text)

10. Glazing adjacent to stairways~~, landings~~ and ramps ~~within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface~~.

Exceptions:

1. Glazing that is 36 inches (914 mm) or more horizontally from the walking surface.
2. Glazing that is 36 inches (914 mm) or more above the plane of the adjoining walking surface.
3. Glazing separated from the walking surface by one of the following installed on the accessible side(s) of the glazing:
   - 3.1. A rail installed 34 to 38 inches (864 mm to 965 mm) above the plane of the adjoining walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in cross sectional height.

3.2. A handrail complying with R311.5.6.
3.3. A guard complying with R312.

4. Glazing adjacent to stairway and ramp landings or floors shall comply with R308.4 (11).

11. Glazing adjacent to stairway~~s~~ and ramp landings or floors within 60 inches (1524 mm) horizontally of the ~~bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread~~ nosing of the bottom tread in a run of stairs or the lower terminus of a ramp.

Exceptions:

1. Glazing more than 36 inches above the surface of the landing or floor.
2. Glazing separated from the walking surface on the accessible side(s) by a guard complying with Section R312 and the glazing is more than 18 inches (914 mm) from the guard.

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. Openings in doors through which a 3-inch (76 mm) sphere is unable to pass.
2. Decorative glass in Items 1, 6 or 7.
3. Glazing in Section R308.4, Item 6, when there is an intervening wall or other permanent barrier between the door and the glazing.
4. Glazing in Section R308.4, Item 6, in walls perpendicular to the plane of the door in a closed position, other than the wall toward which the door swings when opened, or where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in these applications shall comply with Section R308.4, Item 7.
5. Glazing in Section R308.4, Items 7 ~~and 10~~, when a protective bar is installed on the accessible side(s) of the glazing 36 inches ± 2 inches (914 mm ± 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in height.
6. Outboard panes in insulating glass units and other multiple glazed panels in Section R308.4, Item 7, when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.
7. Louvered windows and jalousies complying with the requirements of Section R308.2.
8. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
9. ~~Safety glazing in Section R308.4, Items 10 and 11, is not required where:~~
   - 9.1. ~~The side of a stairway, landing or ramp has a guardrail or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1013 and 1607.7 of the International Building Code; and~~
   - 9.2. ~~The plane of the glass is more than 18 inches (457 mm) from the railing; or 9.3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the floor and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as the protective bar.~~

Reason: Items 10 and 11 of R308.4 both provide rules for safety glazing adjacent stairways, ramps, and landings but with differing results. To ease use of this section of the code and to eliminate conflicts, these two items are editorially revised so that one section addresses stairways and ramps and the other section addresses landings. Those areas that create conflicts have been revised. Following is a line by line explanation of what was done.

R308.4
10. Glazing adjacent to stairways~~, landings~~ and ramps ~~within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface~~.

Because landings are listed in both items 10 and 11, the term is deleted here to eliminate the confusion caused by differing regulations. This item now applies only to stairs and ramps. The remainder of the deleted language in this item is addressed by exceptions.

Exceptions:
1. Glazing that is 36 inches (914 mm) or more horizontally from the walking surface.

This language has been relocated from the first sentence above as an exception.

2. Glazing that is 36 inches (914 mm) or more above the plane of the adjoining walking surface.

This exception corrects a conflict in the code where one section requires safety glazing whenever the glazing is less than 60 inches above the plane of the walking surface (found above) and exception 9.3 exempts safety glazing if there is a "solid wall or panel" 34 to 36 inches above the floor. If a window does not extend to the floor or walking surface, it will have a wall below it. So in effect we are saying that glazing that is more than 34 inches above the walking surface is exempt. This is supported by an illustration published by ICC that follows this explanation. Because that illustration states that safety glazing is required unless the glazing is 36 inches above the walking surface, that measurement is used here rather

than 34 inches. Another conflict that this revision corrects relates to the same text requiring safety glazing unless there is a wall below the glazing 34 to 36 inches high. Why couldn't the wall be 38 inches high or 45 inches high and the safety glazing be exempt. The higher the wall, the less risk of contacting the glazing. There should be no upper limit.

3. Glazing separated from the walking surface by one of the following installed on the accessible side(s) of the glazing:
   - 3.1. A rail installed 34 to 38 inches (864 mm to 965 mm) above the plane of the adjoining walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in cross sectional height.
   - 3.2. A handrail complying with R311.5.6.
   - 3.3 A guard complying with R312.

This language is drawn from exceptions 5 and 9 at the end of the section. The current language contains several issues and conflicts. Exception 5 exempts safety glazing if a "protective bar" is installed 34 to 38 inches above the floor. This seems equivalent to a handrail provided the handrail meets the structural requirements specified. The term "protective bar" has been replaced with the more generic term "rail". Including the word "protective" seems to imply the use of judgment on the part of the building official that the bar must be installed in a particular manner that results in a certain outcome. That is not the case. So exception 3a is only editorially changed by replacing the term "protective bar".

Exception 9.1 at the end of the section provides the basis for exception 3b. Exception 9.1 exempts safety glazing if a handrail including balusters or infill panels is used and the glazing is more than 18 inches from the railing. Why must there be balusters with the handrail when the code already allows, in the previous exception, only a "protective bar" at 34 to 38 inches, the same height as a handrail? Both should provide the same degree of protection so the reference to balusters or infill panels has been deleted. And why must the glazing be 18 inches from a handrail when there is no minimum distance the glass has to be from a "protective bar"? Since the "protective bar" and the handrail are essentially the same thing, the reference to the glazing being 18 inches from the handrail is deleted.

Exception 9.2 provides the basis for exception 3c. Again, the guard is permitted if the glazing is more than 18 inches from the guard. And again, if a "protective bar" can be used right next to the glass, why cannot a guard? This section has been revised by deleting the reference to the glazing being 18 inches from the bar.

4. Glazing adjacent to stairway and ramp landings or floors shall comply with R308.4 (11).

A reference is provided to direct the user of the code to the appropriate section for glazing adjacent landings.

11. Glazing adjacent to stairway~~s~~ and ramp landings or floors within 60 inches (1524 mm) horizontally of the ~~bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread~~ nosing of the bottom tread in a run of stairs or the lower terminus of a ramp.

10 above regulates glazing within 36 inches of the walking surface for landings while 11 regulates glazing within 60 inches of "the bottom tread of a stairway in any direction" which appears to also be a landing and thus there are two different dimensions in the code to regulate glazing adjacent landings. According to the ICC IRC Commentary, #11 is intended to regulate glazing only adjacent stair landings. The proposed modification is intended to more clearly show that the rule applies to landings or floors within 60 inches of the bottom tread in each flight of stairs. Again, the Commentary indicates that this rule applies to intermediate landings as well as bottom landings or floors and that is reflected in the proposed amendment. The phrase "or floors" is added since R311.5.4 states that there must be a floor or landing at the top and bottom of each stairway. The measuring point is clarified to read "nosing of the bottom tread" rather than "tread".

Exception:
1. Glazing more than 36 inches above the surface of the landing or floor.
2. Glazing separated from the walking surface on the accessible side(s) by a guard complying with R312 and the glazing is more than 18 inches (914 mm) from the guard.

As stated above, if a solid wall 34 inches high is provided, the requirement for safety glazing is avoided. That language is simplified and the 36 inch dimension used in the ICC publication is used here.

There also are conflicting phrases used. The charging paragraph references glazing less than 60 inches above the nosing of the tread. Exception 9.3 uses the height 34 inches measured from "the floor". There is not uniformity in phraseology. This conflict has been corrected.

The exception to allow a guard as protection is retained but the reference to a handrail has been removed. The existing reference to handrails requires that it have balusters or in fill panels which is a guard.

Exception: The following products, materials and uses are exempt from the above hazardous locations:

5. Glazing in Section R308.4, Item~~s~~ 7 ~~and 10~~, when a protective bar is installed on the accessible side(s) of the glazing 36 inches ± 2 inches (914 mm ± 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in height.

The portion of the section referencing item 10 is deleted as it is relocated to item 10 above as exception 3a.

~~9. Safety glazing in Section R308.4, Items 10 and 11, is not required where:~~
- ~~9.1. The side of a stairway, landing or ramp has a guardrail or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1013 and 1607.7 of the International Building Code; and~~
- ~~9.2. The plane of the glass is more than 18 inches (457 mm) from the railing; or~~
- ~~9.3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the floor and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as the protective bar.~~

The text found here applies to both items 10 and 11 and is relocated to both items as the exceptions.

So that the extent of the revision is understood, the revised version minus underlining and over struck text follows:

10. Glazing adjacent to stairways and ramps.

Exceptions:

1. Glazing that is 36 inches (914 mm) or more horizontally from the walking surface.
2. Glazing that is 36 inches (914 mm) or more above the plane of the adjoining walking surface.
3. Glazing separated from the walking surface by one of the following installed on the accessible side(s) of the glazing:
   - 3.1. A rail installed 34 to 38 inches (864 mm to 965 mm) above the plane of the adjoining walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1 ½ inches (38 mm) in cross sectional height.
   - 3.2. A handrail complying with R311.5.6.
   - 3.3. A guard complying with R312.
4. Glazing adjacent to stairway and ramp landings or floors shall comply with R308.4 (11).

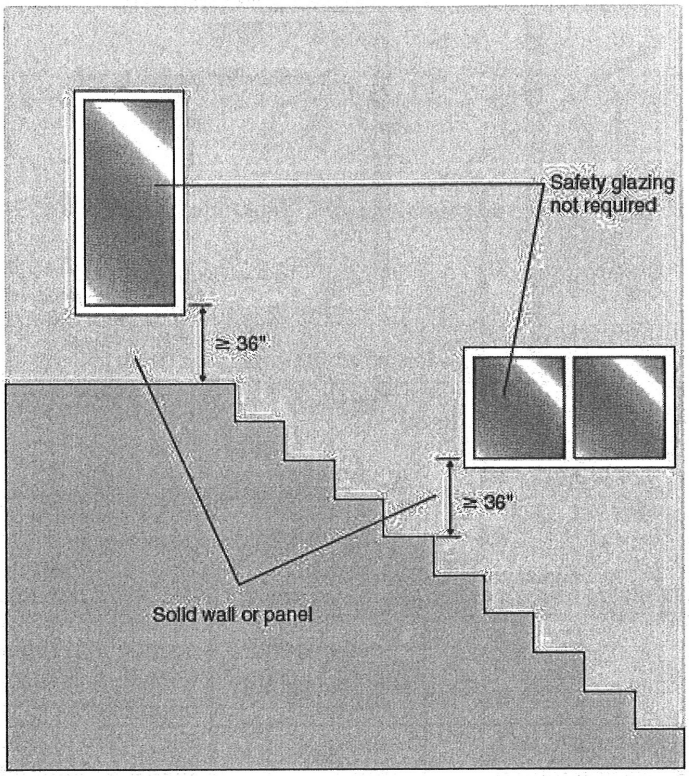
11. Glazing adjacent to stairway and ramp landings or floors within 60 inches (1524 mm) horizontally of the nosing of the bottom tread in a run of stairs or the lower terminus of a ramp.

Exception:

1. Glazing more than 36 inches above the surface of the landing or floor.
2. Glazing separated from the walking surface on the accessible side(s) by a guard complying with Section R312 and the glazing is more than 18 inches (914 mm) from the guard.

Exception: The following products, materials and uses are exempt from the above hazardous locations:

5. Glazing in Section R308.4, Item 7, when a protective bar is installed on the accessible side(s) of the glazing 36 inches ± 2 inches (914 mm ± 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in height.



Glazing Adjacent to Stairways and Landings

R309.1.2	—	—	Other penetrations	This section permits items to penetrate the common wall between the house and garage if the annular space is then filled with an approved material to resist the free passage of flame and the products of combustion.
R309.2	R309.2	R309.2	Separation required	The separation of a detached garage from other portions of the dwelling unit has been revised. The 2006 IRC section now requires the separation of the garage from other dwellings on the same lot where located within 3 feet of each other.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB39–07/08
R308.4

Proponent: Tim Pate, Building Department, City & County of Broomfield, CO, representing Colorado Chapter of ICC

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in swinging doors except jalousies.
2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
3. Glazing in storm doors.
4. Glazing in all unframed swinging doors.
5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any part of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.
6. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.
7. Glazing in an individual fixed or operable panel, other than those locations described in Items 5 and 6 above, that meets all of the following conditions:
   7.1. Exposed area of an individual pane larger than9 square feet (0.836 m^2).
   7.2. Bottom edge less than 18 inches (457 mm) above the floor.
   7.3. Top edge more than 36 inches (914 mm) above the floor.
   7.4. One or more walking surfaces within 36 inches (914 mm) horizontally of the glazing.
8. All glazing in railings regardless of an area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
9. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs and spas where the bottom ledge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm) horizontally of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
10. Glazing adjacent to stairways~~, landings and ramps~~ <u>with two or more risers,</u> within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.
11. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread.

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. Openings in doors through which a 3-inch (76 mm) sphere is unable to pass.
2. Decorative glass in Items 1, 6 or 7.
3. Glazing in Section R308.4, Item 6, when there is an intervening wall or other permanent barrier between the door and the glazing.
4. Glazing in Section R308.4, Item 6, in walls perpendicular to the plane of the door in a closed position, other than the wall toward which the door swings when opened, or where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in these applications shall comply with Section R308.4, Item 7.
5. Glazing in Section R308.4, Items 7 and 10, when a protective bar is installed on the accessible side(s) of the glazing 36 inches ± 2 inches (914 mm ± 51 mm) above the floor. The bar shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 11/2 inches (38 mm) in height.
6. Outboard panes in insulating glass units and other multiple glazed panels in Section R308.4, Item 7, when the bottom edge of the glass is 25 feet (7620 mm) or more above grade, a roof, walking surfaces, or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.
7. Louvered windows and jalousies complying with the requirements of Section R308.2.
8. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
9. Safety glazing in Section R308.4, Items 10 and 11, is not required where:

9.1. The side of a stairway, landing or ramp has a guardrail or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1013 and 1607.7 of the *International Building Code* or when a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the floor and the construction at the top of wall or panel is capable of withstanding the same horizontal load as the protective bar; and

9.2. The plane of the glass is more than 18 inches (457 mm) from the railing; or

~~9.3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm)to 36 inches (914 mm)above the floor and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as the protective bar.~~

10. Glass block panels complying with Section R610.

Reason: This code change will fix an unanticipated problem with the original code change that was brought through for the 2006 IRC. The original code change was a good one that recognized that having a solid wall or panel adjacent to glazing gave similar protection from falling through non safety glazing but the way the wording ended up by adding subsection 9.3 was that the requirement that the glazing still be at least 18 inches away is only tied to subsection 9.1. This code change will move the wording from 9.3 into 9.1 so that the option to use either a guardrail/handrail or a solid wall/panel would be listed in one spot and then it would be clear that no matter which one you use you would still have to have glazing at least 18 inches away.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB40–07/08
R308.4

Proponent: Tim Pate, Building Department, City & County of Broomfield, CO, representing Colorado Chapter of ICC

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in swinging doors except jalousies.
2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
3. Glazing in storm doors.
4. Glazing in all unframed swinging doors.
5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any part of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.
6. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.
7. Glazing in an individual fixed or operable panel, other than those locations described in Items 5 and 6 above, that meets all of the following conditions:
   7.1. Exposed area of an individual pane larger than9 square feet (0.836 m^2).
   7.2. Bottom edge less than 18 inches (457 mm) above the floor.
   7.3. Top edge more than 36 inches (914 mm) above the floor.
   7.4. One or more walking surfaces within 36 inches (914 mm) horizontally of the glazing.
8. All glazing in railings regardless of an area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
9. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs and spas where the bottom ledge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm) horizontally of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
10. Glazing adjacent to stairways~~, landings and ramps~~ with two or more risers, within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.
11. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread.

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. through 10. (No change to current text)

Reason: This code change is to clarify that you would only need to provide safety glazing adjacent to a stairway with two or more risers which would match the intent of the requirements in section R308.4 #11 which requires safety glazing within 60" of the bottom tread of a stairway which effectively means a stairway with two or more risers (if you only have one riser you do not have any treads – just landings). There should not be a difference between these two situations.

These two code sections (R308.4 #10 and #11) were brought in from one of the legacy codes which also had a differentiation between a stairway and a step. This legacy code said that a step was a change of elevation of one riser and a stairway was two or more risers. This legacy code had specific requirements for both steps and stairways. The requirements for safety glazing only applied to stairways and not to steps. This part of the code was not brought forward to the IBC or IRC thereby creating this confusion.

This code change also deletes the word "landings" since the definition of stairway already includes landings. This will clear up the confusion that inspectors have in enforcing this provision by requiring safety glazing adjacent to door landings.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB41–07/08
R308.4

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. through 11. (No change to current text)

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. Openings in doors through which a 3-inch (76 mm) sphere is unable to pass.
2. Decorative glass in Items 1, 6 or 7.
3. Glazing in Section R308.4, Item 6, when there is an intervening wall or other permanent barrier <u>not less than 36 inches (914 mm) in height</u> between the door and the glazing <u>and extending a minimum of 36 inches (914 mm) from the plane of the wall containing the glazing</u>.
4. through 10. (No change to current text)

Reason: There are no specifications in this section to indicate how high this wall should be or how far it should extend from the wall. This results in a lack of uniformity and confusion. The dimensions chosen are arbitrary but rely on the standard dimension of 36 inches that is used frequently in the code. Guards are 36 inches high and the main exit door is 36 inches wide as examples. It is likely that when most building officials are asked the dimensions of this wall that they would say it should be 3 feet high and extend 3 feet from the wall.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB42–07/08
R308.4

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R308.4 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

1. through 11. (No change to current text)

Exception: The following products, materials and uses are exempt from the above hazardous locations:

1. through 11. (No change to current text)
12. Glazing in Section R308.4, item 6, that is adjacent to the fixed panel of patio doors.

Reason: This is not so much a code change as it is a clarification for uniformity of application.

This proposal was submitted and approved by the ICC IRC Committee in Orlando with the following Committee comment: "This proposal to add an exception for glazing adjacent to the fixed panel of sliding door assemblies adds practicality to the code. It is unlikely that sliding doors will be reversed by the owner and people are familiar with their home environments. Therefore, this new language helps to clarify the code text." The Committee was right.

The proposal was challenged and overturned in Rochester with the argument that the fixed and moveable panels of a patio door could be reversed. The membership should know better.

There are swinging patio doors and there are sliding patio doors. A swinging patio door is not unlike any other swinging door with a sidelight. Sidelights don't extend the hazard posed by a door. The same is true for sliding doors which can have panels up to four feet in width.

Patio doors are almost always manufactured as right or left. Doors that are manufactured as right handed cannot be installed as left handed and vice versa, except as pointed out below by machining the door, changing the hardware, patching existing holes and creating new ones. For those very few that can be installed as right or left handed, the manufacturers installation instructions indicate they would be very hard to reverse once installed. They are typically assembled prior to installation in the rough opening. The fixed sash is secured to the frame with screws and other attachments. In order to reverse the operation of these doors, the entire frame would need to be removed, the door disassembled, reassembled in a different configuration, and reinstalled in the rough opening. Is this something the average homeowner is likely to attempt? The answer is no.

However, if one were to assume that a homeowner possessed the skills to modify a patio door so that it worked from the opposite side, could not that same homeowner reverse the swing of other doors in his home on which the requirement for safety glazing are based on the direction the door swings?

The following text is found in Section R308 as it applies to glazing adjacent a swinging door: "4. Glazing in Section R308.4, Item 6, in walls perpendicular to the plane of the door in a closed position, other than the wall toward which the door swings when opened…" A homeowner can purchase a pre-hung entry door, in many cases for less than $100, and remove their existing door and replace it with a new one that might swing in the opposite direction putting existing glazing in violation. Should we impose regulations on the construction of a home based on the anticipation of difficult or extraordinary repairs that might occur to that home in 20, 30, or 40 years or perhaps never, of course not? In this example, glazing that would be immediately adjacent the latch side of the door in a perpendicular wall would be exempt from safety glazing yet some building officials would require glazing in a window up to six feet away to be safety glazed if this door was a patio door!

To determine the possibility of reversing the operation of patio doors, manufacturers listed on the WDMA web site were contacted and the following question was posed to them: Can your sliding and swinging patio doors be reversed or must they be ordered right or left? Following are their responses. Most of the major patio door manufacturers in the country replied and indicated that their doors were manufactured as right or left handed.

Sorry, they need to be ordered that way.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB43–07/08

R309.1.1

Proponents: Ben Cox, CBO, Town of Gilbert, AZ, representing himself/Gary Michael DeWys, City of Chandler, AZ

Revise as follows:

R309.1.1 (Supp) Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than 1 3/8 inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches (35 mm) thick, or 20-minute fire-rated doors. Doors providing opening protection shall be self-closing and self-latching.

Reason: (Cox) The 2006 IRC Code and Commentary Volume I contains a number of clear commentaries pointing to significant concerns related to dwelling unit/garage separation requirements. The following are just a few clarifying statements. R309.1 Opening protection states in part, "Openings to sleeping rooms from garages are not allowed because a person might not wake up in time if there was a hazard from carbon monoxide fumes or smoke from the garage." People do not only fall asleep in a bedroom, they fall asleep in other rooms of homes as well. R309.1.1 Duct penetrations states in part, "Steel ducts are required to help prevent the passage of undetected fire within a garage to a dwelling unit (see Commentary Figure R309.1.1). The opening limitation in the garage is to limit the path for smoke to enter the dwelling unit." Requiring minimum 26 gage sheet steel and annular space sealant would seem unwarranted if the code does not require a rated door to self-close and self-latch. R309.1.2 Other penetrations states in part, "It is important that the code official verify that these spaces are properly filled and do not compromise the protection offered by the common wall between the residence and garage against the free passage of smoke, fire, noxious gases and odors." Filling any annular space would seem unwarranted where the opportunity exists for an extremely large opening that is essentially unprotected because the door is not required to be self-closing and self-latching. Finally R309.2 Separation required states in part, "Numerous potential hazards exist within garages because occupants of dwelling units tend to store a variety of hazardous materials there. Along with this and the potential for carbon monoxide build-up within the garage, the IRC requires that the garage be separated from the dwelling unit and attic…" The need to separate the garage from the dwelling unit is only partially addressed where the door communicating with the dwelling unit is not required to be self-closing and self-latching.

The IRC committee that addressed this code proposal at the 2005 code hearings in Cincinnati had a whole lot more to say than just "there was insufficient technical justification to support the change and there was concern that there was no specific mechanism or strength of spring". Those were the only comments that were/are printed. Those of you who were present when the committee made their comments might recall one of the members rising from his chair and yelling at the proponent. In addition you heard statements such as "don't force the rest of us to do it, they are not there 30 days after final inspection, there are to many variables – what is the closer, need more specific data, what are the principals of a fire door, no data to prove they work, the dog will get cut in half, my child's fingers will get caught in the door, or what about when I want to air cool my garage". These were and are not technical reasons to disapprove the proponent's code change proposal.

I could argue away each one of the comments noted above but it would seem it is unnecessary to do so. We need to provide the same minimum life safety features in residential construction in both the IRC and IBC. The data below is the rest of the technical justification.

If a rated separation and a rated door are necessary, regardless of the required fire resistance rating, then requiring the door in the application addressed in this proposal to be self-closing and self-latching is technically justified and necessary. Just as the same code provisions are necessary in every other (emphasis added) situation where a fire-rated door or smoke-barrier door is required in the IBC. The IBC committee at the 2005 Cincinnati code hearings approved this similar change to the 2006 IBC recognizing the oversight in consistent logical requirements. The same committee overwhelmingly disapproved proposal G79-06/07 in 2006 in Lake Buena Vista, a proposal to remove the requirement from the IBC.

Although specific fire statistics are not necessarily available to address fire origin and spread involving single-family, two-family and townhome dwellings, there is abundant direct evidence to support the proposed change.

One example is from the *NFPA Journal®, September/October 2002* describing a fire involving a vehicle parked in an attached garage of a single-family dwelling unit. The occupant went to investigate when he smelled smoke, swung open the door then quickly turned and ran out of the home through an exterior door in the living area. He did not take the time to close the door and it did not self-close; the structure was a total loss.

Another direct example is discussed in a publication titled Fire in the United States, 1987-1996, Eleventh Edition and Fire in the United States, 1992-2201, Thirteenth Edition published by Federal Emergency Management Agency, United States Fire Administration National Fire Data Center, www.usfa.fema.gov. The agency reports that residential garage fire statistics are not provided in a consistent and accurate format by fire service personnel for a variety of reasons. The reporting standard specifies that attached and detached garage fires should be reported separately, yet they are not. This leads to inaccurate and misleading fire data including information related to deaths and injuries. There is concern expressed that more accurate data may provide clarity and insight into the causes and affects of residential garage fires on dwelling occupants and the fire affects on the life safety of the occupants. The report indicates, "Garage/storage areas are not shown as one of the leading areas, but they are actually more significant than implied. If these storage/garage fires were accurately counted, the total number of fires in dwellings would increase by about 8 percent. There were 24,700 such garage fires in 1996. This portion of the residential fire problem is sometimes overlooked." (p.79). The report indicates that fire deaths attributed to garage fires are between 11-25 persons annually with significantly more persons injured in these fires; including fire fighting personnel.

People use private garages for much more than simply parking a car. Private garages are often used for uses other than intended such as automotive repair, body work, furniture repair and re-finishing, storage, and other hobby activities. Faulty equipment both permanently mounted or portable, spontaneous ignitions of wood finishing products or oily rags, failure to turn off equipment are a few of the causes of fires. These are only some of the many examples of the hazards that lurk in an area that is all too frequently un-occupied except for these hobby activities. Combined with the storage of gasoline, pesticides, fertilizers, pool chemicals, paints and paint thinners what is created is a mini hazardous materials storage area or moderately hazardous manufacturing environment; not a car parking garage.

All of this occurs in a dwelling where people spend most of their time sleeping or participating in activates that sometimes lead to impaired judgment or diminished physical ability, consequently reducing their reaction time and response to emergency situations. Quite often occupants voluntarily or involuntarily sleep in areas that directly communicate with the garage. These are areas that may or may not be protected by smoke detectors. They are not sleeping rooms provided with emergency egress and rescue doors and windows. They are living rooms, dens, family rooms, and the like.

Even where smoke detectors are installed they failed to operate 78% of the time when present in a residence with a fire event. This information is taken from a report titled, Residential Structure Fires in 2000, June 2004, published by the U.S. Fire Administration/National Fire Data Center, Federal Emergency Management Agency. That's 78% of the time the smoke detector did not operate, it did not provide early warming to the occupant of a fire hazard. The use of smoke detectors is cited as a major factor in reduction of fire deaths in an article titled House Fire Deaths, authored by Elliot Eisenberg of the NAHB and published in Housing Economics, November 2002. Although smoke detectors have provided a remarkable increase in fire safety, they are only one component of functional passive fire protection. Smoke detectors and their installation are not always the best solution; they are part of an enhanced layered approach to life safety. One could therefore argue that adding additional smoke detectors would not necessarily be the best or better option. In addition, the cost associated with an additional smoke detector is in the range of $30 to $50 per smoke detector. This far exceeds the cost of the typical spring type hinge that would be used as a closer for the door.

In all other occupancies where similar opening protectives are required, the doors are required to be self-closing and self-latching. Consider the hotel rooms you have stayed in the past where the door closes behind you as you enter or exit your room. These doors utilize the same or similar spring hinges that would most commonly be used in a residential application. Yet, although the IRC requires limited fire resistant protection in section R309.1 of walls and ceilings; requires duct penetrations to be of No. 26 gage steel or other approved materials with no openings into the garage in section R 309.1.1 and does not permit opening into a room used for sleeping purposes, the current IRC provisions permit what is essentially and typically a 21 square foot unprotected opening in the wall. To further support the need for protection from garage hazards IRC section M1307.3 requires appliances having an ignition source to be elevated a minimum of 18 inches above the floor of the garage. This similar requirement is also noted for water heaters in IRC section P2801.6.

This increased protection comes at a truly minimal cost. A pair of spring type hinges typically range from $13 to $25 for hinges manufactured by Hager, Emtek and Stanley to name a few. A pair of non-spring type hinges typically range from $8 to $15. The spring type hinges used in this application are UL listed and comply with NFPA 80. Where bought in bulk the additional cost of approximately $5 to $10 there is the potential to save as many as 25 lives and countless more people from the horrific and painful injuries suffered in a fire. The increased cost is less than that required to install a smoke detector. For that matter, it is less than many of the upgrades added to make a home more convenient. These hinges are designed to work well whether or not a weather-stripped door is utilized.

The arguments offered in opposition to the proposed code amendment address a variety of issues that offer no technical justification not to include these requirements in the code. One would have to ask why fire protective openings work so well in occupancies with the lowest incidence of fire and fire related deaths and injuries. Simply stated they work. They provide time for people that are most often awake, alert, and able to self evacuate. These opening protectives provide occupants the opportunity to safely evacuate, thereby reducing deaths and injuries. In addition they reduce property loss and more importantly increase safety for fire suppression personnel responding to these emergencies.

This is not whether someone gets their finger pinched in the door; most of us have done that in some door, even if it was not self-closing; a car door comes to mind. This is not whether someone wants to leave the door open when they bring in the groceries; if they get distracted and forget the open door what is left is an unprotected opening. A moment of inconvenience is worth the life saved or injury avoided. Self-closing, self-latching devices are required on swimming pool enclosures. They are put on storm and screen doors. These are not viewed as inconvenient, but necessary to protect our children from drowning or keeping the bugs out of our homes. You may have heard your parent exclaim, "Don't let the door slam when you go out that door". Just as with pool safety, fire safety should hold the same importance. The gate or the door can be adjusted to gently close and latch; you won't hear it slam, but rest assured that when there is a fire in the garage the door is closed and latched. The argument that

"most" people close the door is flawed. How many close the door? As defined it would be at best an indefinite large number of people.

We urge you to support this proposal to reduce death, injury and property damage from fires in residential occupancies. This is an inexpensive way to increase the protection of occupants of residential occupancies; the location with the highest fire death and injury rate of any building occupied by the individuals we strive to protect.

The images are provided as an example of a typical spring type hinge that would be used in this application.

(DeWys) This end wording should be consistent with Section 406.1.4(1) of the 2006 *International Building Code*. The last sentence is already change "barred" in the IBC.

Cost Impact: (COX) The code change proposal will increase the cost of construction by approximately $5 to $10 per rated door application. **(DeWYS)** The code change proposal will have a negligible impact. Most builders do this because of previous code mandates or local ordinance requirements.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB44–07/08

R309.1.1, R309.1.2

Proponent: Michael Baker, City of Prescott, AZ, representing Arizona Building Officials

Revise as follows:

R309.1.1 (Supp) Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. ~~Other openings between the garage and residence shall be equipped with solid wood doors not less than 1-3/8 inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 1-3/8 inches (35 mm) thick, or 20-minute fire-rated doors.~~

~~**R309.1.2 (Supp) Duct penetration.** Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other approved material and shall have no openings into the garage.~~

Reason: Penetrations in garage walls have been given far more credibility for being a concern for fire and life safety than they truly are. Flame and smoke spread contributed to these openings are minimal at best. Fire statistics can not bear out the increased exposure due to these openings. For years the legacy codes protected the garage from livable areas and have considered this wall as a significant fire and life saving feature. Over the years fire data has shown that the threat of fire from garages is negligible. The fire statistics according to the NFPA.Org website indicate that the majority of fires in residences are located in kitchens. Kitchen's account for 34% of all residential fires. Bedrooms ranked second at 12%. Living rooms, family rooms and dens contributed a total of 6%. This leaves garages at less than 4% of all home fires. The statistics clearly indicate that garages are not a significant cause of home fires. The most significant cause of home fires is smoking.

