

# RB147-09/10

Table R703.4, R703.11.2, R703.11.2.1, R703.11.2.2, R703.11.2.3, Table R703.11 (New)

## Proposed Change as Submitted

**Proponent:** Dennis Pitts, American Forest & Paper Association

**1. Revise as follows:**

**TABLE R703.4  
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS**

SIDING MATERIAL	NOMINAL THICKNESS <sup>a</sup> (INCHES)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS b,c,d					
				WOOD OR WOOD STRUCTURAL PANEL SHEATHING	FIBERBOARD SHEATHING INTO STUD	GYPHUM SHEATHING INTO STUD	FOAM PLASTIC SHEATHING INTO STUD	DIRECT TO STUDS	NUMBER OR SPACING OF FASTENERS
VINYL SIDING <sup>1</sup>	0.035	LAP	Yes	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN <sup>y,z</sup>	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN <sup>y</sup>	0.120 NAIL (SHANK) WITH A .313 HEAD OR 16 GAGE STAPLE WITH 3/8 TO 1/2-IN. CROWN <sup>y</sup>	<del>0.120 NAIL (SHANK) WITH A .313 HEAD</del> PER <u>SEE SECTION R703.11.2</u>	NOT ALLOWED	16 INCHES ON CENTER OR AS SPECIFIED BY THE MANUFACTURER INSTRUCTIONS OR TEST REPORT

*(Portions of table and footnotes not shown remain unchanged)*

**2. Delete and substitute as follows:**

~~**R703.11.2 Foam plastic sheathing.** Vinyl siding used with foam plastic sheathing shall be installed in accordance with Section R703.11.2.1, R703.11.2.2, or R703.11.2.3.~~

~~**Exception:** Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other approved backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Section R703.11.1.~~

**R703.11.2 Backing material.** Vinyl siding certified per D 3679 is rated for use where the vinyl siding is directly applied over wood structural panels, structural fiberboard, exterior gypsum sheathing, or other approved backing material capable of independently resisting the design suction wind loads in Table R703.11, Case 1. For vinyl siding over foam plastic sheathing or other backing material not approved to independently resist the design wind loads, the vinyl siding must be rated for the design suction wind loads in Table R703.11, Case 2 or 3.

**3. Delete without substitution:**

~~**R703.11.2.1 Basic wind speed not exceeding 90 miles per hour and Exposure Category B.** Where the basic wind speed does not exceed 90 miles per hour (40 m/s), the Exposure Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 1 1/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C578, 1/2-inch thick (12.7 mm) (nominal) polyisocyanurate per ASTM G1289, or 1-inch-thick (25 mm)(nominal) expanded polystyrene perASTMC578.~~

~~**R703.11.2.2 Basic wind speed exceeding 90 miles per hour or Exposure Categories C and D.** Where the basic wind speed exceeds 90 miles per hour (40 m/s) or the Exposure Category is C or D, or all conditions of Section~~

R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Tables R301.2(2) adjusted for height and exposure using Table R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.
2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.

**R703.11.2.3 Manufacturer specification.** Where the vinyl siding manufacturer's product specifications provide an approved design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.

4. Add new table as follows:

**TABLE R703.11**  
**REQUIRED NEGATIVE (SUCTION) WIND LOAD RATINGS (psf) FOR**  
**VINYL SIDING CERTIFIED PER ASTM D 3679<sup>a,b</sup>**

Case	Backing Material	Wind Exposure	Basic Wind Speed (mph - 3 second gust)				
			85	90	100	105	110
1	Exterior Side: Wood structural panels, structural fiberboard, exterior gypsum sheathing, or other approved backing capable of independently resisting the design wind load. Infill materials are permitted between the vinyl siding and the backing material if the minimum fastener penetration is maintained.	B	17.4 <sup>c</sup>	19.5 <sup>c</sup>	24.1 <sup>c</sup>	26.6 <sup>c</sup>	29.1 <sup>c</sup>
		C	24.4 <sup>c</sup>	27.3 <sup>c</sup>	33.7	37.2	40.7
		D	28.9 <sup>c</sup>	32.4	40.0	44.2	48.3
2	Exterior Side: Foam plastic sheathing or other backing material not approved to independently resist the design wind loads. Interior Side: Gypsum wallboard or equivalent on interior side of wall.	B	45.1	50.6	62.5	69.0	75.4
		C	63.2	70.8	87.5	96.5	105.6
		D	74.9	83.9	103.7	114.5	125.2
3	Exterior Side: Foam plastic sheathing or other backing material not approved to independently resist the design wind loads. Interior Side: None	B	64.4	72.2	89.3	98.5	107.8
		C	90.2	101.1	125.0	137.9	150.9
		D	107.0	119.9	148.2	163.5	178.9

**Reason:** Vinyl siding is required to be certified per ASTM D3679 which includes negative (suction) wind testing to set a design wind rating. This wind rating is based on tests conducted with OSB or plywood used as backing material and assumes that the vinyl siding will be applied over similar backing material that can independently resist the negative wind loads. During the last cycle, provisions were added to IRC 703.11 to address the common condition where vinyl siding is installed over foam sheathing. Under this condition, the vinyl siding must resist the full wind load since the foam sheathing does not resist the negative wind loads.

At the final hearings, a new provision was added that provided a prescriptive solution for the case where the basic wind speed does not exceed 90 mph, the Exposure Category is B, and gypsum wallboard or equivalent is installed on the side of the wall opposite the foam plastic sheathing. In support, the following data was provided:

**WIND PRESSURE TESTING OF WALL ASSEMBLIES  
WITH FOAM SHEATHING AND VINYL SIDING PRODUCTS  
(NAHB Research Center Report #4107003013108)**

	Backing Material	Ult. Test Capacity (psf)	Wind Load resisted by Vinyl Siding	Safety Factor on Vinyl Siding	Wind Rating (psf)	Reference
Low Capacity Vinyl Siding	<b>CONTROL: Vinyl Siding test (OSB backing material perforated per D 3679)</b>					
	(none)	22.7	36%	1.50	42.1	D 3679
	<b>Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)</b>					
	3/8" EPS	29.1	100%	2.00	14.6	2009 IRC
	1/2" ISO	41.1	100%	2.00	20.6	2009 IRC
	1/2" XPS	41.6	100%	2.00	20.8	2009 IRC
High Capacity Vinyl Siding	<b>CONTROL: Vinyl Siding test (OSB backing material perforated per D 3679)</b>					
	(none)	81.9	36%	1.50	151.6	D 3679
	<b>Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)</b>					
	3/8" EPS	77.0	100%	2.00	38.5	2009 IRC
	1/2" ISO	86.1	100%	2.00	43.1	2009 IRC
	1/2" XPS	89.5	100%	2.00	44.7	2009 IRC

For the CONTROL case, the vinyl siding was wind rated at 42.1 psf using the procedures in D 3679. This rating was determined from the ultimate test capacity of the vinyl siding acting alone, divided by 0.36 in recognition that the backing material is resisting most of the wind load and by a safety factor of 1.5 since the vinyl siding is serving primarily as an exterior covering. The ultimate test capacity of the vinyl siding backed by solid foam sheathing was divided by 1.0 in recognition that the vinyl siding attachment must resist the wind load and by a safety factor of 2.0 since the vinyl siding is now acting as a structural sheathing to protect the building envelop. For the low capacity vinyl siding, the vinyl siding backed by 3/8" EPS was not capable of resisting the minimum wind loads in the IRC; however, 1/2" ISO and 1/2" XPS were capable of resisting the 19.5 psf negative wind loads associated with 90 mph, Exposure B. This case was selected as the basis of the current prescriptive provisions in R703.11.2.1.

Upon further study of the CONTROL case in the previous table, it can be seen that the low-capacity vinyl siding used in the tests would have a wind rating of 42.1 psf, not the minimum of 29.1 psf permitted by D 3679. A re-analysis was conducted to see what the result would be if minimum vinyl siding was used over foam sheathing:

	Backing Material	D 3679 min. Capacity (psf)	Wind Load resisted by Vinyl Siding	Safety Factor on Vinyl Siding	Wind Rating (psf)	Reference
D 3679 min. Vinyl Siding	OSB	15.7	36%	1.50	29.1	D 3679
	3/8" EPS	15.7	100%	2.00	7.9	2009 IRC
	1/2" ISO	15.7	100%	2.00	7.9	2009 IRC
	1/2" XPS	15.7	100%	2.00	7.9	2009 IRC

In order for the vinyl siding to resist the full wind load, this re-analysis suggests that it would take a medium grade of vinyl siding to meet the minimum negative wind loads and a high grade of vinyl siding and attachment to meet the moderate negative wind loads. For this reason, it is recommended that Section R703.11.2 and R703.11.2.1 be deleted and replaced with wind Table R703.11. Also, the prescriptive fastening in Table R703.4 should be replaced by a reference to the general section since the fastening schedule is linked to the wind rating.

Section R703.11.2.2 was previously added to provide an adjustment to the D 3679 wind ratings for cases where foam sheathing is used as the backing material. It requires the user to multiply the D 3679 wind ratings provided by the vinyl siding manufacturer in literature or an Evaluation Report, with a factor associated with the construction. In this proposed change, Section R703.11.2.2 was deleted and the adjustment factors were incorporated as increases in the required wind ratings in a new Table R703.11. Until D 3679 is modified to provide a means of determining wind ratings using the actual backing materials, this method should be used to prevent confusion and aid the user in selecting the proper vinyl siding.

Section R703.11.3 was added to provide guidance on the use of data for combined vinyl siding and foam sheathing tests. However, no standardized test procedure exists and any information developed by the vinyl siding manufacturer should be evaluated carefully prior to approval. This section is redundant with Section R104.11 and is, therefore, recommended for deletion.

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

ICCFILENAME: PITTS-RB-5-T. R703.4-R703.11

**Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee feels that the deleting of this section may unfairly penalize the use of vinyl siding. Section R703.11.2 contains permissive language. There is a conflict between Footnote b in the proposed new table and Table R703.4. Also, Footnote c requires contact with the manufacture for higher wind loads.

**Assembly Action:**

**None**

## Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

*Public Comment:*

**Dennis Pitts, American Wood Council, American Forest & Paper Association, requests Approval as Modified by this Public Comment.**

Replace proposal as follows:

**TABLE R703.4  
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS**

SIDING MATERIAL	NOMINAL THICKNESS <sup>a</sup> (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS <sup>b,c,d</sup>					
				Wood or wood structural panel sheathing	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
<i>(remainder of table unchanged)</i>									
Vinyl siding <sup>†</sup>	0.035	Lap	Yes	0.120 nail (shank) with a .313 head or 16 gauge staple with 3/8 to 1/2-in crown <sup>y,z</sup>	0.120 nail (shank) with a .313 head or 16 gauge staple with 3/8 to 1/2-in crown <sup>y</sup>	0.120 nail (shank) with a .313 head or 16 gauge staple with 3/8 to 1/2-in crown <sup>y</sup>	<del>0.120 nail (shank) with a .313 head</del> with a 0.313 head per See Section R703.11.2	Not allowed	16 inches on center or as specified by the manufacturer instructions or test report

*(Footnotes remain unchanged)*

**R703.11 Vinyl siding.** Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D 3679 by an *approved* quality control agency.

**R703.11.1 Installation.** Vinyl siding, soffit and accessories shall be installed in accordance with the manufacturer's installation instructions.

**R703.11.1.1 Soffit panels** shall be individually fastened to a supporting component such as a nailing strip, fascia, or subfascia component or as specified by the manufacturer's instructions.

**R703.11.2 Foam plastic sheathing.** Vinyl siding used with foam plastic sheathing shall be installed in accordance with R703.11.2.1, R703.11.2.2, or R703.11.2.3.

**Exception:** Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing, or other *approved* backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with R703.11.1.

**R703.11.2.1 Basic wind speed not exceeding 90 miles per hour and exposure Category B.** Where the basic wind speed does not exceed 90 miles per hour (40 m/s), the Exposure Category is B and gypsum wallboard or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the vinyl siding shall be certified to a design wind pressure rating of at least 42 psf per ASTM D 3679 and the minimum siding fastener penetration into wood framing shall be 1-1/4 inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C578, 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C1289, or 1-inch-thick (25 mm) (nominal) expanded polystyrene per ASTM C578.

**R703.11.2.2 Basic wind speed exceeding 90 miles per hour or exposure Categories C and D.** Where the basic wind speed exceeds 90 miles per hour (40 m/s) or the Exposure Category is C or D, or all conditions of Section R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Tables R301.2(2) adjusted for height and exposure using Section R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:

1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's ASTM D 3679 design wind pressure rating of the vinyl siding shall be multiplied by 0.39.
2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's ASTM D 3679 design wind pressure rating of the vinyl siding shall be multiplied by 0.27.

**R703.11.2.3 Manufacturer specification.** Where the vinyl siding manufacturer's product specifications provide an *approved* design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.

**Commenter's Reason:** Vinyl siding is required to be certified per ASTM D3679 which includes negative (suction) wind testing to set a design wind rating. This wind rating is based on tests conducted with OSB or plywood used as backing material and assumes that the vinyl siding will be applied over similar backing material that can independently resist the negative wind loads. During the last cycle, provisions were added to IRC 703.11 to address the common condition where vinyl siding is installed over foam sheathing. Under this condition, the vinyl siding must resist the full negative wind load since the foam sheathing does not resist the negative wind loads.

**R703.11.2.1**

At the final hearings during the last cycle, proposal RB195-07/08 added a new provision that provided a prescriptive solution for the case where the basic wind speed does not exceed 90 mph, the Exposure Category is B, and gypsum wallboard or equivalent is installed on the side of the wall opposite the foam plastic sheathing. In support of that proposal, the following data was provided:

**WIND PRESSURE TESTING OF WALL ASSEMBLIES  
WITH FOAM SHEATHING AND VINYL SIDING PRODUCTS  
(from NAHB Research Center Report #4107003013108)**

	Backing Material	Ult. Test Capacity (psf)	Wind Load resisted by Vinyl Siding	Safety Factor on Vinyl Siding	Wind Rating (psf)	Reference
Low Capacity Vinyl Siding	<b>CONTROL: Vinyl Siding test (OSB backing material perforated per D 3679)</b>					
	(none)	22.7	36%	1.50	42.1	D 3679
	<b>Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)</b>					
	3/8" EPS	29.1	100%	2.00	14.6	2009 IRC
	1/2" ISO	41.1	100%	2.00	20.6	2009 IRC
	1/2" XPS	41.6	100%	2.00	20.8	2009 IRC
High Capacity Vinyl Siding	<b>CONTROL: Vinyl Siding test (OSB backing material perforated per D 3679)</b>					
	(none)	81.9	36%	1.50	151.6	D 3679
	<b>Vinyl Siding + Foam Sheathing test (Solid foam sheathing backing material)</b>					
	3/8" EPS	77.0	100%	2.00	38.5	2009 IRC
	1/2" ISO	86.1	100%	2.00	43.1	2009 IRC
	1/2" XPS	89.5	100%	2.00	44.7	2009 IRC

For the CONTROL case, the vinyl siding was evaluated and found to resist 22.7 psf which equates to a wind rating of 42.1 psf using the procedures in D 3679. This rating was determined from the ultimate test capacity of the vinyl siding acting alone, divided by 0.36 in recognition that the backing material resists most of the wind load and by a safety factor of 1.5 since the vinyl siding is serving primarily as an exterior covering.

