RB214–07/08
R903.2 (New), Chapter 43 (New)

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

1. Add new text as follows:

R903.2 Secondary water barrier. In hurricane prone regions, a secondary water barrier shall be installed on roof decks using one of the following methods:

1. All joints in roof sheathing or decking shall be covered with a minimum 6 inch wide strip of self-adhering polymer modified bitumen tape complying with ASTM D 1970, applied directly to the sheathing or decking. The deck and self adhering polymer modified bitumen tape shall be covered with an underlayment systems approved for the particular roof covering to be applied to the roof in accordance with Section R905.
2. The entire roof deck shall be covered with an approved self-adhering polymer modified bitumen cap sheet complying with ASTM D 1970. No additional underlayment shall be required on top of this cap sheet for new installations.
3. A reinforced synthetic underlayment that is approved as an alternate to underlayment complying with ASTM D226, meeting the nail sealing requirements of ASTM D1970 and having a minimum tear strength per ASTM D1970 or ASTM D 4533 of 20 lbs. This underlayment, shall be attached using annular ring or deformed shank roofing fasteners with minimum 1-inch diameter metal or plastic caps in a grid pattern of 12 inches (305 mm) between the overlaps, with 6-inch (152 mm) spacing at the overlaps. All seams shall be sealed with a compatible adhesive or compatible 4-inch wide tape.
4. A two-part urethane based closed cell spray-on adhesive applied to the attic side of the joints between the sheathing.

(Renumber subsequent sections)

2. Add standard to Chapter 43 as follows:

ASTM
D4533-04 Standard Test Method for Trapezoid Tearing Strength of Geotextiles

Reason: The purpose of this proposal is to address water penetration issues in hurricane prone regions. The goal is to provide a secondary level of protection from water intrusion in the areas where water is most likely to penetrate – joints in the roof sheathing or decking. While great strides have recently been made in the wind resistance of roof coverings, the roof covering is still one of the weakest areas of a building. Additionally, once the roof covering is lost, the inside of the building is subject to water intrusion during the hurricane and in the days and months following before a new roof covering is installed. With the roof covering removed, even if the primary structure performs well, the inside of the building will be subject to severe damage from water. The methods specified in the proposal provide an additional level of protection, at a modest cost, in the event the roof covering does not perform as desired in the windstorm.

This proposal provides flexibility in the use of materials to achieve the secondary water barrier. The methods specified provide for the use of some materials that are already required by the code. The self-adhering polymer modified bitumen sheets area currently specified for ice dam protection. This proposal also recognizes the use of synthetic reinforced underlayments as acceptable secondary water barriers. The underlayments, while relatively new to the marketplace, have tear and tensile strengths that significantly exceed those of conventional felt paper.

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

Analysis: A review of the standard proposed for inclusion in the code, ASTM D4533, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before January 15, 2008.

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

RB215–07/08
R905.2.8.4

Proponent: Gerald Anderson, City of Overland Park, KS, representing himself

Revise as follows:

R905.2.8.4 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 wall and roof intersection the flashing shall be turned out in order to direct water away from the wall and onto the roof and/or gutter.

Reason: This code change establishes a minimum size for the step flashing. What we are currently seeing in many situations is that roofers are creating the step flashing with a piece of 5 inch flashing. The end result is that you have at best a 2 ½" vertical rise and a 2 ½" deck flange. While flashing of this size maybe adequate to protect against normal water back up, it is inadequate when considering that most types of wood siding must be held off the roof surface 2 inches. As I understand it ARMA (Asphalt Roofing manufacture's Association) recommends a 5" high and 5" wide flashing, while NCRA (National Roofing Contractor's Associations) recommends a 4 " high and 4" wide flashing.
In order to properly flash the roof /vertical wall intersection the weather resistive barrier and the exterior siding must extend down over the metal flashing. A flashing with a minimum height of 4 inches would allow this to be done correctly.
The last sentence addresses the need for a "kick out" flashing which will divert the water away from the wall and back towards the roof. This is standard practice for stucco walls. It needs to be standard practice for all type of exterior siding. It is really a means of protecting (properly flashing) the wall at the end point.

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

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

RB216–07/08
R905.2.8.6 (New)

Proponent: Roger Vermillion, City of Tempe, AZ, representing the Arizona Building Officials

Add new text as follows:

<u>**R905.2.8.6 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 (6.4 mm) below the sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) on center.</u>

Reason: Section 905.2 defines when a building shall be protected from water damage associated with roofing materials. The current code requirements protect side walls, ponding against chimneys and locations where other flashing shall be installed such as vertical soil or vent piping. The code does not recognize the amount of water damage that occurs every year to wooden fascias at shingle roofs. There are no current termination requirements for shingle roofs. The code indicates that it is appropriate for the shingle roofing to end and allows the water to run down over the face of the fascia board. Even if the resident attempts to seal the fascia with paint or water sealer this only a temporary fix. Each year the paint or sealer will have to be reapplied.

During re-roofs we find the decking to be in good shape while the fascia has sustained heavy water damage and rot. This makes sense as we take appropriate measures to protect the decking. We do not take any measures to protect the fascia. Is this due to the wood being exposed to the elements? If so then why do we address front walls and side walls that are also exposed to the elements? It is time to protect the entire roof system from water damage.