Many of the reports read while researching this code proposal did not indicate that garages were a major fire hazard. Rather it indicated that many Americans have turned their garages into mini haz-mat storage facilities. Other reports indicated that fires were started by appliances located below the 18" height requirement. These low level appliances caused solvents, grease laiden rags and gasoline fumes to ignite. The property damage and the cost to repair these fires was significantly lower than fires within the livable portions of the structure. Carelessness by the homeowner was attributed to all of these fires.

We are taking great care to make sure that fires do not spread through minute openings and annular spaces around penetrating items. This does not make sense since we have gotten rid of the self closing door to these areas. It doesn't make sense to protect a ¼" annular space around a water pipe when we can leave a door open. The door creates a minimum of 16.65 square feet of opening for a 2668 door. This is not a logical concept. Several opponents indicated that if the door were open, someone was aware of it. And this may be true in the beginning. However the longer the door is open the easier it is to forget about. This open door poses a more serious fire spread and life safety concern than the annular space around a water pipe. With the door shut opponents argued that noone would be aware the fire had started and would provide more of a chance for the fire to escalate before it is noticed. If we are so concerned about this type of fire then why did we eliminate the separation wall that had been in the code for years. It was eliminated as there were no statistics to indicate its significance. This is true with the penetrating items. We are afraid to eliminate the requirements as it gives us a sense of security. Even if it is a false one.

Past code hearings have indicated that a garage did not pose a significant fire hazard and there was insufficient technical justification showing an increased contribution to residential dwelling fires. The legacy codes required a self-closing door in these locations for fire and life safety. In the I-codes the self closer was eliminated from this section since it could not be shown to substantially reduce fire losses or provide a higher degree of life safety. By eliminating the self closer we conceded that garages were not a major fire safety risk when considering residential dwelling fires. For the same reasoning above for fire doors, the ducts and penetration protection should be eliminated. Partially protecting a garage from a residence adds only a false sense of well being to the residents.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB45–07/08
Table R309.2

Proponent: Bill Towson, Arch Wood Protection

Revise table as follows:

TABLE R309.2 (Supp)
GARAGE SEPARATION

SEPARATION	MATERIAL
From the residence and attics	Not less than ½-inch (12.7 mm) gypsum board or equivalent applied to the garage side.
From the residence and attics, for pull-down stairs installed in the ceilings of garages with uninhabitable attic spaces	Fire-retardant-treated wood panels with a minimum thickness of 3/8 inch (9.53 mm) complying with the requirements of Section R802.1.3.

(Portions of table not shown remain unchanged)

Reason: Installing a pull-down ladder stairway in garages to access the attic space overhead is a common occurrence. In many cases, this stairway is the principal opening provided to access the attic space of the residence or dwelling unit. Access to any attic appliances is required by Section M1305.1.3 although no mention is made as to how to provide that access while meeting and maintaining the separation required in R309.2.

The code requires that the garage be separated from the residence and its attic area by not less than ½ inch gypsum board applied to the garages side. The problem is when pull down attic stairways are installed in garage ceilings to access the uninhabitable attic spaces above, they are typically constructed of ordinary untreated wood with untreated structural wood panel door covers that do not meet the separation requirement or R309.2.

Although it's not equivalent to ½" gypsum board, many of the pull-down attic stairway manufacturers offer an optional 3/8" minimum thick fire retardant treated (FRT) wood structural panel door cover which affords more protection than untreated wood panels. The unique properties of FRT wood reduce the chance of a fire spreading or continuing after the ignition source is removed. FRT wood has a better flammability characteristic than a Class A flame spread index and a lower rate of heat release than untreated wood.

According to the attached research report conducted by the US Forest Products Lab, the fire retardant treatment significantly improves the fire safety of wood products by reducing its heat contribution to a fire and prolonging the times for flashover. Comparison of the flammability parameters for commercial untreated and FRT plywood materials was done. The rate of heat release (RHR) measured in the small scale test Cone calorimeter for untreated material(s) was much higher than RHR of FRT plywood(s).

The total heat released and effective heat of combustion was also significantly lower for treated materials.

In the full scale ISO 9705 Room/Corner Test the flame retardant treatment prolonged the time to flashover. Flashover for the FRT materials was reached under the higher burner output. From the 14 tested wood based materials three types of groups concerning the fire performance in the Room/Corner Test can be traced i.e. materials with the accelerating RHR from the beginning of test until the flashover, materials reaching the plateau in RHR prior to flashover and FRT materials with very limited RHR under lower burner output.

The manufacturers of pull down stairways have investigated the problem how to get their attic stairways to comply with the separation requirements of R309.2. Using ½" gypsum board for the stairway door covers is not practicable because gypsum board is too heavy and not durable enough for this type of use. Another way is to provide fire resistance rated pull down stairway assemblies which are available on the market. Fire resistance rated assemblies cost approximately $1200 or more which isn't economically feasible. Another way is to provide an FRT coating on the exposed surfaces of the stairway unit. However, FRT coatings will deteriorate when exposed to the high continuous heat that accumulates in garage ceilings. They are not durable and must be properly maintained.

Permitting fire-retardant-treated wood panels with a minimum thickness of 3/8 inch (9.53 mm) complying with the requirements of Section R802.1.3 to be used for pull-down stairways installed in the ceilings of garages with uninhabitable attic spaces to meet the separation requirements of Section R309.2 and Table R309.2 is more practical and durable than providing 1/2" gypsum board or equivalent material and a more affordable than providing an fire resistance rated stairway assembly. And, FRT wood panels have better flammability characteristics and a lower rate of heat release than untreated wood.

Cost Impact: The code change proposal will increase the unit cost of a typical pull down attic stairway by approximately $20-25.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB46–07/08
R311.2

Proponent: Maureen Traxler, City of Seattle, WA, representing Washington Association of Building Officials Technical Code Development Committee

Revise as follows:

R311.2 (Supp) Egress door. At least one egress door <u>opening directly to the exterior</u> shall be provided for each dwelling unit. The egress door shall be side-hinged, not less than 3 feet (914 mm) in width and not less than 6 feet 8 inches (2032 mm) in height. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the dwelling without the use of a key or special knowledge or effort.

Reason: The current code language is not clear about the location of the required egress door. The purpose of this proposal is to clearly state that the "required egress door" is to be located at the exterior of the building.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB47–07/08
R311.2

Proponent: John Woestman, The Kellen Company, representing Window and Door Manufacturers Association (WDMA)

Revise as follows:

R311.2 (Supp) Egress door. At least one egress door shall be provided for each dwelling unit. The egress door shall be side-hinged~~,~~ <u>. The door panel minimum nominal width shall be</u> ~~not less than~~ 3 feet (914 mm) ~~in width and not less than~~ <u>and the minimum nominal height shall be</u> 6 feet 8 inches (2032 mm) ~~in height~~. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the dwelling without the use of a key or special knowledge or effort.

Reason: This proposal clarifies code requirements to be consistent with the language used for specifying and selling most doors used in egress applications in residential construction. Entry doors are commonly specified and sold in widths such as 2/6, 2/8, 3/0, & 3/6 and in heights such as 6/8, 7/0, & 8/0 (and similar variations). This proposal clarifies that a 3/0 x 6/8 door, which has a door panel of 3 feet nominal width and 6 feet 8 inches nominal height is the smallest door acceptable by the code for an egress door.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB48–07/08
R311.4

Proponent: Maureen Traxler, City of Seattle, WA, representing Washington Association of Building Officials Technical Code Development Committee

Revise as follows:

R311.4 (Supp) Vertical egress. Egress from habitable levels and basements ~~not provided with~~ <u>shall be by</u> an egress door in accordance with Section<u>s</u> R311.2 <u>and R311.3.1,</u> ~~shall be by~~ a ramp in accordance with Section R311.7 or a stairway in accordance with Section R311.6.

Reason: The purpose of this proposal is to clarify the requirements for vertical egress. The revised means of egress provisions approved in May, 2007 provide for three possible ways to provide egress from a floor. This proposed language collects references to all three in one section.

Cost Impact: This code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB49–07/08
R311.4

Proponent: Tim Nogler, Washington State Building Code Council, representing Washington Association of Building Officials

Revise as follows:

R311.4 (Supp) Vertical egress. Egress from habitable levels and basements not provided with an egress door in accordance with Section R311.2 shall be by a ramp in accordance with Section R311.7 or a stairway in accordance with Section R311.6.

Exception: Stairs or ladders within an individual dwelling unit used for egress from areas of 200 square feet (18.6 m^2) or less, and not containing the primary bathroom or kitchen.

Reason: This code change proposal will add an exception to the stairway and ramp requirements in the IRC. Efficient use of space and energy conservation is a critical element in creating affordable housing. This proposal allows an alternate means of egress from small, limited areas in private residential dwelling units. In small, space efficient units, lofts or similar areas are integral to the use of the space and necessary to make the space habitable. To require a code compliant stair is impractical, as the stair takes up as much space than the loft area provides. The private resident is familiar with the space and knows how to negotiate and protect access to the loft space. This exception has been in effect in the state of Washington for over ten years with no reported problems regarding injuries or other safety issues.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB50–07/08
R311.4.3

Proponent: Thomas B. Zuzik, Jr., Artistic Railings, Inc., representing himself

Revise as follows:

R311.3 (Supp) Floors and landings at doors. There shall be a landing or floor or landing on each side of each exterior door. The width of each landing shall not be less than the door served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel. Exterior landings shall be permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent).

Exception: Exterior doors that are not to serve as a means of egress.

Reason: The current code does not allow the use of false or small personal size viewing balconies with less than 36 inches of projection inside or outside exterior doors. This exception is intended to fill a gap in the code to allow the use of small personal size viewing balconies and guards to block off exterior doors intended more for use as a full height window rather than a door for exiting the premises.

1. The intention of the minimum landing size for exterior doors is based on that the door is to serve the means of egress for leaving the home and being a common path of travel, when the door is more intended for viewing rather than exiting this exception allows additional options.
2. With homeowners and designers now looking to add full height doors as windows and at the same time keep the cost down, the required landing projection of 36 inches is not needed at every door through out the home unless that door is serving the exit path requirements for the structure.

The use of small size personal viewing balconies are intended to allow minimum cost and size to enhance the home. The following 2 pictures show locations on second floor levels of homes were small projection balconies serve there use and requiring 36 inches of projection would be a very high cost thus removing a viable and safe option for homeowners.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB51–07/08
R202 (New)

Proponent: Tim Pate, Building Department, City & County of Broomfield, CO, representing Colorado Chapter of ICC

Add new definitions as follows:

STAIRWAY. One or more flights of stairs, either interior or exterior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another within or attached to a building, porch or deck.

STAIR. A change in elevation, consisting of one or more risers.

Reason: This was a code change (RB31-06/07) that was submitted and turned down by the Residential Committee last cycle. The reason statement was that the Committee felt there should be a definition of stairway and stair but that it should be the same as what is in the IBC. I wrote a challenge to modify the original to have the definition match the IBC language. There was testimony against this modification which explained that the wording in the IBC would cover all stairs even if not associated to the house such as landscaping stairs out back. Based on this testimony the challenge and modification were disapproved in Rochester. I now agree with that problem and bring back the original code change so that we can get the definition into this Code. I believe that the wording is explicitly clear that it would only apply to a stair that is within or attached to an exterior element.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB52–07/08
R311.5.1.1 through R311.5.4.1 (New)

Proponent: Lawrence Suggars, South Salt Lake City, UT, representing Utah Chapter of ICC

Add new text as follows:

R311.5 Construction.

R311.5.1 (Supp) Attachment. Exterior landings, decks, balconies, stairs and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachment shall not be accomplished by use of toenails or nails subject to withdrawal.

R311.5.1.1 Common egress stairway width. When two or more single family dwellings converge into one common path of egress to the public way, the common stairway shall not be less than 44 inches wide.

R311.5.3.1.1 Common egress riser height. When two or more single family dwellings converge into one common path of egress to the public way, the maximum riser height shall not be greater than 7 inches with a maximum of 3/8 inch variation between risers in a flight of stairs.

R311.5.3.2.1 Common egress tread depth. When two or more single family dwellings converge into one common path of egress to the public way, the minimum tread depth shall be not less than 11 inches with a maximum of 3/8 inch variation between treads in a flight of stairs.

R311.5.4.1 Common egress landings for stairways. When two or more single family dwellings converge into one common path of egress to the public way, landings for common stairways shall have a width not less than the stairway served. The landing shall have a minimum dimension in the direction of travel equal to the width of the stairway served but need not exceed 48 inches where the stairway has a straight run.

Reason: One of the real strengths of the IRC is that it is a total or all inclusive code. All the requirements that a designer/inspector needs to do their job can be found in one book, the IRC. But what do you do when separate paths of egress merge with other dwellings sharing one common path? The IBC can handle this convergence very easily between the R-3's individually and collectively. It simple changes form 7 3/4, and 10 inches, to 7, and 11 inches (rise and runs respectively). Technically the hazards for common egress travel are the same in either the IBC or the IRC. Both codes deal with individual dwelling units and converging dwelling units for common egress travel to the public way. Now the IRC can have its own language to address common path for egress to the public way. This is a needed change to keep the IRC all inclusive.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB53–07/08
R311.5.3.1, R311.5.3.3, R312.2

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R311.5.3.1 Riser~~s~~ ~~height~~. The maximum riser height shall be 73/4 inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the leading edge of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4 ⅜ inches (107 mm) sphere.

Exception: The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

R311.5.3.3 (Supp) Profile. The radius of curvature at the nosing shall be no greater than 9/16 inch (14 mm). A nosing not less than 3/4 inch (19 mm) but not more than 1 1/4 inch (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosings shall not exceed 1/2 inch (12.7 mm). ~~Risers shall be vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.~~

Exceptions~~:~~

~~1.~~ A nosing is not required where the tread depth is a minimum of 11 inches (279 mm).
~~2. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.~~

R312.2 Guard opening limitations. Required guards ~~on open sides of stairways, raised floor areas, balconies and porches~~ shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 4 3/8 inches (~~102~~ 107 mm) or more in diameter.

Exceptions~~:~~

~~1.~~ The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (152 mm) cannot pass through.
~~2. Openings for required guards on the sides of stair treads shall not allow a sphere 4 3/8 inches (107 mm) to pass through.~~

Reason: This proposal addresses a number of issues. Rules addressing open risers are located in the section on nosing profile rather than in the section on risers. It can easily be overlooked where it is currently located. The proposal relocates the text to the section on risers so all riser rules are in the same location.

Next, there are currently three different minimum standards for fall protection through guards or stairs: 6 inches, 4 3/8 inches, and 4 inches. Obviously there is something wrong with the code when you are standing on a tread of a stair and you have openings within inches of each other that all have differing ***minimum*** protection requirements that are intended to prevent one thing. The change to permit openings in guards to 4 3/8 inches included all of the necessary information for the IRC Committee to change the code to allow the larger spacing. That information is a public record. By approving this code change the Committee will create more consistency in the rules and eliminate a portion of the multiple standards.

Last, an editorial change is proposed by deleting the term "on open sides of stairways, raised floor areas, balconies and porches" in R312.2. The current text first references "required" guards but then lists specific locations implying that required guards in locations other than those listed need not meet the opening limitation.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB54–07/08
R311.5.3.2

Proponent: Daniel Weed, CBO, City of Central, CO, representing himself

Revise as follows:

R311.5.3.2 Tread depth. The minimum tread depth shall be 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured as above at a point 12 inches (305 mm) from the side where the treads are narrower. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point. Within any flight of stairs, the largest winder tread depth at the 12 inch (305 mm) walk line shall not exceed the smallest by more than 3/8 inch (9.5 mm).

Exception: Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch (9.5 mm) of the rectangular tread depth.

Reason: It has been unclear if winders that are code compliant may be located in the same flight as regular treads that are code compliant. Since most stair activity occurs on the "walk line", the user finds a rhythm along regular steps, then adjusts to the winders as the curve is made, and adjusts back again as the flight straightens out. While the code has not been clear in the past, this change will help be consistent with decisions several jurisdictions across the country have already made.

This concept already exists in 1009.3.2 of the IBC, and logically the user of the residential stair will be more used to their surroundings than those in a commercial setting where the same concept should also exist. As a result, there will be even less opportunity for a dangerous condition when used within this code.

The purpose of this change is to clarify that both types of treads may be allowed in the same flight as long as each type of tread is within 3/8" depth of other treads of the same kind within the flight. The new wording is superior in that it leaves no guessing of intent up to the user. Without this change, the user may decide that different types of treads could not be in the same flight since winders are not rectangular and therefore will vary more than 3/8" from the regular treads.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB55–07/08

R311.5.4 (New), R319.4, R319.4.1 (New), R502.2.4, Chapter 43

Proponent: John Woestman, The Kellen Company, representing Composite Lumber Manufacturers Association

1. Add new text as follows:

R311.5.3.4 Exterior wood plastic composite stair treads. Wood plastic composite stair treads shall comply with the provisions of Section R319.4.

2. Revise as follows:

R319.4 (Supp) Wood plastic composites. Wood plastic composites used in exterior deck boards, stair treads, handrails and guardrail systems shall bear a label indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 7032.

3. Add new text as follows:

R319.4.1 Wood plastic composites shall be installed in accordance with the manufacturer's instructions.

R502.2.2.4 Exterior wood plastic composite deck boards. Wood plastic composite deck boards shall be installed in accordance with the manufacturer's instructions.

4. Revise standard in Chapter 43 as follows:

ASTM

D 7032-~~04~~ 07 Standard Specification for Establishing Performance Ratings For Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)

Reason: During the last code cycle, added to the IRC were requirements for wood plastic composites used in exterior decks, guards, and handrails to bear a label showing performance levels and compliance to ASTM standard D 7032 (Standard Specification for Establishing Performance Ratings For Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)). This proposal expands these same requirements to exterior stair treads of wood plastic composites.

Stair treads are a critical element of many exterior deck systems, and it is appropriate that stair treads constructed from wood plastic composites comply with the same standard as the deck boards to help ensure product performance and occupant safety.

This proposal also includes a requirement for installation of these wood plastic composite products to the manufacturer's instructions. Installation per the manufacturer's instructions is the best way to ensure that wood plastic composites perform to the required design loads, and installation instructions are an integral part of the manufacturers labeling program.

Additionally, adding section R502.2.2.4 to the section for the design and construction of decks provides requirements that wood plastic composite deck boards are subject to compliance with the manufacturers instructions for design and attachment.

This proposal also updates the referenced ASTM standard applicable to wood plastic composites used for exterior deck boards, stair treads, guards, and handrails.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB56–07/08
R311.5.6.1

Proponent: David W. Cooper, Stairway Manufacturers' Association

Revise as follows:

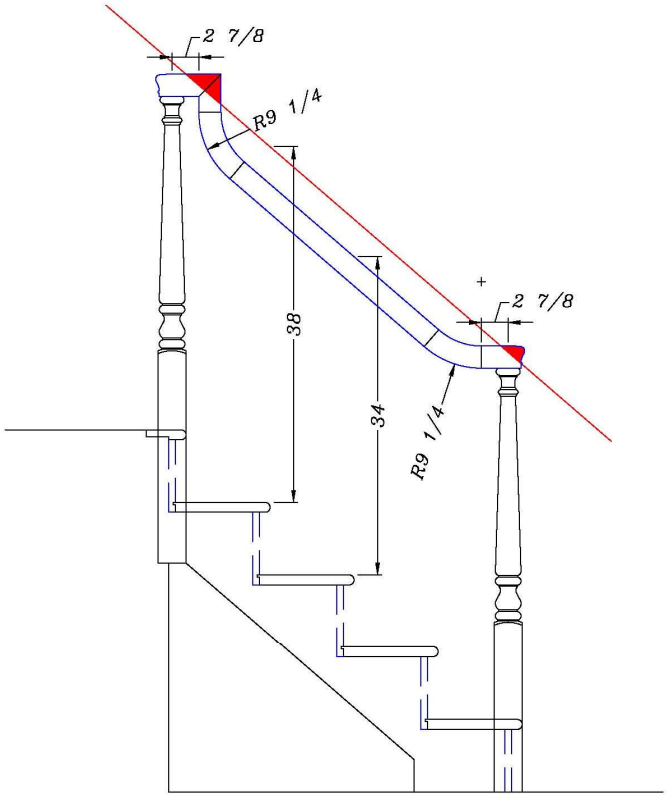
R311.5.6.1 (Supp) Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

Exceptions:

1. The use of a volute, turnout, or starting easing shall be allowed over the lowest tread.
2. When handrail ~~transitions~~ fittings or bendings are used to provide continuous transition between flights, the transition from handrail to guardrail, or used at the start of a flight, the handrail height at the ~~transition~~ fittings or bendings shall be permitted to exceed the maximum height.

Reason: Exception 2 was accepted as modified on the floor in the last cycle. The word "transitions" was substituted for the word "fitting". Both metal and wood industries are in agreement that the above change clarifies and best describes the terminology used. This text more clearly states the intent of the change that was approved as modified in Rochester to allow the exception when the rail is bent in one piece without visible joints as might be seen when fittings are used.

The original purpose of this change was to allow the height variation necessary to make the transition possible to provide continuity not limit the technique used. The same illustration from last year's submission is included here.



Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB57–07/08
R311.6.1

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials

Revise as follows:

R311.6.1 Maximum slope. Ramps shall have a maximum slope of one unit vertical in ~~twelve units horizontal (8.3-percent slope)~~ eight horizontal (12.4 percent slope).

> **~~Exception:~~** ~~Where it is technically infeasible to comply because of site constraints, ramps may have a maximum slope of one unit vertical in eight horizontal (12.5 percent slope).~~

Reason: IBC Section 1010.2 reads as follows:

> **1010.2 Slope.** Ramps used as part of a means of egress shall have a running slope not steeper than one unit vertical in 12 units horizontal (8-percent slope). The slope of other pedestrian ramps shall not be steeper than one unit vertical in eight units horizontal (12.5-percent slope).
>
> **Exception:** An aisle ramp slope in occupancies of Group A shall comply with Section 1025.11.

Since the IBC allows residential ramps with slopes of 1:8, the IRC should not be more restrictive. The IRC Committee disapproved this code change in Orlando on a 6-5 vote with the chair breaking the tie however the discrepancy between the IRC and IBC was not pointed out.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB58–07/08
R312.1, R312.2 (New), R312.3

Proponent: Thomas B. Zuzik, Jr., Artistic Railings, Inc., representing himself

Revise as follows:

R312.1 (Supp) Where ~~Guards~~ required. ~~Guards shall be provided on all decks, landings, porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below. Required guards shall not be less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.~~ Guards shall be located along open-sided walking surfaces, including porches, decks, balconies, mezzanines, stairs, ramps and landings, which are located more than 30 inches (762mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard.

~~Porches and decks which are enclosed with insect screening shall be equipped with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.~~

R312.2 Height. Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall not be less than 36 inches (914mm) high measured vertically above the above the adjacent walking surface or the line connecting the leading edges of the treads.

> **Exception:** Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edge of the treads, and where the guard also serves as the required handrail the height shall not exceed 38 inches (965 mm) measured vertically from a line connecting the leading edge of the treads.

~~R312.2~~ R312.3 ~~Guard~~ Opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102 mm) or more in diameter.

Exceptions:

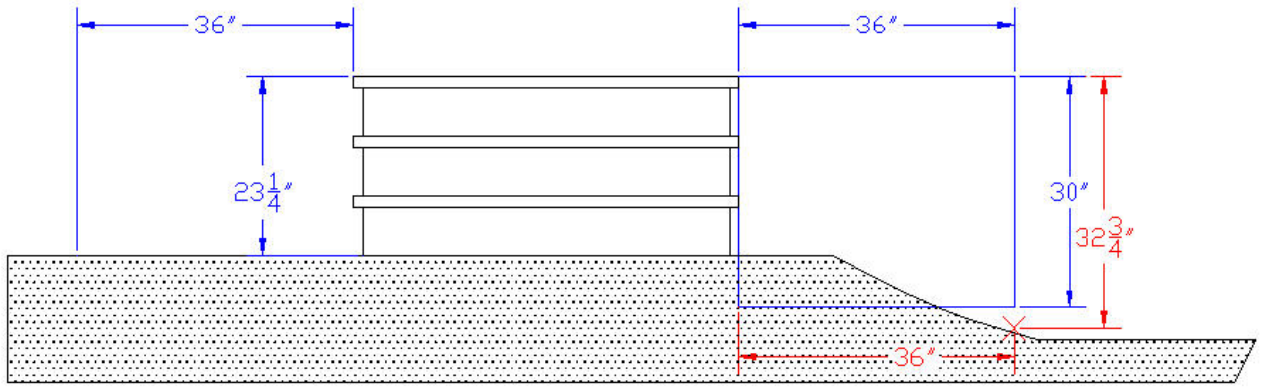
1. The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (152 mm) cannot pass through.
2. Openings for required guards on the sides of stair treads shall not allow a sphere 4 3/8 inches (107 mm) to pass through.

~~R312.3~~ R313.4 (Supp) Exterior wood plastic composite guards. Wood plastic composite guards shall comply with the provisions of Section R319.4

Reason: The purpose of the proposal is to create consistency between IRC 312 & IBC 1013 and next to provide fixed points for measuring the 30 inch vertical riser height of elevated surfaces to determine when guards are required.

1. R312.1 is being broken down in to 2 sections and then moves the existing 312.2 to 312.3. The new R312.1 is centered on general guard requirements of establishing when a guard is required. The new 312.2 establishes the height requirements of the guard along with its stair height exception. The new 312.3 removes the word guard as this is the title of the section and deals directly with the topic of opening limitations.
2. The existing R312.1 states that guards are required when the walking surface is 30 inches or more above the walking surface below, however it does not define clearly were to measure that vertical measurement. This proposed code change also sets a set of parameters as to where to take the measurements.
3. I the author, previously submitted this proposal in the prior code cycle and used the 24 inch offset measurement that is published in the BOCA 1996 building code, section 1825.0 retaining walls, section 1825.5 guards, as the determining distance or point of reference for when retaining walls where required to have guards. Upon request from multiple supporters of the previous proposal a change from 24 inches to 36 inches was made to allow for an area the size of a minimum landing as required in the IRC for inside and outside exterior doors.

The diagram below was drawn by the author and is shown as a visual guide or technical drawing. The drawing shows a 3 riser front entry stoop with 7-3/4" risers from a front elevation. The ground is detailed in outlined dots. The 36" horizontal with 30" vertical box on the right shows the area in which the code change submits the measurements should be taken. The 32-3/4" vertical point shows the deepest point within the 36" horizontal edge measurement. The left side of the stoop is shown not over 30" in height and thus no guard required.



Thus if this stoop was on a home it would require a guard be installed on the right side only as the left side is not 30 inches or more deep.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:				
	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB59–07/08
R312.1

Proponent: Thomas B. Zuzik, Jr., Artistic Railings, Inc., representing himself

Revise as follows:

R312.1 (Supp) Where ~~Guards~~ required. Guards shall be provided on all decks, landings, porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below. Required guards shall not be less than 36 inches (914 mm) in height, measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. ~~Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.~~

Exception: Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edge of the treads, and where the guard also serves as the required handrail the height shall not exceed 38 inches (965 mm) measured vertically from a line connecting the leading edge of the treads.

Porches and decks which are enclosed with insect screening shall be equipped with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

Reason: To simplify when guards are required on all walking surfaces and then list basic exemptions.

1. R312.1 is simplified to when the walking surface is over 30 inches from the level below a guard 36 inches in height is required.
2. Next the exception for the height of a guard on stairs is moved to a proper location as the lower height and upper height are an exception to the standard requirement. This breaks up the run on of additional wording in the main paragraph.
3. The IBC does not require the restriction of when the total height of the risers exceeds 30 from the lower landing that guards are required, thus the IRC should follow in example.
4. The wording for requiring guards on the stairs does not take in to account that you can have a total rise over 30 inches but never have an area of the stairs or upper landing over 30 inches above the immediate area adjacent to the upper landing or stairs.

Example: A 7 riser set of steps coming up a lawn rising above the lower walkway 49 inches, but the lawn ascends up along the steps no more than 8" below each step. The open sides of the stairs has a total rise greater than 30 inches from the starting grade below, but never a 30 inch fall rise within 36 inches horizontal of any edge of the stairs.

In conclusion the requirement as currently written is not in agreement with the standards set in the IBC.

5. The existing R312.1 states that guards are required when the walking surface is 30 inches or more above the walking surface below, however it does not define clearly were to measure that vertical measurement. This proposed code change also sets a set of parameters as to where to take the measurements.
6. I the author, previously submitted a similar proposal in the prior code cycle and used the 24 inch offset measurement that is published in the BOCA 1996 building code, section 1825.0 retaining walls, section 1825.5 guards, as the determining distance or point of reference for when retaining walls where required to have guards. Upon request from multiple supporters of the previous proposal a change from 24 inches to 36 inches was made to allow for an area the size of a minimum landing as required in the IRC for inside and outside exterior doors.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB60–07/08
R312.1

Proponent: Thomas B. Zuzik, Jr., Artistic Railings, Inc., representing himself

Revise as follows:

R312.1 (Supp) Where ~~Guards~~ required. Guards shall be provided on all decks, landings, porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below. Required guards shall not be less than 36 inches (914 mm) in height. ~~Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.~~

Exception: Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edge of the treads, and where the guard also serves as the required handrail the height shall not exceed 38 inches (965 mm) measured vertically from a line connecting the leading edge of the treads.

Porches and decks which are enclosed with insect screening shall be equipped with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

Reason: To simplify when guards are required on all walking surfaces and then list basic exemptions.

1. R312.1 is simplified to when the walking surface is over 30 inches from the level below a guard 36 inches in height is required.
2. Next the exception for the height of a guard on stairs is moved to a proper location as the lower height and upper height are an exception to the standard requirement. This breaks up the run on of additional wording in the main paragraph.
3. The IBC does not require the restriction of when the total height of the risers exceeds 30 from the lower landing that guards are required, thus the IRC should follow in example.
4. The wording for requiring guards on the stairs does not take in to account that you can have a total rise over 30 inches but never have an area of the stairs or upper landing over 30 inches above the immediate area adjacent to the upper landing or stairs.

Example: A 7 riser set of steps coming up a lawn rising above the lower walkway 49 inches, but the lawn ascends up along the steps no more than 8" below each step. The open sides of the stairs has a total rise greater than 30 inches from the starting grade below, but never a 30 inch fall rise within 36 inches horizontal of any edge of the stairs.