The ultimate test capacity of the vinyl siding was then backed by various types of solid foam sheathing was tested. An equivalent wind rating of the composite system was estimated per the requirements of the 2009 IRC R703.11.2 by dividing the ultimate test capacity by 1.0 in recognition that the vinyl siding attachment must resist the wind load and by a safety factor of 2.0 since the vinyl siding is now acting as a structural component necessary to protect the building envelop.

For the low capacity vinyl siding, the vinyl siding backed by 3/8" EPS was not capable of resisting the minimum wind loads in the IRC with the required safety factor; however, 1/2" ISO and 1/2" XPS were capable of providing a rated resistance of 20.6 and 20.8 psf, respectively, slightly higher than the 19.5 psf negative wind loads associated with 90 mph, Exposure B. This case was selected as the basis of the current prescriptive provisions in R703.11.2.1.

Upon further study of the CONTROL case in the previous table, it can be seen that the low-capacity vinyl siding used in the tests would have a wind rating of 42.1 psf, not the minimum of 29.1 psf permitted by D 3679. In order for the vinyl siding/foam sheathing composite described in R703.11.2.1 to resist the wind loads with the required safety factor, the test data clearly indicates that the vinyl siding needs to be rated per D 3679 for about 42 psf, not the minimum value of 29.1. This proposal states this limit explicitly in Section R703.11.2.1.

**R703.11.2.2**

This revision is simply editorial.

**Table R703.4**

The prescriptive fastening schedule for vinyl siding over foam sheathing in Table R703.4 has been replaced by a reference to R703.11.2. Use of products and systems in R703.11.2 can result in a wide variety of fastener types, sizes, and schedules. R703.11.2.1 already provides the prescriptive fastening schedule currently in Table R703.4 for the special case associated with R703.11.2.1. For other conditions covered in R703.11.2.2 and R703.11.2.3, different fastening schedules and detailing will likely be required to meet the higher wind loads. This change corrects this inconsistency.

Final Action: AS AM AMPC\_\_\_\_\_ D

# RB148-09/10

## R202 (New), R703.13 (New), Chapter 44 (New)

### Proposed Change as Submitted

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

#### 1. Add new definition as follows:

**POLYPROPYLENE SIDING.** A shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings.

#### 2. Add new text as follows:

**R703.13 Polypropylene siding.** Polypropylene siding shall be certified and labeled as conforming to the requirements of R703.13.1, of R703.13.2 or of R703.3 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the manufacturer's installation instructions.

**R703.13.1 Flame spread index.** The polypropylene siding material shall comply with the requirements of ASTM D 7254. The certification shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E 84 or UL 723.

**R703.13.2 Heat release.** The polypropylene siding material shall comply with the requirements of ASTM D 7254 and a 4 foot by 8 foot (1.22 x 2.44 m) section of the polypropylene siding material shall exhibit a peak rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source at the thickness intended for use.

**R703.13.3 Fire separation distance.** The polypropylene siding shall comply with all the requirements of ASTM D 7254 and the fire separation distance between a building with polypropylene siding and the adjacent building shall be no less than 10 feet (3.05 m).

#### 3. Add new standards to Chapter 44 as follows:

##### NFPA

289 Standard Method of Fire Test for Individual Fuel Packages (2009)

##### ASTM

D 7254 Standard specification for polypropylene (PP) siding

**Reason:** Polypropylene siding is being used in construction now although the IBC does not permit it. Therefore, it is important to regulate the use of polypropylene siding in a way that it can be used safely. The new sections are similar to the existing sections on vinyl siding, except for the fire testing. Vinyl siding is known to have adequate fire performance since the siding needs to be made of rigid (unplasticized) PVC in accordance with ASTM D 3679. Polypropylene is known not to have adequate fire performance unless properly fire retarded.

A new standard specification has been issued for polypropylene siding, ASTM D 7254. The specification addresses many of the key requirements for the material. Unfortunately the fire test requirement in ASTM D 7254 is not explicit enough. ASTM D 7254 does not require that, when fire testing is conducted in the ASTM E 84 (Steiner tunnel), the test specimen must remain in place during the test and flaming drips and falling test specimens are not allowed to happen. This requirement is critical for materials that are used exposed so that the flame spread index assesses actual surface flame spread on the material surface. The standards committee responsible for the ASTM E 84 fire test (ASTM E05) decided that this issue should be addressed in the code rather than in the standard itself. Polypropylene that has not been appropriately fire retarded will release abundant amount of heat, much more than other combustible sidings permitted by the code, such as wood siding or vinyl (PVC) siding, and spread fire through flaming drips. Such flaming drips will contribute to ignite mulch and debris found near the building and spread the fire. Table 1 shows such results.

Recent fire tests were also conducted in the Steiner tunnel, ASTM E 84, on a rigid PVC material 0.06 in. thick; it exhibited a flame spread index of 10. Under the same test conditions, a fire retarded polypropylene material 0.15 in. thick exhibited a flame spread index of 50. These are both very adequate values, in view of the fact that both the polypropylene material and the PVC material remained in place during the ASTM E 84 test and did not generate flaming drips.

Table 1: Results of Steiner Tunnel Tests (ASTM E 84)

Material	Flame Spread Index	Maximum Flame Front Advance (ft)	Time to Max. Flame Front Advance (min:s)	Flaming on Floor (Duration) (min:s)
PVC	10	4.6	7:48	None
FR Polypropylene	50	19.5	6:24	4:18

This shows that it is possible to use fire retarded polypropylene materials that give very adequate flame spread values and also very adequate heat release values, without flaming drips. Consequently, polypropylene siding should only be used when it is shown to exhibit the appropriate fire performance.

When polypropylene siding material (which does not have the appropriate fire performance) is tested in ASTM E 84 (Steiner tunnel) the test specimen will often fall ahead of the arrival of the flame giving incorrect results.

Table 2 shows new results of cone calorimeter heat release tests with polypropylene and PVC:

Material	Peak Heat Release Rate	Total Heat Released	Time to Ignition	Effective Heat of Combustion	Fire Performance Index
	kW/m <sup>2</sup>	MJ/m <sup>2</sup>	s	MJ/kg	s m <sup>2</sup> /kW
PVC	186.8	16.7	36	9.2	0.19
Non FR Polypropylene	768.3	47.2	23	40.3	0.03

Table 3 shows some earlier results with polypropylene, PVC and wood materials in the cone calorimeter:

Material	Flux 20 kW/m <sup>2</sup>				
	Pk HRR	THR	TTI	EHC	FPI
	(kW/m <sup>2</sup> )	(MJ/m <sup>2</sup> )	(s)	(MJ/kg)	(s m <sup>2</sup> /kW)
PVC Rigid, Custom Inj. Mold.	40	3.0	5159	1.4	1343
PVC Rigid, Extrusion	102	2.9	3591	7.3	31.4
PP Non FR	1170	231.3	218	72.0	0.19
PP FR	236		382	23.6	1.62
PE Non FR	913	161.9	403	41.1	0.44
XLPE FR	88	87.6	750	22.4	8.08
Douglas Fir	237	46.5	254	13.1	1.10
Material	Flux 40 kW/m <sup>2</sup>				
	Pk HRR	THR	TTI	EHC	FPI
	(kW/m <sup>2</sup> )	(MJ/m <sup>2</sup> )	(s)	(MJ/kg)	(s m <sup>2</sup> /kW)
PVC Rigid, Custom Inj. Mold.	175	24.3	73	5.1	0.42
PVC Rigid, Extrusion	183	90.8	85	13.3	0.46
PP Non FR	1509	206.9	86	42.1	0.06
PP FR	243		80	23.9	0.33
PE Non FR	1408	221.0	159	46.6	0.06
XLPE FR	192	126.2	105	24.2	0.55
Douglas Fir	221	64.1	34	17.6	0.15
Material	Flux 70 kW/m <sup>2</sup>				
	Pk HRR	THR	TTI	EHC	FPI
	(kW/m <sup>2</sup> )	(MJ/m <sup>2</sup> )	(s)	(MJ/kg)	(s m <sup>2</sup> /kW)
PVC Rigid, Custom Inj. Mold.	191	93.0	45	12.7	0.24
PVC Rigid, Extrusion	190	96.5	48	10.8	0.25
PP Non FR	2421	231.1	41	43.1	0.02
PE Non FR	2735	227.5	47	42.6	0.02
XLPE FR	268	129.2	35	24.7	0.13
Douglas Fir	196	50.0	12	13.5	0.06

Table 3 shows that, when tested in the cone calorimeter, ASTM E 1354, under the same conditions, it was found that non fire retarded polypropylene exhibits a peak heat release rate of 1509 kW/m<sup>2</sup>, while a non fire retarded PVC material exhibits a peak heat release rate of 183 kW/m<sup>2</sup>, and a Douglas fir material exhibits a peak heat release rate of 221 kW/m<sup>2</sup>. Such a very high heat release rate is unacceptable for a siding material. Testing in the cone calorimeter, including the testing above, is normally conducted in the horizontal orientation with radiant heat exposing the test specimen from above, thus capturing any flaming drips and assessing their effects.

Table 4 shows that wood materials, when not fire retarded, will usually exhibit flame spread index values that are less than 200 and will correspond to Class B or Class C categories. At the same time rigid PVC (vinyl) materials will generally exhibit flame spread index values less than 25. Neither wood nor PVC materials will cause flaming drips or molten material burning on the ground.

Table 4. Steiner tunnel (ASTM E 84) Data for Wood and Vinyl Materials					
Material/Product	Flame Spread Index		Material/Product	Flame Spread Index	
	Low	High		Low	High
Cellulose fiberboard ceiling tile	70	80	Ponderosa pine B	105	170
Cottonwood	115		Poplar	170	185
Cypress	145	150	Red Gum	140	155
Douglas fir	70	100	Red oak flakeboard	70	190
Douglas fir overlay	110	140	Red Oak Flooring	100	100
Douglas fir/cedar plywood	190	230	Red Pine	140	
Eastern White Pine	85		Redwood	65	70
Hemlock/cedar plywood	190		Southern yellow pine	130	195
Lauan hardwood	150	170	Vinyl faced plywood	110	130
Lodgepole Pine	95		Vinyl profile	15	20
Maple flooring	105		Vinyl Siding	10	15
Northern white pine A	190	215	Vinyl vapor barrier	10	15
Northern white pine B	120	180	Walnut	130	140
Pacific silver fir	70		West Coast Hemlock	60	70
Pacific Yellow Cedar	80		Western Red Cedar	70	
Particleboard	135	180	Western spruce	100	
Plywood paneling over gypsum	130	150	Western white pine	75	
Ponderosa pine A	170	230	Yellow birch	105	110

Figure 1 shows char from a PVC siding fire (no foam backing): the material softened, charred and burned but is still substantially intact. Figure 2 shows a vertical PP sheet melting and resulting in flaming drips on the floor.

The reason that heat release rate and floor flaming are important issues is because it has been shown that the heat radiated by siding is a major contributor to the ignition of neighboring houses, as is the spread of fire along the ground, particularly when there are loose combustibles present.

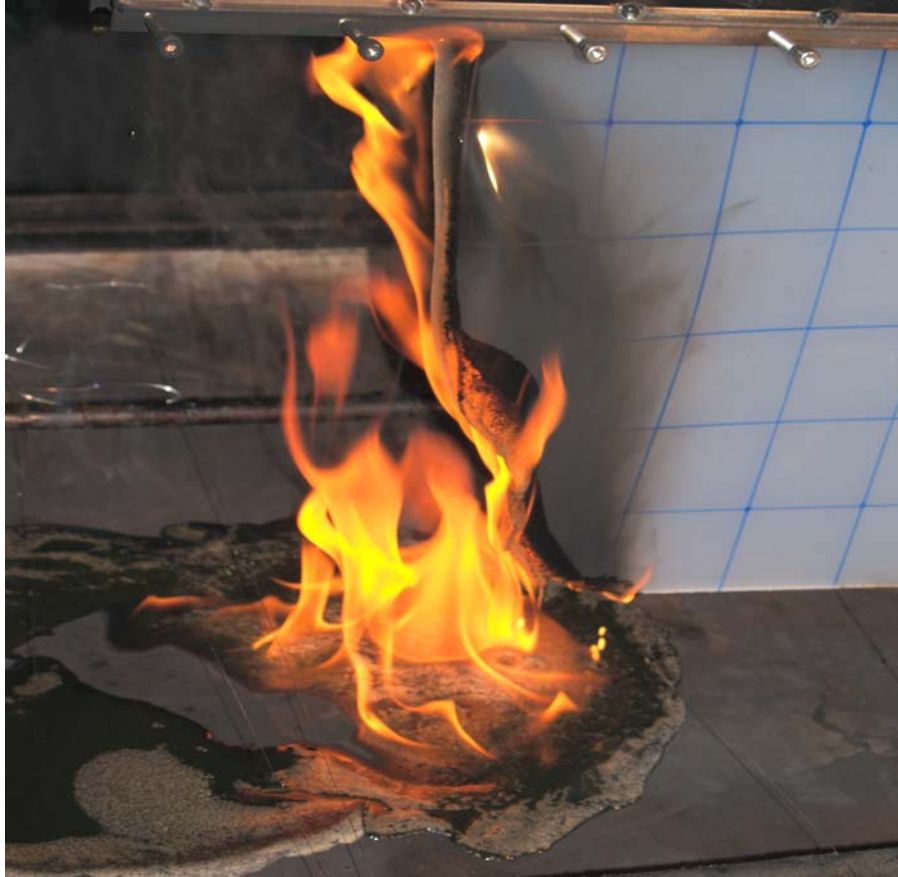
That is the reason that the third option allows polypropylene siding to be used, but with a larger separation distance, when the results of the ASTM E 84/UL 723 (Steiner tunnel) test are based on a test specimen that is not self supporting and falls to the floor of the tunnel during the test. The standard ASTM E 84 states: "1.4 Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place." Therefore valid test results require the test specimen to stay in place ahead of the exposing flame.

**Figure 1 – Remains of vinyl siding fire**





Figure 2 Polypropylene siding melting and flaming on the floor.



NFPA 289 was developed to test individual fuel packages and is similar in concept to UL 1975, already widely used in the ICC codes.

**Cost Impact:** The code does not at present allow the use of polypropylene siding. In order to safely use polypropylene siding construction costs would have to increase either by using materials that would meet test requirements for adequate fire safety or by increasing fire separation distances.

**Analysis:** A review of the standards proposed for inclusion in the code, NFPA 289 and ASTM D 7254, 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 September 24, 2009.

ICCFILENAME: HIRSCHLER-RB-5-R202-R703.13

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### **Public Hearing Results**

**Analysis:** Review of proposed new standards indicated that, in the opinion of ICC Staff, these standards did comply with ICC standards criteria.

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee has serious concerns about the product as to the effect of time after installation will have the fire test results. The committee feels that NFPA 289 is not the appropriate test for the product application.

**Assembly Action:**

**None**

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## Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

*Public Comment:*

**Marcelo M. Hirschler, GBH International, representing American Fire Safety Council, requests Approval as Modified by this Public Comment.**

Replace the proposal as follows:

Polypropylene siding. A shaped material, made principally from polypropylene homopolymer, or copolymer, which in some cases may contain fillers and/or reinforcements, that is used to clad exterior walls of buildings.