In conclusion the requirement as currently written is not in agreement with the standards set in the IBC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB61–07/08

R312.1, Figure R312.1 (New)

Proponent: Michael G. Morse, Brookeville, MD, representing himself

1. Revise as follows:

R312.1 (Supp) Guards. Guards shall be provided on all decks, landings, porches, balconies, ramps or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below. Required guards shall not be less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads. Guard posts shall be installed as to meet or exceed the performance requirements stated in Table R301.5 Minimum Uniformly Distributed Live Loads. The guard post connection shall be permitted to be installed in accordance with Figure R312.1(1). Each guard post shall be supported by a minimum of one approved lateral anchor. Lateral anchors shall be tested and approved as an assembly that shall meet the performance requirements of this code.

Porches and decks which are enclosed with insect screening shall be equipped with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

2. Add new figure as follows:

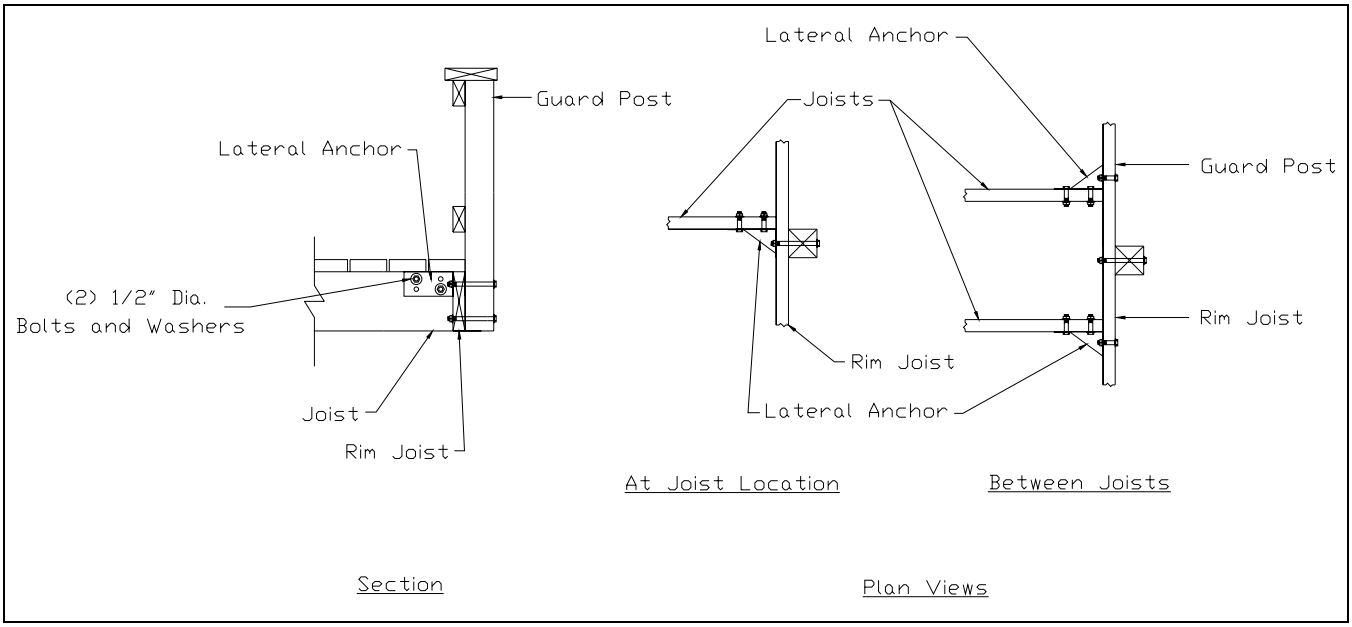


FIGURE R312.1
GUARDS

Reason: Failure of the deck guard system produces devastating injuries and places the public at tremendous risk. Conventional connection methods for attaching wood and composite guard posts to the deck have not tested to the code required loads. This connection weakness necessitates the development of a prescriptive detail to support existing guard performance code. Currently, the IRC does not show how to attach guard posts to decks. This purpose of this revision is to add a prescriptive detail for guard attachment.

Researchers at Virginia Tech University, Washington State University and numerous industry concerns have tested techniques for attaching guard posts to decks to quantify the load capacity of these assemblies. The testing also attempted to identify a connection detail that would provide consistent performance and would meet the current IRC live load requirement of 200lbs with a safety factor of 2.5. Current industry connection methods, as tested, failed to meet this load requirement.

Post attachment methods that rely on nails, screws, blocking, and bolts have been tested and have failed to meet the target load capacity. However, guard post assemblies that incorporate a lateral anchor have consistently achieved results that met or exceeded the target load values as established by the ICC. Lateral anchors have been shown to effectively transfer load and the associated moment to the deck floor joists. This code revision prescribes a method of post-to-deck attachment that will provide guard systems the capacity to meet or exceed code prescribed performance levels.

Bibliography:

1, M. Morse, D. Walsh, 2005. Alternative Hardware for Guardrail to Post Connection, Professional Deck Builder, Vol. 4, (2). 51,59
2. M. Morse, B. Corwin, R. Morse, A. Johnson, 2007. Safety Alert: Study Reveals Sharp Increase in Deck Failures, ICC Safe
3. R. Tichy, 2005. Wood Materials and Engineering Laboratory Report No. WMEL 07-019, Washington State University
4. J. Loferski, F. Woeste, D. Albright, 2005. Load Tested Guardrail Post Connections, Professional Deck Builder, Vol. 4, (2). 48-50,52-56

Cost Impact: The code change proposal will increase the cost of construction. Since the use of lateral anchors will increase the load capacity of the guard system, fewer posts will be required. Therefore, the cost of the lateral anchors and hardware will be offset by the reduction in the number of posts and by the reduced labor costs associated with installing fewer posts.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB62–07/08

R313.1 (New), Appendix P, Chapter 43

Proponents: Sandra Stanek, Fire Code Consultants LLC, representing herself; John C. Dean, National Association of State Fire Marshals (NASFM)

1. Add new text as follows:

SECTION R313
~~SMOKE ALARMS~~ FIRE SPRINKLER SYSTEMS

R313.1 General. An approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings and townhouses in accordance with NFPA 13D.

(Renumber subsequent sections)

2. Delete appendix without substitution:

~~APPENDIX P~~
~~FIRE SPRINKLER SYSTEM~~

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~**AP101 Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with Section 903.3.1 of the *International Building Code*.~~

3. Add standard to Chapter 43 as follows:

NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason (Stanek): All new houses should have fire sprinklers. The majority of the members attending the Rochester ROC meeting in May 07 were in favor of residential sprinklers in all new one & two family dwellings. I believe the will of the majority of ICC members as shown in Rochester should be upheld.

There are many reasons why NOW is the time to change the IRC and establish residential sprinklers as part of the minimum safety package set forth in the national model code for residential construction. Substantial justification was offered last cycle, and additional substantiation is offered in this proposal, primarily focusing on the issues raised in opposition.

1. System freeze-ups in cold climates: Opponents of residential sprinklers assert that system freeze-ups will cause problems in cold climates. However, a sprinkler system poses no greater risk of freezing than domestic plumbing if the system is properly designed and installed. Freeze-ups result from design or installation errors that can occur with any plumbing system, and it is incorrect to suggest that sprinkler systems in cold climates are predisposed to freezing. In fact, on the contrary, there are many jurisdictions with severely freezing climates that have adopted residential sprinkler ordinances, which would surely have been repealed if freezing problems were widespread. This simply hasn't happened. There are many options available to sprinkler homes in freezing climates to combat the risks of frozen piping. These include, among others:

- Using sidewall sprinklers supplied by pipes running in walls, soffits, closets and crawl spaces to keep sprinkler piping out of unheated attics, or
- Properly installing piping beneath the insulation in attics to protect the piping from the unheated attic space. This technique has been used in climates as cold as Wrangle, Alaska to successfully sprinkler single family homes.

The Residential Fire Safety Institute documents that hundreds of jurisdictions in at least 25 states have adopted residential sprinkler legislation, including mountainous states and Northern states ranging from New York to Alaska. In addition, sprinkler systems are required in all residential occupancies governed by the IBC, which include group homes and townhouses exceeding 3-stories in height. The bottom line is that residential sprinkler systems have been installed in homes located in freezing climates for many years, and if freeze concerns are being addressed in these cases, as they must be, then homes sprinklered in accordance with the IRC can and will be handled in the same manner.

2. Cost impact of inflated water tap fees: Opponents of residential sprinklers argue that sprinklers costs will skyrocket in jurisdictions where local water purveyors inflate the cost of larger water taps. Obviously, this is not a building code issue, and local fees should not serve as an impediment to national policy established by the IRC. Nevertheless, an experienced designer can avoid the use of a larger meter, and associated fee increases, by applying alternative design approaches that are already permitted by NFPA 13D. Such alternatives include:

- Using reduced sprinkler spacing in rooms protected by more than one sprinkler. UL listed sprinklers are already on the market for reduced spacing that only require 9 gpm per sprinkler. Given that NFPA 13D requires that a maximum of two sprinklers be calculated for dwelling systems, this yields a total demand of 18 gpm, which can be supplied by many municipal systems using a standard 5/8-inch meter. With this design approach, extended coverage sprinklers can still be used in rooms requiring only a single sprinkler. Although this design approach may not be the best choice for every case, it is particularly suited to smaller homes at the entry/affordable housing level.

- If the tap fees for larger supplies are substantially out of line, there is always an option available to install a small tank/pump system supplied by a standard size water tap. Obviously, this option comes with its own associated cost, but it does provide an upper limit to the potential impact of high tap fees.

The options listed above are available today, and they meet NFPA 13D. Obviously, the most effective approach to fighting unfairly high tap fees is to encourage that the fees be reduced when increased meter sizes are being used to support the installation of a fire sprinkler system. Mandating sprinklers will put builders and code officials on the same side of this issue, trying to get affordable sprinklers, rather than arguing over whether sprinklers should be provided. The home building industry could be using its powerful political contacts to reduce the costs of tap fees rather than resisting the efforts to install fire sprinklers.

For such an effort to be successful, water purveyors will need to understand that increasing meter/tap sizes to supply residential sprinklers does not increase the demand on a public water system. On the contrary, residential sprinklers actually reduce demand because sprinklers only flow water when a fire occurs, and the amount of water used by a residential fire sprinkler system is only a fraction of what firefighters use to extinguish fires in unsprinklered properties. This argument has already successfully resolved tap fee issues in some jurisdictions.

3. Cost of sprinklers and impact on affordable housing. Before specifically addressing the cost of sprinklers, there is a basic question that has to be asked when it comes to the price of housing in America, "What drives the price of a new home?" In many markets, the answer to this question is not "construction costs." Instead, prices are established based on an analysis of what the market will bear. In these markets, sales prices will continue to rise as long as there are buyers who are willing to pay the asking price, and in these markets, it would be disingenuous, at best, to suggest that the cost of fire sprinklers would price buyers out of the market.

In other segments of the home building industry, new home pricing does follow the "cost plus" model, and in these cases, the added cost of a sprinkler system is an important consideration. Such costs will be a function of many variables, including but not limited to, the availability of a public water supply, the size of the home, the level of competition in the local market, the design approach, the climate and enhancements that may be desired by the owner, such as custom colored cover plates for sprinklers.

One source of cost data associated with the widespread installation of residential sprinklers is available from Scottsdale, Arizona. Scottsdale, which became one of the first major U.S. jurisdictions to require residential sprinklers roughly 20 years ago, serves as an excellent demonstration case to show the effects of a community's decision to require residential sprinklers on system cost, life safety, property protection and the local fire-protection infrastructure. With respect to cost, residential sprinkler systems in Scottsdale were recently quoted as costing $0.55 to $0.75 per square foot, and there are now well over 40,000 sprinklered homes in the city. No one is suggesting that every other jurisdiction where residential sprinklers are required will match Scottsdale's cost structure, but Scottsdale's experience clearly demonstrates that a competitive marketplace greatly reduces sprinkler costs.

Technology, creative design approaches and labor charges also impact these costs. Multipurpose systems, which are already permitted by NFPA 13D, have been shown to be particularly well suited to certain types of homes because they add minimal cost to the plumbing installation. Recent surveys of sprinkler costs for affordable homes in the 1,000 to 1,200 square foot range showed that the added cost of materials related to sprinkler protection was in the $0.25 to 0.30 per square foot range, and the sprinkler installation required less than 8 hours of additional labor. While no cost increase is inconsequential when dealing with affordable housing, the significant fire safety benefits gained by installing sprinklers for such a small cost (in the $4/month range on a 30-year mortgage, not including any insurance or tax credit) certainly appears to be money well invested.

With respect to the cost of sprinklers in larger homes, the actual impact of sprinkler costs on the owner's monthly payment isn't much different. Figuring the cost of a hypothetical $3,000 sprinkler system in a $300,000 home with a 6.5% mortgage, a 5% credit on a $2,000/year insurance bill, and a combined Federal/State income tax rate of 33%; the net cost of fire sprinklers, after mortgage related tax deductions, would be $4.37 per month. This represents a 0.23% increase in the monthly payment and roughly equates to the cost of a premium beverage at Starbucks. The total cost on an annual basis would be $52.44, which would easily be offset by insurance reductions.

With all of the foregoing information in mind, it seems fair to say that the true impact on the housing market associated with requiring residential sprinklers will be far less than what opponents of residential sprinklers would like code officials to believe. It has been demonstrated many times in the many jurisdictions throughout the country where residential sprinklers are required that housing markets are not affected by fire sprinklers. These local experiences show us that, once the IRC requires residential sprinklers, home building will continue as it always has. Home prices will fluctuate based on the law of supply and demand; home builders will adjust their products to meet consumer preferences and trends; and home buyers will continue to buy homes.

For a full cost/benefit analysis of the impact of sprinklers on society, see the article, "Cost/Benefit to Society for Having Sprinklers in One and Two Family Dwellings – A Pessimistic Analysis", written by Kenneth E. Isman, P.E. for *SQ Magazine* in the Fall 2005 issue. It should be noted that the article is not designed to show what the fire sprinkler industry thinks will happen if all one and two family dwellings are sprinklered. Instead, the article was written to show that sprinklers still make sense, from a cost/benefit perspective, even if all of the pessimistic assumptions of the homebuilders are correct such as the assumption that fires only occur in older homes. If a more realistic approach is taken, then the benefits for fire sprinklers far outweigh the costs.

4. Does the public want residential sprinklers? Opponents of residential sprinklers have suggested that the general public, which isn't well represented at code hearings, would oppose residential sprinklers, but a recent national poll conducted by Harris Interactive indicates that this claim misrepresents public opinion. The survey of over 1,000 adults revealed that:

- 45% of homeowners said that a sprinklered home is more desirable than an unsprinklered home,
- 69% of homeowners said that having a fire sprinkler system increases the value of a home, and
- 38% of homeowners said that they would be more likely to purchase a home with fire sprinklers than without. The reason that this number isn't higher appears largely tied to an unfounded fear of water damage. 48% of homeowners cited water damage as the reason they would not want to install a sprinkler system. Clearly, this indicates a need for public education on the operation and reliability of sprinkler systems as being a major component in enhancing public support and demand for sprinklers.

The results of this survey support the assertion that the general public has become aware of and has warmed up to the concept of residential sprinklers. Certainly, this is due, at least in part, to the fact that many homeowners live in multifamily occupancies before they own a one- or two-family dwelling. Now that the IBC requires all new multi-family dwellings to be sprinklered, it is fair to say that the home-buying public will continue to become more familiar with residential sprinklers and that public support for residential fire sprinkler systems will continue to grow.

5. Correlation between a home's age and fire risk…aren't homes built to the IRC already safe enough? Opponents of residential sprinklers would like to convince us that residential fire deaths are a function of a home's age and that new homes, built in accordance with the IRC, are safe. Many people buy these arguments because, on the surface, they seem to make sense. However, further analysis paints a different picture.

First, most residential fires deaths result from fires caused directly or indirectly by people. Compliance with the IRC doesn't prevent these types of fires or many other common fire causes, and once a fire starts, compliance with the IRC will not slow its spread. The speed by which a fire spreads in a home is instead a function of contents and room geometry.

Second, a simplistic correlation of residential fire deaths with the age of homes ignores several variables that tend to vary based on the age of a home. These include the socioeconomic status of the occupants, the density of occupants, the age of the occupants, and the presence or omission of smoke detectors (discussed separately below), among others. Fire safety experts know that these factors are far more likely to be contributory factors in fire deaths than the age of a structure. In addition, the fact that more fire deaths occur in "older" homes than newer homes may also be related to the fact that the median age of homes in the U.S., according to a recent HUD study, is 32 years. By sheer numbers, a lot of people live in older homes.

6. Since only a small percentage of fire department responses are for actual structure fires, does the fire service really need residential sprinklers? With respect to residential fire losses, the statistics submitted with last cycle's proposal clearly demonstrated the scope and magnitude of the residential fire problem in the United States. Although the percentage of emergency responses to residential structure fires is a small fraction of overall fire department responses, a shocking 45 percent of firefighter deaths that occur on the fire ground occur at residential occupancies, almost always 1- and 2-family dwellings. Dwelling fires have three characteristics that present disproportionate risks as compared to fires in other occupancies:

- First, they are typically well developed, post-flashover fires by the time the fire department arrives.
- Second, they often occur at night, and
- Third, they often involve a real or perceived need to perform search and rescue operations.

In short, dwelling fires represent a small percentage of our emergency responses but account for a very large percentage of firefighters who are killed in the line of duty.

It is also important to point out that the ability of the fire service to protect our communities by responding to residential fires has declined significantly in recent years, and the situation isn't getting better. The public has a relatively simple expectation with respect to the fire department when a fire happens…they call 911, and the fire department responds to rescue trapped occupants and put out the fire. Unfortunately, that expectation isn't being effectively met in many parts of the country because of dwindling resources.

Nationally, volunteer firefighters, who comprise 73% of the American fire service and protect the vast majority of the geographic area of the United States, are becoming harder and harder to retain. In New York alone, the ranks of volunteer firefighters have declined from 110,000 in the early 1990s to approximately 85,000 today. Considering that all-volunteer fire departments protect 95% of New York communities with a population of less than 10,000, what will happen when there are no longer enough firefighters to respond to 911 calls? This situation is national. It is not unique to New York.

Long after many home builders leave a community, the homes that they leave behind and the people who live in them continue to place demands on the fire service. While the fire service will always strive to meet those demands, it is unrealistic to expect that our volunteers will always be able to do so. Therefore, the fire services' message is simple…if the public is going to be protected from home fires; it's time that we build that protection into new construction.

7. Aren't smoke alarms enough? Homebuilders often suggest that smoke alarms are good enough to protect the public and that residential sprinklers aren't justified. Everyone can agree that smoke alarms save lives and that they are largely responsible for a reduction in the fire death rates that occurred over the past 30 years. Nevertheless, smoke alarms on their own do nothing to stop the spread of fire, protect property or protect firefighters.

Two other issues related to reliance on smoke alarms are of concern. First, as smoke alarms age, their reliability declines. This concern prompted smoke alarm manufacturers and testing laboratories to begin stamping an expiration date on each unit indicating a 10-year replacement cycle. How many alarms will actually be replaced at 10-year intervals, and what will happen to the reliability of alarms that are not replaced? Although an estimated 96% of U.S. homes with telephones now have at least one smoke alarm, in ¼ of reported fires in smoke alarm equipped homes, the devices didn't work.

The second issue related to the effectiveness of smoke alarms in further reducing fire death rates has to do with their performance and waking effectiveness. In a study that was just completed in 2006, only 58% of a test group of children ages 6-12 awakened when a standard smoke alarm sounded, and only 38% of the test group successfully evacuated. The median time to awaken was 3 minutes, and the median time to escape was the maximum allowed 5 minutes.

Another study revealed that a surprising 34% of fire deaths in one- and two-family dwellings during the 2000-2004 period occurred in homes with a working smoke detector. Perhaps this statistic correlates with the fact that fire death rates for the young and the elderly, those who are least likely to be capable of self-preservation even if they are awakened by a smoke detector, are roughly double those for individuals in the central age group. Smoke detectors are good, but they can only go so far in reducing the nation's fire death and injury rates. We need residential sprinklers.

8. What about homes without a public water supply? Opponents of residential sprinklers have suggested that it is impractical and too expensive to require sprinklers in homes that will use a well as the water supply. However, design options are available that make wells a viable water supply for both sprinklers and domestic service. Wells essentially fall into two categories, deep and shallow. With a shallow well, the well will likely be designed to provide a direct feed to the home, with no intervening tank. With these types of systems, pumps can be selected at reasonable costs that are capable of supplying both the domestic and sprinkler demands. Constant pressure, variable speed pumps are an excellent choice for this type of application.

One question that is frequently raised with respect to direct feed well systems involves the "recharge" rate, or the rate at which water can keep up with the required flow. Wells may not be capable of keeping up with the demand associated with a sprinkler system, which will typically be 20 gallons per minute or more. Many automatically assume that a tank and a secondary pump are necessary in these cases, greatly increasing the cost of the sprinkler system, but a lesser known yet simple approach called "developing the well" is a much better solution.

Developing a well essentially creates an underground cistern that replaces the need for a tank. The approach involves digging the well substantially below the water table and allowing the hole to fill with water, retaining the needed capacity underground. By using an appropriate pump with a developed well, an interior tank and pump arrangement can be avoided, and the water supply costs can be limited.

For deeper wells, there are two options. First, there are constant pressure, variable speed pumps suited for these applications. For installations utilizing this approach, a "developed well" as described above can also be used to accommodate needed water retention to satisfy the sprinkler demand.

The second alternative involves a tank and pump, which can be installed between the well pump and the plumbing system. This approach is the common arrangement utilized for deep wells supplying domestic service. To supply sprinklers simply requires that the size of the domestic supply tank be increased to something in the range of 200-300 gallons, and the secondary pump needs to have an increased flow rating. Both of these enhancements can be made at modest cost.

Some have suggested that the IRC should not require homes on wells to have fire sprinklers, yet homes in rural areas, usually corresponding to homes served by wells, are the homes that are least likely to survive a fire because of long or inadequate responses by the fire service. The solution is instead educating contractors on cost-efficient design options for well systems.

9. Impact of residential sprinklers on public and private water systems: It was suggested by one builder last cycle that the operation of residential sprinklers connected to a small water system resulted in the jurisdiction having to drain and decontaminate the entire water system. Subsequent identification and review of the cited event revealed that the concern regarding contamination of the water supply, which was a private system, was linked to the use of fire hydrants during suppression activities, not the sprinkler system. This clearly makes more sense, and for the record, the fire actually started outside of this building, spread to the interior, and sprinklers still helped to stop the fire's progress.

To suggest that the water demand caused by operation of a one- or two-family dwelling or townhouse sprinkler system will lead to contamination of an entire community water system is absurd and demonstrates a complete lack of understanding regarding residential sprinkler systems. The same logic would suggest that a single broken residential pipe, which would flow more water than operating sprinklers, would have the same result. Any water system that is this feeble has much bigger concerns than residential sprinklers.

The truth is that residential sprinklers actually result in a significantly decreased demand on water systems because residential sprinklers use far less water than firefighters to extinguish a fire. Scottsdale, Arizona's experience provides data to support this claim. Scottsdale found that the average estimated sprinkler flow per residential fire incident was 341 gallons, as compared to an estimated manual suppression flow for unsprinklered residential fire incidents of 2,935 gallons.

10. Wait for more cost-effective approaches to residential sprinkler protection before adopting a requirement in the IRC. Opponents of residential sprinklers suggest that we should hold off on requiring such systems in dwellings until improvements in technology make the systems more cost effective. The truth is that many recent improvements in sprinkler technology have largely improved cost effectiveness already. The real problem isn't a lack of cost effective design and installation options.

Instead, the problem appears to stem from a lack of communication within the supply, design and installation communities regarding these efficient design options and the fact that momentum often drives us to continue doing things the way we've done them in the past. To drive the industry toward more innovative solutions, more competition is needed, and changing the IRC to require residential sprinklers will create the demand that will increase competition and motivate cost efficient designs.

Market demand will also drive the creation of design tools that will simplify the exercises of locating sprinklers and sizing pipe. These tools, which will present design requirements in prescriptive, cookbook formats, have already been developed, and are being used in communities like Prince Georges County, Maryland, with a great deal of success for well over ten years. It is expected that they can easily become national in scope as more communities adopt the IRC.

11. Required maintenance: Opponents of residential sprinklers have stated that residential sprinkler systems need regular maintenance and questioned who would perform this service. Someone suggested that local fire departments will have to perform or verify maintenance, potentially raising concerns regarding right of entry.

The fact is that residential sprinkler systems are essentially maintenance free. The owner just needs to be taught what NOT to do. Don't close the valve, don't paint the sprinklers and don't hang clothes from sprinklers. Multipurpose systems are essentially tested every time the domestic water is used. For systems with water flow alarms (not required by NFPA 13D, but installed on some systems) the alarm can easily be tested by the homeowner by turning a valve to create some flow and seeing if the alarm sounds. The test is hardly rocket science and is no more complicated than testing a burglar alarm or replacing a furnace filter, operations that homeowners perform regularly. None of this maintenance would need to be performed or witnessed by the fire department.

12. Trained labor/inspectors: Opponents of residential sprinklers have suggested that, if the IRC were to require residential sprinklers, there would be a shortage of trained labor and trained inspectors to install and inspect these systems. This subject is not a legitimate concern. The fire sprinkler industry has always responded to the increased demand created by code requirements. In the seven years between 1992 and 1999, the fire sprinkler industry doubled in size (going from approximately 20 million sprinklers installed each year to 40 million sprinklers installed). During this time, the industry kept pace with demand, adding additional people to the labor force. There is no doubt that the sprinkler industry can continue to respond to the increase in demand. Once the IRC has been revised, it will take several years for jurisdictions to begin to adopt and enforce the 2009 edition. Some jurisdictions will not choose to adopt the sprinkler requirements, so the impact on the industry will be gradual. There is no question that the demand will be met by the industry as the IRC is changed, adopted and implemented at the local level.

Preliminary discussions have already taken place with the ICC and other certification bodies regarding the possibility of having specific certification programs for installers of residential sprinkler systems and local inspectors that would review and approve the installations. Training programs are underway to take people with a general knowledge of pipe fitting and teach them the additional important requirements for residential fire sprinkler systems, so that all of the installations meet NFPA 13D.

13. Leakage and mold damage: Opponents of residential sprinklers have expressed fear that sprinklers would leak and cause mold damage, which could make a home uninsurable. In response, it should be pointed out that residential sprinkler systems are no different than residential plumbing. If quality products are used and the system is properly installed, it won't leak.

With respect to sprinkler systems, sprinkler piping and fittings, and sprinklers themselves, are subject to rigorous testing to ensure quality. Unquestionably, sprinklers are far higher quality and more thoroughly tested than domestic piping and fixtures. Sprinkler tests required for listing include, among other requirements, a 700 psi hydrostatic strength test, a 500 psi leakage resistance test, a 100,000 cycle water hammer resistance test, a 35-125°F temperature cycling test, and a freeze performance test to -20°F for 24 hours. Also, sprinkler piping and components are rated for a pressure of 175 psi, while plumbing water supply systems are rated for only 80 psi.

14. Appendix P, good enough for now? Opponents of residential sprinklers have suggested that the IRC Appendix P is fairly new and that we should wait to see what happens with it. Unfortunately, this dodges the issues at hand.

When a local jurisdiction goes to adopt Appendix P, the first statement that the local homebuilders make during the hearings is, "Appendix P isn't necessary or important. After all, if sprinklers were really necessary, they would have put them in the body of the code rather than the Appendix." So, the homebuilders end up playing both sides of the fence. At the IRC hearings, they point to Appendix P and use that as justification to keep the requirements for sprinklers out of the code. Then, at the local hearings, they point to the fact that the requirements are in the Appendix as a reason not to mandate sprinklers.

Another reason that we need sprinklers in the body of the standard rather than the Appendix is that the benefits to society become significantly greater when all homes are sprinklered. With the rule in the Appendix, there will be some jurisdictions that don't pass the requirement, leaving these communities unprotected and the public will not be able to reap the benefits (in fact, they may never even know what they are missing). But with the requirements in the body of the IRC, people may debate removing them when they adopt the IRC, but at least they will have some sense of what they are losing.

A third reason that we need the requirements for sprinklers in the body of the IRC rather than the Appendix is that the fire service and the fire sprinkler industry can't bring experts to the debate in every local jurisdiction. There are tens of thousands of jurisdictions where this debate might occur and the homebuilders are going to have their local representatives loaded for these hearings. The fire service and the fire sprinkler industry just don't have the money or the personnel to compete with the homebuilders on a dollar-for-dollar basis. The debate as to the right level of fire protection for a home should be at the national level, with all of the national experts. The right decision (to put sprinklers in homes) should be done at the national level in the body of the code. Then, if people want to modify the code at the local level and take sprinklers out, they do so at their own peril and without the recommendations of the national experts.

Putting the sprinkler requirement into the body of the IRC certainly won't end the local debate, but it will at least put the burden on the home building industry to justify making an amendment to take sprinklers out. Other codes including the Uniform Fire Code, the NFPA Building Code and the Life Safety Code have already set a moral precedent by adding mandatory dwelling sprinkler requirements in their 2006 editions. The IBC and IFC have also done their parts by now requiring all residential occupancies within their respective scopes to be protected by fire sprinklers. Now it is time for the IRC to catch up.

Conclusion: Unlike many issues that we face at code hearings, THIS change strikes directly at the heart of America's fire problem. Opponents of residential sprinklers have a record of fighting just about every initial effort to improve dwelling safety. The same groups initially fought against smoke detectors, ground fault interrupters and mandatory sprinklers in multi-family residential occupancies. On each of these topics, code officials heard the same predictions of gloom and doom, but once the codes moved forward to require these features, the home building industry proceeded without so much as a detectible bump in the road. As years passed, prices for all of these features declined, some dramatically, and technology advanced to create better, yet less expensive products.

Reason (Dean): The life safety hazards in one- and two-family occupancies are clear: Between the years of 2000 and 2004 there was an average of 375,200 reported home structure fires resulting in 2,970 civilian deaths, 14,390 civilian injuries and $5.6 billion dollars in direct property damage per year[i] These losses and deaths far exceed any of the other occupancy types. 75% of reported home structure fires and 87% of total fire deaths occurred in the one- and two-family dwelling environment[ii]

The ICC documents provide much more onerous code requirements for occupancy types other than the one- and two-family dwelling. These other occupancy types have significantly less fire death and loss history, yet they are provided with greater protection. Based on the current code requirements, the protection levels in the IRC do not match the life safety hazards in the one and two-family dwelling environment.
In the year 2006, 39% of all fireground firefighter deaths occurred in dwellings and apartments[iii] At the 2006 Code Development Hearing in Orlando, the Committee disapproved the original proposal put forward and at the May 2007 Rochester Final Action Hearing, the membership heard many of the same arguments. The following paragraphs identify and respond to the concerns raised at both hearings. With these issues addressed, NASFM encourages the support of all code officials in supporting this code change.

1. Does the public want residential sprinklers? Opponents of residential sprinklers suggested in Orlando that the general public, which isn't well represented at code hearings, would oppose residential sprinklers, but a recent national poll conducted by Harris Interactive indicates that this claim misrepresents public opinion. The survey of over 1,000 adults revealed that:

- 45% of homeowners said that a sprinklered home is more desirable than an unsprinklered home, • 69% of homeowners said that having a fire sprinkler system increases the value of a home, and
- 38% of homeowners said that they would be more likely to purchase a home with fire sprinklers than without. The reason that this number isn't higher appears largely tied to an unfounded fear of water damage. 48% of homeowners cited water damage as the reason they would not want to install a sprinkler system. Clearly, this indicates a need for public education on the operation and reliability of sprinkler systems as being a major component in enhancing public support and demand for sprinklers.

The results of this survey support the assertion that the general public has become aware of and has warmed up to the concept of residential sprinklers. Certainly, this is due, at least in part, to the fact that many homeowners live in multifamily occupancies before they own a one- or two-family dwelling. Now that the IBC requires all new multi-family dwellings to be sprinklered, it is fair to say that the home-buying public will continue to become more familiar with residential sprinklers and that public support for residential fire sprinkler systems will continue to grow.

2. Correlation between a home's age and fire risk…aren't homes built to the IRC already safe enough?: Opponents of residential sprinklers would like to convince us that residential fire deaths are a function of a home's age and that new homes, built in accordance with the IRC, are safe. Many people buy these arguments because, on the surface, they seem to make sense. However, further analysis paints a different picture. First, most residential fires deaths result from fires caused directly or indirectly by people. Compliance with the IRC doesn't prevent these types of fires or many other common fire causes, and once a fire starts, compliance with the IRC will not slow its spread. The speed by which a fire spreads in a home is instead a function of contents and room geometry.
Second, a simplistic correlation of residential fire deaths with the age of homes ignores several variables that tend to vary based on the age of a home. These include the socioeconomic status of the occupants, the density of occupants, the age of occupants, and the presence or omission of smoke detectors (discussed separately below), among others. Fire safety experts know that these factors are far more likely to be contributory factors in fire deaths than the age of a structure. In addition, the fact that more fire deaths occur in "older" homes than newer homes may also be related to the fact that the median age of homes in the U.S., according to a recent HUD study, is 32 years. By sheer numbers, a lot of people live in older homes. In summary, we do not debate that a home built in accordance with the IRC is safe, but that changes when people move in.

3. Since only a small percentage of fire department responses are for actual structure fires, does the fire service really need residential sprinklers? With respect to residential fire losses, the statistics submitted clearly demonstrate the scope and magnitude of the residential fire problem in the United States. Although the percentage of emergency responses to residential structure fires is a small fraction of overall fire department responses, a shocking 45 percent of firefighter deaths that occur on the fire ground occur at residential occupancies, almost always 1- and 2-family dwellings. Dwelling fires have three characteristics that present disproportionate risks as compared to fires in other

occupancies. First, they are typically well developed, post-flashover fires by the time the fire department arrives. Second, they often occur at night, and third, they often involve a real or perceived need to perform search and rescue operations. In short, dwelling fires represent a small percentage of our emergency responses but account for a very large percentage of firefighters who are killed in the line of duty.

It is also important to point out that the ability of the fire service to protect our communities by responding to residential fires has declined significantly in recent years, and the situation isn't getting better. The public has a relatively simple expectation with respect to the fire department when a fire happens…they call 911, and the fire department responds to rescue trapped occupants and put out the fire. Unfortunately, that expectation isn't being effectively met in many parts of the country because of dwindling resources.

Nationally, volunteer firefighters, who comprise 73% of the American fire service and protect the vast majority of the geographic area of the United States, are becoming harder and harder to retain. In New York alone, the ranks of volunteer firefighters have declined from 110,000 in the early 1990s to approximately 85,000 today. Considering that all volunteer fire departments protect 95% of New York communities with a population of less than 10,000, what will happen when there are no longer enough firefighters to respond to 911 calls? This situation is national and is not unique to New York. Long after many home builders leave a community, the homes that they leave behind and the people who live in them continue to place demands on the fire service. While the fire service will always strive to meet those demands, it is unrealistic to expect that our volunteers will always be able to do so. Therefore, the fire services' message is simple…if the public is going to be protected from home fires, it's time that we build that protection into new construction.

4. Aren't smoke alarms enough? Homebuilders who testified at the Orlando hearing suggested that smoke alarms are good enough to protect the public and that residential sprinklers aren't justified. Everyone can agree that smoke alarms save lives and that they are largely responsible for the dramatic reduction in fire death rates that has occurred in the U.S. over the past 30 years. Nevertheless, smoke alarms are only life-safety devices. On their own, they do nothing to stop the spread of fire, protect property or protect firefighters.

Two other issues related to reliance on smoke alarms are of concern. First, as smoke alarms age, their reliability declines. This concern prompted smoke alarm manufacturers and testing laboratories to begin stamping an expiration date on each unit indicating a 10-year replacement cycle. The questions before us are how many alarms will actually be replaced at 10-year intervals, and what will happen to the reliability of alarms that are not replaced? Although an estimated 96% of U.S. homes with telephones now have at least one smoke alarm, in ¼ of reported fires in smoke alarm equipped homes, the devices didn't work.

In contrast, residential sprinkler systems have a life expectancy of 50-years, and they require essentially no maintenance, particularly for multipurpose systems. With these systems, if the domestic water is turned on, sprinklers are on as well. With the combination of sprinklers and smoke alarms, homeowners will have the best of both technologies. The second issue related to the effectiveness of smoke alarms in further reducing fire death rates has to do with their performance and waking effectiveness. In a study that was just completed in 2006, only 58% of a test group of children ages 612 awakened when a standard smoke alarm sounded, and only 38% of the test group successfully evacuated. The median time to awaken was 3 minutes, and the median time to escape was the maximum allowed 5 minutes. Another study revealed that a surprising **34% of fire deaths in one- and two-family dwellings during the 2000-2004 period occurred in homes with a working smoke detector**. Perhaps this statistic correlates with the fact that fire death rates for the young and the elderly, those who are least likely to be capable of selfpreservation even if they are awakened by a smoke detector, are roughly double those for individuals in the central age group. Smoke detectors are good, but they can only go so far in reducing the nation's fire death and injury rates. We need residential sprinklers.

5. **What about homes without a public water supply?** Opponents of residential sprinklers have suggested that it is impractical and too expensive to require sprinklers in homes that will use a well as the water supply. However, design options are available that make wells a viable water supply for both sprinklers and domestic service. Wells essentially fall into two categories, deep and shallow. With a shallow well, the well will likely be designed to provide a direct feed to the home, with no intervening tank. With these types of systems, pumps can be selected at reasonable costs that are capable of supplying both the domestic and sprinkler demands. Constant pressure, variable speed pumps are an excellent choice for this type of application.

One question that is frequently raised with respect to direct feed well systems involves the "recharge" rate, or the rate at which water can keep up with the required flow. Wells may not be capable of keeping up with the demand associated with a sprinkler system, which will typically be 20 gallons per minute or more. Many automatically assume that a tank and a secondary pump are necessary in these cases, greatly increasing the cost of the sprinkler system, but a lesser known yet simple approach called "developing the well" is a much better solution. Developing a well essentially creates an underground cistern that replaces the need for a tank. The approach involves digging the well substantially below the water table and allowing the hole to fill with water, retaining the needed capacity underground. By using an appropriate pump with a developed well, an interior tank and pump arrangement can be avoided, and the water supply costs can be limited.

For deeper wells, there are two options. First, there is constant pressure, variable speed pumps suited for these applications. For installations utilizing this approach, a "developed well" as described above can also be used to accommodate needed water retention to satisfy the sprinkler demand. The second alternative involves a tank and pump, which can be installed between the well pump and the plumbing system. This approach is the common arrangement utilized for deep wells supplying domestic service. To supply sprinklers simply requires that the size of the domestic supply tank be increased to something in the range of 200-300 gallons, and the secondary pump needs to have an increased flow rating. Both of these enhancements can be made at modest cost. Some have suggested that the IRC should not require homes on wells to have fire sprinklers, yet homes in rural areas, usually corresponding to homes served by wells, are the homes that are least likely to survive a fire because of long or inadequate responses by the fire service. The solution is instead educating contractors on cost-efficient design options for well systems.

6. Impact of residential sprinklers on public and private water systems: It was suggested by one builder during testimony at the Orlando hearing that operation of residential sprinklers connected to a small water system in a Michigan jurisdiction resulted in the jurisdiction having to drain and decontaminate the entire water system. Subsequent identification and review of the cited event revealed that the concern regarding contamination of the water supply, which was a private system, was linked to the use of fire hydrants during suppression activities, not the sprinkler system. This clearly makes more sense, and for the record, the fire actually started outside of this building, spread to the interior, and sprinklers still helped to stop the fire's progress.

To suggest that the water demand caused by operation of a one- or two-family dwelling or townhouse sprinkler system will lead to contamination of an entire community water system is absurd and demonstrates a complete lack of understanding regarding residential sprinkler systems. The same logic would suggest that a single broken residential pipe, which would flow more water than operating sprinklers, would have the same result. Any water system that is this feeble has much bigger concerns than residential sprinklers.

The truth is that residential sprinklers actually result in a significantly decreased demand on water systems because residential sprinklers use far less water than firefighters to extinguish a fire. Scottsdale, Arizona's experience provides data to support this claim. Scottsdale found that the average estimated sprinkler flow per residential fire incident was 341 gallons, as compared to an estimated manual suppression flow for unsprinklered residential fire incidents of 2,935 gallons.

7. Wait for more cost-effective approaches to residential sprinkler protection before adopting a requirement in the IRC. Opponents of residential sprinklers suggest that we should hold off on requiring such systems in dwellings until improvements in technology make the systems more cost effective. The truth is that many recent improvements in sprinkler technology have largely improved cost effectiveness already. The real problem isn't a lack of cost effective design and installation options. Instead, the problem appears to stem from a lack of communication within the supply, design and installation communities regarding these efficient design options and the fact that momentum often drives us to continue doing things the way we've done them in the past.

To drive the industry toward more innovative solutions, more competition is needed, and changing the IRC to require residential sprinklers will create the demand that will increase competition and motivate cost efficient designs.

Some have suggested that we should wait for NFPA 13D or the IRC to permit the use of a single operating sprinkler as a design basis, as opposed to the currently required two sprinklers, before requiring sprinklers in the IRC. Some have also suggested that we should revisit whether sprinklers are really needed everywhere NFPA 13D requires them before requiring residential sprinklers in the IRC. The best way to encourage research and discussion on both of these ideas is to pass the IRC requirement now. Market demand will drive the research and interest in residential sprinklers will grow.

Market demand will also drive the creation of design tools that will simplify the exercises of locating sprinklers and sizing pipe. These tools, which will present design requirements in prescriptive, cookbook formats, are already being developed, and it is expected that they will be published prior to publication of the 2009 IRC.

8. **Required maintenance:** Opponents of residential sprinklers stated in Orlando that residential sprinkler systems need regular maintenance and questioned who would perform this service. Someone suggested that local fire departments will have to perform or verify maintenance, potentially raising concerns regarding right of entry.

The fact is that residential sprinkler systems are essentially maintenance free. Multipurpose systems have no maintenance requirements at all, and stand-alone systems only require an occasional test of the water flow alarm, if provided (not required by NFPA 13D or the IRC when the sprinkler pipe is copper, CPVC, or PEX) and the backflow preventer, if provided (again, not required by NFPA 13D). None of this maintenance would be performed or witnessed by the fire department. The alarm test can be conducted by the owner, in the same way the owner may periodically test a burglar alarm, and a plumber is required to test a backflow preventer. This test, which is a public health issue, is not associated with functionality or reliability of the sprinkler system, and therefore, it is not a fire safety concern.

9. Trained labor/inspectors: Opponents of residential sprinklers suggested in Orlando that, if the IRC were to require residential sprinklers, there would be a shortage of trained labor and trained inspectors to install and inspect these systems. While that is true today, there is no doubt that industry and code officials will respond once the IRC has been revised, and there will be several years to ramp up before the 2009 IRC begins to have an impact. This is exactly what has happened in the many local jurisdictions that have passed sprinkler ordinances.

Preliminary discussions have already taken place with ICC regarding the possibility of having ICC oversee a certification program for residential sprinkler installers and inspectors. Other organizations have also expressed interest in handling installer training and certification. It is expected that, in some jurisdictions, plumbers will become trained and certified to install residential sprinklers and sprinklers will be installed as part of the plumbing system. Likewise, it is expected that, in some jurisdictions, plumbing inspectors will be trained and certified to inspect these systems. This model is not unlike the approach taken with smoke alarms. They are located and installed by electricians and they are inspected by the electrical or building inspector.

10. Leakage and mold damage: In Orlando, opponents of residential sprinklers expressed fear that sprinklers would leak and cause mold damage, which could make a home uninsurable. In response, it should be pointed out that residential sprinklers systems are no different than residential plumbing. If quality products are used and the system is properly installed, it won't leak. If substandard products are used or workmanship is faulty, leaks will occur.

With respect to sprinkler systems, sprinkler piping and fittings, and sprinklers themselves, are subject to rigorous testing to ensure quality. Unquestionably, sprinklers are far higher quality and more thoroughly tested than domestic piping and fixtures. Sprinkler tests required for listing include, among others, 700 psi hydrostatic strength, 500 psi leakage resistance, 100,000 cycles water hammer resistance, 35-125°F temperature cycling, and freeze performance to 20°F below for 24 hours. Also, sprinkler piping and components are rated for a pressure of 175 psi, while plumbing water supply systems are rated for only 80 psi.

11. Appendix P, good enough for now? Opponents of residential sprinklers suggested in Orlando that, with the IRC having just accepted Appendix P, maybe it would be best to leave the sprinkler requirements in the appendix for a while to see what happens with it. This approach will certainly be appealing to some because it delays the sprinkler issue and gives home builders a leg up in fighting sprinklers at the local level.

However, isn't it time that we give local code officials the leg up? Code officials who have been through the local adoption process will certainly understand that it's much easier to justify taking something controversial out of the code than to add something new during an adoption review. With respect to residential sprinklers, code officials know all too well that arguing them into the code at the local level is a very uphill climb given local politics and the strength of local home builder associations.

Putting the sprinkler requirement into the body of the IRC certainly won't end the local debate, but it will at least put the burden on the home building industry to justify making an amendment to take sprinklers out. Local code officials would then have a respectable chance of keeping the sprinkler requirement. Other codes including the Uniform Fire Code, the NFPA Building Code and the Life Safety Code have already set a moral precedent by adding mandatory dwelling sprinkler requirements in their 2006 editions. The IBC and IFC have also done their parts by now requiring all residential occupancies within their respective scopes to be protected by fire sprinklers. Now it is time for the IRC to do the same.

i Ahrens, 2007, p. 2
ii Ibid.
iii Fahy & Leblanc, 2007, p. 24

Cost Impact (Stanek): The code change proposal will have the effect of a minor increase in the cost of construction in the short term that will be recouped in the long run due to other savings that more than offset the costs. See the Cost/Benefit analysis submitted with this proposal.

Cost Impact (Dean): The code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB63–07/08
R313 (New), Appendix P, Chapter 43 (New)

Proponent: Ray Moore, PE, CPD, Vice President, Legislative, American Society of Plumbing Engineers

1. Add new section as follows:

SECTION R313
SPRINKLER PROTECTION

R313.1 Sprinklers. All dwelling units shall be protected with an automatic residential fire sprinkler system.

Exception: Sprinkler protection shall not be required for additions or alterations of existing buildings that do not have an automatic residential fire sprinkler system installed.

R312.2 Design and installation. Automatic residential fire sprinkler systems shall be designed and installed in accordance with NFPA 13D.

2. Delete Appendix P without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~**AP101 Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new one- and two family dwellings and townhouses in accordance with Section 903.3.1 of the *International Building Code*.~~

3. Add standard to Chapter 43 as follows:

NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason: The American Society of Plumbing Engineers (ASPE) believes that all residential dwelling units must be protected with an automatic residential fire sprinkler system. There is no more effective means of preventing loss of life.

While various design changes over the last 30 years, including the mandating of smoke detectors, has reduced the loss of life in fires of one and two family dwellings and townhouses, there is still too high a loss of life in new dwellings. On a National level, that loss of life results in an annual catastrophe. If all of the fire deaths in one and two family dwellings and townhouses happened in a single occurrence each year, there would be a national uproar to do something about it. ASPE believes it is time to address this catastrophe.

ASPE knows that the engineering community has solved the problem that has resulted in this national catastrophe. That is the installation of residential sprinkler systems. The engineering community has been effective in designing better and more effective sprinklers. The system design has also been engineered to allow for lower cost installations. The engineering community has also recognized the integration of sprinklers into the water distribution system. This water distribution system is already present in a home, hence, it is easy and inexpensive to add sprinklers to any new dwelling unit.

There is no denying that the installation of fire sprinkler systems will increase the cost of construction. However, that cost is minimal when considering the life saving aspects of the building. One can ask whether a life is worth $2000 to $3000 for a sprinkler system in a new home. However, there are sprinkler systems that also cost less than this to install in a new home.

To put this evaluation into perspective, a recent change to residential gas fired water heaters made it so that the water heaters will not ignite a vat of gasoline that is sitting immediately adjacent to the water heater. This was done to prevent loss of life from gasoline explosions and fires that were ignited by water heaters. Consumers must now pay between $80 and $100 more for a water heater to have this protection. If you evaluate the annual cost for these new water heaters and equate it to the lives that they will save each year, it equates to $50,000,000 per life saved to the consumer. That is the additional cost paid nationwide to save these lives.

If you perform the same analysis on a residential sprinkler system, it equates to $670,000 per life saved with the sprinkler system. The consumers are getting a greater deal on a national level with the installation of sprinklers. What this really shows is how many more lives can be saved with residential sprinklers.

While there are many homes without sprinklers, there has to be a time to start mandating sprinklers. Now is an appropriate time. Think back to the time when codes mandated plumbing in all new homes. This significantly increased the cost of construction, but with a tremendous health benefit. When electricity was mandated, again there was a significant increase in the cost of construction. Later, smaller items were mandated, like a washing machine connection, smoke detectors, ground fault protection, closer electrical outlets, larger egress windows, additional light switches, light in the attic, central heating, pressure balancing shower valves, thermostatic mixing valves for bathtubs, and additional backflow protection. All of these additions were for the betterment of Society. They helped protect public health, safety, and welfare. Similarly, residential sprinklers are also for the betterment of society. They will also provide life safety protection.

ASPE recognizes that there are certain hardships that must be addressed. That is why an exception was added to not require sprinkler protection in additions and alterations of existing homes.

It should also be noted that the change references NFPA 13D which is the recognized standard for the design and installation of sprinklers in one and two family dwellings and townhouses.

As ASPE submits this change, we are asking other engineering societies to join us in co-sponsoring this code change. We anticipate the support of other groups by the time of the first code change hearings.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB64–07/08

R313 (New), Appendix P, Chapter 43 (New)

Proponent: Ronny J. Coleman, Retired California State Fire Marshal, representing IRC Fire Sprinkler Coalition

1. Add new section as follows:

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. Effective January 1, 2011, an approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with NFPA 13D.

(Renumber subsequent sections)

2. Delete IRC Appendix P without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~**AP101 Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with Section 903.3.1 of the *International Building Code*.~~

3. Add standard to Chapter 43 as follows:

NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

Reason: This proposal is submitted as part of a package of three proposals that were developed in cooperation with the International Association of Fire Chiefs with input from code officials, home builders, fire chiefs and other interested parties. During last year's code development cycle, many ICC members stated that the preferred way to advance fire sprinklers into new home construction is through a comprehensive approach that involves:

1. A schedule for implementation,
2. Reasonable and appropriate design and construction incentives, and
3. A simple, prescriptive methodology for designing systems.

In response, representatives of the IRC Fire Sprinkler Coalition (IRCFSC) and the International Association of Fire Chiefs have developed and submitted three proposals for this code cycle, one addressing each topic.

This proposal addresses the first issue, "a schedule for implementation." It requires new homes constructed after January 1, 2011 to have fire sprinklers. The delayed implementation date provides a time buffer that will allow for development of infrastructure, such as trained installers and inspectors, prior to the residential sprinkler requirement becoming effective. While the approach of delaying a code requirement may be unfamiliar to some, it is entirely appropriate, and it is already used by the IRC in Chapter 38, as follows:

> ***E3802.12 Arc-fault protection of bedroom outlets.*** *All branch circuits that supply 120-volt, single-phase, 15- and 20-ampere outlets installed in bedrooms shall be protected by a combination type or branch/feeder type arc-fault circuit interrupter installed to provide protection of the entire branch circuit.* ***Effective January 1, 2008, such arc-fault circuit interrupter devices shall be combination type.*** *(emphasis added).*

It is common knowledge that fires in one- and two-family dwellings are the root of America's fire problem, and a substantial majority of ICC members who voted at last year's final action hearing, 56%, agreed that residential sprinklers are the right solution. To truly address America's fire problem, ICC members know that we must, at some point, begin to mainstream fire sprinklers into new home construction, and this proposal provides a rational way to make the transition by fixing a future date for the requirement to become effective.

During last year's debate, the IRCFSC provided detailed responses that addressed all of the concerns cited in testimony as a basis for opposing residential sprinklers. These concerns, which included the use of wells to supply sprinklers, freezing, leakage and cost, among others, were addressed in our public comment to proposal RB114-06/07 and in testimony offered at the final action hearing in Rochester. They were also addressed in a Web cast aired by the IRCFSC in May 2007, copies of which are now available on a free DVD that can be ordered at www.IRCFireSprinkler.org.

As a result of this outreach effort, opposition to sprinklers based on myths and misinformation has largely dissipated, and the debate has largely become focused on two issues; First, whether the requirement for fire sprinklers in dwellings should be determined at a local level, and second, whether the residential fire problem is limited to older homes. The remainder of this reason statement focuses on these two issues.

1. Should the requirement for fire sprinklers in dwellings be a local issue? Several speakers in Rochester who spoke in opposition to RB114 conveyed an opinion that requirements for fire sprinklers in dwellings should be decided at the local level. The question is why? By including Appendix P, the IRC has already acknowledged fire sprinklers as a basic safety feature that should be included in new homes. There is no premise for the IRC to promote residential fire safety on community-by-community basis. The IRC, as a model code, should promote safety and regulatory consistency among all jurisdictions, as opposed to creating a local "shopping list" of safety requirements.

No other ICC code treats sprinkler requirements or residential fire safety as a local choice to be made at the time of code adoption. The IBC establishes a baseline that ALL residential occupancies must be protected by fire sprinklers, including one- and two-family dwellings and townhouses. Some argue that it's appropriate for IBC to be more restrictive than the IRC because use of the IBC is only mandatory for dwellings exceeding three stories in height, but that argument disregards one very important fact; most residential fire deaths occur in one- and two-story homes. To have an impact on fire deaths in one- and two-story homes, we need a fire sprinkler requirement in the IRC.

A newly published study by the National Institute of Standards and Technology (NIST) entitled "Benefit-Cost Analysis of Residential Fire Sprinkler Systems," reports that, out of almost 2,000 fire incidents in homes equipped with fire sprinklers during the 4-year period 2002 to 2005, there were no fire-related fatalities. This statistic clearly demonstrates the potential for sprinklers to save thousands of lives that would otherwise be lost in residential fires. With the knowledge that residential fire sprinklers are a proven, life-saving technology, it is clear that the IRC should establish a model that sprinklers are a minimum safety feature that should be included in all new homes.

2. Is the residential fire problem limited to older homes?

According to a recent HUD study, the median age of homes in the U.S. is 32 years. With this in mind, it makes perfect sense that more fires and fire deaths occur in "older" homes, simply because there are many more of them. However, the residential fire problem is certainly not limited to older homes, and it is has not been correlated with home age.

To evaluate the relationship between the age of a home and fire risk, it is necessary break the concept of fire risk into its two components, the probability of a fire event occurring and the associated consequence once the event occurs. The probability of a fire event occurring equates to the risk of fire ignition. With respect to the age of a home, only those ignition sources that are permanently affixed to a home, such as central heating systems or electrical distribution systems, might be directly correlated to home age, but to date, there are no known studies demonstrating increased fire risk as these systems age. Such a study would be difficult to perform because heating and electrical systems are often replaced when a home is remodeled, breaking any correlation that might otherwise exist between the age of a home and the age of fixed systems installed therein. Nevertheless, because most fire deaths are associated with ignition scenarios related to human behavior, which are independent of home age, it is clear that home age has little to do with the probability of a fire event.

With respect to consequences associated with a fire event, assuming that an ignition has occurred, it is again difficult to establish any correlation with home age, except to the extent that the probability of safe evacuation is increased based on the possible presence of working smoke alarms and/or escape windows. On the contrary, some design and construction methods commonly used in new homes actually reduce fire safety. These include the use of lightweight trusses (now used in more than 60% of new homes according to the Wood Truss Council of America), which are known to become unstable and collapse more quickly in fire situations than conventional construction; and open floor plans, which reduce compartmentation and allow a fire to quickly spread throughout a home.

The truth is that fire growth in a home is largely dependent on contents, not the structure itself, and contents are independent of home age. Although smoke alarms and escape windows associated with newer homes are beneficial in some fire incidents, statistics show that the value of these features is declining over time, as fire deaths in homes that have working smoke alarms are becoming increasingly common. The most recent data (for the period 2000 to 2004), shows that 34% of fire deaths occurred in homes that had WORKING smoke alarms. This is up from 24% in the previous period, and as smoke alarms age, we can only assume that their reliability will continue to decline unless they are periodically replaced, which seems to be wishful thinking when one considers that we have a problem even getting people to change batteries in smoke alarms on a regular basis.

In summary, a simple risk analysis demonstrates that home age is largely independent of either the risk of ignition or the consequences of a fire, if ignition occurs. Therefore, it is clear that home age has little to do with the residential fire problem or the need for residential sprinklers.

Conclusion:

The outpouring of support for residential sprinklers has been building for many years, and today, all U.S. model building codes require fire sprinklers in residential occupancies, including one- and two-family dwellings, with the exception of the IRC. It is only logical that the IRC should finally acknowledge the value of residential sprinklers in preventing deaths, injuries and property loss by making sprinklers a standard feature in new home construction.

Although some in the IRC arena have argued that "big government" shouldn't intrude into American homes by requiring fire sprinklers, those of us who have been around for a while will recall that this same argument was made 30-years ago when smoke alarms were first required in dwellings. Today, it's hard to imagine any reasonable individual arguing that the IRC requirement for smoke alarms constitutes a "government intrusion" into the American home, largely because smoke alarms are viewed as cost-effective safety devices. Sprinklers should be viewed the same way.

Given the proposed incentive package and prescriptive design option for multipurpose fire sprinkler systems being advanced this year in a proposal by the International Association of Fire Chiefs, it is entirely feasible that it will be cheaper to build some homes with fire sprinklers than without. For those cases where there is a net cost to sprinklers, NIST's newly published "Benefit-Cost Analysis of Residential Fire Sprinkler Systems" report concludes that multipurpose residential fire sprinkler systems are still a good investment, yielding a positive present value of net benefits (PVNB) for every home type studied, including ranch-style homes, colonial-style homes and townhouses.

This proposal provides a reasonable and justified approach for advancing fire sprinklers into the body of the IRC, and the time has come to for the IRC to include fire sprinklers as part of the model for residential construction.

ABOUT THE IRC FIRE SPRINKLER COALITION: The IRC Fire Sprinkler Coalition is an organization that represents national, state and regional groups of code officials and other associations focused on public safety. The Coalition has been active in presenting training programs to code officials and others aimed at conveying facts and debunking myths and misinformation about residential sprinklers. At the time of submittal of this proposal, groups who pledged to support the IRC Fire Sprinkler Coalition's mission of mainstreaming fire sprinklers into new home construction included:

NATIONAL AND REGIONAL COALITION MEMBERS

* International Association of Fire Chiefs – Fire and Life Safety Section
* Center for Campus Fire Safety
* ICC Joint Fire Service Review Committee
* Institution of Fire Engineers, US Branch
* International Fire Marshals Association
* National Association of State Fire Marshals
* New England Association of Fire Marshals

* New England Division of the International Association of Fire Chiefs
* Safe Buildings Coordinating Committee
* Society of Fire Protection Engineers
* Southeastern Association of Fire Chiefs
* Uniform Fire Code Association
* Western Fire Chiefs Association

STATE AND LOCAL COALITION MEMBERS

Alaska
* Alaska Fire Chiefs Association

Arizona
* Arizona Fire Chiefs Association
* Arizona Fire Marshals Association
* Arizona: Society of Fire Protection Engineers, Arizona Chapter
* Arizona: Yuma County, AZ Fire Officer's Association

California
* California: California Fire Chiefs Association
* California: Northern California Fire Prevention Officers Section
* California: Orange County Fire Chiefs Association
* California: Southern California Fire Prevention Officers Section

Colorado
* Colorado: Fire Marshals Association of Colorado

Connecticut
* Connecticut: Capitol Region Fire Marshals Association of Connecticut

Delaware
* Delaware: Fire Marshals Association of Delaware Valley

Florida
* Florida Fire Marshals and Inspectors Association
* Florida Fire Chiefs Association
* Florida: Northeast Florida Fire Prevention Association

Idaho
* Idaho Fire Chiefs Association
* Idaho Fire Prevention Officers Association

Illinois
* Illinois Fire Inspectors Association
* Illinois Fire Chiefs Association
* Illinois: Lake County Fire Chiefs Association

Indiana:
* Indiana: Fire Inspectors Association Of Indiana

Iowa
* Iowa: Hawkeye State Fire Safety Association, Iowa
* Iowa Fire Marshal's Association

Louisiana
* Louisiana Association of Fire Prevention Chiefs

Maryland
* Maryland Building Officials Association
* Maryland State Firemen's Association

Maine
* Maine Fire Chiefs Association

Massachusetts
* Massachusetts: Fire Chiefs Association of Massachusetts

Michigan
* Michigan Association of Fire Chiefs
* Michigan Fire Inspectors Society
* Michigan: Macomb County Fire Chiefs Association

Missouri
* Missouri: Tri-Lakes Fire Chiefs Association

Minnesota
* Minnesota: Fire Marshals Association of Minnesota

Nebraska
* Nebraska Municipal Fire Chiefs Association

Nevada
* Nevada: Fire Prevention Association of Nevada

New Jersey
* New Jersey Fire Prevention and Protection Association
* New Jersey: Northern Ocean Fire Chiefs Association
* New Jersey: Uniform Fire Prevention/Protection Officials Assn. of Ocean County

New Mexico
* New Mexico Fire Marshals Association

New York
* New York: Association of Fire Districts of the State of New York
* New York: Career Fire Chiefs' Association of New York State
* New York: Fire Marshals Association of Suffolk County
* New York: Firemen's Association of the State of New York
* New York: Monroe County, NY Fire Marshals & Inspectors Association
* New York State Association of Fire Chiefs
* New York State Building Officials Conference
* New York State Code Coalition to Protect and Preserve our Communities:
* New York State Fire Marshals and Inspectors Association
* New York: Suffolk County Fire Chiefs Association

North Carolina
* North Carolina State Firemen's Association

Ohio
* Ohio Fire Officials Association

Oregon
* Oregon Fire Code Committee
* Oregon Fire Marshals Association

Pennsylvania
* Pennsylvania Fire and Emergency Services Institute

Rhode Island
* Rhode Island Association of Fire Marshals

Tennessee
* Tennessee Fire Safety Inspectors Association

Texas
* Texas Fire Marshals Association
* Texas: Fire Prevention Association of North Texas

Virginia
* Virginia: Central Virginia Fire and Arson Association
* Virginia Fire Chiefs Association
* Virginia Fire Prevention Association

Washington
* Washington Fire Chiefs Association
* Washington State Assn of Fire Marshals

Cost Impact: This code change will increase the cost of construction.