**R703.13 Polypropylene Siding.** Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D 7254 and those of R703.13.1 or those of R703.13.2 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the requirements of R703.13.3 and in accordance with the manufacturer's installation instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

**R703.13.1 Flame Spread Index.** The certification of the flame spread index shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E 84 or UL 723.

**R703.13.2 Fire Separation Distance.** The fire separation distance between a building with polypropylene siding and the adjacent building shall be no less than 10 feet (3.05 m).

**R703.13.3 Installation.** Polypropylene siding shall be limited to exterior walls of Type VB construction located in areas where the wind speed specified in Figure R301.2(4) does not exceed 100 miles per hours (45 m/s) and the building height is less than or equal to 40 feet (12,192 mm) in Exposure C.

**ASTM**  
**D 7254**      Standard specification for polypropylene (PP) siding

**Commenter's Reason:** The committee had a valid concern regarding the use of NFPA 289 for testing this material and this option has been eliminated. Polypropylene siding material does not normally contain flame retardants or any other additives that will prevent it from forming a pool fire as soon as it is exposed to a flame. Therefore, when polypropylene siding is exposed to the flame in the ASTM E 84 Steiner tunnel test it immediately starts melting and burning occurs in the floor of the tunnel, with no material left in the tunnel ceiling where the test sample should be. This material gets a low flame spread index (ASTM D 7254 requires a flame spread index under 200, just like for wood siding) but it is not a valid result because the material is no longer in the test position when the flame comes by.

This is a problem because polypropylene that is not properly flame retarded will generate about 4 times as much heat as vinyl (PVC) or as wood or even as flame retarded polypropylene (see peak heat release rate in the table below) and it ignites much more rapidly. Therefore if polypropylene siding is made with typical polypropylene that has not been treated, the siding is a very dangerous product and polypropylene siding should not be allowed to be used based only on the requirements of ASTM D 7254.

<b>Table: Results of Cone Calorimeter (ASTM E 1354) Tests (4 inch x 4 inch test sample)</b>			
<b>Material</b>	<b>Peak Heat Release Rate</b>	<b>Time to Ignition</b>	<b>Effective Heat of Combustion</b>
	<b>kW/m<sup>2</sup></b>	<b>s</b>	<b>MJ/kg</b>
PVC (vinyl)	190	36	9
Wood	220	34	15
Non FR Polypropylene	770	23	40
FR Polypropylene	200	60	25

It is possible to make properly flame retarded polypropylene and use it for siding because flame retarded polypropylene can easily be compounded so that it does not melt/drip and pass the requirements of a flame spread index of 200 in the ASTM E 84 test. In fact, the original proposal includes an ASTM E 84 test with an FR polypropylene material that gave a flame spread index of 50. Such a material should be permitted for use but not the unsafe material normally offered for sale.

Final Action:            AS                    AM                    AMPC \_\_\_\_\_            D

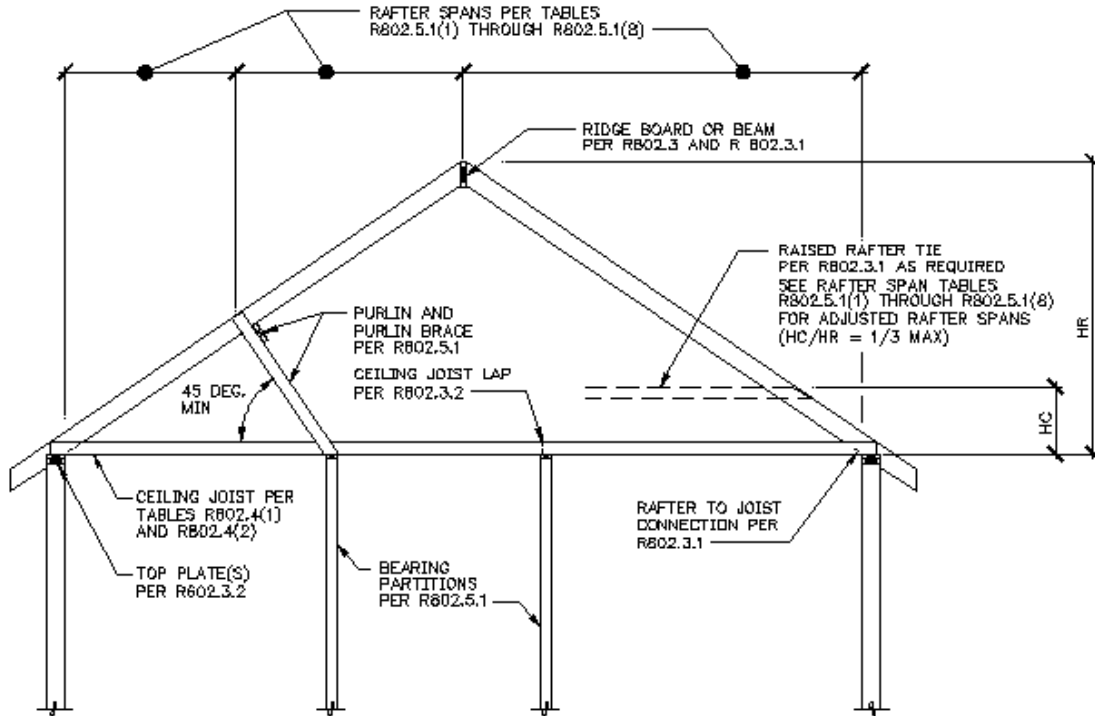
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**RB151-09/10**  
**Figure R802.5.1**

**Proposed Change as Submitted**

**Proponent:** Robert Rice, Grants Pass, OR, representing Josephine County Building Safety and Southern Oregon Chapter of ICC

**Delete existing Figure R802.5.1 and replace as follows:**



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.018 rad.  
 Note: Where ceiling joists run perpendicular to the rafter, rafter ties shall be installed per R802.3.1  
 HC = Height of ceiling joists or rafter tie measured vertically above the top of rafter support walls  
 HR = Height of roof ridge measured vertically above the top of the rafter support walls.

**FIGURE R802.5.1**  
**BRACED RAFTER CONNECTION**

**Reason:** The existing figure is lacking in some information and references to pertinent sections of code. This proposal updates the figure.

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

ICCFILENAME: RICE-RB-4-F. R802.5.1

**Public Hearing Results**

**Committee Action:**

**Approved as Submitted**

**Committee Reason:** Based on the proponent's published reason. This change makes improvements to the figure.

**Assembly Action:**

**None**

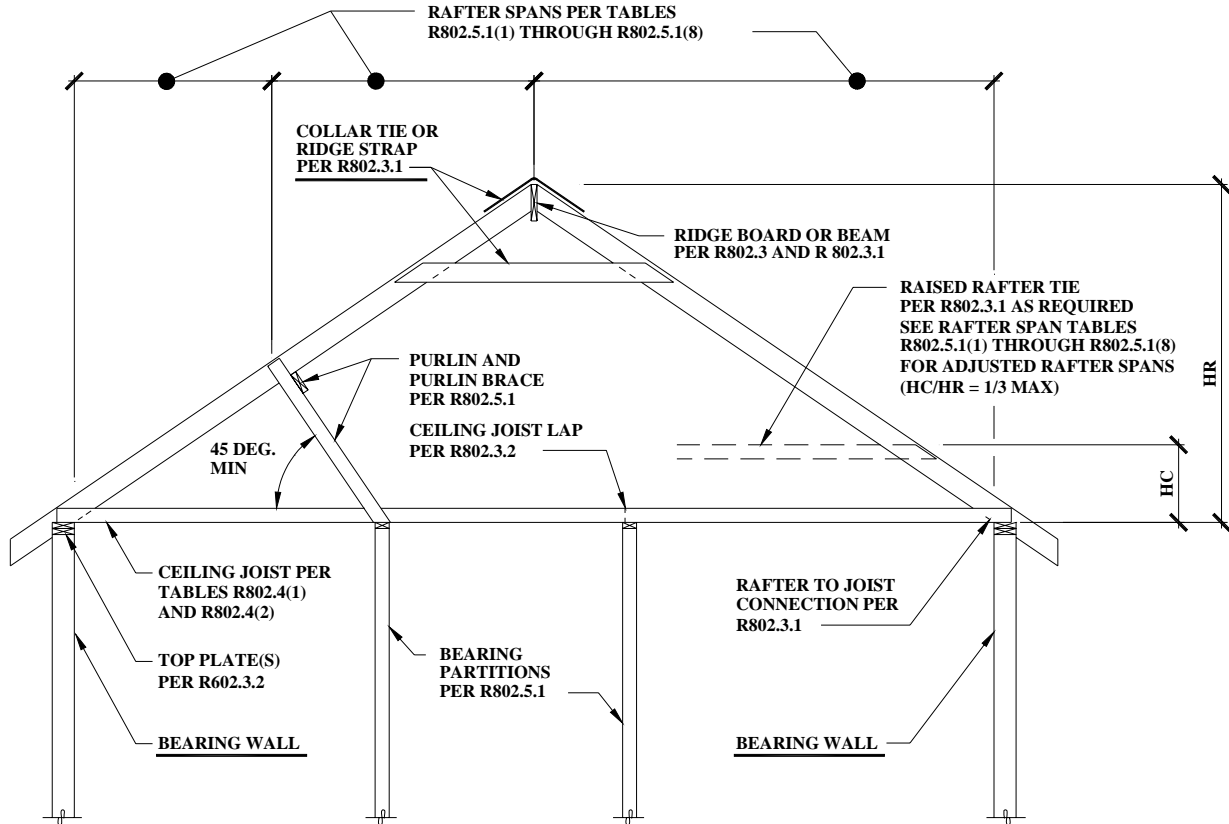
## Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

*Public Comment:*

Robert Rice, Josephine County Oregon, representing Josephine County Oregon and Southern Oregon Chapter of ICC, requests Approval as Modified by this Public Comment.

Modify the proposal as:



**FIGURE R802.5.1  
BRACED RAFTER CONNECTION**

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.018 rad.

**Note:** Where ceiling joints run perpendicular to the rafter, rafter ties shall be installed per R802.3.1

**HC** = Height of ceiling joists or rafter ties measured vertically above the top of rafter support walls

**HR** = Height of roof ridge measured vertically above the top of the rafter support walls.

**Committer's Reason:** The figure submitted in the original proposal was approved As Submitted by the committee in Baltimore. This modification merely adds the collar tie/ridge strap requirement and a note to see R802.3.1. The requirements already exist in the code. This amendment does not add any requirements to the code. Also, notes were added stating that the exterior walls are bearing walls.

Final Action:                      AS                      AM                      AMPC\_\_\_\_\_                      D

# RB152-09/10

R802.7, R802.7.1, R802.7.1.1 (New), Figure R802.7.1.1 (New), R802.7.1.2 (New), Figure R802.7.1.2

## Proposed Change as Submitted

**Proponent:** Dennis Pitts, American Forest and Paper Association

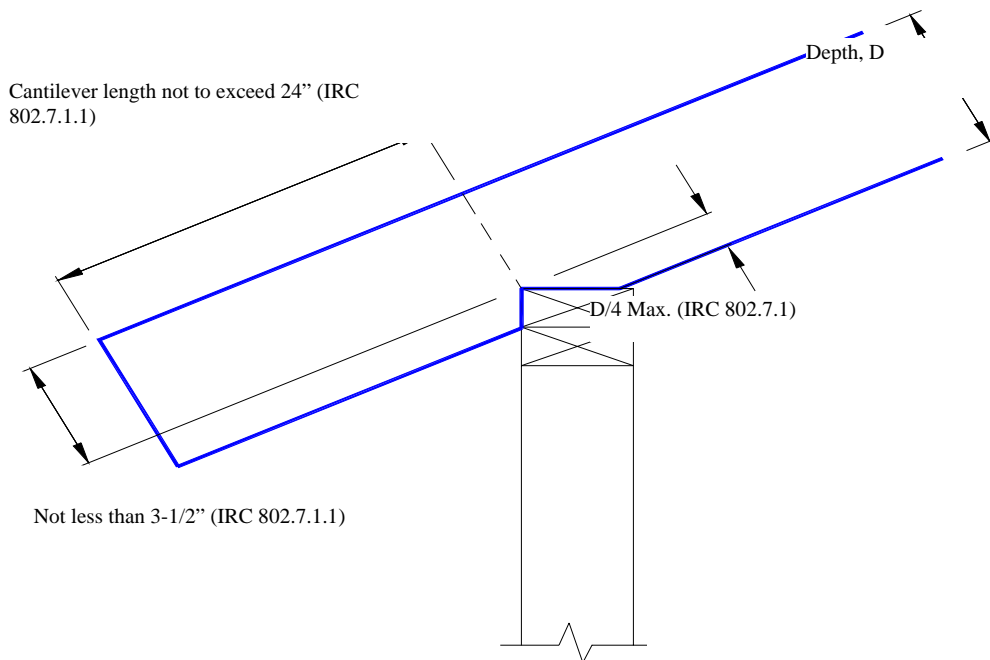
### 1. Revise as follows:

**R802.7 Cutting, drilling and notching.** Structural roof members shall not be cut, bored or notched in excess of the limitations specified in this section.

**R802.7.1 Sawn lumber.** Cuts, notches, and holes. ~~Notches in solid lumber joists, rafters, blocking and beams shall not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of the holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is also notched, the hole shall not be closer than 2 inches (51 mm) to the notch comply with the provisions of R502.8.1 except that cantilevered portions of rafters shall be permitted in accordance with Section R802.7.1.1.~~

**R802.7.1.1 Cantilevered portions of rafters.** **Exception:** Notches on cantilevered portions of rafters are permitted provided the dimension of the remaining portion of the rafter is not less than ~~4~~ 3-1/2-inch nominal (102.89 mm) and the length of the cantilever does not exceed 24 inches (610 mm) in accordance with Figure R802.7.1.1.

### 2. Add new figure as follows:

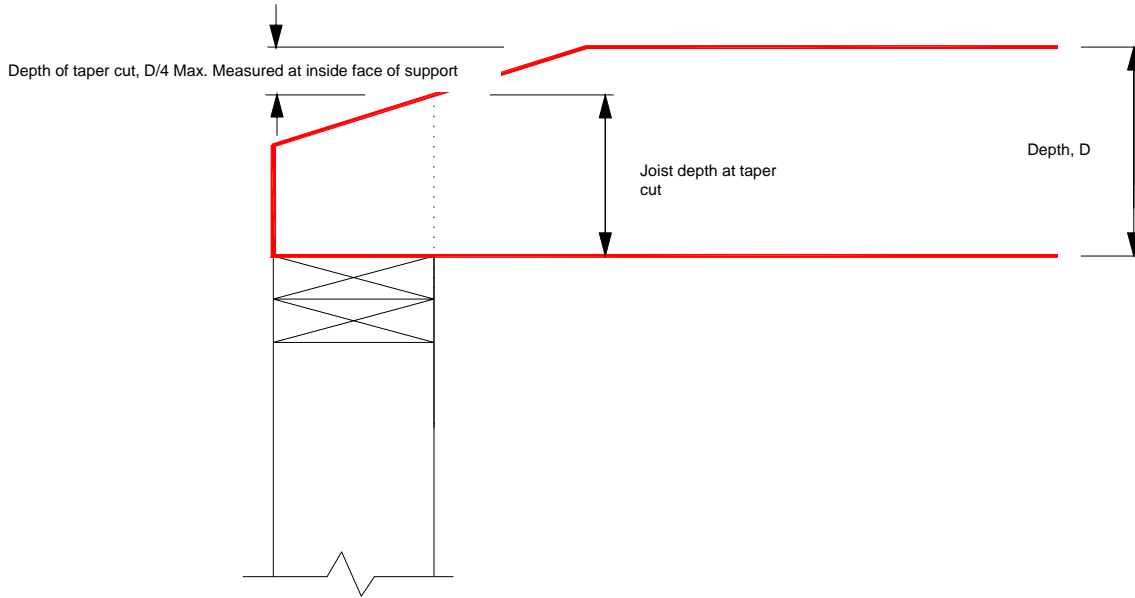


**FIGURE R802.7.1.1**  
**RAFTER NOTCH**

**3. Add new text as follows:**

**R802.7.1.2 Ceiling joist taper cut.** Taper cuts at the ends of the ceiling joist shall not exceed one-fourth the depth of the member in accordance with Figure R802.7.1.2.