Analysis: This proposal includes an "effective date" which is typically not included in the I-Codes. Typically, the provisions in the code become effective when the code is adopted.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB65–07/08
R325 (New), Chapter 43 (New)

Proponents: Jim Jorgensen/Greg Reed, City of Lenexa, KS

1. Add new section as follows:

SECTION R325
AUTOMATIC SPRINKLER SYSTEM

R325.1 Fire protection systems. An automatic residential fire sprinkler system shall be installed in new townhouses in accordance with NFPA 13D.

2. Add standard to Chapter 43 as follows:

NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason: Townhouses present a unique fire protection and property protection issues for fore departments and owners of connected townhouses. With separate ownerships townhouses are uniquely affected by fires in adjacent units even if the fire does not breach the two hour walls separating the units. After a severe fire the structure is open to the elements and subject to damage from water intrusion and other effects. These detrimental effects contribute to ongoing damage of adjacent townhouses since the process for repair may take an extended period of time. Legal issues may further complicate the repair process. Adding sprinklers will minimize the extent of damage so that repairs are easier to complete and the time of exposure of adjacent units to adverse affects is minimized.

Significant documentation was provided RB114-06/07 to show that non-sprinkled dwellings are a major contributing factor to the amount of property damage and loss of life from fires. Sprinkling is now required for all multi-family dwellings and townhouses should be treated in a similar manner.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB66–07/08
R101.2, R301.1.3.1 (New), R313 (New), R317.2, R317.2.4, R310.1, AP102 (New), Chapter 43 (New)

Proponent: Rick Morris, AvalonBay Communities, Inc.

1. Revise as follows:

R101.2 (Supp) Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above-grade in height with a separate means of egress and their accessory structures.

The provisions of this Code shall also apply to the construction, alteration, enlargement and replacement of townhouses not more than 4 stories above grade plane that are equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

Exception: Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family dwellings or townhouses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section 903.3.1.3 of the *International Building Code*.

2. Add new text as follows:

R301.1.3 Engineered design. When a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the *International Building Code* is permitted for all buildings and structures, and parts thereof, included in the scope of this code.

R301.1.3.1 Townhouses four stories above grade plane. For structural design of townhouses four stories above grade plane, the structural provisions of the *International Building Code* for Group R-3 shall apply

3. Rename section and add new R313.1 as follows:

R313
FIRE PROTECTION SYSTEMS AND SMOKE ALARMS

R313.1 Fire protection systems. An approved automatic fire sprinkler system shall be installed in new townhouses in accordance with NFPA 13D, except as follows:

1. Where townhouses have separation walls designed based on R317.2, Exception 2, sprinklers shall be provided to protect exterior combustible balconies, decks, porches and ground floor patios located under such combustible projections. Exterior sprinklers and supply piping shall be protected from freezing where freeze protection is required by P2603.6. Where sidewall sprinklers are installed beneath exposed wood joists, sprinklers shall be permitted to be installed with deflectors located 1 inch (25 mm) to 6 inches (152 mm) below the joists, not to exceed a maximum distance of 14 inches (356 mm) below the deck.
2. Where townhouses with private garages have separation walls designed based on R317.2, Exception 2, fire sprinkler protection shall be provided in the garage. Sprinklers in garages shall be connected to a system that complies with NFPA 13D. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft^2. Garage doors shall not be considered as obstructions with respect to sprinkler placement.

(Renumber subsequent sections)

4. Revise as follows:

R317.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302 for exterior walls.

Exceptions:

1. A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section R317.3.
2. A common 1-hour fire-resistance rated wall is permitted for townhouses equipped throughout with an automatic sprinkler system installed in accordance with R313.1. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Where roof surfaces adjacent to the wall are at different elevations, the rated wall shall continue to the upper roof sheathing.

5. Revise as follows:

R317.2.4 Structural independence. Each individual townhouse shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common ~~2 hour~~ fire-resistance-rated wall as provided in Section R317.2.

6. Revise as follows:

R310.1 (Supp) Emergency escape and rescue required. Basements and every sleeping room shall have at least one operable emergency escape and rescue opening. Such opening shall open directly into a public street, public alley, yard or court. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) above the floor. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

Exceptions:

1. Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m_2).
2. In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

7. Add new text as follows:

AP102 Fire flow. The fire-flow requirements for townhouses specified by IFC Appendix B, where adopted, shall be permitted to be reduced by 75% for buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

8. Add standard to Chapter 43 as follows:

NFPA

13D Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason: This proposal would add a requirement for residential sprinkler systems to be installed in all new townhouses constructed under the *International Residential Code*, and it includes a package of sprinkler incentives that will help offset the added cost of sprinklers, as well as improve design flexibility. If a reasonable package of incentives can be offered by the code, it simply makes sense for multifamily developers to provide these systems to protect new townhouses.

It is well known that sprinklers are the best tool for providing firesafety in residential occupancies, and the concept of the code providing incentives to encourage the use of these systems in residential occupancies is already in use in the IBC. In fact, the IBC's incentive package provided a basis for major multifamily builders to not oppose the IBC requirement for all residential occupancies to be sprinklered when that issue was considered several years ago.

By accepting this code change, sprinkler protection for townhouses would become reasonably affordable to the builders who build townhouses and to the homeowners who buy them. As a result, we could take a significant step forward in improving life safety and reducing property losses in residential occupancies for decades to come.

The following is an explanation of each new proposed section relating to this sprinkler alternative for dwellings:

1. *Revise Section R101.2:* Typical townhouse construction is no more than 4 stories above grade plane. Presently when a developer goes from 3 to 4 stories above grade, the project is then required to be designed under the IBC. Covering townhouses up to 4 stories above grade plane in the IRC provides a significant incentive for developers. The impact on 4-story buildings would be significant enough to warrant installing sprinklers in 2- and 3-story buildings, which will gain far less benefit from this change, when one considers the overall package. The overall gain of having all townhouses equipped with fire sprinklers makes the allowance of 4-story townhouses under the IRC a worthwhile investment in safety.

2. *Add new Subsection R301.1.3.1 to the "Engineered design" requirement*. This new subsection will address the structural design requirements for townhouses built under the IRC that are 4 stories above grade. The existing structural requirements in the IRC are based on a maximum 3 stories above grade, and by referencing the IBC, proper design is assured.
3. *Rename Section R313 and add new Section R313.1:* This provides a charging requirement for providing residential sprinklers in accordance with NFPA 13D for townhouses. The two exceptions deal with issues not addressed by NFPA 13D, one is outside combustible decks and the other is private garages. The combustible deck sprinkler requirement is consistent with a similar provision to IBC Section 903.3.1.2.1, "Balconies and decks". Most likely a dry sidewall sprinkler supplied by a wet pipe sprinkler system would be used to comply with this exception. The garage sprinkler criteria are based on NFPA 13R Section 6.8.3.3. Dry pendent sprinklers supplied by a wet pipe sprinkler system would most likely be used to protect garages.

4. & 5. *Add new Exception#2 to R 317.2 and revise Exception #5 to R317.2.4:* This is a similar one hour exception that was in BOCA Code Section 310.5 Exception #2 for multiple single-family dwellings. That section of Code read: "In multiple single-family dwellings that are equipped throughout with an approved automatic sprinkler system installed in accordance with Section 906.2.3 (NFPA 13D), the fire-resistance rating between each dwelling unit shall not be less than 1 hour and shall be constructed as a fire partition."

6. *Add new Exception to Section R310.1:* The IRC already allows elimination of escape windows in Groups R-1, R-2, R-4 and I-1 occupancies (IBC Section 1026, Exception 1) based on the installation of fire sprinklers. NFPA Life Safety Code, also contains an NFPA 13D related exception to the escape window requirement for one- and two-family dwellings in Section 24.2.2.1.2(2).
7. *Revise Appendix P101:* The reduction in fire flow is similar to allowances granted by the IFC.

Cost Impact: The code change proposal may increase or decrease the cost of construction, depending on the value of sprinkler incentives versus the cost of adding sprinklers to a particular building..

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB67–07/08

R302.1, Table R302.1, Table R302.1(2) (New), R317.2, R317.2.4, R317.2.5 (New), R309.7 (New), R313.2, R310.1, AP102 (New), Chapter 43 (New)

Proponent: Tom Lariviere, Fire Department, Madison, MS, representing Fire & Life Safety Section of the International Association of Fire Chiefs (IAFC)

1. Revise as follows:

R302.1 (Supp) Exterior walls. Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1<u>(1); or for dwellings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D and Table R302.1(2)</u>.

Exceptions:

1. Walls, projections, openings, or penetrations in walls perpendicular to the line used to determine the fire separation distance.
2. Walls of dwellings and accessory structures located on the same lot.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.
4. Detached garages accessory to a dwelling located within 2 feet (610 mm) of a lot line are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(1) (Supp)
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour with exposure from both sides	0 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet
	(Not fire-resistance rated)	0	5 feet
Openings	Not allowed	N/A	< 3 feet
	25 % Maximum of Wall Area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R317.3	< 5 feet
		None required	5 feet

N/A = Not Applicable

TABLE R302.1(2)
EXTERIOR WALLS – DWELLINGS WITH FIRE SPRINKLERS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour with exposure to the fire from the outside	0 feet
	(Not fire-resistance rated)	0 hours	3 feet[1]
Projections	Fire-resistance rated	1 hour on the underside	2 feet[1]
	(Not fire-resistance rated)	0	3 feet
Openings	Not allowed	N/A	< 3 feet
	Unlimited	0	3 feet[1]
Penetrations	All	Comply with Section R317.3	< 3 feet
		None required	3 feet[1]

[1] For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with NFPA 13D, as amended by R309.7, the fire separation distance for non-rated exterior walls and rated projections shall be permitted to be reduced to zero feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

2. Revise as follows:

R317.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302 for exterior walls.

Exceptions:

1. A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section R317.3.
2. A common 1-hour fire-resistance rated wall is permitted for townhouses equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D, as amended by R309.7 and R317.2.5, up to an aggregate floor area of 28,000 square feet per building. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Where roof surfaces adjacent to the wall are at different elevations, the rated wall shall continue to the upper roof sheathing.

R317.2.4 Structural independence. Each individual townhouse shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common ~~2 hour~~ fire-resistance-rated wall as provided in Section R317.2.

3. Add new text as follows:

R317.2.5 Fire sprinklers for balconies, decks, porches and ground floor patios. Where townhouses have separation walls designed based on R317.2, Exception 2, sprinklers shall be provided to protect exterior combustible balconies, decks, porches and ground floor patios located under such combustible projections. Exterior sprinklers and supply piping shall be protected from freezing where freeze protection is required by P2603.6. Where sidewall sprinklers are installed beneath exposed wood joists, sprinklers shall be permitted to be installed with deflectors located 1 inch (25 mm) to 6 inches (152 mm) below the joists, not to exceed a maximum distance of 14 inches (356 mm) below the deck.

4. Add new text as follows:

R309.7 Fire Sprinklers. Private garages shall be protected by fire sprinklers, where:

1. The garage is in a townhouse having separation walls designed based on R317.2, Exception 2.
2. A garage wall has been designed based on Table R302.1(2), Footnote 1.

Sprinklers in garages shall be connected to a system that complies with NFPA 13D. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft^2. Garage doors shall not be considered obstructions with respect to sprinkler placement.

5. Revise as follows:

R313.2 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.

   Exception: In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D,

3. In a common area on each additional story of the dwelling, including basements but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

When more than one smoke alarm is required to be installed within an individual dwelling unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

6. Revise as follows:

R310.1 (Supp) Emergency escape and rescue required. Basements and every sleeping room shall have at least one operable emergency escape and rescue opening. Such opening shall open directly into a public street, public alley, yard or court. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) above the floor. Where a door opening having a threshold below

the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

Exceptions:

1. Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m_2).
2. In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

7. Add new text as follows:

AP102 Fire flow. As provided in IFC Appendix B, where adopted, the fire-flow requirements for one and two family dwellings and townhouses shall be permitted to be reduced by 50% for buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

8. Add standard to Chapter 43 as follows:

NFPA

13D Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason: Fire sprinklers are universally recognized as the most effective means of reducing America's fire losses and preventing firefighter deaths and injuries associated with firefighting operations. Both of these objectives are fundamental to the mission of the International Association of Fire Chiefs (IAFC). Through this proposal, the IAFC hopes to encourage more widespread use of residential sprinklers by establishing a package of sprinkler incentives in the IRC that will appeal to homebuilders and consumers.

The use of incentives to encourage the installation of fire sprinkler systems is traceable in model building codes for at least 80 years, and today, these incentives are woven into the text of nearly every ICC code. Likewise, in communities throughout the United States where residential sprinklers are required, incentives play a critical roll in developing and maintaining community support for sprinklers. Nevertheless, sprinkler incentives remain few and far between in the IRC, offering little to offset the cost of installing sprinklers or to enhance their value through building design options. Many stakeholders in the residential construction industry have made it clear that this must change before we'll see residential sprinklers in the mainstream of new home construction, and as an organization dedicated to public safety, IAFC chose to undertake the challenge of assembling a reasonable IRC incentive package to motivate the use of sprinklers. To identify incentives that would be seen by the homebuilding industry as having value, input was sought and received from the National Association of Homebuilders, and although NAHB was unable to consider endorsing this proposal prior to the code change submittal deadline, their input is reflected in the proposed text.

Overall, IAFC believes that the package of incentives contained in this proposal will significantly enhance the safety of buildings constructed in accordance with the IRC, and ultimately, we expect to see more homes protected by fire sprinklers once these revisions are published in the IRC. Although individual items in this package may be viewed by some as too liberal, while others will say that they are not liberal enough, IAFC believes that each of the suggested changes is reasonable and justifiable for a sprinklered dwelling.

The following discussion provides justifications for each of the 7 parts of this proposal.

1. ***Modify existing Section R302.1 and add a new Table R302.1(2)****:* This change provides a significant financial and design incentive for residential sprinklers. From a financial perspective, the proposal permits cost reductions related to exterior wall construction and, in the case of a planned community, could result in more developable lots. From a design advantage perspective, the proposal permits homes to have larger footprints without triggering fire-rated exterior walls and permits more flexible use of windows on walls facing property lines.

   From a firesafety perspective, the proposed requirements generally put the code back where it was in 2000 and 2003, so there is essentially no concession compared to how homes have been built under the IRC since the code was first published in 2000. In 2006, the IRC's fire separation distances for non-rated exterior walls were increased from 3 feet to 5 feet for the purpose of coordinating the IRC's residential separation distances with those in the IBC (Code Change G128-03/04). History shows that residential sprinklers reliably limit fire spread to the room of origin, and with such protection, allowing the code to revert to a 3-foot separation distance provides a reasonable compensation for sprinklers. Certainly, the probability of a favorable outcome in the event of a fire is much better for a sprinklered building with a 3-foot separation versus a nonsprinklered building with a 5-foot separation, so encouraging sprinklers is a preferred approach.
2. ***Revise the exceptions to R317.2 and R317.2.4****:* Because residential sprinklers will slow fire growth and often completely extinguish a fire, the fire challenge to townhouse separation walls is expected to be significantly delayed, reduced or eliminated. Precedent for this incentive exists in Section 310.5 Exception 2 of the BOCA code, which read: "In multiple single-family dwellings that are equipped throughout with an approved automatic sprinkler system installed in accordance with Section 906.2.3 (NFPA 13D), the fire resistance rating between each dwelling unit shall not be less than 1 hour and shall be constructed as a fire partition." Clearly, the overall level of safety and best chance for a favorable outcome in the event of a fire is through the use of fire sprinklers with a 1-hour wall versus no sprinklers and a 2-hour wall.
3. ***Add a new Section R317.2.5****:* This revision provides a limitation on the incentive described in Part 2 above. Because NFPA 13D systems are being recognized to a limited degree for property protection, as well as life safety, it was considered appropriate to ask for sprinklers to protect combustible exterior projections sometimes associated with outdoor fires, typically associated with a barbecue grill on a deck. Similar requirements are established by the IBC in Section 903.3.1.2.1 for NFPA 13R systems. Often, this type of protection is provided by dry sidewall sprinklers connected to a wet pipe sprinkler system.
4. ***Add a new Section R309.7****:* This revision provides a limitation on the incentive described in Part 2 above. Because NFPA 13D systems are being recognized to a limited degree for property protection, as well as life safety, it was considered appropriate to ask for sprinklers to protect sprinklers to protect garages. Design criteria suggested for sprinklers was derived from NFPA 13R Section 6.8.3.3, which addresses sprinkler protection for garages in buildings protected by NFPA 13R sprinkler systems. Often, this type of protection is provided by dry pendent sprinklers connected to a wet pipe sprinkler system.

5. ***Revise Section R313.2***: The value of smoke alarms with respect to life safety is well recognized. Nevertheless, code requirements associated with how many smoke alarms must be installed in a dwelling and where they must be located were developed without respect to the presence of fire sprinklers. It is widely known that the addition of fire sprinklers to a dwelling will provide a significant improvement to life safety and property protection versus having smoke alarms alone, so eliminating a minimal number of smoke alarms as part of a package to gain sprinklers is a reasonable approach.

   Contrary to what one might expect as a result of reducing the number of smoke alarms, the proposed revision could actually improve the performance of smoke alarms because it will require that a minimum of one smoke alarm be located in the common area on each floor. Currently, the code only requires smoke alarms outside of sleeping areas, often satisfied by installing a smoke alarm in the hallway outside of bedroom doors. The number of alarms will only be reduced in cases where there is more than one sleeping area on a floor.

   Given that fires often start in kitchens and living rooms, installing a smoke alarm in a more central area, as required by this proposal, may well result in more effective detection of fires in these areas. Plus, with the code still requiring smoke alarms in each bedroom, connected to common area smoke alarms, waking effectiveness and protection of bedroom areas will not be impacted by this proposal.
6. ***Add a new Exception to Section R310.1****:* This part of the proposal will, on its own, provide enough incentive to get a home sprinklered in some cases. Homebuilders and homeowners often want greater flexibility to use a variety of window types and configurations to provide required light and ventilation (it should be noted an exception to the emergency escape window requirement is unlikely to result in rooms without windows or doors because rooms will still require light and ventilation to comply with R303.1 and it seems unlikely that homeowners would choose to forgo natural light in bedrooms). For example, by allowing side-hinged windows, smaller windows or strategically positioned windows that wouldn't meet the current escape window requirements, there are potential gains in energy efficiency and wind resistance versus traditional hung windows with friction seals used to meet escape provisions.

   To those who might regard egress windows as a safety feature that should not be equated to sprinkler protection, consider that the IBC already allows elimination of escape windows in Groups R-1, R-2, R-4 and I-1 occupancies (IBC Section 1026, Exception 1) based on the installation of fire sprinklers. It simply makes no sense that sprinkler protection should be considered as providing adequate safety without escape windows in fraternities, apartments, hotels, adult care, child care and assisted living facilities, among others, but not in one- and two-family dwellings. In fact, even the NFPA Life Safety Code, a document with a pure life safety focus, provides an exception to the escape window requirement for one- and two-family dwellings [2006 NFPA 101, Section 24.2.2.1.2(2)] based on the installation of fire sprinklers in accordance with NFPA 13D. Recognizing the high level of safety that will be provided in homes that have both smoke alarms and sprinklers, providing adequate time for occupants to escape a fire using the normal means of egress, and with so much code precedent and a high incentive value, it makes sense to extend the sprinkler allowance for escape windows to include one- and two-family dwellings and townhouses.
7. ***Add a new Section AP102****:* The reduction in fire flow simply calls attention to an allowance already permitted by the IFC.

Cost Impact: The code change proposal will decrease the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB68–07/08

R313.1 (New), Chapter 43 (New)

Proponent: Sean DeCrane, Fire Department, Cleveland, OH, representing International Association of Fire Fighters, Local 93

1. Add new text as follows:

R313.1 Fire protection systems. One and two family dwellings that incorporate lightweight truss or engineered lightweight material such as wooden I-beams, cold form steel or trusses in the floor or ceiling areas shall have the floors/ceilings assemblies protected by a thirty (30) minute fire-rated barrier.

Exception: Where the building is protected with a sprinkler system designed to NFPA 13D.

2. Add standard to Chapter 43 as follows:

NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

(Renumber subsequent sections)

Reason: On August 13, 2006 a Wisconsin fire fighter was killed, and a second fire fighter injured, when the floor they were operating on collapsed sending them into the basement. One fire fighter fell directly into the room of origin and was killed, the second fire fighter landed on the opposite side of a block wall and survived by shielding herself and making an escape through a rear window. They checked the floor to ensure it was safe and solid, just prior to collapse they heard a loud crack.

The floor they were operating on was unprotected lightweight construction that collapsed without warning. In the ensuing investigation, the National Institute for Occupational Safety and Health released report F2006-26. One of the recommendations is to "modify current building codes to require that lightweight trusses be protected with a fire barrier". This should not only pertain to truss construction. There are additional forms of construction that can be determined to be lightweight, cold form steel, bar joists, wooden engineered I-beam, etc., the recent trend in residential construction is to use products that are financially beneficial. It is the belief of many of us in the fire service that as the industry engineers products to a more finite point we are losing our safety factors.

In April, 2005, NIOSH released their report "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures". In their release they recommended the placement of a labeling system on buildings to indicate the type of construction. While this recommendation will probably not be acceptable to residents of a one or two family home, we can mandate that they increase the protection of the construction type to provide increased safety to the residents and the responding fire fighters.

1. National Institute for Occupational Safety and Health Report F206-26. July, 2007.
2. National Institute for Occupational Safety and Health Alert, "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures".

Cost Impact: This code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB69-07/08

AP102 (New), AP103 (New), AP104 (New), AP105 (New), AP106 (New), AP107 (New), AP107.1 (New), AP107.2 (New), AP107.3 (New), AP107.3.1 (New)

Proponent: Steven Orlowski, National Association of Home Builders

Add new text to Appendix P as follows:

APPENDIX P
FIRE SPRINKLER SYSTEM

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION AP102
ALLOWANCES FOR FIRE SPRINKLERS

AP102.1Exterior walls of sprinklered dwellings. Construction, projections, openings and penetrations of exterior walls of dwellings that are equipped throughout with an automatic sprinkler system in accordance with Section AP101, shall not be required to comply with Table R302.1.

AP102.2 Emergency escape and rescue in sprinklered dwellings. Emergency escape and rescue openings in accordance with Section R310 shall not be required in dwellings that are equipped throughout with an automatic sprinkler system in accordance with Section AP101.

AP102.3 Smoke Alarms in sprinklered dwellings. Smoke alarms shall be located in accordance with Section R313 of the *International Residential Code.*

Exception: Smoke alarms shall not be required in sleeping rooms in dwellings that are equipped throughout with an automatic sprinkler system in accordance with Section AP101.

AP102.4 Arc-fault protection of bedroom outlets in sprinklered dwellings. Electrical arc-fault protection in accordance with Section E3802.12 shall not be required in dwellings that are equipped throughout with an automatic sprinkler system in accordance with Section AP101.

SECTION AP103
FEES

AP103.1 General. Where water supply and distribution system fees are assessed and based on the size of the system, fees shall be based on the minimum size meter and water distribution needed to meet the water supply fixture unit values.

SECTION AP104
FIRE SERVICE FEATURES

AP104.1 General. Where a fire sprinkler system is installed in accordance with Section AP101, service features shall be in compliance with Sections AP104.2 through AP104.4.1.

AP104.2 Fire-flow. Fire-flow requirements shall conform to the *International Fire Code* Appendix B105.1, or a reduction in the required fire-flow of 50 percent is allowed, as approved, when all one- and two-family dwelling and townhouses are equipped with an automatic sprinkler system installed in accordance with this appendix.

AP104.3 Fire hydrant spacing. In one- and two-family dwelling and townhouse developments where all dwellings are equipped throughout with an approved automatic sprinkler system in accordance with this appendix, the spacing of the fire hydrants shall be permitted to be up to 1000'.

AP104.4 Fire apparatus access roads. Fire apparatus access roads shall conform to the *International Fire Code Appendix D107.1,* or where the one- and two-family dwellings and townhouses on a single public or private fire apparatus access road are equipped throughout with an automatic sprinkler system in accordance with this appendix, access from two directions shall not be required.

AP104.4.1 Dimensions. Fire apparatus access roads shall be permitted to have a clear unobstructed width of less than 20 feet, as approved, when all dwellings on a single public or private fire apparatus access road are equipped throughout with an approved automatic sprinkler system in accordance with this section.

Reason: The exceptions included in this proposal are reasonable allowances for consideration by the IRC Committee and the ICC Membership, should sprinklers be installed in accordance with the proposed prescriptive sprinkler system provisions or NFPA 13D and do not result in a reduction to occupant safety. Several of these exceptions are similar in methodology to other trade exceptions offered in structures that are equipped with an automatic sprinkler system. Some of the proposed exceptions are referenced in other codes that may not have been adopted by the jurisdiction, therefore it is important that they be included in the IRC Appendix P as possible trade exceptions. Below is a list and supporting information for each proposed trade exception;

AP102.1 This proposal exception would allow for the reduction in the fire separation distance between dwellings, require that the 1 hour rating of the exterior wall to be limited to the outside exposed wall. This proposal would also allow one- and two-family dwelling, equipped with an automatic sprinkler system, to be built without a rated exterior wall and unlimited openings up to the property, provided there is setback of a minimum 6 feet. When a dwelling unit is equipped with an automatic sprinkler system most fires can be controlled by one or two sprinklers, thereby reducing the concern about heat exposure from one dwelling to another.

AP102.2 Emergency escape and rescue openings are required by the code to allow a secondary exit should the primary escape route is blocked. As stated above, the automatic sprinkler system is designed to provide an increased level of safety for the occupant by controlling or suppressing the fire. Similar exceptions are already provided in the International Building Code and Life Safety Code to other R occupancies when the structure is equipped with an approved automatic sprinkler system.

AP102.3 The purpose of the smoke alarm system is to provide the occupant enough time to escape the dwelling upon notification of a fire. Dwellings that are equipped with an automatic sprinkler system should be permitted to reduce the number of smoke alarms required in the dwelling, since they increase the amount of time the occupant has to vacate the dwelling by controlling and sometimes extinguishing the fire.

AP102.4 The IRC Commentary explains that Arc-Fault receptacles are required to reduce the number of fires that are associated with electrical arcs. Based on information provided in reports published by the National Fire Protection Association prior to the code requiring arc-fault protection, the number of fires who's origin was based on an electrical distribution and lighting failure or malfunction accounted for 3% of all residential structure fires and caused the least number of fire fatalities.

AP103 When the sizing of the water meter and distribution line must be increased to accommodate an automatic sprinkler system, the fees assessed by the water purveyor should be based solely on the size meter and distribution lines that would be required to meet the domestic potable demand. Unless the sprinkler is activated, there is no increase in the amount of water consumed by the dwelling. Consumers should not be charged higher rates or fees, just because the sprinkler system design required the distribution system to be increased.

AP104.2 The purpose of this proposal is to follow a precedence that has been established in the *International Residential Code* when referencing another code. The *International Fire Code* allows the Authority Having Jurisdiction to reduce the required fire flow rate by 50 percent when the dwelling is provided with an approved sprinkler system.

AP104.3 Would allow greater distances between fire hydrants in residential developments where all dwellings are equipped with an automatic sprinkler system in accordance with Appendix P. Both the *Uniform fire Code* and the *Urban- Wildland Interface Code* allow for increase to the fire hydrant spacing when all dwelling units in a development are equipped with an automatic sprinkler system. The spacing increase to 1,000 feet would still meet the UFC requirement for response to vehicular accidents and the WUIC requirement for maximum distance to a water source.

AP104.4.1 This proposed exception would allow for the increase the number of dwelling units allowed before requiring a secondary fire apparatus access road and would allow for the reduction of the access road to less than 20 feet when all the dwellings are equipped with an approved automatic sprinkler system. The *International Fire Code* allows for a single fire apparatus access road for developments that are equipped with an automatic sprinkler system and some jurisdictions have allowed for narrower roads as an exception when dwellings are sprinklered.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB70–07/08

AP111 (New), AP112 (New), AP113 (New)

Proponent: Steven Orlowski, National Association of Home Builders

Add new text to Appendix P as follows:

SECTION AP 111
ALLOWANCES FOR FIRE SPRINKLERS

AP111.1 Exterior walls of sprinklered dwellings. Construction, projections, openings and penetrations of exterior walls of dwellings that are equipped throughout with an automatic sprinkler system in accordance with, Sections AP101 through AP 110 shall not be required to comply with Table R302.1.

AP111.2 Emergency escape and rescue in sprinklered dwellings. Emergency escape and rescue openings in accordance with Section R310 shall not be required in dwellings that are equipped throughout with, Sections AP101 through AP 110.

AP111.3 Smoke alarms in sprinklered dwellings. Smoke alarms shall be located in accordance with Section R313 of the *International Residential Code*.

Exception: Smoke alarms shall not be required in sleeping rooms in dwellings that are equipped throughout with an automatic sprinkler system in accordance with, Sections AP101 through AP 110.

AP111.4 Arc-fault protection of bedroom outlets in sprinklered dwellings. Electrical arc-fault protection in accordance with Section E3802.12 shall not be required in dwellings that are equipped throughout with an automatic sprinkler system in accordance with, Sections AP101 through AP 110.

SECTION AP112
FEES

AP112.1 General. Where water supply and distribution system fees are assessed and based on the size of the system, fees shall be based on the minimum size meter and water distribution needed to meet the water supply fixture unit values.

SECTION AP113
FIRE SERVICE FEATURES

AP113.1 General. Where a fire sprinkler system is installed in accordance with Sections AP101 through AP110, fire service features shall be in compliance with Sections AP113.2 through AP113.4.1.

AP113.2 Fire-flow. Fire-flow requirements shall conform to the *International Fire Code* Appendix B105.1, or a reduction in the required fire-flow of 50 percent is allowed, as approved, when all one- and two-family dwelling and townhouses are equipped with an automatic sprinkler system installed in accordance with this appendix.

AP113.3 Fire hydrant spacing. In one- and two-family dwelling and townhouse developments where all dwellings are equipped throughout with an approved automatic sprinkler system in accordance with this appendix, the spacing of the fire hydrants shall be permitted to be up to 1000'.