**4. Add new figure as follows:**



**FIGURE R802.7.1.2**  
**CEILING JOIST TAPER CUT**

**Reason:** The revision simplifies text by referencing material elsewhere in the code. The exception is re-written as a section on cantilever portions of rafters and includes a figure to clarify the intent. The actual dimension “3-1/2 inch” replaces “4-inch nominal” to clarify the minimum dimension remaining after the notching. “Nominal” is typically used to describe standard sizes. The section on ceiling joist taper cut is added to clarify application of the D/4 provision to a ceiling joist taper cut.

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

ICCFILENAME: PITTS-RB-6-R802.7

**Public Hearing Results**

**Committee Action:**

**Approved as Submitted**

**Committee Reason:** This change adds clarification for cutting, drilling and notching of roof members. Adds figures for rafter notch and ceiling joist taper cut.

**Assembly Action:**

**None**

**Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Rick Davidson, City of Maple Grove, representing self, requests Approval as Modified by this Public Comment.**

**Modify the proposal as follows:**

**R802.7.1 Sawn lumber.** Cuts, notches, and holes, in solid lumber joists, rafters, blocking and beams shall not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of the holes bored or cut into members shall not exceed one-third

the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is also notched, the hole shall not be closer than 2 inches (51 mm) to the notch ~~except that cantilevered portions of rafters shall be permitted in accordance with Section R802.7.1.1.~~

**Exception:** Cantilevered portions of rafters shall be permitted in accordance with Section R802.7.1.1.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** This modification retains the original proposal but does not delete the language dealing with cuts, notches, and holes. Deleting existing language and referring the user of the code to another section is not user friendly. It does not improve the use of the code. If you are providing copies for the public, you must provide pages from two chapters. Let's leave this language where it is. This modification leaves the original proposal intact except for reinserting previously existing language.

Final Action: AS AM AMPC \_\_\_\_\_ D

## RB154-09/10

### R301.2.1

#### Proposed Change as Submitted

**Proponent:** T. Eric Stafford, PE, representing the Institute for Business and Home Safety

#### 1. Revise as follows:

**R301.2.1 Wind limitations.** Buildings and portions thereof shall be limited by wind speed, as defined in Table R301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be determined from Figure R301.2(4). Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where loads for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.6. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.

**TABLE R602.3(1)  
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER <sup>a,b,c</sup>	SPACING OF FASTENERS
5	Rafter <u>or roof truss</u> to plate, toe nail	<del>2</del> 3-16d box nails (3½"x0.135") or 3-10d common nails (3"x0.148")	<u>2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss</u>

(Portions of table not shown remain unchanged)

a. through i. (No change)

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe-nails on one side of the rafter and toe-nails from the ceiling joist to top plate in accordance with this schedule. The toe-nail on the opposite side of the rafter shall not be required.

#### 2. Delete without substitution:

**R802.10.5 Truss to wall connection.** Trusses shall be connected to wall plates by the use of *approved* connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. ~~For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in Table R301.2(2), adjusted for height and exposure per Table R301.2(3), see section R802.11.~~

#### 3. Revise as follows:

**R802.11.1 Uplift resistance.** Roof assemblies shall have uplift resistance in accordance with Sections R802.11.1.2 and R802.11.1.3 ~~which are subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater shall have roof rafters or trusses attached to their supporting wall assemblies by connections capable of providing the resistance~~

required in Table R802.11. Wind uplift pressures shall be determined using an effective wind area of 100 square feet (9.3 m<sup>2</sup>) and Zone 1 in Table R301.2(2), as adjusted for height and exposure per Table R301.2(3).

Where the uplift force does not exceed 200 pounds, rafters and trusses spaced not more than 24 inches on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Where the basic wind speed does not exceed 90 mph, the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet or less, rafters and trusses spaced not more than 24 inches on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

~~A continuous load path shall be designed to transmit the uplift forces from the rafters or trusses to the foundation.~~

**4. Add new text as follows:**

**R802.11.1.2 Truss uplift resistance.** Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings. Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice.

**R802.11.1.3 Rafter uplift resistance.** Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by Table R802.11 or as determined by accepted engineering practice. Connections for beams used in a roof system shall be designed in accordance with accepted engineering practice.

**5. Delete existing Table R802.11 and replace as follows:**

**TABLE R802.11  
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND  
(POUNDS PER CONNECTION)**

Rafter or Truss Spacing	Roof Span (feet)	EXPOSURE B							
		Basic Wind Speed (MPH)							
		85		90		100		110	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12	<5:12	≥5:12
12" o.c.	12	47	41	62	54	93	81	127	110
	18	59	51	78	68	119	104	165	144
	24	70	61	93	81	145	126	202	176
	28	77	67	104	90	163	142	227	197
	32	85	74	115	100	180	157	252	219
	36	93	81	126	110	198	172	277	241
	42	105	91	143	124	225	196	315	274
	48	116	101	159	138	251	218	353	307
16" o.c.	12	63	55	83	72	124	108	169	147
	18	78	68	103	90	159	138	219	191
	24	93	81	124	108	193	168	269	234
	28	102	89	138	120	217	189	302	263
	32	113	98	153	133	239	208	335	291
	36	124	108	168	146	264	230	369	321
	42	139	121	190	165	299	260	420	365
	48	155	135	212	184	335	291	471	410
24" o.c.	12	94	82	124	108	186	162	254	221
	18	117	102	155	135	238	207	329	286
	24	140	122	186	162	290	252	404	351
	28	154	134	208	181	326	284	454	395
	32	170	148	230	200	360	313	504	438



		<u>36</u>	<u>186</u>	<u>162</u>	<u>252</u>	<u>219</u>	<u>396</u>	<u>345</u>	<u>554</u>	<u>482</u>
		<u>42</u>	<u>209</u>	<u>182</u>	<u>285</u>	<u>248</u>	<u>449</u>	<u>391</u>	<u>630</u>	<u>548</u>
		<u>48</u>	<u>232</u>	<u>202</u>	<u>318</u>	<u>277</u>	<u>502</u>	<u>437</u>	<u>706</u>	<u>614</u>
<b><u>Rafter or Truss Spacing</u></b>	<b><u>Roof Span (feet)</u></b>	<b>EXPOSURE C</b>								
		<b>Basic Wind Speed (MPH)</b>								
		<b>85</b>		<b>90</b>		<b>100</b>		<b>110</b>		
		<b><u>Roof Pitch</u></b>		<b><u>Roof Pitch</u></b>		<b><u>Roof Pitch</u></b>		<b><u>Roof Pitch</u></b>		
		<b><u>&lt;5:12</u></b>	<b><u>≥5:12</u></b>	<b><u>&lt;5:12</u></b>	<b><u>≥5:12</u></b>	<b><u>&lt;5:12</u></b>	<b><u>≥5:12</u></b>	<b><u>&lt;5:12</u></b>	<b><u>≥5:12</u></b>	<b><u>&lt;5:12</u></b>
<u>12" o.c.</u>	<u>12</u>	<u>94</u>	<u>82</u>	<u>114</u>	<u>99</u>	<u>157</u>	<u>137</u>	<u>206</u>	<u>179</u>	
	<u>18</u>	<u>120</u>	<u>104</u>	<u>146</u>	<u>127</u>	<u>204</u>	<u>177</u>	<u>268</u>	<u>233</u>	
	<u>24</u>	<u>146</u>	<u>127</u>	<u>179</u>	<u>156</u>	<u>251</u>	<u>218</u>	<u>330</u>	<u>287</u>	
	<u>28</u>	<u>164</u>	<u>143</u>	<u>201</u>	<u>175</u>	<u>283</u>	<u>246</u>	<u>372</u>	<u>324</u>	
	<u>32</u>	<u>182</u>	<u>158</u>	<u>224</u>	<u>195</u>	<u>314</u>	<u>273</u>	<u>414</u>	<u>360</u>	
	<u>36</u>	<u>200</u>	<u>174</u>	<u>246</u>	<u>214</u>	<u>346</u>	<u>301</u>	<u>456</u>	<u>397</u>	
	<u>42</u>	<u>227</u>	<u>197</u>	<u>279</u>	<u>243</u>	<u>394</u>	<u>343</u>	<u>520</u>	<u>452</u>	
<u>16" o.c.</u>	<u>48</u>	<u>254</u>	<u>221</u>	<u>313</u>	<u>272</u>	<u>441</u>	<u>384</u>	<u>583</u>	<u>507</u>	
	<u>12</u>	<u>125</u>	<u>109</u>	<u>152</u>	<u>132</u>	<u>209</u>	<u>182</u>	<u>274</u>	<u>238</u>	
	<u>18</u>	<u>160</u>	<u>139</u>	<u>194</u>	<u>169</u>	<u>271</u>	<u>236</u>	<u>356</u>	<u>310</u>	
	<u>24</u>	<u>194</u>	<u>169</u>	<u>238</u>	<u>207</u>	<u>334</u>	<u>291</u>	<u>439</u>	<u>382</u>	
	<u>28</u>	<u>218</u>	<u>190</u>	<u>267</u>	<u>232</u>	<u>376</u>	<u>327</u>	<u>495</u>	<u>431</u>	
	<u>32</u>	<u>242</u>	<u>211</u>	<u>298</u>	<u>259</u>	<u>418</u>	<u>364</u>	<u>551</u>	<u>479</u>	
	<u>36</u>	<u>266</u>	<u>231</u>	<u>327</u>	<u>284</u>	<u>460</u>	<u>400</u>	<u>606</u>	<u>527</u>	
	<u>42</u>	<u>302</u>	<u>263</u>	<u>372</u>	<u>324</u>	<u>524</u>	<u>456</u>	<u>691</u>	<u>601</u>	
<u>48</u>	<u>338</u>	<u>294</u>	<u>416</u>	<u>362</u>	<u>587</u>	<u>511</u>	<u>775</u>	<u>674</u>		
<u>24" o.c.</u>	<u>12</u>	<u>188</u>	<u>164</u>	<u>228</u>	<u>198</u>	<u>314</u>	<u>273</u>	<u>412</u>	<u>358</u>	
	<u>18</u>	<u>240</u>	<u>209</u>	<u>292</u>	<u>254</u>	<u>408</u>	<u>355</u>	<u>536</u>	<u>466</u>	
	<u>24</u>	<u>292</u>	<u>254</u>	<u>358</u>	<u>311</u>	<u>502</u>	<u>437</u>	<u>660</u>	<u>574</u>	
	<u>28</u>	<u>328</u>	<u>285</u>	<u>402</u>	<u>350</u>	<u>566</u>	<u>492</u>	<u>744</u>	<u>647</u>	
	<u>32</u>	<u>364</u>	<u>317</u>	<u>448</u>	<u>390</u>	<u>628</u>	<u>546</u>	<u>828</u>	<u>720</u>	
	<u>36</u>	<u>400</u>	<u>348</u>	<u>492</u>	<u>428</u>	<u>692</u>	<u>602</u>	<u>912</u>	<u>793</u>	
	<u>42</u>	<u>454</u>	<u>395</u>	<u>558</u>	<u>485</u>	<u>786</u>	<u>684</u>	<u>1040</u>	<u>905</u>	
	<u>48</u>	<u>508</u>	<u>442</u>	<u>626</u>	<u>545</u>	<u>882</u>	<u>767</u>	<u>1166</u>	<u>1014</u>	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.

- The uplift connection forces are based on a maximum 33 foot mean roof height and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated basic wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights.
- The uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.
- The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.
- The tabulated uplift connection forces shall be permitted to be multiplied by 0.75 for connections not located within 8 feet of building corners.
- For buildings with hip roofs with 5:12 and greater pitch, the tabulated uplift connection forces shall be permitted to be multiplied by 0.70. This reduction shall not be combined with any other reduction in tabulated forces.
- For wall-to-wall and wall-to-foundation connections, the uplift connection force shall be permitted to be reduced by 60 plf for each full wall above.
- Linear interpolation between tabulated roof spans and wind speeds shall be permitted.
- The tabulated forces for a 12" on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

(Portions of proposal not shown remain unchanged)

**Reason:** The issue of roof uplift connections, the limits of conventional nailed connections, and the point at which pre-engineered metal clips or straps are required has been a topic of much debate over the last several code cycles. A 200 pound maximum capacity for conventional rafter-to-wall or truss-to-wall connections has been suggested, based largely on capacities calculated directly from AF&PA's NDS. At the same time, the existing Table R802.11 has not been updated in some time and is overly conservative for many typical houses. The uplift loads are based on low-slope (4:12 pitch or less) roofs. The table does not account for the reduction in uplift loads that occur on higher-slope (5:12 pitch or greater) roofs or on hip roofs per ASCE 7. Thus the code does not encourage the use of high-slope roofs, which have been shown to experience significantly less damage in high-wind events. The triggers proposed by the insurance industry, coupled with the current table, would subject many houses in low-wind areas to a requirement for roof-to-wall ties (not to mention continuous straps to the foundation) that is not justified by the actual performance of roof systems in low-wind areas. This requirement is particularly unjustified on higher-slope roofs where the uplift loads can be substantially reduced through a detailed analysis using ASCE 7.

This proposal rolls together elements of several proposals concerning roof uplift connections (RB132-07/08, RB206-07/08, and RB207-07/08) from the last cycle. First, three options are provided for selection of the roof uplift: Table R802.11, the truss designer, or an engineered approach. In many jurisdictions (particularly rural ones), an engineered truss design is not required and the local truss fabricator will run the software from the plate company. These jurisdictions may also have limited or no plan review. Thus, there is less opportunity to insure the proper wind speed, building dimensions, mean roof height, etc. are used, and a possibility that overly conservative roof uplift loads will be generated on the truss design drawing. Hence, the ability to determine an uplift load from Table R802.11 even when there are truss drawings must be preserved. However, to address issues previously raised by code officials in relation to this section, we have introduced language to limit the use of Table R802.11 to roof rafters and single-ply trusses within the applicability limits of R802.10.1.1, and to clarify that and girder trusses and roof beams require engineered connections and/or use of the truss design drawing values.