AP113.4 Fire apparatus access roads. Fire apparatus access roads shall conform to the *International Fire Code* Appendix D107.1, or where the one- and two-family dwellings and townhouses on a single public or private fire apparatus access road are equipped throughout with an automatic sprinkler system in accordance with this appendix, access from two directions shall not be required.

AP113.4.1 Dimensions. Fire apparatus access roads shall be permitted to have a clear unobstructed width of less than 20 feet, as approved, when all dwellings on a single public or private fire apparatus access road are equipped throughout with an approved automatic sprinkler system in accordance with this section.

NOTE: THE ALLOWANCES GIVEN IN THE PROPOSED NEW TEXT ABOVE ARE BASED UPON THE USE OF THE FIRE SPRINKLER SYSTEM THAT IS PART OF ANOTHER CODE CHANGE PROPOSAL WHICH WILL BE ON THE AGENDA OF THE IRC MECHANICAL AND PLUMBING COMMITTEE. THE DETAILS OF THAT FIRE SPRINKLER SYSTEM ARE SHOWN BELOW FOR INFORMATION. THESE DETAILS ARE NOT THE SUBJECT OF THIS CODE CHANGE PROPOSAL AND ARE THEREFORE NOT ABLE TO BE MODIFIED BY ACTIONS TAKEN IN THIS CODE CHANGE PROPOSAL.

FIRE SPRINKLER SYSTEMS

SECTION AP 101
GENERAL

AP101.1 Scope. The provisions of this appendix shall control the design and installation of automatic fire sprinkler system in new one- and two-family dwellings and townhouses.

Exception: Residential fire sprinklers installed in accordance with NFPA 13D shall be permitted.

SECTION AP 102
REQUIREMENTS FOR SPRINKLERS

AP102.1 Sprinklers. Sprinklers shall be listed residential sprinklers. Residential sprinklers shall be installed in accordance with the manufacturer's installation instructions.

AP102.2 Temperature rating and separation from heat sources. Sprinklers shall have a temperature rating of 135-170°F and shall be separated from heat sources as required by the manufacturer's instructions.

Exception: Sprinklers shall have a temperature rating of 175-225°F where installed in the following areas:

1. Directly under skylights where exposed to direct sunlight.
2. In attics or concealed spaces located directly beneath a roof.

AP102.3 Intermediate temperature sprinklers. Sprinklers located within the distance to a heat source as specified in Table AP102.3 shall have a temperature rating of 175-225°F.

TABLE AP102.3
DISTANCE FROM HEAT SOURCE

HEAT SOURCE	LOCATION OF SPRINKLER WITHIN DISTANCE TO HEAT SOURCE (INCH)
Fireplace, Side of Open or Recessed Fireplace	36
Fireplace, Front of Recessed Fireplace	84
Coal and Wood Burning Stove	42
Kitchen Range Top	18
Oven	18
Vent Connector or Chimney Connector	18
Heating Duct Not Insulated	18
Hot Water Pipe Not Insulated	12
Side of Ceiling or Wall Warm Air Register	24
Front of Wall Mounted Warm Air Register	36
Water Heater, Furnace, or Boiler	6
Luminaire, Up to 250 Watts	6
Luminaire, 251 Watts Up to 499 Watts	12

AP103
SPRINKLER COVERAGE

AP103.1 General. The area of coverage of the residential sprinklers shall be based on the manufacturer's installation instruction. The minimum area of coverage shall be 12 feet by 12 feet for each sprinkler. The maximum area of coverage shall be 20 feet by 20 feet.

AP104
SPRINKLER HYDRAULIC DEMAND

AP104.1 General The hydraulic demand, flow rate and minimum pressure, for each sprinkler shall be based on the area of coverage as specified in the manufacturer's installation instructions.

AP104.2 Hydraulic requirements. Where more than one sprinkler is located in a room, the hydraulic demand for the multiple sprinklers shall be based on two sprinklers discharging. A room shall be considered a space surrounded by walls, windows, doors, or lintels that are 8 inches or more in height.

AP105
SPRINKLERS REQUIRED

AP105.1 General. Sprinklers shall be provided to protect all areas of the dwelling unit except those areas specified in Section AP105.2.

AP105.2 Sprinklers not required. Sprinklers shall not be required in the following areas:

1. Attics and unfinished basements
2. Crawl spaces and closets
3. Bathrooms and toilet rooms
4. Garages and car ports
5. Accessory buildings not having sleeping rooms
6. Balconies, Breezeways, and decks

AP106
SPRINKLER PIPING

AP106.1 General. The sprinkler piping shall conform to the requirements for cold water distribution piping. Sprinkler piping shall connect to and be a part of the cold water distribution piping system.

AP106.1.1 Pipe protection. CPVC pipe, PEX tubing, PEX-Al-PEX tubing, and PE-AL-PE tubing shall be protected from exposure to the living space by a layer of 3/8 inch thick gypsum wallboard, 1/4 inch thick plywood, or other material having a 15 minute fire rating. Protection of the pipe shall not be required in areas not required to be protected with sprinklers as specified in Section AP105.2.

Exception. Protection shall not be required where exposure is permitted by the third party certification.

AP106.2 Water filtration or treatment systems. An automatic bypass valve shall be installed on all connections of the water distribution system to water filters, water softener or other water treatment systems that are located between the water service and any sprinkler.

Exception. Where hydraulic calculations verify that an automatic bypass valve is not required.

AP106.3 Shutoff valve limitation. A shutoff valve shall be prohibited from being installed in the water piping system such that the valve only isolates the water supply to a sprinkler or sprinklers.

AP107
PRIVATE WELLS

AP107.1 General. Sprinkler systems supplied by private well shall conform to the requirements of Section AP107.2 through AP107.2.1.

AP107.2 Well pump rating. The pump for a private well shall be rated for a minimum flow required for the entire sprinkler system. The minimum pressure setting of the pump shall be used for sizing the water piping system.

AP107.2.1 Capacity. For a well system, any combination of well capacity and tank storage shall provide a flow of water at the maximum sprinkler flow rate for a period of 7 minutes for dwelling units 2000 square feet or less in area and 10 minutes for dwelling units in excess of 2000 square feet.

AP108
SYSTEM DESIGN FLOW

AP108.1 Determining system design flow. The flow for sizing the sprinkler piping system shall be based on the flow rating of each sprinkler in accordance with Section AP108.3 and the calculation in accordance with Section AP108.3.

AP108.2 Determining required flow rate for each sprinkler. The minimum required flow for each sprinkler shall be determined using the sprinkler manufacturer's published data for the specific sprinkler model based on all of the following:

1. The area of coverage
2. The ceiling configuration
3. The temperature rating
4. Any additional conditions specified by the sprinkler manufacturer.

AP108.3 System design flow rate. The design flow rate for the system shall be based on the following:

1. The design flow rate for a room having only one sprinkler shall be the flow rate required for that sprinkler, as determined by Section AP108.1.
2. The design flow rate for a room having two or more sprinklers a shall be determined by identifying the sprinkler in that room with the highest required flow rate, based on Section AP108.1, and multiplying that flow rate by 2.
3. Where the sprinkler manufacturer specifies different criteria for ceiling configurations that are not smooth, flat and horizontal, the required flow rate for that room shall comply with the sprinkler manufacturer's instructions.
4. The design flow rate for the sprinkler system shall be the flow required by the room with the largest flow rate, based on Items 1, 2 and 3.
5. For the purpose of this section, it shall be permissible to reduce the design flow rate for a room by subdividing the space into two or more rooms, where each room is evaluated separately with respect to the required design flow rate. Each room shall be bounded by walls and a ceiling. Openings in walls shall have a lintel not less than 8 inches in depth and each lintel shall form a solid barrier between the ceiling and the top of the opening.

AP109
PIPE SIZING

AP109.1 General The piping to sprinklers shall be sized for the flow required by Section AP108.3. The flow required to supply the plumbing fixtures shall not be required to be added to the sprinkler design flow.

AP109.2 Method of sizing pipe. Piping supplying sprinklers shall be sized using the prescriptive method in Sections AP109.3 or by hydraulic calculation in accordance with NFPA 13D. The minimum pipe size from the water supply source to any sprinkler shall be 3/4 inch nominal. Threaded adapter fittings at the point where sprinklers are attached to the piping shall be a minimum of ½ inch nominal.

AP109.3 Prescriptive pipe sizing method. Pipe shall be sized by determining the available pressure to offset friction loss in piping and identifying a piping material, diameter and length using the equation in Section AP109.3.1 and the procedure in Section AP109.3.2.

AP109.3.1 Available pressure equation. The pressure available to offset friction loss in the interior piping system (P_t) shall be determined in accordance with the Equation AP-1.

$$P_t = P_{sup} - PL_{svc} - PL_m - PL_d - PL_e - P_{sp} \qquad \textbf{(Equation AP-1)}$$

Where:

P_t	=	Pressure used in applying Tables AP109.2.1(4) through AP190.2.1(9).
P_{sup}	=	Pressure available from the water supply source.
PL_{svc}	=	Pressure loss in the water-service pipe.
PL_m	=	Pressure loss in the water meter.
PL_d	=	Pressure loss from devices other than the water meter.
PL_e	=	Pressure loss associated with changes in elevation.
P_{sp}	=	Maximum pressure required by a sprinkler

AP109.3.2 Calculation procedure. Determination of the required size for water distribution piping shall be in accordance with the following procedure:

Step 1 - Determine P_{sup}
Obtain the supply pressure that will be available from the water main from the water purveyor, or for an individual source, the available supply pressure. The pressure shall be the residual pressure available at the flow rate used when applying Table AP109.2.1 (1).

Step 2 – Determine PL_{svc}
Use Table AP109.2.1 (1) to determine the pressure loss in the water service pipe based on the selected size of the water service.

Step 3 – Determine PL_m
Use Table AP109.2.1 (2) to determine the pressure loss from the water meter. based on the selected water meter size.

Step 4 – Determine PL_d
Determine the pressure loss from devices, other than the water meter, installed in the piping system supplying sprinklers, such as pressure-reducing valves, backflow preventers, water softeners or water filters. Device pressure losses shall be based on the device manufacturer's specifications. The flow rate used to determine pressure loss shall

be the rate from Section AP108.3, except that 5 gpm shall be added where the device is installed in a water-service pipe that supplies more than one dwelling. As alternative to deducting pressure loss for a device, an automatic bypass valve shall be installed to divert flow around the device when a sprinkler activates.

Step 5 – Determine PL_e
Use Table AP109.2.1 (3) to determine the pressure loss associated with changes in elevation. The elevation used in applying the table shall be the difference between the elevation where the water source pressure was measured and the elevation of the highest sprinkler.

Step 6 – Determine P_{sp}
Determine the maximum pressure required by any individual sprinkler based on the flow rate from Section AP108.1. The required pressure is provided in the sprinkler manufacturer's published data for the specific sprinkler model based on the selected flow rate.

Step 7 – Calculate P_t
Using Equation AP-1, calculate the pressure available to offset friction loss in water-distribution piping between the service valve and the sprinklers.

Step 8 – Determine the maximum allowable pipe length
Use Tables AP109.2.1 (4) through AP109.2.1 (9) to select a material and size for water distribution piping. The piping material and size shall be acceptable if the developed length of pipe between the service valve the most remote sprinkler does not exceed the maximum allowable length specified by the applicable table. Interpolation of P_t between the tabular values shall be permitted.

The maximum allowable length of piping in Tables AP109.2.1 (4) through AP109.2.1 (9) incorporates an adjustment for pipe fittings, and no additional consideration of friction losses associated with pipe fittings shall be required.

AP110
SIGNS

AP110.1 Valve Sign. A sign shall be installed at the main shutoff valve to the water distribution system stating "Warning, the water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign."

TABLE AP109.2.1(1)
WATER SERVICE PRESSURE LOSS (PL_{SVC})[a, b]
(Underlining of table omitted for clarity)

Flow Rate[c]	3/4" Water Service Pressure Loss (psi)				1" Water Service Pressure Loss (psi)				1-1/4" Water Service Pressure Loss (psi)			
(gpm)	40' or less	41' to 75'	76' to 100'	101' to 150'	40' or less	41' to 75'	76' to 100'	101' to 150'	40' or less	41' to 75'	76' to 100'	101' to 150'
8	5.1	8.7	11.8	17.4	1.5	2.5	3.4	5.1	0.6	1.0	1.3	1.9
10	7.7	13.1	17.8	26.3	2.3	3.8	5.2	7.7	0.8	1.4	2.0	2.9
12	10.8	18.4	24.9	NP	3.2	5.4	7.3	10.7	1.2	2.0	2.7	4.0
14	14.4	24.5	NP	NP	4.2	7.1	9.6	14.3	1.6	2.7	3.6	5.4
16	18.4	NP	NP	NP	5.4	9.1	12.4	18.3	2.0	3.4	4.7	6.9
18	22.9	NP	NP	NP	6.7	11.4	15.4	22.7	2.5	4.3	5.8	8.6
20	27.8	NP	NP	NP	8.1	13.8	18.7	27.6	3.1	5.2	7.0	10.4
22	NP	NP	NP	NP	9.7	16.5	22.3	NP	3.7	6.2	8.4	12.4
24	NP	NP	NP	NP	11.4	19.3	26.2	NP	4.3	7.3	9.9	14.6
26	NP	NP	NP	NP	13.2	22.4	NP	NP	5.0	8.5	11.4	16.9
28	NP	NP	NP	NP	15.1	25.7	NP	NP	5.7	9.7	13.1	19.4
30	NP	NP	NP	NP	17.2	NP	NP	NP	6.5	11.0	14.9	22.0
32	NP	NP	NP	NP	19.4	NP	NP	NP	7.3	12.4	16.8	24.8
34	NP	NP	NP	NP	21.7	NP	NP	NP	8.2	13.9	18.8	NP
36	NP	NP	NP	NP	24.1	NP	NP	NP	9.1	15.4	20.9	NP

NP - Not permitted. Pressure loss exceeds reasonable limits

a. Values are applicable for underground piping materials listed in Table P2904.4 and are based on an SDR of 11 and a Hazen Williams C Factor of 150.
b. Values include the following length allowances for fittings: 25% length increase for actual lengths up to 100 feet and 15% length increase for actual lengths over 100 feet.
c. Flow rate from Section AP108.3. Add 5 gpm to the flow rate required by Section AP108.3 where the water-service pipe supplies more than one dwelling.

TABLE AP109.2.1 (2)
MINIMUM WATER METER PRESSURE LOSS (PL_m)[a]

FLOW RATE (GPM)[B]	5/8" METER PRESSURE LOSS (PSI)	3/4" METER PRESSURE LOSS (PSI)
8	2	1
10	3	1
12	4	1
14	5	2
16	7	3
18	9	4
20	11	4
22	NP	5
24	NP	5
26	NP	6
28	NP	6
30	NP	7
32	NP	7
34	NP	8
36	NP	8

NP - Not permitted unless the actual water meter pressure loss is known.
a. Table AP109.2.1(2) establishes conservative values for water meter pressure loss for installations where the water meter loss is unknown. Where the actual water meter pressure loss is known, P_m shall be the actual loss.
b. Flow rate from Section AP108.3. Add 5 gpm to the flow rate required by Section AP108.3 where the water-service pipe supplies more than one dwelling.

TABLE AP109.2.1 (3)
ELEVATION LOSS (PL_e)

ELEVATION (FEET)	PRESSURE LOSS (PSI)
5	2.2
10	4.4
15	6.5
20	8.7
25	10.9
30	13
35	15.2
40	17.4

TABLE AP109.2.1 (4)
ALLOWABLE PIPE LENGTH FOR ¾ INCH TYPE M COPPER WATER TUBING

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	3/4	217	289	361	434	506	578	650	723	795	867
9	3/4	174	232	291	349	407	465	523	581	639	697
10	3/4	143	191	239	287	335	383	430	478	526	574
11	3/4	120	160	200	241	281	321	361	401	441	481
12	3/4	102	137	171	205	239	273	307	341	375	410
13	3/4	88	118	147	177	206	235	265	294	324	353
14	3/4	77	103	128	154	180	205	231	257	282	308
15	3/4	68	90	113	136	158	181	203	226	248	271
16	3/4	60	80	100	120	140	160	180	200	220	241
17	3/4	54	72	90	108	125	143	161	179	197	215
18	3/4	48	64	81	97	113	129	145	161	177	193
19	3/4	44	58	73	88	102	117	131	146	160	175
20	3/4	40	53	66	80	93	106	119	133	146	159
21	3/4	36	48	61	73	85	97	109	121	133	145
22	3/4	33	44	56	67	78	89	100	111	122	133
23	3/4	31	41	51	61	72	82	92	102	113	123
24	3/4	28	38	47	57	66	76	85	95	104	114
25	3/4	26	35	44	53	61	70	79	88	97	105
26	3/4	24	33	41	49	57	65	73	82	90	98
27	3/4	23	30	38	46	53	61	69	76	84	91
28	3/4	21	28	36	43	50	57	64	71	78	85
29	3/4	20	27	33	40	47	53	60	67	73	80
30	3/4	19	25	31	38	44	50	56	63	69	75
31	3/4	18	24	29	35	41	47	53	59	65	71
32	3/4	17	22	28	33	39	44	50	56	61	67
33	3/4	16	21	26	32	37	42	47	53	58	63
34	3/4	NP	20	25	30	35	40	45	50	55	60
35	3/4	NP	19	24	28	33	38	42	47	52	57
36	3/4	NP	18	22	27	31	36	40	45	49	54
37	3/4	NP	17	21	26	30	34	38	43	47	51
38	3/4	NP	16	20	24	28	32	36	40	45	49
39	3/4	NP	15	19	23	27	31	35	39	42	46
40	3/4	NP	NP	18	22	26	29	33	37	40	44

NP - Not permitted.

a. Flow rate from Section AP108.3.

TABLE AP109.2.1 (5)
ALLOWABLE PIPE LENGTH FOR 1 INCH TYPE M COPPER WATER TUBING

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler (feet)									
8	1	806	1075	1343	1612	1881	2149	2418	2687	2955	3224
9	1	648	864	1080	1296	1512	1728	1945	2161	2377	2593
10	1	533	711	889	1067	1245	1422	1600	1778	1956	2134
11	1	447	596	745	894	1043	1192	1341	1491	1640	1789
12	1	381	508	634	761	888	1015	1142	1269	1396	1523
13	1	328	438	547	657	766	875	985	1094	1204	1313
14	1	286	382	477	572	668	763	859	954	1049	1145
15	1	252	336	420	504	588	672	756	840	924	1008
16	1	224	298	373	447	522	596	671	745	820	894
17	1	200	266	333	400	466	533	600	666	733	799
18	1	180	240	300	360	420	479	539	599	659	719
19	1	163	217	271	325	380	434	488	542	597	651
20	1	148	197	247	296	345	395	444	493	543	592
21	1	135	180	225	270	315	360	406	451	496	541
22	1	124	165	207	248	289	331	372	413	455	496
23	1	114	152	190	228	267	305	343	381	419	457
24	1	106	141	176	211	246	282	317	352	387	422
25	1	98	131	163	196	228	261	294	326	359	392
26	1	91	121	152	182	212	243	273	304	334	364
27	1	85	113	142	170	198	226	255	283	311	340
28	1	79	106	132	159	185	212	238	265	291	318
29	1	74	99	124	149	174	198	223	248	273	298
30	1	70	93	116	140	163	186	210	233	256	280
31	1	66	88	110	132	153	175	197	219	241	263
32	1	62	83	103	124	145	165	186	207	227	248
33	1	59	78	98	117	137	156	176	195	215	234
34	1	55	74	92	111	129	148	166	185	203	222
35	1	53	70	88	105	123	140	158	175	193	210
36	1	50	66	83	100	116	133	150	166	183	199
37	1	47	63	79	95	111	126	142	158	174	190
38	1	45	60	75	90	105	120	135	150	165	181
39	1	43	57	72	86	100	115	129	143	158	172
40	1	41	55	68	82	96	109	123	137	150	164

a. Flow rate from Section AP108.3.

TABLE AP109.2.1 (6)
ALLOWABLE PIPE LENGTH FOR ¾ INCH CPVC PIPE

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	3/4	348	465	581	697	813	929	1045	1161	1278	1394
9	3/4	280	374	467	560	654	747	841	934	1027	1121
10	3/4	231	307	384	461	538	615	692	769	845	922
11	3/4	193	258	322	387	451	515	580	644	709	773
12	3/4	165	219	274	329	384	439	494	549	603	658
13	3/4	142	189	237	284	331	378	426	473	520	568
14	3/4	124	165	206	247	289	330	371	412	454	495
15	3/4	109	145	182	218	254	290	327	363	399	436
16	3/4	97	129	161	193	226	258	290	322	354	387
17	3/4	86	115	144	173	202	230	259	288	317	346
18	3/4	78	104	130	155	181	207	233	259	285	311
19	3/4	70	94	117	141	164	188	211	234	258	281
20	3/4	64	85	107	128	149	171	192	213	235	256
21	3/4	58	78	97	117	136	156	175	195	214	234
22	3/4	54	71	89	107	125	143	161	179	197	214
23	3/4	49	66	82	99	115	132	148	165	181	198
24	3/4	46	61	76	91	107	122	137	152	167	183
25	3/4	42	56	71	85	99	113	127	141	155	169
26	3/4	39	52	66	79	92	105	118	131	144	157
27	3/4	37	49	61	73	86	98	110	122	135	147
28	3/4	34	46	57	69	80	92	103	114	126	137
29	3/4	32	43	54	64	75	86	96	107	118	129
30	3/4	30	40	50	60	70	81	91	101	111	121
31	3/4	28	38	47	57	66	76	85	95	104	114
32	3/4	27	36	45	54	63	71	80	89	98	107
33	3/4	25	34	42	51	59	68	76	84	93	101
34	3/4	24	32	40	48	56	64	72	80	88	96
35	3/4	23	30	38	45	53	61	68	76	83	91
36	3/4	22	29	36	43	50	57	65	72	79	86
37	3/4	20	27	34	41	48	55	61	68	75	82
38	3/4	20	26	33	39	46	52	59	65	72	78
39	3/4	19	25	31	37	43	50	56	62	68	74
40	3/4	18	24	30	35	41	47	53	59	65	71

a. Flow rate from Section AP108.3.

TABLE AP109.2.1 (7)
ALLOWABLE PIPE LENGTH FOR 1 INCH CPVC PIPE

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler (feet)									
8	1	1049	1398	1748	2098	2447	2797	3146	3496	3845	4195
9	1	843	1125	1406	1687	1968	2249	2530	2811	3093	3374
10	1	694	925	1157	1388	1619	1851	2082	2314	2545	2776
11	1	582	776	970	1164	1358	1552	1746	1940	2133	2327
12	1	495	660	826	991	1156	1321	1486	1651	1816	1981
13	1	427	570	712	854	997	1139	1281	1424	1566	1709
14	1	372	497	621	745	869	993	1117	1241	1366	1490
15	1	328	437	546	656	765	874	983	1093	1202	1311
16	1	291	388	485	582	679	776	873	970	1067	1164
17	1	260	347	433	520	607	693	780	867	954	1040
18	1	234	312	390	468	546	624	702	780	858	936
19	1	212	282	353	423	494	565	635	706	776	847
20	1	193	257	321	385	449	513	578	642	706	770
21	1	176	235	293	352	410	469	528	586	645	704
22	1	161	215	269	323	377	430	484	538	592	646
23	1	149	198	248	297	347	396	446	496	545	595
24	1	137	183	229	275	321	366	412	458	504	550
25	1	127	170	212	255	297	340	382	425	467	510
26	1	118	158	197	237	276	316	355	395	434	474
27	1	111	147	184	221	258	295	332	368	405	442
28	1	103	138	172	207	241	275	310	344	379	413
29	1	97	129	161	194	226	258	290	323	355	387
30	1	91	121	152	182	212	242	273	303	333	364
31	1	86	114	143	171	200	228	257	285	314	342
32	1	81	108	134	161	188	215	242	269	296	323
33	1	76	102	127	152	178	203	229	254	280	305
34	1	72	96	120	144	168	192	216	240	265	289
35	1	68	91	114	137	160	182	205	228	251	273
36	1	65	87	108	130	151	173	195	216	238	260
37	1	62	82	103	123	144	165	185	206	226	247
38	1	59	78	98	117	137	157	176	196	215	235
39	1	56	75	93	112	131	149	168	187	205	224
40	1	53	71	89	107	125	142	160	178	196	214

a. Flow rate from Section AP108.3.

TABLE AP109.2.1 (8)
ALLOWABLE PIPE LENGTH FOR ¾ INCH PEX TUBING

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	3/4	93	123	154	185	216	247	278	309	339	370
9	3/4	74	99	124	149	174	199	223	248	273	298
10	3/4	61	82	102	123	143	163	184	204	225	245
11	3/4	51	68	86	103	120	137	154	171	188	205
12	3/4	44	58	73	87	102	117	131	146	160	175
13	3/4	38	50	63	75	88	101	113	126	138	151
14	3/4	33	44	55	66	77	88	99	110	121	132
15	3/4	29	39	48	58	68	77	87	96	106	116
16	3/4	26	34	43	51	60	68	77	86	94	103
17	3/4	23	31	38	46	54	61	69	77	84	92
18	3/4	21	28	34	41	48	55	62	69	76	83
19	3/4	19	25	31	37	44	50	56	62	69	75
20	3/4	17	23	28	34	40	45	51	57	62	68
21	3/4	16	21	26	31	36	41	47	52	57	62
22	3/4	NP	19	24	28	33	38	43	47	52	57
23	3/4	NP	17	22	26	31	35	39	44	48	52
24	3/4	NP	16	20	24	28	32	36	40	44	49
25	3/4	NP	NP	19	22	26	30	34	37	41	45
26	3/4	NP	NP	17	21	24	28	31	35	38	42
27	3/4	NP	NP	16	20	23	26	29	33	36	39
28	3/4	NP	NP	15	18	21	24	27	30	33	36
29	3/4	NP	NP	NP	17	20	23	26	28	31	34
30	3/4	NP	NP	NP	16	19	21	24	27	29	32
31	3/4	NP	NP	NP	15	18	20	23	25	28	30
32	3/4	NP	NP	NP	NP	17	19	21	24	26	28
33	3/4	NP	NP	NP	NP	16	18	20	22	25	27
34	3/4	NP	NP	NP	NP	NP	17	19	21	23	25
35	3/4	NP	NP	NP	NP	NP	16	18	20	22	24
36	3/4	NP	NP	NP	NP	NP	15	17	19	21	23
37	3/4	NP	NP	NP	NP	NP	NP	16	18	20	22
38	3/4	NP	NP	NP	NP	NP	NP	16	17	19	21
39	3/4	NP	NP	NP	NP	NP	NP	NP	16	18	20
40	3/4	NP	NP	NP	NP	NP	NP	NP	16	17	19

NP - Not permitted.

a. Flow rate from Section AP108.3.

TABLE AP109.2.1 (9)
ALLOWABLE PIPE LENGTH FOR 1 INCH PEX TUBING

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	1	314	418	523	628	732	837	941	1046	1151	1255
9	1	252	336	421	505	589	673	757	841	925	1009
10	1	208	277	346	415	485	554	623	692	761	831
11	1	174	232	290	348	406	464	522	580	638	696
12	1	148	198	247	296	346	395	445	494	543	593
13	1	128	170	213	256	298	341	383	426	469	511
14	1	111	149	186	223	260	297	334	371	409	446
15	1	98	131	163	196	229	262	294	327	360	392
16	1	87	116	145	174	203	232	261	290	319	348
17	1	78	104	130	156	182	208	233	259	285	311
18	1	70	93	117	140	163	187	210	233	257	280
19	1	63	84	106	127	148	169	190	211	232	253
20	1	58	77	96	115	134	154	173	192	211	230
21	1	53	70	88	105	123	140	158	175	193	211
22	1	48	64	80	97	113	129	145	161	177	193
23	1	44	59	74	89	104	119	133	148	163	178
24	1	41	55	69	82	96	110	123	137	151	164
25	1	38	51	64	76	89	102	114	127	140	152
26	1	35	47	59	71	83	95	106	118	130	142
27	1	33	44	55	66	77	88	99	110	121	132
28	1	31	41	52	62	72	82	93	103	113	124
29	1	29	39	48	58	68	77	87	97	106	116
30	1	27	36	45	54	63	73	82	91	100	109
31	1	26	34	43	51	60	68	77	85	94	102
32	1	24	32	40	48	56	64	72	80	89	97
33	1	23	30	38	46	53	61	68	76	84	91
34	1	22	29	36	43	50	58	65	72	79	86
35	1	20	27	34	41	48	55	61	68	75	82
36	1	19	26	32	39	45	52	58	65	71	78
37	1	18	25	31	37	43	49	55	62	68	74
38	1	18	23	29	35	41	47	53	59	64	70
39	1	17	22	28	33	39	45	50	56	61	67
40	1	16	21	27	32	37	43	48	53	59	64

a. Flow rate from Section AP108.3.

Reason: The exceptions included in this proposal are reasonable allowances for consideration by the IRC Committee and the ICC Membership, should sprinklers be installed in accordance with the proposed prescriptive sprinkler system provisions or NFPA 13D and do not result in a reduction to occupant safety. Several of these exceptions are similar in methodology to other trade exceptions offered in structures that are equipped with an automatic sprinkler system. Some of the proposed exceptions are referenced in other codes that may not have been adopted by the jurisdiction, therefore it is important that they be included in the IRC Appendix P as possible trade exceptions. Below is a list and supporting information for each proposed trade exception;

AP111.1 This proposal exception would allow for the reduction in the fire separation distance between dwellings, require that the 1 hour rating of the exterior wall to be limited to the outside exposed wall. This proposal would also allow one- and two-family dwelling, equipped with an automatic sprinkler system, to be built without a rated exterior wall and unlimited openings up to the property, provided there is setback of a minimum 6 feet. When a dwelling unit is equipped with an automatic sprinkler system most fires can be controlled by one or two sprinklers, thereby reducing the concern about heat exposure from one dwelling to another.

AP111.2 Emergency escape and rescue openings are required by the code to allow a secondary exit should the primary escape route is blocked. As stated above, the automatic sprinkler system is designed to provide an increased level of safety for the occupant by controlling or suppressing the fire. Similar exceptions are already provided in the International Building Code and Life Safety Code to other R occupancies when the structure is equipped with an approved automatic sprinkler system.

AP111.3 The purpose of the smoke alarm system is to provide the occupant enough time to escape the dwelling upon notification of a fire. Dwellings that are equipped with an automatic sprinkler system should be permitted to reduce the number of smoke alarms required in the dwelling, since they increase the amount of time the occupant has to vacate the dwelling by controlling and sometimes extinguishing the fire.

AP111.4 The IRC Commentary explains that Arc-Fault receptacles are required to reduce the number of fires that are associated with electrical arcs. Based on information provided in reports published by the National Fire Protection Association prior to the code requiring arc-fault protection, the number of fires who's origin was based on an electrical distribution and lighting failure or malfunction accounted for 3% of all residential structure fires and caused the least number of fire fatalities.

AP112 When the sizing of the water meter and distribution line must be increased to accommodate an automatic sprinkler system, the fees assessed by the water purveyor should be based solely on the size meter and distribution lines that would be required to meet the domestic potable demand. Unless the sprinkler is activated, there is no increase in the amount of water consumed by the dwelling. Consumers should not be charged higher rates or fees, just because the sprinkler system design required the distribution system to be increased.

AP113.2 The purpose of this proposal is to follow a precedence that has been established in the *International Residential Code* when referencing another code. The *International Fire Code* allow the Authority Having Jurisdiction to reduce the required fire flow rate by 50 percent when the dwelling is provided with an approved sprinkler system.

AP113.3 Would allow greater distances between fire hydrants in residential developments where all dwellings are equipped with an automatic sprinkler system in accordance with Appendix P. Both the *Uniform fire Code* and the *Urban- Wildland Interface Code* allow for increase to the fire hydrant spacing when all dwelling units in a development are equipped with an automatic sprinkler system. The spacing increase to 1,000 feet would still meet the UFC requirement for response to vehicular accidents and the WUIC requirement for maximum distance to a water source.

AP113.4 This proposed exception would allow for the increase the number of dwelling units allowed before requiring a secondary fire apparatus access road and would allow for the reduction of the access road to less than 20 feet when all the dwellings are equipped with an approved automatic sprinkler system. The *International Fire Code* allows for a single fire apparatus access road for developments that are equipped with an automatic sprinkler system and some jurisdictions have allowed for narrower roads as an exception when dwellings are sprinklered.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB71–07/08

R313, R313.1.1 (New), R313.1.2 (New), R313.1.3 (New), Chapter 43 (New)

Proponent: Roger R. Evans, Park City Municipal Corporation, representing Utah Chapter of ICC

1. Revise section title as follows:

SECTION R313
~~SMOKE~~ ALARMS

2. Add new text as follows:

R313.1.1 Carbon monoxide alarms. In new construction, dwelling units within which fuel-fired appliances are installed shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).

R313.1.2 Where required-existing dwellings. In existing dwellings, where interior alterations, repairs, fuel-fired appliance replacements of additions requiring a permit occur, or where one or more sleeping rooms are added or created, carbon monoxide alarms shall be provided in accordance with Section 313.1.1.

R313.1.3 Alarm requirements. The required carbon monoxide alarms shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. Carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

(Renumber subsequent sections)

3. Add standard to Chapter 43 as follows:

UL

2034-96 Standard for Single and Multiple Station Carbon Monoxide Alarms

Reason: According to the Journal of the American Medical Association (JAMA), carbon monoxide is the leading cause of accidental poisoning deaths in America. Over 1,500 people die annually due to accidental carbon monoxide exposure and an additional 10,000 seek medical attention. www.homesafe.com

Cost Impact: The code change proposal will increase the cost of construction from between $50.00 to $300.00 per dwelling unit.

Analysis: The standard proposed for inclusion in the code, UL 2034, complies with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB72–07/08
R313.1

Proponents: Shane M. Clary, Bay Alarm Company; Thomas P. Hammerberg, Automatic Fire Alarm Association, Inc.

Revise as follows:

R313.1 Smoke detection and notification. All smoke alarms shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72.

Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms ~~in the event the fire alarm panel is removed or the system is not connected to a central station~~. Where a household fire warning system is installed, it shall become a permanent fixture of the occupancy and owned by the homeowner. The household fire warning system shall not be leased.

Reason: The current provisions of Section R313.1 regarding household fire warning systems are not technically possible. The smoke detectors and any notification appliances receive their power from the Fire Alarm Control Unit (FACU). Removing the FACU will completely disable the system. It is my understanding that this is indeed the concern by some on allowing the use of a systems approach as opposed to the use of smoke alarms. By requiring the system to become a permanent fixture of the occupancy and not be leased, will prevent the system from being removed due to nonpayment.

For larger homes, the only possible way to provide detection is through the use of a household fire warning system. NFPA 72, National Fire Alarm Code, has limits as to the number of smoke alarms that may be interconnected. Section 11.8.2.2 of the 2006 edition allows only twelve smoke alarms to be interconnected If the interconnecting means is not supervised. Up to forty-two smoke alarms may be interconnected if they are supervised.

A number of homeowners prefer that their household fire warning systems be monitored by a supervising station. The listing of UL 217 smoke alarms prohibits them from being monitored.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB73–07/08
R313.1

Proponent: Gary Lampella, City of Redmond, OR, representing Oregon Building Officials Association

Revise as follows:

R313.1 Smoke detection and notification. All smoke alarms shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code ~~and~~ or the household fire warning equipment provisions of NFPA 72.

Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms in the event the fire alarm panel is removed or the system is not connected to a central station.

Reason: The wording of this code section would require that smoke detectors are required to be installed in accordance with NFPA 72 for household fire alarm systems even if they are not designed as such. The second paragraph of this section gives the user the option of using that system, but does not require them. Adding the word “or” in place of “and” would be consistent with this option.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB74–07/08
R313.1, R313.2 (New)

Proponent: William E. Koffel, PE, Koffel Associates, Inc., representing National Burglar and Fire Alarm Association

Revise as follows:

R313.1 Smoke detection and notification. All smoke alarms shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72.

R313.2 Smoke detection systems. Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms in the event the fire alarm panel is removed or the system is not connected to a central station.

Exception: Where smoke alarms are provided meeting the requirements of Section R313.3.

(Renumber subsequent sections)

Reason: The current language has been interpreted to apply even in those instances where a household fire alarm system is installed in addition to smoke alarms. The proposed revised format and exception are intended to clarify that the performance requirements for household fire warning systems do not apply to those systems installed in addition to smoke alarms.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB75–07/08
R314.5.3, R314.5.4

Proponent: Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials (AMBO)

Revise as follows:

R314.5.3 Attics. The thermal barrier specified in Section 314.4 is not required where all of the following apply:

1. Attic access is required by Section R807.1. ~~and where~~
2. The space is entered only for ~~service of utilities and when~~ purposes of repairs or maintenance.
3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
   - ~~1.~~ 3.1. 1.5-inch-thick (38 mm) mineral fiber insulation;
   - ~~2.~~ 3.2. 0.25-inch-thick (6.4 mm) wood structural panels;
   - ~~3.~~ 3.3. 0.375-inch (9.5 mm) particleboard;
   - ~~4.~~ 3.4. 0.25-inch (6.4 mm) hardboard;
   - ~~5.~~ 3.5. 0.375-inch (9.5 mm) gypsum board; or
   - ~~6.~~ 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

R314.5.4 Crawl spaces. The thermal barrier specified in Section R314.4 is not required where all of the following apply:

1. Crawlspace access is required by Section R408.3. ~~and where~~
2. Entry is made only for ~~service of utilities and~~ purposes of repairs or maintenance.
3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
   - ~~1.~~ 3.1. 1.5-inch-thick (38 mm) mineral fiber insulation;
   - ~~2.~~ 3.2. 0.25-inch-thick (6.4 mm) wood structural panels;
   - ~~3.~~ 3.3. 0.375-inch (9.5 mm) particleboard;

~~4.~~ 3.4. 0.25-inch (6.4 mm) hardboard;
~~5.~~ 3.5. 0.375-inch (9.5 mm) gypsum board; or
~~6.~~ 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.41 mm).

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

Reason: The purpose of this code change is to clear up the confusion that may occur over when this section applies and what "service of utilities" means.

A similar proposal was disapproved by the Committee in Orlando. That proposal used the terms "appliance" and "equipment". It was argued that the term "equipment" was to broad and included components that were not intended to apply in this section. This proposal is more generic in nature but gives greater direction than the current language. It replaces the term "service of utilities" with the term "repairs or maintenance".

The IRC Commentary gives as the requirement for the attic access: "The requirement for an attic access is predicated on the likelihood that during the life of the structure, access to an attic space for repair of piping, electrical and mechanical systems will be required."

The proposed modification is in line with the position taken in the Commentary.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB76–07/08
R314.5.3

Proponent: Marcelo M. Hirschler, GBH International, representing American Fire Safety Council

Revise as follows:

R314.5.3 Attics. The thermal barrier specified in Section 314.4 is not required where attic access is required by Section R807.1 and where the space is entered only for service of utilities and when the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
~~2. 0.25-inch-thick (6.4 mm) wood structural panels;~~
~~3. 0.375-inch (9.5 mm) particleboard;~~
~~4. 0.25-inch (6.4 mm) hardboard;~~
~~5.~~ 2. 0.375-inch (9.5 mm) gypsum board; ~~or~~
~~6.~~ 3. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm); or
4. Other approved material.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

Reason: Foam plastic insulation has not been permitted to be used exposed in codes for many years. The separation required is normally a thermal barrier in accordance with R314.4. The reason for this is because it has been known for many years that testing of foam plastic insulation by using ASTM E 84 (Steiner tunnel test) can generate misleading results. This was the result of a 1973 Federal Trade Commission ruling and agreement. It is also well known that burning foam plastic insulation can generate very high heat release rate values and severe fires.

The use of foam plastic insulation in attics and crawl spaces has been allowed as an exception because of the remoteness of the area. Nowadays it is no longer reasonable to consider these areas to be inaccessible spaces. Therefore it is important to take a fresh look at this application.

Having the foam plastic insulation covered simply by a ¼ inch wood panel, or 3/8 inch particle board (not required to be fire-retardant-treated wood) is not safe as the wood panel can ignite relatively easily and the fire would then spread to the foam and a large fire would result. The other "protective coverings" permitted to cover the foam plastic insulation, namely 3/8 inch gypsum wallboard, 1.5 inch mineral fiber insulation and 1/64 inch corrosion resistant steel are all either non combustible or virtually noncombustible materials. There is no need for this protective covering to be non combustible but it needs to exhibit better fire performance than ¼ inch wood. This is covered by the permission to use "other approved materials", which gives the appropriate leeway to the authority having jurisdiction.

Other requirements for foam plastic insulation in the IRC:

1. Overall it needs to meet a flame spread index of 75 and a smoke developed index of 450 and be covered by a thermal barrier (R313.3 & R314.4).
2. Within masonry walls covered by 1 inch of masonry (R314.5.1).
3. In roofing, as part of Class A, B, or C roof covering assemblies, if the foam passes FM 4450 or UL 1256 or if the foam is separated from the building by wood structural panel sheathing not less than 0.47 inch in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints or other approved type of edge support, or an equivalent material (R314.5.2).
4. As a special approval, with large scale tests (R314.6).

Cost Impact: The code change proposal should not affect the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB77–07/08
R314.5.3

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing Cellulose Insulation Manufacturers Association (CIMA)

Revise as follows:

R314.5.3 Attics. The thermal barrier specified in Section R314.4 is not required where attic access is required by Section R807.1 and where the space is entered only for service of utilities and when the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
2. 0.25-inch-thick (6.4 mm) wood structural panels;
3. 0.375-inch (9.5 mm) particleboard;
4. 0.25-inch (6.4 mm) hardboard;
5. 0.375-inch (9.5 mm) gypsum board; or
6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).
7. 1.5-inch thick (38mm) cellulose loose-fill insulation.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

Reason: We are proposing the use of 1-1/2 inch thick cellulose loose-fill insulation as another acceptable material for use as an ignition barrier to satisfy the requirements of R314.5.3 for the protection of foam plastic insulation in attics as an alternate to the thermal barrier required by Section 314.4. We are basing this proposal on the equivalent performance to that of Item No. 1 of this Section which allows 1-1/2 inch mineral fiber insulation which by definition would include both mineral wool or glass fiber. Presently, cellulose insulation is recognized as being equivalent to mineral fiber insulation for the purpose of providing additional protection of 15 minutes to a fire resistance wall assembly utilizing wood stud construction as specified in Table 721.6.2(5) of the 2006 International Building Code (IBC).

Furthermore, when the Cellulose Manufacturers Insulation Association (CIMA) conducted the full scale test to validate the comparable performance for cellulose insulation in achieving a one-hour fire-resistance rating for wood stud wall assemblies faced with various thicknesses of gypsum wall board, we also measured the heat transfer through the insulation within the wall cavity to determine its resistance to the movement of heat through the assembly during the ASTM E119 Fire Test Exposure. The test data indicated that the cellulose insulation was capable of limiting the temperature increase to an average maximum temperature of 250^{o}F for a period of 15 minutes which is the same performance specified for a thermal barrier in Section R314.4 using an approximate thickness of 1-1/2 inches of the cellulose insulation.

Therefore, we believe that this proposal to include 1-1/2 inch cellulose loose-fill insulation as another material acceptable for an ignition barrier is appropriate.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB78–07/08
R314.5.3, R314.5.4

Proponent: Michael P. Burnetter, PE, NY State Department of State, Codes Division

Revise as follows:

R314.5.3 Attics. The thermal barrier specified in Section 314.4 is not required where attic access is required by Section R807.1 and where the space is entered only for service of utilities and when the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
2. 0.25-inch-thick (6.4 mm) wood structural panels;
3. 0.375-inch (9.5 mm) particleboard;
4. 0.25-inch (6.4 mm) hardboard;
5. 0.375-inch (9.5 mm) gypsum board; or
6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).
7. Approved spray applied thermal barrier, intumescent, cementitious, cellulose, or Portland cement plaster materials.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

R314.5.4 Crawl spaces. The thermal barrier specified in Section R314.4 is not required where crawlspace access is required by Section R408.3 and where entry is made only for service of utilities and the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
2. 0.25-inch-thick (6.4 mm) wood structural panels;
3. 0.375-inch (9.5 mm) particleboard;
4. 0.25-inch (6.4 mm) hardboard;
5. 0.375-inch (9.5 mm) gypsum board; or
6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.41 mm).
7. Approved spray applied thermal barrier, intumescent, cementitious, cellulose, or Portland cement plaster.

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

Reason: The new materials listed would still require the approval of the authority having jurisdiction and only apply to fully un-occupied spaces which are not finished and have very limited access for service of utilities. Given the nature of spray foam which can vastly improve the energy conservation of a building (due to the added benefit of air sealing) and the newer allowance for these efficient systems (see R806.4 Conditioned attic assemblies since the 2006 IRC) to save energy once sprayed into the various building cavities found in the unfinished attic or crawl space. Then considering the materials listed which may perform well as a thermal barrier can also be applied in the same fashion (spray) as the foam which this code section addresses in part. In other words, the labor savings and potential benefits from the combination of materials to perform both energy savings and then to provide a thermal barrier protection will greatly enhance the possibility that these spray foam applications will be safe.

Cost Impact: The code change proposal will not increase the cost of construction and would in fact reduce the costs compared to the current material allowances in the 2007 IRC supplement, due to the allowance for spray applications of proven material equivalents for a thermal barrier.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB79–07/08
R314.5.11

Proponent: Craig Conner, Building Quality, representing Icynene Incorporated

Revise as follows:

R314.5.11 Sill plates and headers. Foam plastic shall be permitted to be spray applied to a sill plate and header without the thermal barrier specified in Section R314.4 subject to all of the following:

1. The maximum thickness of the foam plastic shall be 31/4 inches (83 mm).
2. The density of the foam plastic shall be in the range of ~~1.5~~ 0.5 to 2.0 pounds per cubic foot (24 to 32 kg/m3).
3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke developed index of 450 or less when tested in accordance with ASTM E 84.

Reason: This section specifies that high density foams do not require a thermal barrier when sprayed on a sill plate or header, provided they meet the specified tests. The other common type of spray foam, low density foam, should also be allowed in the same application if it can pass the same specified flame spread and smoke development tests. Icynene's spray foam has already passed the required test. Presumably other companies that make a similar lower density foam would also qualify in this application.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB80–07/08
R316.2

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing Cellulose Insulation Manufacturers Association (CIMA)

Revise as follows:

R316.2 (Supp) Loose-fill insulation. Loose-fill insulation materials that cannot be mounted in the ASTM E 84 or UL 723 apparatus without a screen or artificial supports shall comply with the flame spread and smoke-developed limits of Sections R316.1 ~~and R316.4~~ when tested in accordance with CAN/ULC S102.2.

Exception: Cellulose loose-fill insulation shall not be required to ~~comply with the flame spread index requirement of~~ be tested in accordance with CAN/ULC S102.2, provided such insulation complies with the requirements of Section R316.1 and Section R316.3.

Reason: This code change proposal deletes the requirement that cellulose loose-fill insulation be tested in accordance with CAN/ULC S102.2 for a smoke-developed rating. It should be noted that testing cellulose loose-fill insulation per CAN/ULC S102.2 for flame spread is already preempted by federal regulations promulgated by the Consumer Product Safety Commission (CPSC). However, those regulations do not specifically preempt it from being tested for smoke development. That is why the code currently requires cellulose loose-fill insulation to be tested per ASTM E84 for smoke developed. See Exception 2 to Section R316.1.

Approval of this code change would also make the International Residential Code (IRC) consistent with the requirements in Section 719.4 of the International Building Code (IBC) contained in the 2007 Supplement to the International Codes. A similar code change to the IBC (FS 148-0607) was approved during the ICC Final Action Hearings held last May in Rochester, NY to clarify how cellulose loose-fill insulation is to be tested for its flame spread and smoke-developed limitations specified in that section.

CAN/ULC S102.2 was originally developed in Canada for testing attic insulation but it never caught on, primarily because of ASTM E970, the critical radiant flux test for attic floor insulation. ASTM E970 is required by both the IRC and IBC and it is specified throughout the world simply because it is a better test for attic insulation. Another major drawback to the CAN/ULC S102.2 test is that it requires major modifications to the ASTM E84 test apparatus. In fact, there are only a couple of Canadian laboratories that can do this test because they made the modifications but there are currently no US laboratories that have made the needed modifications. Furthermore, a Health Canada Laboratories representative who conducts this test publicly stated it is “unreliable and inconsistent”. And, the standard hasn’t had a consensus revision in more than 20 years.

Several member companies of CIMA have conducted significant numbers of both the ASTM E84 and the CAN/ULC S102.2 tests on cellulose insulation at considerable expense and noted that they get virtually the same “smoke-developed” numbers from both tests. Please refer to the following test data that several CIMA members have provided showing the smoke characteristics of cellulose loose-fill insulation based on tests conducted in accordance with both ASTM E84 and CAN/ULC S102.2. Two of the US manufacturers sell product in Canada so they have tested to the CAN/ULC S102.2 test method and one manufacturer has actually tested to both that test method and ASTM E84. The following are the results of the smoke-developed limits determined by the two tests where both tests have been conducted:

Manufacturer	ASTM E84	CAN/ULC S102.2
X	10—30	12.4—29.5
Y	—	3.7
4 others	0—10	—
Overall	0—30	3.7—29.5

From a comparison of this limited amount of test data it is readily apparent that there is no significant difference between the smoke-developed index determined in accordance with ASTM E84 and the smoke-developed limit determined by CAN/ULC S102.2. It is also especially important to note that the smoke-developed numbers are significantly less than the maximum 450 allowed by Section 719 by an order of magnitude. On that basis, it does not appear that there is a need to require smoke testing per CAN/ULC S102.2 where the insulation has already been tested in accordance with ASTM E84 to determine a smoke-developed index.

Furthermore, the cost to comply with the current requirement will likely run in the tens of thousands of dollars for the cellulose insulation industry. Thus, we propose there is no technical basis or benefit for testing cellulose loose-fill insulation to CAN/ULC for the sole purpose of obtaining a smoke developed number.

Also, due to a lack of interest in Canada because of its poor repeatability and reproducibility and lack of correlation with real world fires, CAN/ULC S102.2 has been earmarked by Health Canada for removal from the Canadian government’s Product Safety Act.

We believe the proposed code change will better clarify the intent of the code proposal to exempt cellulose loose-fill insulation from being tested to two separate fire tests for determination of the smoke developed index (rating).

It has been stated that the ASTM E84 test is not an appropriate test for loose-fill insulation. In general, we agree, certainly from the perspective of determining a flame spread index. However, the way the present code is structured for testing of cellulose loose-fill insulation, the ASTM E84 test is only used to determine the smoke developed index. That index is allowed to be as high as 450, whereas the flame spread index could not be greater than 25. Since there is more than an order of magnitude difference in the required limits, the accuracy of the ASTM E84 test method is not nearly as critical for determining the smoke developed index of a material as it is for determining the flame spread index. Furthermore, cellulose loose-fill insulation tested to ASTM E84 generally results in smoke developed indexes of less than 50 as shown above. So even if there was a significant error in the test results, there would be no jeopardy of approaching the 450 limit specified in the code.

It has also been indicated that testing agencies in the United States do test to the CAN/ULC S102.2. However, it should be clarified that there are testing agencies in the United States that are qualified to test to this standard but they must modify their typical ASTM E84 test apparatus to accomplish that. Currently, there are no such testing labs in the United States that have permanently modified their equipment for this testing. Therefore, any manufacturer wishing to test to the Canadian standard must go to Canada. We do not believe that such a hardship which involves significant additional costs and time is justified for determining a smoke developed rating which by ASTM E84 testing has been shown to be very low.

For all of the above reasons, we respectfully request the Committee to approve this code change proposal which deletes the requirements for testing cellulose loose-fill insulation in accordance with CAN/ULC S102.2 to determine a smoke-developed number.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB81–07/08
R317.1

Proponent: Rick Thornberry, PE, The Code Consortium, Inc., representing Alliance for Fire and Smoke Containment and Control (AFSCC)

Revise as follows:

R317.1 (Supp) Two-family dwellings. Dwelling units in two-family dwellings shall be separated from each other by wall and/or floor assemblies having not less than a 1-hour fire-resistance rating when tested in accordance with ASTM E 119 or UL 263. Fire-resistance- rated floor-ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend <u>from the foundation</u> to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.
2. Wall assemblies need not extend through attic spaces when the ceiling is protected by not less than 5/8-inch (15.9 mm) Type X gypsum board and an attic draft stop constructed as specified in Section R502.12.1 is provided above and along the wall assembly separating the dwellings. The structural framing supporting the ceiling shall also be protected by not less than 1/2 -inch (12.7 mm) gypsum board or equivalent.

Reason: This code change proposal simply clarifies how the dwelling unit separation wall is to be constructed to form a complete and continuous fire separation between adjacent dwelling units in two-family dwellings. Such walls should start at the foundation in order to provide a complete separation so that basements and crawl spaces are not allowed to communicate with each other in adjacent dwelling units. This will prevent fires in such concealed spaces from bypassing the 1-hour fire-resistance rated separation wall and spreading from one unit to the other. This is also consistent with Section 708.4 Continuity of the 2006 International Building Code for fire partitions required to separate dwelling units in the same building.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB82–07/08
R317.2

Proponent: Daniel Weed, CBO, City of Central, CO, representing himself

Revise as follows:

R317.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance- rated wall assemblies meeting the requirements of Section R302 for exterior walls.

Exception<u>s</u>:

1. <u>A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section R317.3.</u>
2. <u>Use of Section R302 shall not preclude the extension of eave projections over adjacent roofs of attached townhouses that are across a lot line if the rated wall goes up between the projection and the building it is attached to and the projection is rated for one hour on the underside.</u>

Reason: Many jurisdictions are finding that townhouses are being designed with property lines between them, and as such they do not allow any projections over the line because the code refers the reader to section 302 where you may only come within a certain distance of the line. As a result, in some more restrictive jurisdictions, designers have to cut the eaves off their building so that eaves do not project across the line and over the neighbor's roof. This results in a less than appealing design.

In other jurisdictions, the decision has been made to allow the overhangs because everyone else is doing it, while recognizing that it does not comply with the code because projections are not allowed to be that close to the line, let alone be "over" the line.

The purpose of this code change is to clarify that it is okay to allow projections on a townhouse building that cross the property line between two attached units as long as the rated separation wall is continuous between the projection and the unit it is attached to and the projection must be protected on the underside for one hour. These "burnoff" elements as they are often referred to are basically the property of the neighbor now that they are over the line, but in most cases the HOA controls all the exterior maintenance and responsibility anyway.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB83–07/08

R317.2.1, Figure R317.2(1) (New)

Proponent: Lee J. Kranz, City of Bellevue, WA, representing The Washington Association of Building Officials (WABO), Technical Code Development Committee

1. Revise as follows:

R317.2.1 Continuity. The fire-resistance-rated wall or assembly separating townhouses shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures. Where an upper story extends beyond a story below forming an overhanging floor area, it shall have a minimum fire-resistance rating of one hour on the underside and the fire-resistance-wall or assembly separating townhouses shall extend to within five feet of the outside edge of the upper story. (See Figure R317.2(1)).

2. Add new figure as follows:

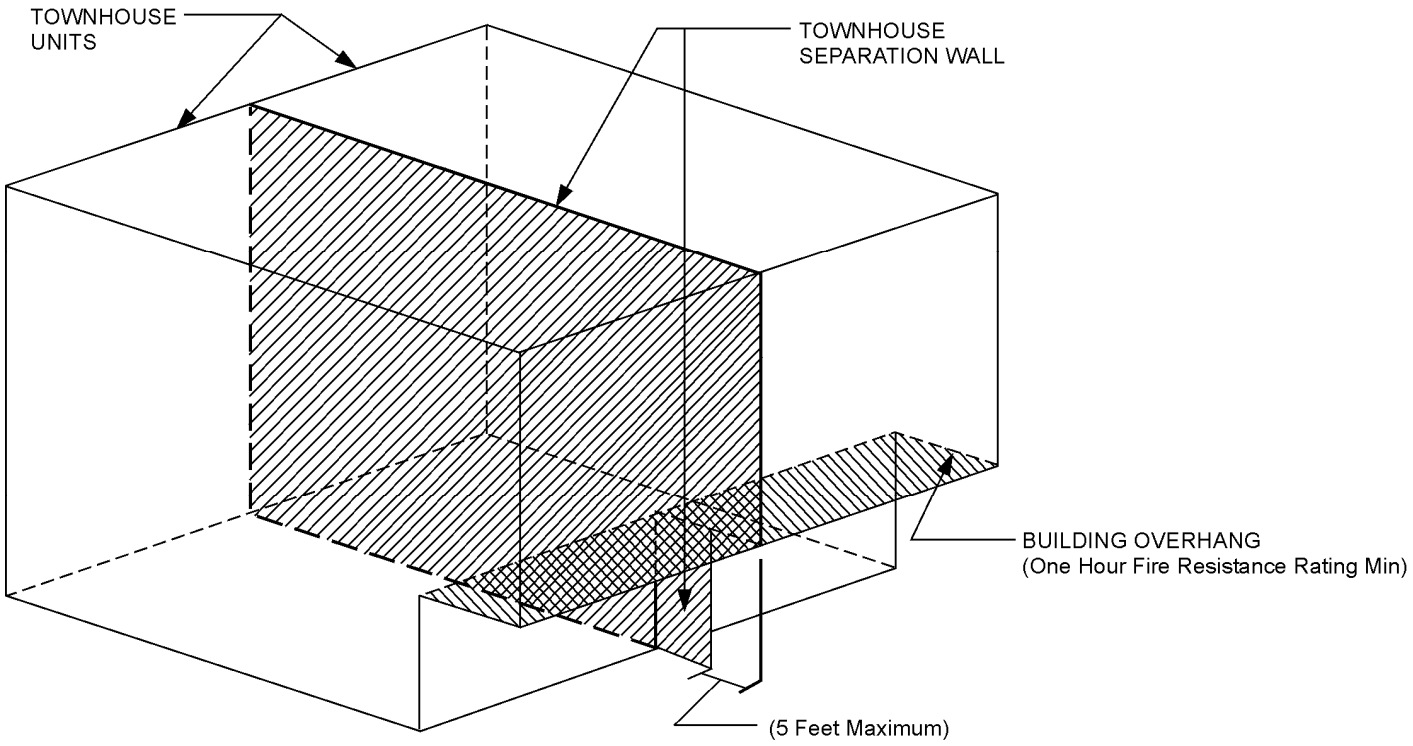


FIGURE R317.2(1)
CANTILEVERED BUILDING

Reason: Overhanging floor areas are typical in many townhouse designs and are not currently affectively addressed in the code. This proposal addresses a townhouse design with an upper story overhang. IRC 317.2.1 requires that the fire-resistance rating extend the full length of the wall and be continuous from the foundation to the roof, deck or slab. Under the current provisions, a townhouse with an overhang or cantilever design must have a fire-resistance-rated separation wall that extends to the outer face of the exterior wall above and must provide a complete fire resistance rated separation from one dwelling unit to the other.

This proposal provides an alternate means of separating the townhouse units where overhanging areas occur. By allowing the "wing wall" to terminate at a point less than the full length of the townhouse building and protecting the underside of the overhang, adequate separation is provided. The 5' distance from the end of the separation wall to the exterior wall of the floor above is consistent with the minimum fire separation distance required in Table R302.1 for projections.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB84–07/08
R319.1

Proponent: Bill Towson, Arch Wood Protection

Revise as follows:

SECTION R319
PROTECTION OF WOOD AND WOOD BASED PRODUCTS AGAINST DECAY

R319.1 (Supp) Location required. Protection of wood and wood based products from decay shall be provided in the following locations by the use of naturally durable wood or wood that is preservative treated in accordance with AWPA U1 for the species, product, preservative and end use. Preservatives shall be listed in Section 4 of AWPA U1.

1. Wood joists or the bottom of a wood structural floor when closer than 18 inches (457 mm) or wood girders when closer than 12 inches (305 mm) to the exposed ground in crawl spaces or unexcavated area located within the periphery of the building foundation.
2. All wood framing members that rest on concrete or masonry exterior foundation walls and are less than 8 inches (203 mm) from the exposed ground.
3. Sills and sleepers on a concrete or masonry slab that is indirect contact with the ground unless separated from such slab by an impervious moisture barrier.
4. The ends of wood girders entering exterior masonry or concrete walls having clearances of less than 0.5 inch (12.7mm) on tops, sides and ends.
5. Wood siding, sheathing and wall framing on the exterior of a building having a clearance of less than 6 inches (152 mm) from the ground or less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs, and similar horizontal surfaces exposed to the weather.
6. Wood structural members supporting moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, unless separated from such floors or roofs by an impervious moisture barrier.
7. Wood furring strips or other wood framing members attached directly to the interior of exterior masonry walls or concrete walls below grade except where an approved vapor retarder is applied between the wall and the furring strips or framing members.

Reason: The section title and language in the body of this code section should be changed to clarify that the intent of this code section is the protection of wood and wood based products from to damage by decay.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB85–07/08
R319.3.1, Table R319.3.1 (New)

Proponent: Steven Orlowski, National Association of Home Builders

1. Revise as follows:

R319.3.1 (Supp) Fasteners for preservative treated wood. Fasteners for preservative-treated wood shall be ~~of hotdipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper~~ in accordance with Table R319.1.3. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153

Exceptions:

1. One-half-inch (12.7 mm) diameter or greater steel bolts.
2. Fasteners other than nails, timber rivets, wood screws and lag screws shall be permitted to be of mechanically deposited zinc coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.
3. Fasteners permitted for untreated wood, used in applications that will remain dry in service, shall be permitted for wood treated with non-corrosive borate preservatives.