Second, this proposal replaces the current Table R802.11 with a new table based on Table 2.2A of the WFCM, which is based on the latest ASCE 7 wind load provisions. The new table expands upon both the existing IRC table and the WFCM table by incorporating values for high-slope roofs. These factors were derived using the ASCE 7 wind provisions and the calculation method used to develop Table 2.2A of the WFCM. A factor for hip roofs is also added, as hip roofs have seen similar improved performance in high-wind events. This table was proposed as part of the public comment to RB207-07/08. The failure of the public comment was due to concerns over the triggering language. The technical content of the proposed table was unchallenged; in fact a number of industry groups including IBHS, SBCA, AF&PA, and the Foam Sheathing Coalition who are not often in agreement with each other spoke in favor of the proposed revisions.

By introducing clarity to the trigger language for uplift connectors and providing this revised table, the IRC provisions for roof uplift connections will be substantially improved. Builders and building officials will have improved direction for when pre-engineered metal connectors are actually required. Additionally, the use of hip roofs and high-slope roofs will be encouraged, as designers, engineers and builders will be able to appropriately reduce uplift loads and avoid triggering uplift connector requirements for building locations and for roof configurations where the requirements are not justified.

**Cost Impact:** The code change proposal will increase the cost of construction.

ICCFILENAME: STAFFORD-RB-1-R301.2.1-T. R602.3(1)-R802

### **Public Hearing Results**

**Committee Action:**

**Approved as Submitted**

**Committee Reason:** The committee feels like this change should be merged with RB156-09/10. This change should be brought back with a public comment to correlate with RB156-09/10.

**Assembly Action:**

**None**

### **Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Bonnie Manley, American Iron and Steel Institute (AISI), representing Steel Framing Alliance, requests Approval as Modified by this Public Comment.**

**Modify the proposal as follows:**

**R301.2.1 Wind limitations.** Buildings and portions thereof shall be limited by wind speed, as defined in Table R301.2(1) and construction methods in accordance with this code. Basic wind speeds shall be determined from Figure R301.2(4). Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where loads for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors are not otherwise specified, the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.6. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 or Section R804.3.9 from the roof assembly to the foundation.

*(Portions of proposal not shown remain unchanged)*

**Commenter's Reason:** This modification simply adds the comparable reference to the section on cold-formed steel roof framing.

**Analysis:** This proposal contains conflicts with RB156-09/10 as follows:

	<b>RB154 -09/10</b>	<b>RB156-09/10</b>
<b>Section R802.11.1</b>	Uplift force trigger of 200 pounds	Uplift force trigger of 230 pounds
<b>Table R802.11</b>	Contains uplift force values for High-slope roofs	Footnote allows adjustment and provides adjustment factors for uplift force for high-slope roofs

Final Action:      AS      AM      AMPC \_\_\_\_      D

# RB156-09/10

Table R602.3(1), Section R602.10.1.2.1, R802.10.5, R802.11.1, Table R802.11

## Proposed Change as Submitted

**Proponent:** Gary Ehrlich, PE, National Association of Home Builders (NAHB)

### 1. Revise as follows:

**TABLE R602.3(1)  
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER <sup>a,b,c</sup>	SPACING OF FASTENERS
5	Rafter or <u>roof truss</u> to plate, toe nail	<del>2</del> 3-16d box nails (3½"x0.135") or 3-10d common nails (3"x0.148")	<u>2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss</u>

(Portions of table not shown remain unchanged)

a. through i. (No change)

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe-nails on one side of the rafter and toe-nails from the ceiling joist to top plate in accordance with this schedule. The toe-nail on the opposite side of the rafter shall not be required.

**R602.10.1.2.1 Braced wall panel uplift load path.** *Braced wall panels* located at exterior walls that support roof rafters or trusses (including stories below top story) shall have the framing members connected in accordance with one of the following:

- Fastening in accordance with Table R602.3(1) where:
  - ~~The basic wind speed does not exceed 90 mph (40 m/s), the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, or~~
  - The net uplift value at the top of a wall does not exceed 400 115 plf. The net uplift value shall be determined in accordance with Section R802.11 and shall be permitted to be reduced by 60 plf (86 N/mm) for each full wall above.
- Where the net uplift value at the top of a wall exceeds 400 115 plf (146 N/mm), installing *approved* uplift framing connectors to provide a continuous load path from the top of the wall to the foundation. The net uplift value shall be as determined in Item 1.2 above.
- Bracing and fasteners designed in accordance with accepted engineering practice to resist combined uplift and shear forces.

### 2. Delete without substitution:

~~**R802.10.5 Truss to wall connection.** Trusses shall be connected to wall plates by the use of *approved* connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in Table R301.2(2), adjusted for height and exposure per Table R301.2(3), see section R802.11.~~

### 3. Delete and substitute as follows:

~~**R802.11.1 Uplift resistance.** Roof assemblies which are subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater shall have roof rafters or trusses attached to their supporting wall assemblies by connections capable of providing the resistance required in Table R802.11. Wind uplift pressures shall be determined using an effective wind area of 100 square feet (9.3m<sup>2</sup>) and Zone 1 in Table R301.2(2), as adjusted for height and exposure per Table R301.2(3). A continuous load path shall be designed to transmit the uplift forces from the rafter or truss ties to the foundation.~~

**R802.11.1 Uplift resistance.** Individual rafters and trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by one of the following methods:

- as specified in Table R802.11; or
- as specified on the Truss Design Drawings; or

3. as specified by a registered design professional.

Where the uplift force does not exceed 230 pounds, rafters and trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Connections for girder trusses and roof beams shall be designed in accordance with the uplift forces specified on the Truss Design Drawings or as determined by a registered design professional.

**TABLE R802.11  
REQUIRED STRENGTH OF TRUSS OR RAFTER CONNECTIONS TO  
RESIST WIND UPLIFT FORCES<sup>a, b, c, e, f</sup>  
(Pounds per connection)**

**TABLE R802.11  
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)**

Rafter or Truss Spacing	Roof Span (feet)	Exposure B				Exposure C			
		Basic Wind Speed (mph)				Basic Wind Speed (mph)			
		85	90	100	110	85	90	100	110
<b>12" O.C.</b>	12	47	62	93	127	94	114	157	206
	18	59	78	119	165	120	146	204	268
	24	70	93	145	202	146	179	251	330
	28	77	104	163	227	164	201	283	372
	32	85	115	180	252	182	224	314	414
	36	93	126	198	277	200	246	346	456
	42	105	143	225	315	227	279	394	520
	48	116	159	251	353	254	313	441	583
<b>16" O.C.</b>	12	63	83	124	169	125	152	209	274
	18	78	103	159	219	160	194	271	356
	24	93	124	193	269	194	238	334	439
	28	102	138	217	302	218	267	376	495
	32	113	153	239	335	242	298	418	551
	36	124	168	264	369	266	327	460	606
	42	139	190	299	420	302	372	524	691
	48	155	212	335	471	338	416	587	775
<b>24" O.C.</b>	12	94	124	186	254	188	228	314	412
	18	117	155	238	329	240	292	408	536
	24	140	186	290	404	292	358	502	660
	28	154	208	326	454	328	402	566	744
	32	170	230	360	504	364	448	628	828
	36	186	252	396	554	400	492	692	912
	42	209	285	449	630	454	558	786	1040
	48	232	318	502	706	508	626	882	1166

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s, 1 pound = 0.454 kg.

- a. The tabulated uplift connection forces are based on a maximum 33 foot mean roof height, and Wind Exposure Category B or C. For Exposure D, the uplift connection force shall be selected from the Exposure C portion of the table using the next highest tabulated basic wind speed. The Adjustment Coefficients in Table R301.2(3) shall not be used to multiply the above forces for Exposures C and D or for other mean roof heights. Linear interpolation between tabulated roof spans and wind speeds shall be permitted.
- b. The tabulated uplift connection forces include an allowance for roof and ceiling assembly dead load of 15 psf.
- c. The tabulated uplift connection forces are limited to a maximum roof overhang of 24 inches.
- d. The tabulated uplift connection forces shall be permitted to be multiplied by one of the reduction factors listed in the table below. Tabulated reduction factors shall not be combined.

Roof Type	Roof Pitch	Connection Location	Adjustment Factor
Any	Any	Within 8 feet of building corners	1.00
		8 feet or more from building corners	0.75
Monoslope or gable roof	5:12 or greater	Within 8 feet of building corners	0.87
		8 feet or more from building corners	0.75
Hip roof	5:12 or greater	Within 8 feet of building corners	0.70
		8 feet or more from building corners	0.75

e. The tabulated forces for a 12" on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

**Reason:** The purpose of this proposal is to provide sensible and simplified requirements for roof uplift connections. The issue of roof uplift connections, the limits of conventional nailed connections, and the point at which pre-engineered metal clips or straps are required has been a topic of much debate over the last several code cycles. The insurance industry and others have been trying to mandate a 200 pound maximum capacity for conventional rafter-to-wall or truss-to-wall connections, based largely on capacities calculated directly from AF&PA's NDS. At the same time, the existing Table R802.11 has not been updated in some time and is overly conservative for many typical houses. The uplift loads are based on low-slope (4:12 pitch or less) roofs. The table does not account for the reduction in uplift loads that occur on higher-slope (5:12 pitch or greater) roofs or on hip roofs per ASCE 7. Thus the code does not encourage the use of high-slope roofs, which have been shown to experience significantly less damage in high-wind events. The triggers proposed by the insurance industry, coupled with the current table, would subject many houses in low-wind areas to a requirement for roof-to-wall ties (not to mention continuous straps to the foundation) that is not justified by the actual performance of roof systems in low-wind areas. This requirement is particularly unjustified on higher-slope roofs where the uplift loads can be substantially reduced through a detailed analysis using ASCE 7.

This proposal is similar to a companion proposal which rolls together elements of several proposals concerning roof uplift connections (RB132-07/08, RB206-07/08, and RB207-07/08) from the last cycle. The key difference is the proposed trigger of 230 pounds in this proposal. This value is consistent with the capacities seen in uplift testing of both individual components and roof assemblies conducted by the NAHB Research Center, Clemson University, State Farm, and others. It is a modest increase from the 200 pound capacity previously proposed by IBHS. The benefit in this small yet technically-justified increase is an ability to simplify the proposed code language by including a house with a 32' span low-slope roof in 90mph Exposure B in the scope of conventional connections. This will allow the prescriptive kick-out for the 32' high-slope condition to be removed and the overall table to be simplified.

By introducing clarity to the trigger language for uplift connectors and providing this revised table, the IRC provisions for roof uplift connections will be substantially improved. Builders and building officials will have improved direction for when pre-engineered metal connectors are actually required. Additionally, the use of hip roofs and high-slope roofs will be encouraged, as designers, engineers and builders will be able to appropriately reduce uplift loads and avoid triggering uplift connector requirements for building locations and for roof configurations where the requirements are not justified.

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

ICCFILENAME: EHRlich-RB-10-T. R602.3(1)-R602.10.1.2.1-R802.10.5-R802.11.1

## Public Hearing Results

**Committee Action:**

**Approved as Submitted**

**Committee Reason:** This change adds a simplified method for roof uplift connections as stated in the proponent's published reason.

**Assembly Action:**

**None**

## Individual Consideration Agenda

**This item is on the agenda for individual consideration because public comments were submitted.**

*Public Comment 1:*

**Gary J. Ehrlich, P.E., National Association of Home Builders, requests Approval as Modified by this Public Comment.**

**Modify the proposal as follows:**

~~**R802.11.1 Uplift resistance.** Individual rafters and trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by one of the following methods:~~

- ~~1. as specified in Table R802.11; or~~
- ~~2. as specified on the Truss Design Drawings; or~~
- ~~3. as specified by a registered design professional.~~

~~Where the uplift force does not exceed 230 pounds, rafters and trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).~~

Connections for girder trusses and roof beams shall be designed in accordance with the uplift forces specified on the Truss Design Drawings or as determined by a registered design professional.

**R802.11.1 Uplift resistance.** Roof assemblies shall have uplift resistance in accordance with Sections R802.11.1.2 and R802.11.1.3.

Where the uplift force does not exceed 230 pounds, rafters and trusses spaced not more than 24 inches on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

**R802.11.1.2 Truss uplift resistance.** Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the Truss Design Drawings for the basic wind speed as determined by Figure R301.2(4) and listed in Table R301.2(1). Where Truss Design Drawings are not required to be prepared by a registered design professional in accordance with R802.10.2, uplift forces shall be permitted to be determined from Table R802.11. Connections for girder trusses shall be designed in accordance with the uplift forces specified on the Truss Design Drawings or shall be determined in accordance with accepted engineering practice.

**R802.11.1.3 Rafter uplift resistance.** Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by Table R802.11 or as determined by accepted engineering practice. Connections for beams used in a roof system shall be designed in accordance with accepted engineering practice.

**TABLE R802.11**  
**RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION)**  
*(No changes to table values)*

- a. through c. *(No changes)*
- d. The tabulated uplift connection forces shall be permitted to be multiplied by one of the reduction factors listed in the table below. Tabulated reduction factors shall not be combined.

Roof Type	Roof Pitch	Connection Location	Adjustment Factor
Any	Any	Within 8 feet of building corners	1.00
		8 feet or more from building corners	0.75
Monoslope or gable roof	5:12 or greater	Within 8 feet of building corners	<del>0.90</del> 0.87
		8 feet or more from building corners	0.75
Hip roof	5:12 or greater	<del>Any Within 8 feet of building corners</del>	<del>0.75</del> 0.70
		<del>8 feet or more from building corners</del>	0.75

- e. The tabulated forces for a 12" on center spacing shall be permitted to be used to determine the uplift load in pounds per linear foot.

*(Portions of proposal not shown remain unchanged)*

**Commenter's Reason:** At the public hearings in Baltimore, proposals RB154-09/10 and RB156-09/10 were both approved by the IRC-Building/Energy Committee. The Committee liked the simplified table of uplift loads and tabulated footnote adjustments supplied by RB156-09/10. At the same time, the Committee preferred the charging language in RB154-09/10 and asked it be merged with RB156-09/10. This public comment adopts the language from RB154-09/10 with a few enhancements. A pointer to the Climatic and Geographic Design Criteria table and the Basic Wind Speed Figure is added to the truss language. This emphasizes the need for the Truss Designer to correctly select the proper wind speed and other criteria in the software. This is to insure the Truss Design Drawings reflect the correct uplift reactions for the site in question, not those from a higher wind speed because the operator forgot or chose not to change the settings. This is important as the builder (and homeowner) should not be required to install extra (or larger) uplift connectors simply because the Truss Design Drawings reflect a conservative setting for the wind speed.

The original charging language of RB154 allowed the use of Table R802.11 for trusses "if applicable". It is unclear exactly what makes the table "applicable" for trusses. That requirement is replaced here with a reference to the requirements for an engineered truss design in R802.10.2. If a jurisdiction does not require signed and sealed truss drawings, it is logical to allow the builder to use the prescriptive table to select the uplift loads. In fact, it is when the Truss Design Drawings are not prepared under the supervision of an engineer that it is most likely for the software to be run with an overly conservative wind speed.

Finally, the factor for the high-slope roof condition is adjusted. The relative effect of the dead load in resisting the uplift reaction decreases as the span and wind speed increase. In order to achieve the goal of preserving conventional practice in low-hazard areas, the high-slope factor was originally selected based on a 90mph basic wind speed. However, the increase to a 230-lb trigger in this proposal, relative to the 200-lb trigger in RB154-09/10, achieves a similar intent. By implementing this modest increase (consistent with testing at the NAHB Research Center), the factor can be adjusted to the more conservative value.

**Public Comment 2:**

**Randall Shackelford, Simpson Strong-Tie Company, requests Disapproval.**

**Commenter's Reason:** During the Baltimore Code Development Hearings, both RB154 and RB156 were approved. Both of these changes are part of a larger process that has been undertaken in the last two code cycles to fix the wind resistance provisions of the IRC, so that the windspeed where the structural requirements of the IRC are permitted can be increased from 100 to 110 miles per hour.

Fixing the roof tiedown requirements was the last item needed for the wind resistance provisions to be corrected. Both RB154 and RB156 did the same thing. The primary difference is that RB154 set the trigger for roof tiedown at 100 plf, while RB156 set the trigger for roof tiedown at 115 plf.

Among the groups that had been working on this code change, 100 plf had generally been the agreed on trigger. In fact, this number was actually a compromise to get the many involved groups to agree to the code change.

If the capacity of the proposed nails is calculated according to the code referenced standard for calculating the capacity of nails, the AF&PA NDS-05, the code capacity would be as follows:

- 3-16d box nails: 147 lbs.
- 3-10d common nails: 138 lbs.

And that assumes that the toenails are properly installed.

The 100 plf in RB154 is a good compromise that allows small structures in low wind areas to be built without additional connections. The proponent did not offer any technical justification for increasing the trigger to 115 plf in RB156.

Further, RB156 proposes to also change the trigger for additional uplift connections in the wall bracing section (R602.10.1.2.1) to 115 plf. The ICC Ad Hoc Wall Bracing Committee put this requirement into the IRC in the last cycle with the agreed upon trigger of 100 plf, also as a compromise. For studs, the connection of the stud to the top and bottom plates has a calculated capacity of zero if end nails are used. Again, no justification was submitted to change the agreed-upon trigger from 100 to 115 plf.

Although both are a step in the right direction, approving RB 154 and RB156 creates a conflict that will be difficult to resolve.

We urge the membership to disapprove RB156, and if given the opportunity, support RB154.

**Analysis:** This proposal contains conflicts with RB154-09/10 as follows:

	RB154 -09/10	RB156-09/10
Section R802.11.1	Uplift force trigger of 200 pounds	Uplift force trigger of 230 pounds
Table R802.11	Contains uplift force values for High-slope roofs	Footnote allows adjustment and provides adjustment factors for uplift force for high-slope roofs

Final Action: AS AM AMPC\_\_\_ D

## RB157-09/10

### R806.1, R806.2, R806.3 (New)

#### Proposed Change as Submitted

**Proponent:** Michael Fischer, The Kellen Company, representing the Roof Attic Ventilation Coalition

#### 1. Revise as follows:

**R806.1 Ventilation required.** Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than 1/4 inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth, or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Openings in roof framing members shall conform to the requirements of Section R802.7. Required ventilation openings shall open directly to the outside air.

**R806.2 Minimum area.** The total net free ventilating area shall not be less than 1/150 of the area of the attic or rafter space ventilated ~~except that reduction of the total area to 1/300 is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.~~ As an alternative, the net free cross-ventilation area may be reduced to 1/300 when a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.

#### 2. Add new text as follows:

**R806.3 Cross-ventilation.** At least 40 percent and not more than 50 percent of the required ventilating area shall be provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located no more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents.

**Exception.** Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet below the ridge or highest point of the space shall be permitted.

**Reason:** The code sets minimum requirements for ventilated attics. This proposal establishes an appropriate requirement for cross-ventilation as the default condition instead of allowing a reduction in ventilation for what is the most commonly recommended practice for ventilated attics. An exception for conditions where framing might preclude cross-ventilation to the specific location required allows some design flexibility for non-typical roof/wall assemblies. The proposal further clarifies that ventilators open to outside air, as opposed to adjacent attic or rafter spaces or some other interior space.

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

ICCFILENAME: FISCHER-RB-5-R806.1

**Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee feels there is no technical justification for this change. There are questions about the amount of ventilation needed. The committee would like to see this combined with RB159-09/10 and brought back.

**Assembly Action:**

**None**

**Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Michael D. Fischer, The Kellen Company, representing The Roof Assembly Ventilation Coalition, requests Approval as Modified by this Public Comment.**

**Modify the proposal as follows:**

**R806.2 Minimum area.** The total net free ventilating area shall not be less than 1/150 of the area of the attic or rafter space.

**Exceptions:** As an alternative, the net free cross-ventilation area may be reduced to 1/300 when one or more of the following conditions are met:

1. A Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
2. At least 40 percent and not more than 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located no more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet below the ridge or highest point of the space shall be permitted.

~~2. **R806.3 Cross-ventilation.** At least 40 percent and not more than 50 percent of the required ventilating area shall be provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located no more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents.~~

~~**Exception.** Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet below the ridge or highest point of the space shall be permitted.~~

*(Portions of proposal not shown remain unchanged)*

**Commenter Reason:** This proposal as submitted contained two concepts- the first was removing the option for reduction in ventilator area based upon cross ventilation, and the other was the rewrite of the current confusing language. During debate, the committee objected to eliminating the reduction in area. This comment removes the reduction, but moves forward with the appropriate rewrite of the cross ventilation requirement. This part of the proposal received positive testimony from proponents and opponents alike.

Final Action:            AS                    AM                    AMPC\_\_\_\_\_            D

**RB158-09/10**  
**R806.2**

**Proposed Change as Submitted**

**Proponent:** Joseph Lstiburek, Building Science Corporation

**Revise as follows:**

**R806.2 Minimum area.** The total net free ventilating area shall not be less than ~~4/150~~ 1/300 of the area of the space ventilated where except that reduction of the total area to 1/300 is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. ~~As an alternative, the net free cross-ventilation area may be reduced to 1/300 when~~ In climate zones 5, 6, 7 and 8 a Class I or II vapor retarder ~~is~~ shall be installed on the warm-in-winter side of the ceiling.



**Reason:** This language is now more consistent with the IBC, which only allows one ventilation ratio. It also is consistent with the appropriate building science/physics.

The previous wording encouraged installing vapor retarders in ceilings in hot humid climates in order to reduce ventilation areas. That is very bad in terms of the governing physics. This wording fixes that.

Vapor retarders are required in cold climates regardless of ventilation area. This wording makes that clear as well.

Bottom line: if you choose to vent a roof this language says vent it according to the 1:300 ratio everywhere. In cold climates you need to add a vapor retarder. The language relating to vapor retarders is now consistent with the vapor retarder changes made to wall assemblies in the two previous code cycles.

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

ICCFILENAME: LSTIBUREK-RB-3-R806.2

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** Based upon the proponent's request for disapproval. This change needs additional work and will be brought back.

**Assembly Action:**

**None**

### **Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Joseph Lstiburek, Building Science Corporation, representing self, requests Approval as Modified by this Public Comment.**

**Replace the proposal as follows:**

~~**R806.2 Minimum vent area.** The total net free ventilating area shall not be less than 1/150 of the area of the space ventilated except that reduction of the total area to 1/300 is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. As an alternative, the net free cross-ventilation area may be reduced to 1/300 when a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.~~

The minimum net free ventilating area shall be 1/150 of the area of the vented space.

**Exception:** The minimum net free ventilating area shall be 1/300 of the vented space provided the following conditions are met.

1. At least 50 percent and not more than 80 percent of the ventilating area is located at least 3 feet (914 mm) above the eave or cornice vents.
2. The balance of the required ventilation is provided by eave or cornice vents.
3. In climate zones 6, 7 and 8 a Class I or Class II vapor retarder is installed on the warm-in-winter side of the ceiling.

**Commenter's Reason:** The first sentence of the existing section is eight lines long. This replaces the awkward code language with a series of clear statements.

The requirement for a vapor retarder is modified to limit it to northern climates, as a vapor retarder in southern climates can lead to moisture problems.

Final Action:            AS                    AM                    AMPC\_\_\_\_            D

## **RB160-09/10 R806.4 (New)**

### **Proposed Change as Submitted**

**Proponent:** Michael D. Fischer, The Kellen Company, representing the Roof-Attic Ventilation Coalition

**Add new text as follows:**

**R806.4 Installation and weather protection.** Ventilators shall be installed in accordance with manufacturer's installation instructions. Installation of ventilators in roof systems shall be in accordance with the requirements of R903. Installation of ventilators in wall systems shall be in accordance with the requirements of Section R703.1.

(Renumber subsequent sections)

**Reason:** The code sets minimum requirements for ventilated attics. This proposal requires that ventilators be installed in accordance with the manufacturers' installation instructions. This requirement is essential if ventilation systems are to provide proper cross-ventilation and perform as intended. The proposal further clarifies that the weather protection requirements applicable for roof and wall penetrations, including flashing requirements, are considered.

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

ICCFILENAME: FISCHER-RB-4-R806.4

**Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee feels this additional text is unnecessary as it is already addressed in the code. Also, this would require ventilators to be provided.

**Assembly Action:**

**None**

**Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Michael D. Fischer, The Kellen Company, representing The Roof Assembly Ventilation Coalition, requests Approval as Submitted.**

**Commenter's Reason:** Wall and Roof ventilators are subject to code requirements for structural loading as elements of components and cladding. These products often bear labels to demonstrate compliance with the applicable code requirements. One example of an ICC-ES report includes the following language:

*Installation of the ridge vents described in this report must comply with this report, the manufacturers published installation instructions and the requirements of the applicable code. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.*

This is important to ensure that the selected vent is appropriate for the specific roof or wall covering material.

The proposal includes a requirement that the ventilators be installed with these instructions, and also includes reference to the applicable weathering section of the code.

Final Action:            AS                    AM                    AMPC\_\_\_\_            D

**RB162-09/10  
R903.2.1**

**Proposed Change as Submitted**

**Proponent:** Mike Rice, Maplewood, MN, representing the Association of Minnesota Building Officials

**Revise as follows:**

**R903.2.1 Locations.** Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. Kick out flashing shall be installed where the lower portion of a sloped roof stops within the plane of an intersecting wall cladding in such a manner as to divert or kick out water away from the assembly. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet).

**Reason:** This would be consistent with the code change proposal of R703.8. This change would also complement the current code addressing wall and roof intersections and prevent water from entering the wall cavity or penetrating to the structural building components. Step flashing at wall and roof intersections is incomplete without the kick out flashing, where the lower portion of a sloped roof stops within the plane of an intersecting wall. The water must be diverted away or it will find a way behind the water-resistive barrier and the siding or in some cases, it will go through the siding. The benefit of adding the kick out flashing would far exceed the cost, as the cost would be little.

**Cost Impact:** The code change proposal will increase the cost of construction.

ICCFILENAME: RICE-RB-1-R903.2.1

**Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** Based on the committee's previous action on RB146-09/10.

**Assembly Action:**

**None**

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**Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment 1:*

**Scott Dornfeld, City of Delano, representing Association of Minnesota Building Officials, requests Approval as Modified by this Public Comment.**

**Modify the proposal as follows:**

**R903.2.1 Locations.** Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. ~~Kick-out flashing shall be installed where the lower portion of a sloped roof stops within the plane of an intersecting wall cladding in such a manner as to divert or kick out the water away from the assembly. A flashing shall be installed to divert the water away from where the eave of a sloped roof intersects a vertical sidewall.~~ Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No.26 galvanized sheet).

**Commenter's Reason:** When this was brought forward in Baltimore the thought of adding this flashing was a good idea, but the committee needed the language cleaned up. Removing the phrases that the committee needed definitions for and going to language that was reader friendly and by moving this change to below the current language it put the change in location that helps clarify the need for the flashing. We have seen for years the damage that water does to the structural frame over time. Flashing will help remove the water damage that goes behind the exterior wall finish at the roof slope bottom edge at an intersecting a wall.

*Public Comment 2:*

**Theresa A. Weston, PhD, DePont Building Innovations, requests Approval as Modified by this Public Comment.**

**Modify the proposal as follows:**

**KICK OUT FLASHING.** Corrosion resistant flashing used to divert or kick out water away from the lower portion of a sloped roof assembly with an intersecting wall cladding.

*(Portions of proposal not shown remain unchanged)*

**Commenter's Reason:** This comment is submitted to respond to the committee's reason for disapproval. The committee's reason for disapproval of RB162 was "based on the committee's previous action on RB146-09/10". This references the committee's reason for disapproval of RB146 which was "The committee feels this needs to be addressed but it belongs in Chapter 9. The proponent needs to rework and bring this back. This needs a detail or definition of "kick out flashing".

I am commenting on RB162 rather than RB146 because it covers the appropriate section in Chapter 9 as directed in the committee's reason for disapproval. Also in response to the committee's request a definition for "kick-out flashing" has been added.

Final Action:            AS                    AM                    AMPC\_\_\_\_            D

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**RB164-09/10**  
**R905.1**

**Proposed Change as Submitted**

**Proponent:** W. Harvey Cappel, PE, Racelectric Engineering

**Revise as follows:**

**R905.1 Roof covering application.** Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, specifically

waived by a listed exception in the appropriate code section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

**Reason:** The term "otherwise specified" without a definition basically means "anything specified" which makes this Section R905.1 meaningless and basically void. The original intent here is to require roof coverings to be installed to resist specific wind loads. With this undefined "otherwise specified" loophole the intent of R905.1 is cancelled. We want roof coverings to be installed to resist the wind loads so let's be clear about what we want.

**Cost Impact:** There will be no cost impact (as compared to the original intent of the Code) related to this proposed code change.

ICCFILENAME: CAPPEL-RB-3-R905.1

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee feels the existing language is clear and the new text is not needed and is confusing.

**Assembly Action:**

**None**

### **Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**W. Harvey Cappel, PE. representing himself, requests Approval as Submitted**

**Commenter's Reason:** The problem with the wording in IRC Article R905.1 (Roof covering application) is that it is being interpreted wrongly. "Otherwise specified" is being taken as anything stated and therefore the requirement to be installed to resist the component and cladding loads is being completely ignored. For example: R905.2.6 Attachment (of composite shingles) then becomes 1) Perform an adhesive test per ASTM D-3161 or ASTM D-7158 (neither one test fasteners) and 2) Follow manufacturer's installation instructions. Composite shingle manufacturer's installation instructions typically do not address the wind speed, structure mean roof height and exposure considerations required for adequate fastener design. This is a particularly significant problem in the hurricane prone regions of Texas along the Gulf Coast where, because of this misinterpretation, shingles are being installed inadequately. The wrongly installed shingles experienced failure rates in excess of 50% as everyone could see by counting the blue FEMA roof tarps after hurricanes Rita and Ike. Making the true meaning of this code article clearer can help to solve this very serious cost and safety problem. Shingles that were replaced after hurricane Rita failed at about the same rate during hurricane Ike (only four years later) as they did during hurricane Rita.

Final Action: AS AM AMPC\_\_\_ D

**RB165-09/10**

**R905.2.4.1**

### **Proposed Change as Submitted**

**Proponent:** W. Harvey Cappel, PE, Racelectric Engineering

**Revise as follows:**

**R905.2.4.1 Wind resistance of asphalt shingles adhesive strips.** Asphalt shingles shall be tested for wind resistance of the adhesive strips (required to secure the shingle tabs) in accordance with ASTM D 7158. Asphalt shingles shall meet the classification requirements of Table R905.2.4.1 (1) for the appropriate maximum basic wind speed. Asphalt shingle packaging shall bear a label to indicate compliance with ASTM D 7158 and the required classification in Table R905.2.4.1 (1).

**Exception:** Asphalt shingles not included in the scope of ASTM D 7158 shall be tested and labeled to indicate compliance with ASTM D 3161 and the required classification in Table R905.2.4.1 (2).

**Reason:** The referenced test standards test the adhesive and its resistance to failure due to wind loads (test simulated) on the upwind side of the roof. These tests do not test fasteners or the resistance of fasteners to withdrawal from the wood deck. The tests aren't even (test simulated) on the correct side of the roof (downwind) required for testing the fasteners. Mr. Mike Noone, Chairman of ASTM Subcommittee D08-02 (the authors of ASTM D 3161 and similar test codes) will confirm this. The problem with the current wording is that it is misleading causing some to believe that use of the manufactures' nail standard during this test is a test of the nails and therefore the standard nailing required, for these shingles, on any roof for

winds up to the test standard wind speeds. This is not true. For high wind areas (110 mph or greater) the fasteners must be designed for the wind speed, mean roof height and exposure. Fasteners are not tested nor do they need to be. Sufficient data is already available to Engineers for the design of fastener systems.

**Cost Impact:** The only impact this code change proposal will have on cost is to those that have been wrongly interpreting the intent of the Code. In this case the cost of only a few more nails per shingle will be insignificant especially as compared to the cost of a failed shingle system cause by inadequate nailing.

ICCFILENAME: CAPPEL-RB-1-R905.2.4.1

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The shingle, not the adhesive strip, is what is required to be wind resistant. Shingle rigidity is a factor in wind resistant. The term "adhesive strips" implies more than one is required. This would exclude interlocking shingles.

**Assembly Action:**

**None**

## **Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**W. Harvey Cappel, PE., representing self, requests Approval as submitted.**

**Commenter's Reason:** The problem with the wording in IRC Article R905.2.4.1 (Wind resistance of asphalt shingles) is that it is being interpreted wrongly.

The adhesive testing performed by ASTM D3161 and ASTM D 7158 is just that adhesive test. The test simulation is on the wrong side of the roof (upwind) to even test fasteners. Fastener testing into structural elements is not even required. Fastener test data is readily available to Engineers for fastener design. This wrong interpretation leads some to believe that fastener design is not required; just simply follow manufacturer's installation instructions. This is simply not true. Composite shingle manufacturer's installation instructions typically do not address the wind speed, structure mean roof height and exposure considerations required for adequate fastener design. This is a particularly significant problem in the hurricane prone regions of Texas along the Gulf Coast where, because of this misinterpretation, shingles are being installed inadequately. The wrongly installed shingles experienced failure rates in excess of 50% as everyone could see by counting the blue FEMA roof tarps after hurricanes Rita and Ike. Making the true meaning of this code article clearer can help to solve this very serious cost and safety problem. Shingles that were replaced after hurricane Rita failed at about the same rate during hurricane Ike (only four years later) as they did during hurricane Rita.

Final Action:                      AS                      AM                      AMPC \_\_\_\_                      D

## **RB166-09/10 R905.2.5**

### **Proposed Change as Submitted**

**Proponent:** W. Harvey Cappel, PE, Racelectric Engineering

**Revise as follows:**

**R905.2.5 Fasteners.** Fasteners for asphalt shingles shall be galvanized steel, stainless steel, aluminum or copper roofing nails, minimum 11 gage (0.1205 (3mm) ~~12 gage (0.405 inch (3mm))~~ shank with a minimum 3/8-inch (10 mm) diameter head, ASTM F 1667, of a length to penetrate through the roofing materials and penetrate through the minimum required roof sheathing or penetrate to an equivalent embedment into the thicker than minimum required roof sheathing, a minimum of 3/4 inch (19 mm) into the roof sheathing. Where the roof sheathing is less than 3/4 inch (19mm) thick, the fasteners shall penetrate through the sheathing. Fasteners shall comply with ASTM F 1667.

**Reason:** 1) The 12 gage nails are rarely if ever used anymore and in many cases inadequate. The outdated standard is copied from the typical manufacturer's installation instructions (also outdated). The minimum standard needs to be updated.

2) The current Section wording is outdated (copied from the typical shingle manufacturer's installation instructions, also outdated) and ambiguous. It implies an either or standard with the in between not in compliance with the Code. This is ridiculous. If a 3/8 inch penetration is in compliance with the Code then all greater penetrations and embedment's up to and including the other Code required 3/4 inch penetration are also in compliance with the Code. The problem with this incorrect wording is that it is being used as evidence of non compliance, which is senseless.

**Cost Impact:** 1) Probably no cost impact at all to go to the new 11 gage nail since the 12 gage nail isn't normally being used anyway, but even where it is, the cost impact will be minimal.

2) There will be no cost impact related to this proposed Code change; only less confusion and potentially a cost savings.

ICCFILENAME: CAPPEL-RB-2-R905.2.5

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** There is no technical data justifying this change and it exceeds the tested manufacturer's specification.

**Assembly Action:**

**None**

### **Individual Consideration Agenda**

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**W. Harvey Cappel PE representing self, requests Approval as submitted.**

**Commenter's Reason:** The problem with the wording in IRC Article R905.2.5 (Fasteners) is that it is being interpreted wrongly. One would expect that if a 3/8-inch penetration thru a wood sheathing would be acceptable that all other deeper penetrations either thru or into the same wood sheathing would also be acceptable, actually better. Not so by the current wording. By the current wording if the wood sheathing is not at least 3/4-inch thick then the fastener penetrations must be thru the sheathing. This is ridiculous. The National Design Specification For Wood Construction (NDS) Table 11.2C Nail and Spike Withdrawal Values makes no distinction (including no footnotes) between penetration thru or into wood sheathing. This antiquated wording needs to be changed to reflect true engineering of fastener design.

Final Action:      AS              AM              AMPC\_\_\_\_              D

## **RB167-09/10**

### **R905.2.6**

### **Proposed Change as Submitted**

**Proponent:** W. Harvey Cappel, PE, Racelectric Engineering

**Revise as follows:**

**R905.2.6 Attachment.** Asphalt shingles shall have the minimum number of fasteners required by the manufacturer, but not less than four fasteners per strip shingle or two fasteners per individual shingle. Where the roof slope exceeds 21 units vertical in 12 units horizontal (21:12, 175 percent slope), or where the basic wind speed is equal to or exceeds 100 mph shingles shall be installed as required by the manufacturer, but with not less than six nails per shingle and as required to comply with Section R905.1.

**Reason:** The current code is being misinterpreted (mainly because of a misunderstanding of the ASTM D 3161 test [it only tests adhesives] requirement for high wind areas) regarding the fastening requirements to resist wind loads. This proposed change will help reinforce the known requirement that additional fasteners are required in high wind areas. The shingle manufacturers cannot be relied on for this requirement since they cannot and do not take responsibility for fastening design or fastening installation in high wind areas. Their wind related limit of warranty and responsibility typically stops with assurance against manufacturer's defects and compliance with one of the ASTM adhesive tests standards. Knowing that four nails per shingle are typically inadequate in high wind areas, here is an opportunity to set a minimum standard for high wind areas. The extreme number of shingle failures as a result of recent hurricanes Rita and Ike with wind speeds well below the typical coastal design standards, should be sufficient motivation to make a change in our shingle installation codes. What we have in force now, (basically four nails per shingle everywhere) is not working.

**Cost Impact:** There will be no cost impact (as compared to the original intent of the Code) related to this proposed Code change. Even if this change causes some construction projects to use six nails per shingle instead of the incorrect four nails per shingle, the additional cost will be minimal, especially as compared to the cost of an inadequate and failed shingle installation.

ICCFILENAME: CAPPEL-RB-4-R905.2.6

## Public Hearing Results

**Committee Action:**

**Disapproved**

**Committee Reason:** This change is not necessary. Additional fasteners are not the controlling factor for shingle blow off, the shingle is. Improvement in the shingle and ASTM D 7158 has improved the wind resistance of shingles.

**Assembly Action:**

**None**

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### Individual Consideration Agenda

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**W. Harvey Cappel, PE., representing self, requests Approval as submitted.**

**Commenter's Reason:** The problem with the wording in IRC Article R905.2.6 (Attachment) is that it leaves the fastener design to the shingle manufacturer. Shingle manufacturers do not design fastening (into structural sheathing) systems, cannot control the field application of same and therefore do not even warrant fastener design. Composite shingle manufacturer's installation instructions typically do not address the wind speed, structure mean roof height and exposure considerations required for adequate fastener design. Also the testing performed by ASTM D-3161 and or ASTM D-7158 is only a test of the tab adhesive. These tests do not test fasteners; the wind test simulation isn't even on the correct side of the roof. The test is on the upwind side of the roof which does not load the fasteners. Shingle fastener testing is not required. Fastener design data is readily available to Engineers for design purposes. The wording here leads one to believe wrongly that the only requirement for shingle fastener design is what it says on a shingle package. This is devastatingly wrong. This is a particularly significant problem in the hurricane prone regions of Texas along the Gulf Coast where, because of this misinterpretation, shingles are being installed inadequately. The wrongly installed shingles experienced failure rates in excess of 50% as everyone could see by counting the blue FEMA roof tarps after hurricanes Rita and Ike. Making the true meaning of this code article clearer can help to solve this very serious cost and safety problem. Shingles that were replaced after hurricane Rita failed at about the same rate during hurricane Ike (only four years later) as they did during hurricane Rita.

Final Action:      AS              AM              AMPC \_\_\_\_\_      D

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## **RB168-09/10**

### **R905.2.8.3**

### Proposed Change as Submitted

**Proponent:** Gary Ehrlich, PE, National Association of Home Builders (NAHB)

**Revise as follows:**

**R905.2.8.3 Sidewall flashing.** Flashing against a vertical sidewall shall be ~~by the step flashing method. The flashing shall be~~ a minimum of 4 inches (102 mm) high and 4 inches (102 mm) wide. ~~At the end of the vertical sidewall the step flashing shall be turned out in a manner that~~ and shall directs water away from the vertical sidewall and onto the roof and/or into the gutter. Where siding is provided on the vertical sidewall, the vertical leg of the flashing shall be continuous under the siding.

**Reason:** The purpose of this proposal is to clarify the requirements for the use of flashing at a vertical wall-to-roof intersection. The use of "step flashing" is fine for masonry wall construction; but to use it where siding is provided is incorrect. Walls with siding should be provided with continuous "J"-shaped sections of flashing, with the vertical leg continuous under the siding. A "J" turn back lip on the horizontal leg of the siding controls the water and directs it down the roof to the gutter. Step flashing does not have the return lip. "J"-shaped flashing sections are continuous, requiring fewer joints, look much better, and also reduce the opportunity for water to have multiple points of possible entry.

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

ICCFILENAME: EHRlich-RB-11-R905.2.8.3

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## Public Hearing Results

**Committee Action:**

**Disapproved**

**Committee Reason:** Based on the proponent's request for disapproval. The language is unclear and too restrictive. The proponent will work with industry and submit a public comment for Final Action.

**Assembly Action:**

**None**

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## **Individual Consideration Agenda**

This item is on the agenda for individual consideration because a public comment was submitted.

### *Public Comment:*

**Gary J. Ehrlich, PE, National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.**

Modify the proposal as follows:

**R905.2.8.3 Sidewall flashing.** ~~Base flashing~~ Flashing against a vertical sidewall shall be continuous or step flashing and shall be a minimum of 4 inches (102 mm) in height high and 4 inches (102 mm) in width-wide and shall direct water away from the vertical sidewall onto the roof and/or into the gutter. Where siding is provided on the vertical sidewall, the vertical leg of the flashing shall be continuous under the siding. Where anchored masonry veneer is provided on the vertical sidewall, the base flashing shall be provided in accordance with this section and counterflashing shall be provided in accordance with Section R703.7.2.2. Where exterior plaster or adhered masonry veneer is provided on the vertical sidewall, the base flashing shall be provided in accordance with this section and Section R703.6.3.

**Commenter's Reason:** The purpose of this public comment is to address issues raised by ARMA, BIA, and others at the public hearings. First, it is clarified that both continuous flashing and step flashing are considered acceptable methods for the base flashing at the sidewall. This allows the builder, in conjunction with the roofer and roofing manufacturer, to select the appropriate flashing method for the site conditions and the project schedule. Second, a reference is provided to the counterflashing requirements for anchored masonry veneer in Chapter 7. The counterflashing needs to be step flashing so it can be inserted into the mortar joints of the veneer. The base flashing can be continuous if desired. Finally, a reference is provided to Section R703.6.3 for exterior plaster (stucco) and adhered masonry veneer. That section calls for installing the vertical leg of the flashing between the two layers of water-resistant barrier required behind the stucco or veneer.

Final Action:                      AS                      AM                      AMPC\_\_\_\_\_                      D

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## **RB170-09/10**

### **R905.2.8.5 (New)**

### **Proposed Change as Submitted**

**Proponent:** Logan G. Sauter, Salt Lake City Corporation, representing the Utah Chapter of ICC

Add new text as follows:

**R905.2.8.5 Drip Edge.** Provide drip edge at eaves and gables of shingle roofs. Overlap to be a minimum of 2 inches (51 mm). Eave drip edges shall extend 0.25 inch (6.4 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edges shall be mechanically fastened a maximum of 12 inches (305 mm) o.c.

**Reason:** Unlike the IBC, the IRC does not include drip edge requirements for shingle roofs. This new text brings the IRC into uniformity with the IBC, reflects manufacturers' requirements for shingle roof installations, and uses identical wording and placement as found in IBC 1507.2.9.3.

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

ICCFILENAME: SAUTER-RB-1-R905.2.8.5

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### **Public Hearing Results**

**Committee Action:**

**Approved as Submitted**

**Committee Reason:** This is a good change that will provide protection of the shingles and gives rigidity to the shingle edges. This is consistent with the IBC.

**Assembly Action:**

**None**

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## Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

### *Public Comment 1:*

**Rick Davidson, City of Maple Grove, representing self, requests Approval as Modified by this Public Comment.**

**Modify the proposal as follows:**

**R905.2.8.5 Drip Edge.** ~~Provide drip~~ Drip edge shall be provided at eaves and gables of shingle roofs. Overlap to be Adjacent pieces of drip edge shall be overlapped a minimum of 2 inches (51 mm). Eave drip ~~Drip edges shall extend a minimum of 0.25 inch (6.4 mm) below the roof sheathing and extend back on extend up the roof deck a minimum of 2 inches (51 mm). Drip edges shall be mechanically fastened to the roof deck at a maximum of 12 inches (305 mm) o.c. with fasteners as specified in Section R905.2.5. Underlayment shall be installed over the drip edge along eaves and under the underlayment on gables. Unless specified differently by the shingle manufacturer, shingles are permitted to be flush with the drip edge.~~

**Commenter's Reason:** While we would disagree with the suggestion that the proposal reflects manufacturer's requirements for drip edge (R905.1 requires roofing be installed according to manufacturer's installation instructions so if they require it, it need not be repeated in the code), if such regulation must be in the code, better direction must be included for a proper installation. The direction provided in this modification comes from the Asphalt Roofing Manufacturer's Association.

### *Public Comment 2:*

**Gary Ehrlich, National Association of Home Builders (NAHB), requests Approval as Modified by this Public Comment.**

**Modify the proposal as follows:**

**R905.2.8.5 Drip Edge.** ~~Provide~~ A drip edge shall be provided at rake edges and at the upper and lower eaves and gables of shingle roofs. The horizontal leg of the drip edge shall overlap to be roof sheathing a minimum of 2 inches (51 mm). The vertical leg of the Eave ~~drip edges shall extend 0.25 inch (6.4 mm) minimum below the bottom of the roof sheathing and shall be offset 0.25 inches (6.4mm) minimum from the edge of the roof sheathing or fascia board extend back on the roof a minimum of 2 inches (51 mm). Drip edges shall be mechanically fastened a maximum of 12 inches (305 mm) o.c. Where an ice barrier or other roof underlayment is provided at rake edges, the drip edge shall be installed over the underlayment. Where an ice barrier or other roof underlayment is provided along an eave, the underlayment shall be installed over the drip edge. Where a gutter is provided, the drip edge shall be installed to direct water into the gutter.~~

**Commenter's Reason:** The purpose of this public comment is to revise and clarify the drip edge provisions that were approved at the Public Hearings in Baltimore. The provisions are vague, use incorrect terminology, and are not written in proper code language. The following changes are proposed:

1. The approved language requires a drip edge at "gables of shingle roofs". The proper term for this location is the "rake edge".
2. The language is revised to clarify the horizontal overlap of the drip edge with the roof sheathing.
3. The language is revised to specify the proper length and location of the vertical leg of the drip edge. The ¼" offset is critical to insure water is directed away from the fascia board.
4. Additional language is added to insure the installation of the drip edge is properly coordinated with the installation of ice barriers or other roof underlayment and with the installation of gutters.

These changes are critical to insure that the drip edge is installed correctly. If this public comment is not approved, it is possible that incorrect installations will occur and cause the exact moisture problems that the drip edges are supposed to protect against.

Final Action:                      AS                      AM                      AMPC \_\_\_\_\_                      D

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**RB177-09/10-PART I**  
**AG106.2 (New), AG108 (New), Chapter 44 (New)**

**Proposed Change as Submitted**

**Proponent:** Jesse J. Beitel, Hughes Associates, Inc., representing the Pool Safety Council

**PART I – IRC BUILDING/ENERGY**

**1. Add new text as follows:**

**AG106.2 Vacuum relief system required.** All pool and spa single- or multiple-outlet circulation systems that incorporate submerged suction outlet fittings shall be equipped with an approved or engineered vacuum relief system as follows:

1. Safety vacuum release systems conforming to ASME A112.19.17 or ASTM F 2387; or
2. An approved gravity drainage system.

**2. Add new standards to Chapter 44 and AG108 as follows:**

**ANSI/ASME**

A112.19.17-02 Manufactured Safety Vacuum Release Systems (SVRS) For Residential and Commercial Swimming Pool, Spa, Hot Tub and Wading Pool Suction Systems

**ASTM**

F 2387-04 Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) For Swimming Pools, spas, Hot Tubs

**Reason:** This code change provides a final layer of protection against potential entrapments. While the APSP-7 provides partial protection against entrapment, it does not protect swimmers or waders in the event that problems occur with improperly designed pools, some types of blocked drains, etc. These events can and do occur and when they occur, this proposal provides a mechanism to help prevent entrapment.

**Cost Impact:** The code change proposal will increase the cost of construction.

**Analysis:** A review of the standards proposed for inclusion in the code, ANSI/ASME A112.19.17 and ASTM F 2387, 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 September 24, 2009.

ICCFILENAME: BEITEL-RB-2-APDX G-IBC-G-1- 3109.5.1

**Public Hearing Results**

**Analysis:** Review of proposed new standards indicated that, in the opinion of ICC Staff, the standards did comply with ICC standards criteria.

**PART I - IRC**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee feels that this change is not needed at this time. The Federal Law will cover this and we have an approved ANSI/APSP-7 Standard. ICC is developing a Swimming Pool Code and this issue should be considered within that process.

**Assembly Action:**

**None**

## Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

### *Public Comment:*

**Jesse J. Beitel, Hughes Associates, Inc., representing Pool Safety Council, requests Approval as Submitted.**

**Commenter's Reason:** **Commenter's Reason:** The Pool Safety Council as well as others, continue to believe that the proposed code change provides the best solution to prevent entrapments. This proposal provides the final layer of protection that is in the best safety interest for everyone who uses pools, spas, etc.

The Federal Law does require entrapment safety, and the proposed changes provide additional requirements so as to bring the IRC and the IBC into compliance with the Federal Law.

Final Action:                    AS                    AM                    AMPC\_\_\_\_\_                    D

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## **RB177-09/10-PART II** **3109.5.1 (New), Chapter 35 (New)**

### Proposed Change as Submitted

**Proponent:** Jesse J. Beitel, Hughes Associates, Inc., representing the Pool Safety Council

#### **PART II – IBC GENERAL**

##### **1. Add new text as follows:**

**3109.5.1 Vacuum relief system required.** All pool and spa single- or multiple-outlet circulation systems that incorporate submerged suction outlet fittings shall be equipped with an approved or engineered vacuum relief system as follows:

1. Safety vacuum release systems conforming to ASME A112.19.17 or ASTM F 2387; or
2. An approved gravity drainage system.

##### **2. Add new standards to Chapter 35 as follows:**

#### **ANSI/ASME**

A112.19.17-02                    Manufactured Safety Vacuum Release Systems (SVRS) For Residential and Commercial Swimming Pool, Spa, Hot Tub and Wading Pool Suction Systems

#### **ASTM**

F 2387-04                    Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) For Swimming Pools, Spas, Hot Tubs

**Reason:** This code change provides a final layer of protection against potential entrapments. While the APSP-7 provides partial protection against entrapment, it does not protect swimmers or waders in the event that problems occur with improperly designed pools, some types of blocked drains, etc. These events can and do occur and when they occur, this proposal provides a mechanism to help prevent entrapment.

**Cost Impact:** The code change proposal will increase the cost of construction.

**Analysis:** A review of the standards proposed for inclusion in the code, ANSI/ASME A112.19.17 and ASTM F 2387, 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 September 24, 2009.

ICCFILENAME: BEITEL-RB-2-APDX G-IBC-G-1- 3109.5.1

## Public Hearing Results

**Analysis:** Review of proposed new standards indicated that, in the opinion of ICC Staff, the standards did comply with ICC standards criteria.

### **PART II - IBC**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved consistent with the action taken on Part I and at the proponent's request. ICC has begun the process of developing a swimming pool code. The development process for the new code will provide a better forum to resolve the various contentious issues related to this proposal and similar proposals heard by the IRC – Building and Energy Code Development Committee.

**Assembly Action:**

**None**

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## Individual Consideration Agenda

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Jesse J. Beitel, Hughes Associates, Inc., representing Pool Safety Council, requests Approval as Submitted.**

**Commenter's Reason:** See RB177-09/10, Part I

Final Action:            AS            AM            AMPC\_\_\_\_            D

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## **RB184-09/10**

**R302.1, Table R302.1(1), Table R302.1(2) (New), R309.5 (New)**

### Proposed Change as Submitted

**Proponent:** Tom Lariviere, Chairman - Joint Fire Service Review Committee

#### **1. Revise as follows:**

**R302.1 Exterior walls.** Construction, projections, openings and penetrations of *exterior walls* of *dwelling*s and accessory buildings shall comply with Table R302.1(1); or for *dwelling*s equipped throughout with an automatic sprinkler system installed in accordance with Section P2904 shall comply with Table R302.1(2).

#### **Exceptions:**

1. Walls, projections, openings, or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *dwelling*s 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)  
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	<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
		None required	5 feet

For SI: 1 foot = 304.8 mm.

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-tested in accordance with ASTM E 119 or UL 263 with exposure from the outside	0 feet
	(Not fire-resistance rated)	0 hours	3 feet <sup>a</sup>
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet <sup>a</sup>
	(Not fire-resistance rated)	0 hours	3 feet
Openings in walls	Not allowed	N/A	<3 feet
	Unlimited	0 hours	3 feet <sup>a</sup>
	All	Comply with Section R317.3	<3 feet
		None required	3 feet <sup>a</sup>

For SI: 1 foot = 304.8 mm.

N/A = Not Applicable

a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with Section P2904, 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. Add new text as follows:**

**R309.5 Fire Sprinklers.** Private garages shall be protected by fire sprinklers where the garage wall has been designed based on Table R302.1(2), Footnote a. Sprinklers in garages shall be connected to an automatic sprinkler system that complies with Section P2904. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft<sup>2</sup>. Garage doors shall not be considered obstructions with respect to sprinkler placement.

**Reason:** In the last code cycle, Proposal RB67-07/08 (which was withdrawn at the Final Action Hearings) provided as one of its sprinkler alternatives a reduction in exterior wall fire ratings that we believe still is a reasonable and justifiable sprinkler incentive. This proposal will provide a reasonable sprinkler alternative in the IRC when residential sprinkler systems are installed.

This proposal 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 fire safety perspective, the proposed requirements under new Table R302.1(2) 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.

The proposed garage requirement for R309.5 provides a limitation on the application of new Table R302.1(2) by only allowing use of sprinkler incentives in areas where sprinklers are provided. Normally, garages aren't required to have sprinklers; however, where a designer chooses to take advantage of reduced separation requirements for a garage wall, it is appropriate for the garage to be provided with sprinklers as a means of property protection. Proposed design criteria for sprinklers were derived from NFPA 13R Section 6.8.3.3, which addresses sprinkler protection for garages in buildings protected by NFPA 13R sprinkler systems. Often, garage protection is provided by dry pendent or dry sidewall sprinklers connected to a wet pipe sprinkler system.

The original Table R302.1(1) has been retained for jurisdictions that may adopt this edition of the Code without the mandatory sprinkler requirements that are presently in the 2009 IRC and for cases where there are additions or modifications to an existing non-sprinklered property.

**Cost Impact:** This code change proposal will decrease the cost of construction.

ICCFILENAME: LARIVIERE-RB2-R302.1

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee feels that sprinklers inside one house will not protect the adjacent house that may or may not be sprinklered. The footnote to the table invokes entire subdivisions and conditions that may or may not exist and this is way outside the scope of the IRC.

**Assembly Action:**

**Approved as Submitted**

## **Individual Consideration Agenda**

**This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action and a public comment was submitted. Note that the assembly action, Approved as Submitted, will be the initial motion on the floor for consideration when this item is called.**

*Public Comment:*

**Rick Thornberry, The Code Consortium, Inc, representing Cellulose Insulation Manufacturers Association (CIMA), requests Disapproval.**

**Commenter's Reason:** We are submitting this Public Comment to oppose the assembly action for approved as submitted of this Code Change Proposal in order to support the International Residential Code Building/Energy Code Development Committee's recommendation for disapproval. We certainly agree with the Committee's reason for disapproval in that there will be many cases where a new dwelling unit will be constructed next to an existing dwelling unit where the new dwelling unit may be sprinklered but the existing dwelling unit may not. So it would not be prudent to allow for these reduced fire separation distances for requirements invoking 1-hour rated exterior walls or projections, limitations on unprotected openings in exterior walls, and protection of penetrations.

Also the proposed new Table R302.1(2) Exterior Walls – Dwellings with Fire Sprinklers is somewhat confusing regarding the minimum fire separation distances specified. For example, for exterior walls where a 1-hour rating is required, the minimum fire separation distance specified is zero (0) feet. What happens if the minimum fire separation distance is greater than zero (0) feet but less than 3 feet? Similarly, for projections required to be 1-hour fire-resistance rated on the underside where the minimum fire separation distance is specified as 2 feet, what happens if the minimum fire separation distance is greater than 2 feet but less than 3 feet? It should also be noted that this new table will allow unlimited unprotected openings in a nonrated exterior wall where the fire separation distance is at least 3 feet. This compares to the current code that would only allow 25% of the exterior wall area to have unprotected openings where the fire separation distance is between 3 feet and 5 feet. This is significant in that a fire in one building which breaks out of the unprotected opening can expose the adjacent building not only by radiant heat, but also by convected heat in the form of a flame plume which may project as much as 5 to 6 feet beyond the face of the building.

These trade-offs all presume that the automatic sprinkler system will perform as designed and prevent the fire from breaking out an exterior window and burning on the exterior so as to expose an adjacent dwelling. But what if the fire occurs in the attic where there are no sprinklers and breaks out of a vent in the side wall?

The IRC will allow an NFPA 13D or equivalent sprinkler system to be used for these trade-offs. As we all know, an NFPA 13D sprinkler system is primarily a life safety system and not a full property protection system. This is clearly stated in Section 1.2 Purpose of NFPA 13D as follows:

**1.2.1** The purpose of this standard shall be to provide a sprinkler system that aids in the detection and control of residential fires and thus provides improved protection against injury and life loss.

**1.2.2** A sprinkler system designed and installed in accordance with this standard shall be expected to prevent flashover (total involvement) in the room of fire origin, where sprinklered, and to improve the chance for occupants to escape or be evacuated.

These trade-offs rely on the owners of the adjacent buildings to maintain their automatic sprinkler systems in an operative condition at all times. Unfortunately, there is no supervision required for these systems and no fire department connection is provided for the fire department to boost the sprinkler system water supply as is typical of an NFPA 13 sprinkler system. Furthermore, the water supply to the system could be shut off for repairs and not turned back on since no supervision of the control valve supplying the water supply to the sprinkler system is required if the valve is locked open. Obviously, the owner of the townhouse would have the key to the lock on the valve so there would be nothing to prevent the owner from unlocking the lock and closing the valve for whatever reason. And it is not uncommon for the valve to remain closed since there is no supervisory reminder that the valve remains closed. It could easily be forgotten after the repairs have been made to the system.

There is also the question of the reliability of the sprinkler system water supply. Will it be available at all times when there is the possibility of a fire occurring? This is especially important in high seismic activity areas where fires often start soon after an earthquake and the water supplies in many cases are out of service due to main breaks and loss of power for extended periods of time.

We also have a concern with the proposed new Section R309.5 Fire Sprinklers which requires private garages to be protected by fire sprinklers where the garage has been designed to have exterior walls protected in accordance with Table R302.1(2), Footnote a. In our opinion, this will actually provide a lesser degree of protection in cold weather climates where the sprinkler system in the garage may be subject to freezing. It is very difficult to prevent the sprinkler piping from freezing where it passes through attics of residential dwellings in these cold climate areas, but that problem is significantly increased where sprinklers are required in private garages as an extension of the sprinkler system in the adjacent dwelling. So if the garage sprinkler freezes, it could damage and rupture the piping, thus, causing failure of the sprinkler system in the dwelling that it is adjacent to by draining the water from the sprinkler system. This would be especially critical in a case where the sprinkler system is supplied by a fixed storage tank rather than a municipal water supply system. So the sprinkler water supply system could be totally drained due to the rupture caused in the frozen piping of the garage sprinkler system.

In conclusion, we believe it is unwise to allow for these automatic sprinkler system trade-offs based on sprinkler systems designed in accordance with NFPA 13D which are not as reliable, nor as effective in providing property protection, as an NFPA 13 sprinkler system. Therefore, we urge the Class A voting members to support the Committee's recommendation for disapproval of this code change.

Final Action:            AS            AM            AMPC\_\_\_\_            D

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