2. Add new table as follows:

***TABLE R319.3.1**
ACCEPTABLE FASTENERS PER CHEMICALS USED IN PRESSURE-PRESERVATIVELY TREATED WOOD

****CHEMICAL**	**FASTENERS**
Borate (disodium octaborate tetrahydrate "DOT")	Carbon steel, galvanized steel, stainless steel, copper, and silicon bronze
ACQ (copper combined with a quaternary ammonium compound "QUAT")	Hot-dipped galvanized, stainless steel, and triple coated zinc polymer
Wolman E (copper combined with the organic fungicide, tebuconazole)	Hot-dipped galvanized, stainless steel, and triple coated zinc polymer
****If the chemical used is not listed above, the fastener used in pressure-preservative treated wood is subject to approval from the building official.**	

Reason: Extensive testing of borate wood preservation products to AWPA's *Standard Method of Determining Corrosion of Metal in Contact with Treated Wood* by wood product manufacturers has consistently shown that borate treated lumber poses no significant corrosion threat to standard fasteners used with untreated lumber. Borate preservative and treated lumber manufacturers clearly state this in their respective literature describing their products and the recommended use and fastening of them. R319.3 is intended to ensure fasteners used for lumber treated with corrosive preservatives are adequately corrosion resistant. Corrosion resistant fasteners are significantly more expensive than standard fasteners. As currently written, R319.3 applies to borate treated lumber products and is being enforced as such which is not necessary based on the noted testing and manufacturers' clear affirmation of the results and therefore needlessly increases construction costs. The proposed exception addresses the matter appropriately.

Section R319.1 of the IRC ensures that preservative treated woods are specified for their species, product, preservatives and end use. In the application and end use of borates, manufactures will specify that the wood products treated with borates shall not be exposed to environments that will cause leaching by water. This is reflected in the text limiting the exception to applications that will remain dry while in service, such as sill plates for exterior and interior walls in direct contact with concrete or masonry that are protected from the elements.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB86–07/08
R319.3.1, R319.3.3

Proponent: Joseph T. Holland, III, Hoover Treated Wood Products

Revise as follows:

R319.3.1 (Supp) Fasteners for preservative treated wood. Fasteners for preservative-treated wood shall be of hotdipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper.

Exceptions:

1. One-half-inch (12.7 mm) diameter or greater steel bolts.

2. Fasteners other than nails~~,~~ and timber rivets~~, wood screws and lag screws~~ shall be permitted to be of mechanically deposited zinc coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.

R319.3.3 (Supp) Fasteners for fire-retardant-treated wood used in exterior applications or wet or damp locations. Fasteners for fire-retardant-treated wood used in exterior applications or wet or damp locations shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. Fasteners other than nails and timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.

Reason: Revise section to allow fasteners used in preservative treated wood for exterior applications for FRTW as well. Restore language inadvertently deleted by item S76-06/07 Part II.

The treatment for FRTW does not contain a copper ingredient like preservative treated wood. The copper has been identified as contributing to the corrosion of fasteners. Fasteners appropriate for preservative treated in exterior environments are also appropriate for FRTW.

This will also make the provisions in the building code and the residential code consistent with each other.

The change for S76 was developed using the 2003 IRC. This proponent did not realize the provision was modified for the 2006 IRC. The request is to restore the exception as printed in the 2006 IRC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB87–07/08

R320, R320.1

Proponent: Bill Towson, Arch Wood Protection

Revise as follows:

SECTION R320
PROTECTION OF WOOD AND WOOD BASED PRODUCTS
AGAINST SUBTERRANEAN TERMITES

R320.1 (Supp) ~~Subterranean termite control methods~~ Protection wood and wood based products required. In areas subject to damage from termites as indicated by Table R301.2(1), ~~methods of protection~~ protection of wood and wood based products from termites shall be provided by one of the following methods or a combination of these methods:

1. Chemical termiticide treatment, as provided in Section R320.2.
2. Termite baiting system installed and maintained according to the label.
3. Pressure-preservative-treated wood in accordance with the AWPA standards listed in Section R319.1.
4. Naturally durable termite-resistant wood.
5. Physical barriers as provided in Section R320.4.
6. ~~Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.~~

Reason: The section title and language in the body of this code section should be changed to clarify that the intent of this code section is the protection of wood and wood based products from to damage by termites. In addition, Item 6, Cold formed steel framing was added to the list of subterranean termite control methods in this section in the 2007 IRC Supplements. Clearly this is a mistake and this item should not have been included here. Cold formed steel framing, in and of itself, is not a cellulosic, wood or wood based material that is subject to damage or required to be protected from termites and decay. Nor is cold formed steel when it is used in combination with any of the other listed methods, an approved method of control to prevent the termite attack of wood and wood based products. Everyone knows that termites won't attack and can't eat steel, concrete or masonry products. Adding materials that are not required to have protection from termites, such as cold formed steel, concrete or masonry products is frivolous. Changes like this only make the ICC codes more cumbersome and difficult to interpret and enforce. The provisions for cold formed steel framing are covered by Chapters 5 and 6. Therefore, Item 6 should be stricken entirely from this code section without any substitution.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB88–07/08
R320.1

Proponent: Dennis Pitts, American Forest & Paper Association

Revise as follows:

R320.1 (Supp) Subterranean termite control methods. In areas subject to damage from termites as indicated by Table R301.2(1), methods of protection shall be one of the following methods or a combination of these methods:

1. Chemical termiticide treatment, as provided in Section R320.2.
2. Termite baiting system installed and maintained according to the label.
3. Pressure-preservative-treated wood in accordance with the ~~AWPA standards listed in Section R319.1~~ provisions of Section R319.
4. Naturally durable termite-resistant wood.
5. Physical barriers as provided in Section R320.4 and used in locations as specified in Section R319.1.
6. Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.

Reason: As written in the public comment for RB126-06/07 which was approved by the ICC membership in Rochester, the text creates potential confusion. The text of the new item #3, if taken literally, only recognizes the use of preservatively treated wood treated in accordance with the appropriate AWPA standards. It doesn't address the accepted application of the material. Similarly item #4 recognizes the use of naturally durable wood without addressing where it should be used. The proposed wording references all of the provisions for preservatively treated wood contained in Section R319 as well as the locations cited in R319.1 for naturally durable wood. This is consistent with the use of preservatively treated and naturally durable wood for termite protection in the IBC and the way it was addressed in the legacy codes.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB89–07/08
R320.4.1 (New), Chapter 43 (New)

Proponent: Bill Towson, Arch Wood Protection

1. Add new text as follows:

R320.4 Barriers. Approved physical barriers, such as metal or plastic sheeting or collars specifically designed for termite prevention, shall be installed in a manner to prevent termites from entering the structure. Shields placed on top of an exterior foundation wall are permitted to be used only if in combination with another method of protection.

R320.4.1 Metal barriers. Metal barriers or collars in direct contact with pressure-preservative wood and fire retardant treated wood shall be hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. The weights for zinc-coated steel barriers and collars shall be in accordance with ASTM A 755.

2. Add standard to Chapter 43 as follows:

ASTM

A755A/755M-03	Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.

Reason: Metal termite barriers are permitted for use in accordance with Section R320.4. This section specifically lists several specific types of termite barriers and the proper use of a termite shied is addressed. The copper based preservative formulations used to treat some wood and wood based products may cause dissimilar metals to corrode. Therefore, metal termite barriers and collars, such as cold-formed steel termite shields, must be protected from the corrosion effects caused by moisture exposure which is conducive to forming galvanic reactions between the copper in the treated wood and the metal of the termite barrier or collar.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, ASTM A 755, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before January 15, 2008.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB90–07/08
R324.1

Proponent: William Easterling, Grand Haven, MI, representing himself

Revise as follows:

R324.1 (Supp) General. Buildings and structures ~~constructed~~ located in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1) shall be designed and constructed in accordance with the provisions contained in this section. ~~**Exception:**~~ Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

Reason: The purpose of the proposed code change is to clarify the two different requirements of this code section by using consistent language and proper format. An existing building or structure located in a flood hazard area and not just constructed in a flood hazard area is subject to the requirements of Section R324 as is a building or structure located in a floodway is subject to the requirements of ASCE 24. The additional requirements for floodways over flood hazard areas should be identified as such and not as an exception to the requirements for flood hazard areas. Likewise the minimum requirements of Section R324 should not be waived by exception, but maintained as a minimum requirement for building and structures located in a flood hazard area that may also be a floodway. Any conflicts between R324 and ASCE 24 are addressed by Section R102.1.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB91–07/08
R324.1.2

Proponent: William Easterling, Grand Haven, MI, representing himself

Revise as follows:

R324.1.2 Flood-resistant construction. All buildings and structures ~~erected~~ located in areas prone to flooding shall be designed, constructed, altered and repaired by methods and practices that minimize flood damage below the design flood elevation.

Reason: The purpose of the proposed code change is to clarify what Section R102.7.1 already plainly requires to be done under Section R301.2.4 and R324 when making repairs or alterations below the design flood elevation to an existing structure. Like with other hazards that become known after a structure is built, subsequent repairs and alterations below the design flood elevation to an existing structure must meet and be afforded same the minimum safety requirements as established by the IRC for new structures.

Plain meaning enforcement of Section R324 when required by Section R102.7.1 will incrementally provide, at least to the repair or alteration undertaken, the already established minimum protection from the known hazard of floods; which when enforced properly does protect emergency responders from falling through a floor that was repaired with 5/8" flood-resistant floor sheathing 16" O.C. in a flood situation as opposed to if no flood-resistant materials were used on the repair. Additionally plain meaning enforcement of Section R102.7.1 when structures are repaired or altered will help reduce repetitive losses and assist in keeping future repair costs from reaching the substantial damage threshold.

The proposed code clarification is also inline with 44CFR60.3.3 – Floodplain Management Criteria for Flood-Prone Areas; which requires a local jurisdiction participating in FEMA's National Flood Insurance Program to "Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, (ii) be constructed with materials resistant to flood damage, (iii) be constructed by methods and practices that minimize flood damages, and (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding."

Likewise according to federal law, being 44CFR60.1.d, FEMA encourages jurisdictions to adopt more comprehensive floodplain management regulations such as what IRC has already done with plain meaning of Section R102.7.1, Section R301.2.4, and Section R324. Federal law states in part at 44CFR60.1.d that: "Any community may exceed the minimum criteria under this part by adopting more comprehensive flood plain management regulations … Therefore, any flood plain management regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence".

The proposed code change is also needed because of the confusion caused by IRC Committee Interpretation 85-05, where without citing any authority, "deemed inapplicable" the requirements of Section R102.7.1, as affirmed by R102.1, when making repairs below the design flood elevation to an existing structure from the known and identified flood hazard. The IRC contains no basis for differentiating between repairs made below the design flood elevation and from repairs that require the minimum safety levels bet met. The finding through Section R105.3.1.1 that elevation is not required should not be the implied basis of not enforcing Section R102.7.1 and R102.1. Additionally no creditability should be afforded IRC Committee Interpretation 85-05 given the fact that the submitted information on which the IRC Committee based its decision is intentionally withheld from being disclosed, even upon request; which is contrary to an open consensus process and good public policy.

Cost Impact: The code change proposal will not increase the cost of construction given the fact that the code already requires it.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB92–07/08
R324.1.3

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.1.3 Establishing the design flood elevation. The design flood elevation shall be used to define areas prone to flooding~~, and shall describe,~~. At a minimum, the design flood elevation is the higher of:

1. The base flood elevation at the depth of peak elevation of flooding (including wave height) which has a 1 percent (100-year flood) or greater chance of being equaled or exceeded in any given year, or
2. The elevation of the design flood associated with the area designated on a flood hazard map adopted by the community, or otherwise legally designated.

Reason: The purpose of this code change is to clarify the definition and to more closely align the IRC with the term "design flood elevation" that is defined in the IBC and in the referenced standard, ASCE 24 *Flood Resistant Design and Construction*. While the majority of the 20,000 flood-prone communities use the flood maps prepared by the Federal Emergency Management Agency which shown the flood hazard area delineated using the base flood, some communities and states are preparing maps based on a different design flood, for example using flood discharges based on anticipated development in order to take into account reasonably anticipated increases in flood levels.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB93–07/08
R324.1.5, R324.1.7, R324.2.1, R324.3.2, M1701.6, M2201.6, P3101.5

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.1.5 (Supp) Protection of mechanical and electrical systems. Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall be located at or above the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones) or R324.3.2 (coastal high-hazard areas including V Zones). If replaced as part of a substantial improvement, electrical systems, equipment and components, and heating, ventilating, air conditioning, and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment are permitted to be located below the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones) or R324.3.2 (coastal high-hazard areas including V Zones) provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in accordance with ASCE 24. Electrical wiring systems are permitted to be located below the ~~design flood~~ required elevation provided they conform to the provisions of the electrical part of this code for wet locations.

R324.1.7 Flood-resistant materials. Building materials used below the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones) or R324.3.2 (coastal high-hazard areas including V Zones) shall comply with the following:

1. All wood, including floor sheathing, shall be pressure-preservative-treated in accordance with AWPA U1 for the species, product, preservative and end use or be the decay-resistant heartwood of redwood, black locust or cedars. Preservatives shall be listed in Section 4 of AWPA U1.

2. Materials and installation methods used for flooring and interior and exterior walls and wall coverings shall conform to the provisions of FEMA/FIA-TB

R324.2.1 Elevation requirements.

1. Buildings and structures shall have the lowest floors elevated to or above the base flood elevation plus one foot (305 mm), or the design flood elevation, whichever is higher.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet (mm) on the FIRM plus one foot (305 mm), or at least ~~2~~ 3 feet (~~610~~ 915 mm) if a depth number is not specified.
3. Basement floors that are below grade on all sides shall be elevated to or above the base flood elevation plus one foot (305 mm), or the design flood elevation, whichever is higher.

   Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R324.2.2.

R324.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high hazard areas shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing, is ~~located at or above the design flood elevation.~~:
   1.1 Located at or above the design flood elevation, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees from the direction of approach, or
   1.2. Located at the base flood elevation plus one foot (305 mm), or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees from the direction of approach.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. The placement of fill beneath buildings and structures is prohibited.

   Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R324.3.4 and R324.3.5.

M1701.6 [Combustion air] Opening location. In areas prone to flooding as established by Table R301.2(1), openings shall be located at or above the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones) or 324.3.2 (coastal high-hazard areas including V Zones) ~~established in Section R324.1.5~~.

M2201.6 Flood-resistant installation. In areas prone to flooding as established by Table R301.2(1), tanks shall be installed at or above the ~~design flood~~ elevation required in Section R324.2.1 (flood hazard areas including A Zones or R324.3.2 (coastal high-hazard areas including V Zones) ~~established in Section R323~~ or shall be anchored to prevent flotation, collapse and lateral movement under conditions of the design flood.

P3101.5 Flood resistance. In areas prone to floodings as established by Table R301.2(1), vents shall be located at or above the ~~design flood~~ elevation ~~established in Section R324.1~~ required in Section R324.2.1 (flood hazard areas including A Zones) or R324.3.2 (coastal high-hazard areas including V Zones).

Reason: The purpose of this code change is to reduce flood risks on homes by adding a factor of safety of one-foot of additional height (called freeboard) to the requirements related to elevation of the lowest floors and other aspects of buildings that are located, in whole or in part, in flood hazard areas.

The design flood elevation is defined as the higher of the elevation of the base flood (i.e., the base flood elevation shown on many NFIP flood hazard maps) or the elevation of the flood hazard area shown on a community's flood hazard map if a community has elected to adopt a different map. A community may elect to use a design flood or design flood elevation that is higher than the base flood elevation for a number of reasons. Some communities prepare flood hazard maps based on such factors projecting build-out of upper watershed areas or a flood of record. This code change mirrors the elevation requirements in the *International Building Code,* which cites the 2005 edition of ASCE's standard *Flood Resistant Design and Construction* (ASCE 24-05). Therefore, this code change aligns the IRC with the IBC with respect to elevation requirements for Category II buildings.

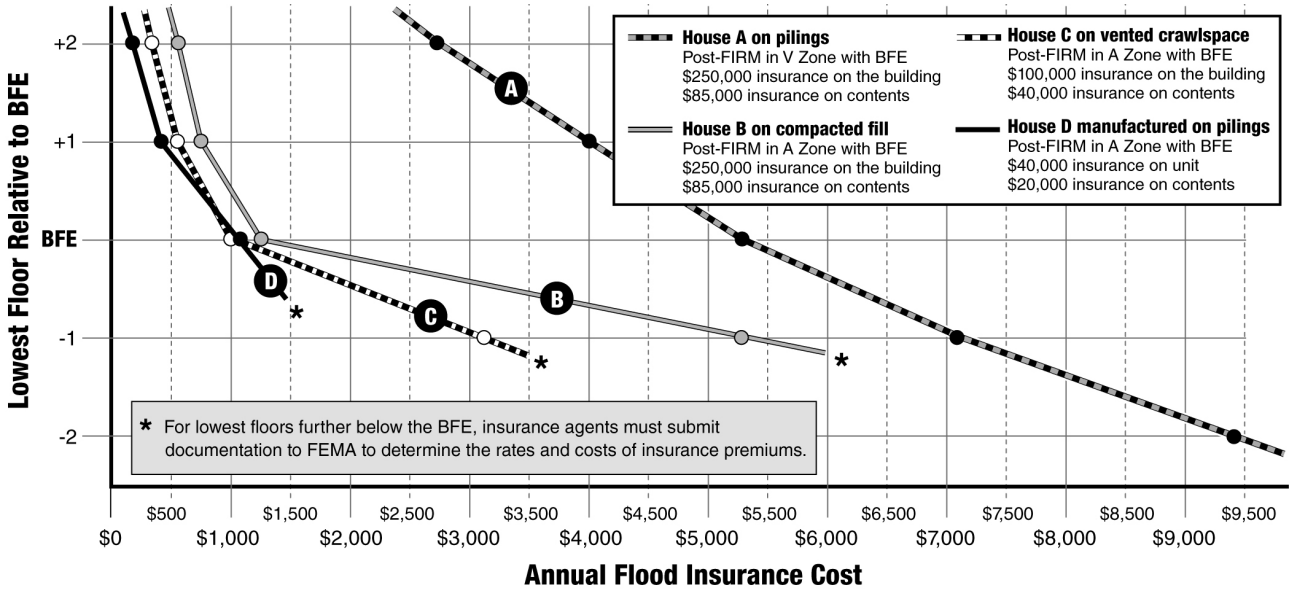
Evaluation of the National Flood Insurance Program's Building Standards (October 2006), a report prepared by the American Institutes of Research for the Federal Emergency Management Agency provides clear evidence of the benefits associated with adding freeboard to homes built in flood hazard areas. The report documented the added costs (as a percent of the cost of building to the base flood elevation) and the benefits of adding freeboard to new construction. Approximately 1,500 combinations of house size, foundation type, flood hazard zone, flood elevation, freeboard added, and discount rate were evaluated. The benefits considered are two-fold: flood damages avoided and flood insurance premium savings.

The report concluded that – based on flood damages avoided only -- it is worth spending an additional percentage of the at-BFE building cost to incorporate freeboard, where the percentage generally ranges from less than 1% to 5% for one-foot of freeboard, depending on the flood hazard zone. The cost of adding one-foot of freeboard, on the other hand, ranged from 0.25% to 3% of the at-BFE building cost (see cost statement below) depending on the type of foundation and the flood hazard zone. The flood damage reduction benefits of one-foot of freeboard outweighed the costs of that freeboard in all but a few cases (e.g., where large quantities of fill are already needed to raise an A zone building to the BFE).

The savings in insurance premium reduction, which are realized by homeowners for the life of the building, are on top of savings associated with avoiding future damage. Flood insurance premium savings alone can recover the added cost of freeboard in just a few years. Importantly, the report acknowledges that the computed benefits "are conservative, and will understate the true benefits" because some avoided costs are not accounted for, including clean-up and demolition costs, debris disposal costs, uninsured losses, displacement and relocation costs, loss of jobs and tax base, etc.

The technical information that substantiates this proposal is ASCE 24-05, *Flood Resistant Design and Construction.* The 2005 edition of this standard incorporates freeboard as a function of building occupancy and flood hazard zone. ASCE 24 sets requirements for Category II buildings, including the one- and two-family dwellings and townhouses that are within the scope of the IRC, such that the lowest floor is to be elevated to or above the base flood elevation plus one foot, or the design flood elevation, whichever is higher. In coastal high hazard areas (V Zone), the freeboard specified in ASCE 24 is a function of whether the lowest horizontal structural member is parallel – or perpendicular – to the anticipated direction of wave approach. As noted in the commentary for ASCE 24 Section 4.4, "[t]here is substantial evidence from post-event investigations that indicate damage occurs when water strikes a structure broadside, which is the case when horizontal structural members are struck. Orienting these members to minimize the direct impact by the water will reduce flood loads being transmitted to the structure."

Additional substantiation for the additional elevation requirement is found in the insurance rating structure of the National Flood Insurance Program. The NFIP bases the rates for insurance for new buildings as a function of risk. Freeboard reduces risk because the lowest floors of buildings are elevated above the predicted flood levels associated with the 1-percent-annual-chance flood (100-year or base flood). This risk reduction is reflected in reduced insurance rates, with reductions of 20% or more for the first foot of freeboard above the base flood elevation. These cost savings will be realized every year by building owners. The graphic that shows examples of how insurance varies as a function of elevation is provided (based on insurance rates in effect in 2007). Note: the graphic illustrates insurance costs for four scenario dwellings with different foundation types and different values of the structure and contents; it should not be used for any purpose other than to illustrate the general variation in costs as a function of elevation.



Further substantiation for this code change is found in Mitigation Assessment Team reports prepared by teams of experts assembled by FEMA after significant disasters for more than 10 years. The reports are published by FEMA and are available in hardcopy by calling the FEMA Distribution Center (800-480-2520) or online at http://www.fema.gov/fima/mat/mat_rprts.shtm. A summary report of the 2004 hurricane season in Florida (FEMA 490) characterizes the nature and severity of damage and recommendations that are intended to reduce future damage. The most recent report, FEMA 548, was prepared after Hurricane Katrina; it includes a recommendation to add at least one-foot of freeboard to reduce future damage. Specific recommendations are to adopt freeboard requirements that are consistent with those specified in ASCE 24-05.

Bibliography:

Mitigation Assessment Team reports published by FEMA, including: FEMA 490 *Summary Report on Building Performance: 2004 Hurricane Season* 2005); and FEMA 549 *Mitigation Assessment Team Report: Hurricane Katrina in the Gulf Coast* (2006)

American Institutes for Research (October 2006), *Evaluation of the National Flood Insurance Program's Building Standards.* Available online: www.fema.gov/business/nfip/nfipeval.shtm.

Cost Impact: This code change will increase the initial cost of construction. The anticipated damages avoided because of the higher level of protection, other savings realized by owners, and the lower cost of federal flood insurance justifies the added initial construction costs. Flood insurance premium savings alone can recover the added cost of freeboard in just a few years. As cited in the *Evaluation of the National Flood Insurance Program's Building Standards* (2006), the added cost is a function of the type of foundation. However, estimates of the cost increase over the cost to build a foundation at the base flood elevation range from less than 1% to 3% of to add one foot of freeboard, where the lower range is applicable to pile or masonry pier foundations and the upper end of the range applies to masonry walls with interior piers (crawlspace). The cost increase to add freeboard when placing fill to raise a slab-on-grade foundation is slightly higher because the fill quantity and therefore costs do not increase linearly with added height.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RB94–07/08
324.1.5

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.1.5 (Supp) Protection of mechanical, plumbing and electrical systems. Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall be located at or above the design flood elevation. If replaced as part of a substantial improvement, electrical systems, equipment and components, and heating, ventilating, air conditioning, and plumbing appliances, plumbing fixtures, duct systems, and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Electrical systems, equipment and components, and heating, ventilating, air conditioning and plumbing appliances, plumbing fixtures, duct systems, and other service equipment are permitted to be located below the design flood elevation provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in accordance with ASCE 24. Electrical wiring systems are permitted to be located below the design flood elevation provided they conform to the ~~provisions of the electrical part of this code~~ requirements of NFPA 70 for wet locations.

Reason: The purpose of this code change is to clarify the source of requirements pertinent to electrical wiring systems that are installed below the design flood elevation.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB95–07/08
R324.1.8, AE101.1

Proponent: Rebecca C. Quinn. RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agenda (FEMA)

Revise as follows:

R324.1.8 Manufactured housing. New manufactured housing or replacement manufactured housing shall be elevated in accordance with Section R324.2 and the anchor and tie-down requirements of Sections AE604 and AE605 of Appendix E shall apply. The foundation and anchorage of manufactured housing to be located in identified flood ways as established in Table R301.2(1) shall be designed and constructed in accordance with the applicable provisions in the *International Building Code.*

AE101.1 General. These provisions shall be applicable only to a manufactured home used as a single dwelling unit installed on privately owned (nonrental) lots and shall apply to the following:

1. Construction, alteration and repair of any foundation system which is necessary to provide for the installation of a manufactured home unit.
2. Construction, installation, addition, alteration, repair or maintenance of the building service equipment which is necessary for connecting manufactured homes to water, fuel, or power supplies and sewage systems.
3. Alterations, additions or repairs to existing manufactured homes. The construction, alteration, moving, demolition, repair and use of accessory buildings and structures and their building service equipment shall comply with the requirements of the codes adopted by this jurisdiction.

These provisions shall not be applicable to the design and construction of manufactured homes and shall not be deemed to authorize either modifications or additions to manufactured homes where otherwise prohibited.

Exception: In addition to these provisions, new manufactured homes and replacement manufactured homes to be located in flood hazard areas as established in Table R301.2(1) of the *International Residential Code* shall meet the applicable requirements of Sections R324 of the *International Residential Code*.

Reason: The purpose of this code change is to clarify that the requirement applies to both new manufactured homes and to manufactured homes that are replacing a home on sites in flood hazard areas.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB96–07/08
R324.1.8

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.1.8 Manufactured housing. New or replacement manufactured housing shall be elevated in accordance with Section R324.2 ~~and the~~ or Section R324.3 in coastal high hazard areas (V Zones). The anchor and tie-down requirements of Sections AE604 and AE605 of Appendix E shall apply. The foundation and anchorage of manufactured housing to be located in identified flood ways as established in Table R301.2(1) shall be designed and constructed in accordance with the applicable provisions in the *International Building Code.*

Reason: The purpose of this code change is to clarify that manufactured homes that are to be located in coastal high hazard areas (also known as "V Zones") are to be installed on foundations that meet the requirements for coastal high hazard areas found in R324.3. Because flood loads are different, largely due to wave action, the foundation requirements and other limitations applicable coastal high hazard areas must also apply to manufactured homes in these areas. This code change is necessary for consistency with the National Flood Insurance Program.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB97–07/08
R324.1.8

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.1.8 Manufactured housing. New or replacement manufactured housing shall be elevated in accordance with Section R324.2 and the anchor and tie-down requirements of Sections AE604 and AE605 of Appendix E shall apply.

Exception: The foundation and anchorage of manufactured housing to be located in identified flood ways ~~as established in Table R301.2(1)~~ shall be designed and constructed in accordance with ~~the applicable provisions in the *International Building Code*~~ ASCE 24.

Reason: The purpose of this code change is to improve consistency in the structure of the section with a similar provision in R324.1 by making the provision related to floodways an exception and by citing ASCE 24 rather than the IBC. The existing requirement for manufactured homes placed in floodways is to require use of the International Building Code. IBC Section 1612 refers to the standard, ASCE 24 *Flood Resistant Design and Construction;* thus, it will be easier for contractors, code officials, and designers to use ASCE 24 directly rather than through the IBC. The IRC has ASCE 24 as a referenced standard.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB98–07/08
R324.2.2

Proponent: Michael Graham, Smart Vent, Inc.

Revise as follows:

R324.2.2 (Supp) Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria:
   - 2.1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
   - 2.2. The total net area of all openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area, or the openings shall be designed and the construction documents shall include a statement by a registered design professional that the design ~~and installation~~ of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.6.2.2 of ASCE 24.
   - 2.3. The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.
   - 2.4. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.
   - 2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area.
   - 2.6. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

Reason: The purpose of this code change is to improve consistency with the *International Building Code* and the regulations of the National Flood Insurance Program, to clarify the code that statement regarding design pertains to design of flood openings, and to cite the design criteria for engineered openings in ASCE 24, *Flood Resistant Design and Construction*.

The *International Building Code* (1612.5(1.2)) and the regulations of the National Flood Insurance Program (44 CFS 60.3(c)(5)) both require that openings other than those that meet the prescriptive requirement (1 square inch per square foot of enclosed area) be certified by a registered design professional. In addition, both the IBC and the NFIP regulations specifically require that the design of openings other than prescriptive openings (but not the installation of those openings) must be certified by a registered professional engineer or architect. Criteria for determining adequacy of performance are found in ASCE 24-05 *Flood Resistant Design and Construction* and in the NFIP's Technical Bulletin 1-93, *Openings in Foundation Walls for Buildings Located in Special Flood Hazard Areas.*.

As added background, it is valuable for code officials, designers and builders to know that the International Code Council Evaluation Service recently issued Acceptance Criteria 364, *Acceptance Criteria for Automatic Foundation Flood Vents*. As with other products that are designed to satisfy code requirements, it is reasonable that a device intended to meet the performance-based alternative of the IRC (and IBC, which references ASCE 24 *Flood Resistant Design and Construction*) be demonstrated and certified as meeting the performance requirement, which is appropriately done by conforming with AC364.

Cost Impact: The code change proposal will not increase the cost of construction. Certification of the design of non-prescriptive (engineered) openings is already required by communities that participate in the NFIP.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB99–07/08
R324.2.2

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.2.2 (Supp) Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria:

2.1. There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.
2.2. The total net area of all openings shall be at least 1 square inch (645 mm²) for each square foot (0.093 m²) of enclosed area, or the openings shall be designed and the construction documents shall include a statement by a registered design professional that the design ~~and installation~~ will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters.
2.3. The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.
2.4. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.
2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area.
2.6. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

Reason: The purpose of this code change is to clarify that flood openings (sometimes called flood vents) that are designed to satisfy the stated performance rather than meet the prescriptive requirements (1 sq in per square foot of enclosed area) are to be designed by a registered design professional. This change is consistent with IBC Section 1612.5(1.2) and the regulations of the National Flood Insurance Program, which requires that the design be certified. Installation of flood openings is governed by the remaining requirements of R324.2.2.

Cost Impact: The code change proposal will not increase the cost of construction. Communities that participate in the NFIP already require that engineered openings be certified by a registered design professional.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RB100–07/08
R324.3.2

Proponent: Rebecca C. Quinn, RCQuinn Consulting, Inc., representing US Homeland Security, Federal Emergency Management Agency

Revise as follows:

R324.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high hazard areas shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing, is located at or above the design flood elevation.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. ~~The placement of fill beneath buildings and structures is prohibited.~~

Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R324.3.4 and R324.3.5.

Reason: The purpose of this code change is to remove an unnecessarily restrictive provision. While the placement of nonstructural fill can divert waves and increase the potential for scour around foundation elements, the intent of limiting fill is not to preclude placement of landscaping materials or replacement of sand and soil that may be removed during flood conditions.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF