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

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

RB217–07/08
R1004.3

Proponent: Jim Buckley, Buckley Rumford Co., representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

R1004.3 Decorative shrouds. Decorative shrouds shall not be installed at the termination of <u>air-cooled</u> chimneys for factory-built fireplaces <u>listed to UL127</u> except where the shrouds are listed and labeled for use with the specific factory-built fireplace system and installed in accordance with the manufacturers installation instructions.

Reason: Add the words "air-cooled" and "listed to UL127" as non listed decorative shrouds can interfere with the air flow of air-cooled metal chimneys listed to UL 127 for factory-built fireplaces. There is no problem, however, adding decorative shrouds to insulated factory-built chimneys listed to UL 103 that are used for masonry fireplaces, stoves, furnaces and many other appliances. The language here should be specific to air-cooled UL 127 chimneys and distinguished from insulated Class A chimneys specified in Section R1005.

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

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

RB218–07/08
R1005.2

Proponent: Jim Buckley, Buckley Rumford Co., representing the Masonry Alliance for Codes and Standards (MACS)

Revise as follows:

R1005.2 Decorative shrouds. ~~Decorative shrouds shall not be installed at the termination of factory-built chimneys except where the shrouds are listed and labeled for use with the specific factory-built chimney system and installed in accordance with the manufacturer's installation instructions.~~ <u>Decorative shrouds shall comply with the provisions of R1003.9.</u>

Reason: There is no problem adding decorative shrouds to insulated factory-built chimneys listed to UL 103 that are used for masonry fireplaces, stoves, furnaces and many other appliances provided they comply with the general provisions for chimney terminations in Section R1003.9.

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

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

RB219–07/08
R1006

Proponent: Jim Brewer, Magic Sweep Corporation, National Chimney Sweep Guild

Delete and substitute as follows:

~~SECTION R1006~~
~~EXTERIOR AIR SUPPLY~~

~~**R1006.1 Exterior air.** Factory-built or masonry fireplaces covered in this chapter shall be equipped with an exterior air supply to assure proper fuel combustion unless the room is mechanically ventilated and controlled so that the indoor pressure is neutral or positive.~~

~~**R1006.1.1 Factory-built fireplaces.** Exterior combustion air ducts for factory-built fireplaces shall be a listed component of the fireplace and shall be installed according to the fireplace manufacturer's instructions.~~

~~**R1006.1.2 Masonry fireplaces.** Listed combustion air ducts for masonry fireplaces shall be installed according to the terms of their listing and the manufacturer's instructions.~~

~~**R1006.2 Exterior air intake.** The exterior air intake shall be capable of supplying all combustion air from the exterior of the dwelling or from spaces within the dwelling ventilated with outside air such as non-mechanically ventilated crawl or attic spaces. The exterior air intake shall not be located within the garage or basement of the dwelling nor shall the air intake be located at an elevation higher than the firebox. The exterior air intake shall be covered with a corrosion-resistant screen of 1/4-inch (6 mm) mesh.~~

~~**R1006.3 Clearance.** Unlisted combustion air ducts shall be installed with a minimum 1-inch (25 mm) clearance to combustibles for all parts of the duct within 5 feet (1524 mm) of the duct outlet.~~

~~**R1006.4 Passageway.** The combustion air passageway shall be a minimum of 6 square inches (3870 mm^2) and not more than 55 square inches (0.035 m2), except that combustion air systems for listed fireplaces shall be constructed according to the fireplace manufacturer's instructions.~~

~~**R1006.5 Outlet.** Locating the exterior air outlet in the back or sides of the firebox chamber or within 24 inches (610 mm) of the firebox opening on or near the floor is permitted. The outlet shall be closable and designed to prevent burning material from dropping into concealed combustible spaces.~~

<u>SECTION R1006</u>
<u>OUTDOOR COMBUSTION AIR SUPPLY</u>

<u>**R1006.1 Outdoor combustion air.** Fireplaces covered in this chapter shall be equipped with an outdoor combustion air supply installed in accordance with one of the methods prescribed in Sections R1006.2 through R1006.4 unless the room is mechanically ventilated and controlled so that the indoor pressure is neutral or positive.</u>

R1006.2 Factory-built fireplaces. Outdoor combustion air ducts for factory-built fireplaces shall be a listed component of the fireplace and shall be installed in accordance with the fireplace manufacturer's instructions.

R1006.3 Masonry fireplaces listed ducts. Listed outdoor combustion air ducts for masonry fireplaces shall be installed in accordance with the manufacturer's installation instructions.

R1006.4 Masonry fireplaces unlisted ducts. Unlisted outdoor combustion air ducts for masonry fireplaces shall be installed in accordance with Sections R1006.4.1 through R1006.4.4.

R1006.4.1 Exterior air intake. The outdoor combustion air intake shall not be located within the garage or basement of a dwelling. Such intake shall not be located at an elevation higher than the firebox of the fireplace where the air outlet is located anywhere in the firebox. The outdoor combustion air intake shall be covered with a corrosion-resistant screen having ¼-inch (6.4 mm) mesh.

R1006.4.2 Installation. All portions of the outdoor combustion air supply duct shall be constructed of non-combustible material and shall maintain a 1-inch clearance to combustible material for a distance of 5 feet (1524 mm) from the duct outlet.

R1006.4.3 Size. The outdoor combustion air duct or passageway shall be not less than 6 square inches in cross-sectional area.

R1006.4.4 Outlet. The outdoor combustion air outlet shall be located in the back or sides of the firebox chamber or within 24 inches (610 mm) of the firebox opening on or near the floor. Such outlet shall be closable and designed to prevent burning material from dropping into concealed combustible spaces.

Reason: Rationale – The entire section is reorganized for clarity. Unenforceable and unnecessary language has been removed. This section has never been clear as to which requirements apply to listed systems vs. unlisted systems. The proposed code change makes this clear. The first technical change included in this proposal is a requirement that the combustion air duct be constructed of non-combustible material. Currently, this is not stated and it would be difficult to prohibit ducts of combustible construction. The second technical change included in the proposal was the deletion of the maximum size of the combustion air passageway. Since there is no limit on how large a fireplace can be, there should be no limit on how large the combustion air passageway can be, especially given that the intent is to supply "all combustion air". The requirement to be able to supply all combustion air is difficult to determine or enforce and has been removed. The volume of required combustion air for a wood-burning fireplace varies with numerous factors including the fireplace size, fuel load, outdoor temperature and chimney height.

A technical change was made in R1006.4.1 to allow the exterior air intake to be located higher than the fireplace when the air outlet is not located in the fireplace firebox. Current code language prohibits the air intake from being higher than the fireplace and this essentially prohibits fireplaces from being installed in below-grade locations such as basements. As long as the combustion air duct outlet is not in the fireplace with the fire or hot coals there is no reason to prohibit the air intake from being higher than the firebox.

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

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

RB220–07/08

Proponent: Standards Writing Organization

Revise standards as follows:

AAMA	American Architectural Manufacturers Association (AAMA) 1827 Walden Office Square, Suite 550 Schaumburg, IL 60173
Standard reference number	Title
450—06 ~~00~~	Voluntary Performance Rating Method for Mulled Fenestration Assemblies
506— 06 ~~00~~	Voluntary Specifications for Hurricane Impact and Cycle Testing of Fenestration Products.

ACI

American Concrete Institute
P. O. Box 9094
Farmington Hill, MI 48333-9094

Standard reference number	Title
332—08 ~~04~~	Code Requirements for Residential Concrete Construction

ASTM

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

Standard reference number	Title
C 129—06 ~~05~~	Specification for Nonloadbearing Concrete Masonry Units
C 1107- 07 ~~04~~	Standard Specification for Packaged Dry Hydraulic-Cement Grout (Nonshrink)
C 1116—06 ~~03~~	Standard Specification for Fiber-Reinforced Concrete and Shotcrete
D 2824— 06 ~~04~~	Specification for Aluminum-Pigmented Asphalt Roof Coatings, Non-fibered, Asbestos Fibered, and Fibered without Asbestos
D 7032-07 ~~04~~	Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)

GA

Gypsum Association
810 First Street, NE #510
Washington, DC 20002-4268

Standard reference number	Title
GA-253— 07 ~~99~~	~~Recommended Standard Specification for the~~ Application of Gypsum Sheathing

UL

Underwriters Laboratories, Inc.
333 Pfingsten Road
Northbrook, IL 60062

Standard reference number	Title
726-1995	**Oil Fired Boiler Assemblies – with Revisions through ~~February~~ March 2006**
959—01	Medium Heat Appliance Factory-built Chimneys-with Revisions through September 2006
2158A-2006 ~~96~~	**Outline of Investigation for Clothes Dryer Transition Duct**

Reason: The *CP 28 Code Development Policy,* Section 4.5* requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Change Proposal. In May 2007, a letter was sent to each developer of standards that are referenced in the International Codes, asking them to provide the ICC with a list of their standards in order to update to the current edition. Above is the received list of the referenced standards that are under the maintenance responsibility of the IRC Committee.

***4.5 Updating Standards:** The updating of standards referenced by the Codes shall be accomplished administratively by the appropriate code development committee in accordance with these full procedures except that multiple standards to be updated may be included in a single proposal.

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

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

RB221–07/08
AG101.2 (New), AG101.2.1 (New), AG101.2.2 (New)

Proponent: Rebecca C. Quinn, RC Quinn Consulting, Inc., representing the US Department of Homeland Security, Federal Emergency Management Agency

Add new text as follows:

<u>**AG101.2 Pools in flood hazard areas.** Pools that are located in flood hazard areas established by Table R301.2(1), including above-ground pools, on-ground pools, and in-ground pools that involve placement of fill, shall comply with Sections AG101.2.1 or AG101.2.2.</u>

> <u>**Exception:** Pools located in riverine flood hazard areas which are outside of designated floodways.</u>

<u>**AG101.2.1 Pools located in designated floodways.** Where pools are located in designated floodways, documentation shall be submitted to the building official, which demonstrates that the construction of the pool will not increase the design flood elevation at any point within the jurisdiction.</u>

<u>**AG101.2.2 Pools located where floodways have not been designated.** Where pools are located where design flood elevations are specified but floodways have not been designated, documentation shall be submitted to the building official, which demonstrates that the cumulative effect of the proposed pool, when combined with all other existing and anticipated flood hazard area encroachment, will not increase the design flood elevation more than 1 foot (305 mm) at any point within the jurisdiction.</u>

Reason: The purpose of this code change proposal is to address installation of swimming pools in or on the lot of a one- or two-family dwelling if the location of the proposed swimming pool is in the floodway of a flood hazard area, regardless of whether the floodway has been designated. Floodways are portions of riverine floodplains where encroachments, such as above-ground and on-ground pools or fill that may be placed around pools, may block the flow of floodwater and increase flood levels and flood risks on adjacent properties. Similar language regarding floodway encroachments is found at R324.1.3.2. This code change does not alter the scope of Appendix G.

Cost Impact: The code change proposal will not increase the cost of construction (more than 20,000 local jurisdictions already participate in the NFIP).

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

RB222–07/08
AG103.3 (New), AG108.1 (New)

Proponent: Rebecca C. Quinn, RC Quinn Consulting, Inc., representing the US Department of Homeland Security, Federal Emergency Management Agency

Add new text as follows:

<u>**AG103.3 Pools in flood hazard areas.** In flood hazard areas established by Table R301.2(1), pools in coastal high hazard areas shall be designed and constructed in conformance with ASCE 24.</u>

Add standard to Section AG108 as follows:

<u>**ASCE**</u>

<u>24-05</u> <u>Flood Resistant Design and Construction</u>

Reason: The purpose of this code change proposal is to address installation of swimming pools in or on the lot of a one- or two-family dwelling if the location of the proposed swimming pool is in a coastal high hazard areas (V Zone). Coastal high hazard areas are areas where wave heights are predicted to exceed 3 feet during the base flood. Breaking waves impart dynamic loads on structures, including above-ground pools and in-ground pools in soils that are subject to scour and erosion. ASCE 24 specifies that pools are to be designed to withstand flood-related loads and load combinations. If pools are structurally connected to buildings, the pools are to be designed to function as a continuation of the building (see R324.3.3). The regulations of the National Flood Insurance Program require that all development be designed and adequately anchored to prevent flotation, collapse, or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy (44 C.F.R. 60.3(a)(3)(i)). This code change does not alter the scope of Appendix G.

Cost Impact: The code change proposal will not increase the cost of construction (more than 20,000 local jurisdictions already participate in the NFIP).

Analysis: A review of the standard proposed for inclusion in the code, ASCE 24-05, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before January 15, 2008.

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

RB223–07/08
IRC AG 102; IBC 3109.2

Proponent: Mike Winkler, Holland Charter Township, MI

THESE PROPOSALS ARE ON THE AGENDA OF THE IRC BUILDING/ENERGY AND THE IBC GENERAL CODE DEVELOPMENT COMMITTEES AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IRC

Revise as follows:

SECTION AG102
DEFINITIONS

SWIMMING POOL~~S~~. Any structure intended for swimming, recreational bathing <u>or wading</u> that <u>is capable of</u> ~~contains~~ <u>containing</u> water over 24 inches (610 mm) deep. This includes in-ground, above-ground, ~~and~~ on-ground ~~swimming~~ pools; <u>portable pools;</u> hot tubs and spas<u>;</u> ~~and~~ <u>fixed-in-place wading pools and inflatable pools</u>.

Reason: The purpose of the proposed code change is to clarify the intent of the current language, to correct the punctuation and to create uniformity with the IRC. With the recent introduction of inflatable pools (usually blue) to the market place, a new hazard has emerged. According to the Consumer Product Safety Commission web site, the number of children dying in these types of pools is growing at an alarming rate.

The depth clarification was addressed by a formal ICC interpretation this past year and this code change simply puts that interpretation into the text of the code. Many homeowners would simply lower the water level of the pool to a depth just under 24 inches for the inspection and claim to be exempt.

The portable and inflatable language was added because many homeowners mistakenly believe that because these types of pools are exempt from the electrical code that they are also exempt from the building codes. For this reason, many inspectors are also hesitant to enforce the current pool safety barrier requirements because inflatable and portable pools are not specifically listed and/or are mistakenly thought to be unregulated due to their temporary nature.

Cost Impact: Because this is only a clarification, the code change proposal will not increase the cost of construction.

PART II – IBC GENERAL

Revise as follows:

3109.2 Definition. The following word and term shall, for the purposes of this section and as used elsewhere in this code, have the meaning shown herein.

SWIMMING POOL~~S~~. Any structure intended for swimming, recreational bathing or wading that <u>is capable of</u> ~~contains~~ <u>containing</u> water over 24 inches (610 mm) deep. This includes in-ground, above-ground, ~~and~~ on-ground pools; <u>portable pools;</u> hot tubs; spas and fixed-in-place wading pools <u>and inflatable pools.</u>

Reason: The purpose of the proposed code change is to clarify the intent of the current language, to correct the punctuation and to create uniformity with the IBC. With the recent introduction of inflatable pools (usually blue) to the market place, a new hazard has emerged. According to the Consumer Product Safety Commission web site, the number of children dying in these types of pools is growing at an alarming rate.

The depth clarification was addressed by a formal ICC interpretation this past year and this code change simply puts that interpretation into the text of the code. Many homeowners would simply lower the water level of the pool to a depth just under 24 inches for the inspection and claim to be exempt.

The portable and inflatable language was added because many homeowners mistakenly believe that because these types of pools are exempt from the electrical code that they are also exempt from the building codes. For this reason, many inspectors are also hesitant to enforce the current pool safety barrier requirements because inflatable and portable pools are not specifically listed and/or are mistakenly thought to be unregulated due to their temporary nature.

Wading pool language was added for consistency with the IBC definition of a swimming pool.

Cost Impact: Because this code change is only a clarification, the code change will not increase the cost of construction.

PART I – IRC

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

PART II – IBC GENERAL

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

RB224–07/08
AG105.2; IBC 3109.4.1.1, 3109.3

Proponent: Bruce Dodge, Building Official City of Grand Haven, MI, representing himself

THESE PROPOSALS ARE ON THE AGENDA OF THE IRC BUILDING/ENERGY AND THE IBC GENERAL CODE DEVELOPMENT COMMITTEES AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IRC

Revise as follows:

AG105.2 (Supp) Outdoor swimming pool. An outdoor swimming pool, including an in-ground, above-ground or on-ground pool, hot tub or spa shall be surrounded by a barrier which shall comply with the following:

1. The top of the barrier shall be at least 48 inches (1219 mm) above grade measured on the side of the barrier which faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches (51 mm) measured on the side of the barrier which faces away from the swimming pool. Where the top of the pool structure is above grade, such as an above-ground pool, the barrier may be at ground level, such as the pool structure, or mounted on top of the pool structure. Where the barrier is mounted on top of the pool structure, the maximum vertical clearance between the top of the pool structure and the bottom of the barrier shall be 4 inches (102 mm).
2. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere. <u>Where balusters or individual components are used to create the barrier, the individual components shall not allow the passage of a 4 inch (102 mm) sphere except when a force greater than 50 pounds (0.22 kN) is applied to the sphere in any direction</u>.
3. Solid barriers which do not have openings, such as a masonry or stone wall, shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.
4. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed 1 3/4 inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1 3/4 inches (44 mm) in width.
5. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall not exceed 4 inches (102 mm). Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1 3/4 inches (44 mm) in width.
6. Maximum mesh size for chain link fences shall be a 2 1/4-inch (57 mm) square unless the fence has slats fastened at the top or the bottom which reduce the openings to not more than 1 3/4 inches (44 mm).
7. Where the barrier is composed of diagonal members, such as a lattice fence, the maximum opening formed by the diagonal members shall not be more than 1 3/4 inches (44 mm).
8. Access gates shall comply with the requirements of Section AG105.2, Items 1 through 7, and shall be equipped to accommodate a locking device. Pedestrian access gates shall open outward away from the pool and shall be self-closing and have a self-latching device. Gates other than pedestrian access gates shall have a self-latching device. Where the release mechanism of the self-latching device is located less than 54 inches (1372 mm) from the bottom of the gate, the release mechanism and openings shall comply with the following:

8.1. The release mechanism shall be located on the pool side of the gate at least 3 inches (76 mm) below the top of the gate; and

8.2. The gate and barrier shall have no opening larger than 1/2 inch (12.7 mm) within 18 inches (457 mm) of the release mechanism.

9. Where a wall of a dwelling serves as part of the barrier, one of the following conditions shall be met:

9.1. The pool shall be equipped with a powered safety cover in compliance with ASTM F 1346; or

9.2. Doors with direct access to the pool through that wall shall be equipped with an alarm which produces an audible warning when the door and/or its screen, if present, are opened. The alarm shall be listed and labeled in accordance with UL 2017. The deactivation switch(es) shall be located at least 54 inches (1372 mm) above the threshold of the door; or

9.3. Other means of protection, such as self-closing doors with self-latching devices, which are approved by the governing body, shall be acceptable so long as the degree of protection afforded is not less than the protection afforded by Item 9.1 or 9.2 described above.

10. Where an above-ground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps:

10.1. The ladder or steps shall be capable of being secured, locked or removed to prevent access; or

10.2. The ladder or steps shall be surrounded by a barrier which meets the requirements of Section AG105.2, Items 1 through 9. When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4-inch-diameter (102 mm) sphere.

PART II – IBC GENERAL

Revise as follows:

3109.3 Public swimming pools. Public swimming pools shall be completely enclosed by a fence at least 4 feet (1290mm) in height or a screen enclosure. Openings in the fence shall not permit the passage of a 4-inch diameter (102 mm) sphere. <u>Where balusters or individual components are used to create the barrier, the individual components shall not allow the passage of a 4 inch (102 mm) sphere except when a force greater than 50 pounds (0.22 kN) is applied to the sphere in any direction</u>. The fence or screen enclosure shall be equipped with self-closing and self-latching gates.

3109.4.1.1 Openings. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere. <u>Where balusters or individual components are used to create the barrier, the individual components shall not allow the passage of a 4 inch (102 mm) sphere except when a force greater than 50 pounds (0.22 kN) is applied to the sphere in any direction</u>.

Reason: (PART I and PART II) With fencing being made of plastic which can be very strong in one direction and weak in the other I have found some fencings that can be spread with little effort allowing a four inch sphere or larger to go through with little or no effort. I do not find any requirements for testing or the strength of components of fences. Section 1607.7.1.2 for guardrails require the12 inch square horizontal test showing that the components will withstand the side pressure of 50 pounds.

What good is a fence if children can squeezes through? Therefore, I'm proposing a change to require that the fences / components of the fence be test to show that it will take a minimum of 50 pound pressure to spread them apart to allow a 4 inch sphere to pass through. An inspector, manufacture, or contractor can do a test very easily by getting a 4-inch sphere and a fish scale and pulling the 4 inch sphere through the railing when an inspector thinks that it will not meet the 50 pound test.

I have inspected fences where a 4-inch sphere will come through the balusters with less than 10 pounds of pressure. Next time you see a plastic fence try putting your knee thought the fences and see how much pressure it takes. Some I have tried are very strong but others will allow it with very little pressure. I had one where you could separate them and have a 6-inch opening. The manufacture had to get aluminum extruded to fit the interior of the plastic baluster and installed in each vertical baluster in order to get so the balusters would not flex to allow a 4-inch sphere to go through.

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

PART I - IRC

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

PART II - IBC

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

RB225–07/08
IRC AG105.2; IBC 3102.4.1.1

Proponent: Mike Winkler, Holland Charter Township, MI

THESE PROPOSALS ARE ON THE AGENDA OF THE IRC BUILDING/ENERGY AND THE IBC GENERAL CODE DEVELOPMENT COMMITTEES AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IRC

Revise as follows:

AG105.2 Outdoor swimming pool. An outdoor swimming pool, including an in-ground, above-ground or on-ground pool, hot tub or spa shall be surrounded by a barrier which shall comply with the following:

1. The top of the barrier shall be at least 48 inches (1219 mm) above grade measured on the side of the barrier which faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches (51 mm) measured on the side of the barrier which faces away from the swimming pool. Where the top of the pool structure is above grade, such as an above-ground pool, the barrier may be at ground level, such as the pool structure, or mounted on top of the pool structure. Where the barrier is mounted on top of the pool structure, the maximum vertical clearance between the top of the pool structure and the bottom of the barrier shall be 4 inches (102 mm).
2. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere. <u>The barrier shall not be readily climbable due to slope; indentations or protrusions; texture; construction detail, or any other means. Pool equipment and accessories, such as pumps, filters, storage bins shall be located far enough away from the barrier so as not to act as steps.</u>
3. Solid barriers which do not have openings, such as a masonry or stone wall, shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.
4. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed 13/4 inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 13/4 inches (44 mm) in width.
5. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall not exceed 4 inches (102 mm). Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 13/4 inches (44 mm) in width.
6. Maximum mesh size for chain link fences shall be a 21/4-inch (57 mm) square unless the fence has slats fastened at the top or the bottom which reduce the openings to not more than 13/4 inches (44 mm).
7. Where the barrier is composed of diagonal members, such as a lattice fence, the maximum opening formed by the diagonal members shall not be more than 13/4 inches (44 mm).
8. Access gates shall comply with the requirements of Section AG105.2, Items 1 through 7, and shall be equipped to accommodate a locking device. Pedestrian access gates shall open outward away from the pool and shall beself-closing and have a self-latching device. Gates other than pedestrian access gates shall have a self-latching device. Where the release mechanism of the self-latching device is located less than 54 inches (1372 mm) from the bottom of the gate, the release mechanism and openings shall comply with the following:
   - 8.1. The release mechanism shall be located on the pool side of the gate at least 3 inches (76 mm) below the top of the gate; and
   - 8.2. The gate and barrier shall have no opening larger than 1/2 inch (13 mm) within 18 inches (457 mm) of the release mechanism.
9. Where a wall of a dwelling serves as part of the barrier, one of the following conditions shall be met:
   - 9.1. The pool shall be equipped with a powered safety cover in compliance with ASTM F 1346; or
   - 9.2. Doors with direct access to the pool through that wall shall be equipped with an alarm which produces an audible warning when the door and/or its screen, if present, are opened. The alarm shall be listed in accordance with UL 2017. The audible alarm shall activate within 7 seconds and sound continuously for a minimum of 30 seconds after the door and/or its screen, if present, are opened and be capable of being heard throughout the house during normal household activities. The alarm shall automatically reset under all conditions. The alarm system shall be equipped with a manual means, such as touch pad or switch, to temporarily deactivate the alarm for a single opening. Deactivation shall last for not more than 15 seconds. The deactivation switch(es) shall be located at least 54 inches (1372 mm) above the threshold of the door; or

9.3. Other means of protection, such as self-closing doors with self-latching devices, which are approved by the governing body, shall be acceptable so long as the degree of protection afforded is not less than the protection afforded by Item 9.1 or 9.2 described above.

10. Where an above-ground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps:
    10.1. The ladder or steps shall be capable of being secured, locked or removed to prevent access; or
    10.2. The ladder or steps shall be surrounded by a barrier which meets the requirements of Section AG105.2, Items 1 through 9. When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4-inch-diameter (102 mm) sphere.

Reason: The purpose of this code change is to clarify the intent of pool barrier requirements to include language that would address common elements that defeat the safety barriers. While this is primarily an IRC issue, it should be added to the IBC for consistency and for those residential projects that may need to deal with this issue.

With the introduction of inflatable pools, a new issue has emerged. These pools allow for easy climbing by young children, as demonstrated in the video on the Consumer Product Safety Commission web site, due to the soft texture and sloped sides. Owners of these pools claim that the 4 foot high sides of these climbable pools meet the barrier requirements of the code. While common sense dictates that having a climbable barrier does not meet the intent of the code, the code does not currently contain language to that effect, which is leading to enforcement difficulties in the field. According to the Consumer Product Safety Commission web site, the death toll from these pools is rising at an alarming rate.

Some of the fabric sided above ground pools have pockets for the support bars that offer a ladder effect into the pool, effectively eliminating the effectiveness of the safety that the sides of the pool would otherwise provide. Metal sided above ground pools often have angled braces to support the pool side walls that small children can easily climb. Pool filters, pumps and other ancillary pool accessories are often placed next to the above ground pool and act as easy steps into the pool. None of these issues are addressed in the current code language.

Because this code change is only a clarification, the code change will not increase the cost of construction.

Cost Impact: Because this code change is only a clarification, the code change will not increase the cost of construction.

PART II – IBC GENERAL

Revise as follows:

3109.4.1.1 Openings. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere. <u>The barrier shall not be readily climbable due to slope; indentations or protrusions; texture; construction detail, or any other means. Pool equipment and accessories, such as pumps, filters, storage bins shall be located far enough away from the barrier so as not to act as steps.</u>

Reason (Part I): This code change recognizes the promulgation of APSP-7 (2006) “American National Standard For Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins”. This standard is basically a construction standard but it does not require the same entrapment protection as that provided for in the existing IBC Code requirements. Thus, the Pool Safety Consortium has maintained the Section requiring atmospheric vacuum relief systems.

The APSP’s Suction Entrapment Avoidance Standard is based upon the following premises:

> 4.3“*There is no backup for a missing or damaged suction outlet cover/grate. If any cover/grate is found to be damaged or missing, the pool or spa shall be immediately closed to bathers.”*
>
> *5.1“ General, Methods to avoid entrapment in circulation systems, swim jet systems, alternative suction systems, and debris removal systems are shown in 5.2 through 5.10.*

APSP’s long held position is that Dual outlets (Sec. 5.3) is the only necessary entrapment avoidance method and back up systems such as Safety Vacuum Release Systems are not needed and an unnecessary added expense to the cost of a pool or spa. Notice for Sec. 5.1 above there is no back-up (additional layer of protection) for when unforeseen blockage occurs or especially contractor error, Contractor error has been documented in past and recent entrapment investigations by the US-CPSC.

This formula for safety presumes that a child or a responsible party understands the clear and present danger of a missing or damaged cover or grate, and is informed enough to know that the pool or spa should immediately be closed to bathers. This safety prescription is short sighted, and does not protect the child or parent from their own lack of understanding as to the degree of danger this condition represents.

Many entrapment accidents happen when the child themselves remove the drain cover. In a recent evisceration case in Minneapolis, Minn., the drain cover was reported to be floating next to the child’s body.

The safety standards now promulgated under the IBC and IRC recognize the need for a safety formula that requires an additional degree of protection to guard against the possibility of body or limb entrapment on a single functioning suction outlet with a missing or broken suction outlet cover.

APSP’s guidelines for dual suction outlets as detailed in Section 5 of the Standard are not descriptive enough to provide direction to the Industry or the Code Officials as to how to construct a safe dual drain system.

When two suction outlets are flowing, and one is blocked by a bather, there is a resultant hold down force on the bather proportional to the exposed area of the suction outlet blocked, and proportional to the dynamic pressure drop in the branch piping.

The Standard does require a 3 ft/sec velocity limit in branch suction piping between suction outlets (see 4.4 Water velocity). This limit further restricts branch suction piping velocity to 8 ft/sec when one suction outlet is blocked. While the dynamic pressure drop in the branch piping is proportional to the square of the velocity in the pipe, it is also affected by entrance losses through outlet covers and grates, as well as separation distances and piping configurations.

Thorough testing for one of the ASTM 15.51 Sub-Committees has shown that the 3ft/sec can not be accomplished when 2” PVC piping is used in the interconnecting piping (see figure 1- Pipe Velocity of section 4.4). How is a building inspector to know what the velocity is before OR after the pool/spa is built?

Figure 4 of this section states “*minimum distance 3 feet apart*”. Testing shows that there is a definite increase in hold down force the further apart the suction outlets are placed.

The Standard does not provide the Industry or the Code Officials with the necessary criteria in terms of suction outlet covers, piping configurations and allowable fittings, and maximum allowable suction outlet separation distances. Lacking this information, the Standard does not adequately protect the bathing public from the risk of entrapment due to dynamic hold-down forces on dual suction outlets.

APSP's guidelines for Engineered Vent Systems detailed in Section 7.2 of the Standard are not descriptive enough to provide direction to the Industry or the Code Officials as to how to construct a safe vent line system.

So called "Engineered" vent line systems have been used in Florida for the past five years, with no consideration given to static differential forces, and the hold-down force that results when a bather blocks a single functioning suction outlet. The Standard lacks descriptive information regarding the requirement for hydrostatically balanced vent line designs, to mitigate the affect of static differential hold-down forces.

In April of 2004, Mr. Art Kamm, P.E. wrote a letter to the Florida Building Commission's Plumbing Technical Advisory Committee, detailing the resulting affect caused by static differentials in improperly designed vent lines. The hold-down force created by an evacuated deep vent line in a 6 foot deep pool, can exceed 100 lbs on a single operating open suction outlet sump. This force is excessive and dangerous.

The Standard does not provide the Industry or the Code Officials with the necessary criteria in terms of hydraulically balanced vent line design. Lacking this information, the Standard does not adequately protect the bathing public from the risk of entrapment due to static differential hold-down forces on a single functioning suction outlet.

APSP-7 allows alternative methods to be determined by the "*authority having jurisdiction*". This loophole was used in Florida to allow the use of the Hayward "Drain Flapper" as a substitute for the SVRS for years before the Florida Building Commission found it to unsafe and reversed the position allowing it's use as a final layer of protection.

These arguments and others were presented to the IBC and the IRC when APSP attempted to remove the requirement for atmospheric vacuum relief systems. To date, the ICC has appropriately rejected these arguments during the last two code cycles.

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

Analysis: A review of the standard proposed for inclusion in the code, APSP-7 (2006), for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before January 15, 2008.

Reason (Part II): The purpose of this code change is to clarify the intent of pool barrier requirements to include language that would address common elements that defeat the safety barriers. While this is primarily an IRC issue, it should be added to the IBC for consistency and for those residential projects that may need to deal with this issue.

With the introduction of inflatable pools, a new issue has emerged. These pools allow for easy climbing by young children, as demonstrated in the video on the Consumer Product Safety Commission web site, due to the soft texture and sloped sides. Owners of these pools claim that the 4 foot high sides of these climbable pools meet the barrier requirements of the code. While common sense dictates that having a climbable barrier does not meet the intent of the code, the code does not currently contain language to that effect, which is leading to enforcement difficulties in the field. According to the Consumer Product Safety Commission web site, the death toll from these pools is rising at an alarming rate.

Some of the fabric sided above ground pools have pockets for the support bars that offer a ladder effect into the pool, effectively eliminating the effectiveness of the safety that the sides of the pool would otherwise provide. Metal sided above ground pools often have angled braces to support the pool side walls that small children can easily climb. Pool filters, pumps and other ancillary pool accessories are often placed next to the above ground pool and act as easy steps into the pool. None of these issues are addressed in the current code language.

Because this code change is only a clarification, the code change will not increase the cost of construction.

Cost Impact: Because this code change is only a clarification, the code change will not increase the cost of construction.

PART I – IRC

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

PART II – IBC GENERAL

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

RB226–07/08

AG106.1, AG106.2, AG108 (New); IBC 3109.5, 3109.5.1, Chapter 35 (New)

Proponent: Jesse J. Beitel, Hughes Associates, Inc., representing Pool Safety Consortium

THESE PROPOSALS ARE ON THE AGENDA OF THE IRC BUILDING/ENERGY AND THE IBC GENERAL CODE DEVELOPMENT COMMITTEES AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I - IRC

1. Revise as follows:

AG106.1 General. Suction outlets shall be designed and installed in accordance with APSP-7. ~~to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or multiple suction outlets, whether isolated by valves or otherwise, shall be protected against user entrapment.~~

~~**AG106.2 Suction fittings.** Pool and spa suction outlets shall have a cover that conforms to ANSI/ASME A 112.19.8M, or an 18 inch x 23 inch (457 mm by 584 mm) drain grate or larger, or an approved channel drain system.~~

~~**Exception:** Surface skimmers~~

(Renumber subsequent sections)

2. Add standard to Section AG108 as follows:

<u>APSP-7 (2006)</u> <u>American National Standard For Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins</u>

PART II – IBC GENERAL

1. Revise as follows:

3109.5 Entrapment avoidance. Suction outlets shall be designed<u> and installed in accordance with APSP-7.</u> ~~to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or other such multiple suction outlets whether isolated by valves or otherwise shall be protected against user entrapment~~

~~**3109.5.1 Suction fittings.** All pool and spa suction outlets shall be provided with a cover that conforms to ASME A112.19.8M, a 12-inch by 12-inch (305 mm by 305 mm) drain grate or larger, or an approved channel drain system.~~

~~**Exception:** Surface skimmers.~~

(Renumber subsequent sections)

2. Add standard to Chapter 35 as follows:

<u>APSP-7 (2006)</u> <u>American National Standard For Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins.</u>

Reason: This code change recognizes the promulgation of APSP-7 (2006) "American National Standard For Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins". This standard is basically a construction standard but it does not require the same entrapment protection as that provided for in the existing IBC Code requirements. Thus, the Pool Safety Consortium has maintained the Section requiring atmospheric vacuum relief systems.

The APSP's Suction Entrapment Avoidance Standard is based upon the following premises:

4.3 "*There is no backup for a missing or damaged suction outlet cover/grate. If any cover/grate is found to be damaged or missing, the pool or spa shall be immediately closed to bathers."*

5.1" General, Methods to avoid entrapment in circulation systems, swim jet systems, alternative suction systems, and debris removal systems are shown in 5.2 through 5.10.

APSP's long held position is that Dual outlets (Sec. 5.3) is the only necessary entrapment avoidance method and back up systems such as Safety Vacuum Release Systems are not needed and an unnecessary added expense to the cost of a pool or spa. Notice for Sec. 5.1 above there is no back-up (additional layer of protection) for when unforeseen blockage occurs or especially contractor error, Contractor error has been documented in past and recent entrapment investigations by the US-CPSC.

This formula for safety presumes that a child or a responsible party understands the clear and present danger of a missing or damaged cover or grate, and is informed enough to know that the pool or spa should immediately be closed to bathers. This safety prescription is short sighted, and does not protect the child or parent from their own lack of understanding as to the degree of danger this condition represents.

Many entrapment accidents happen when the child themselves remove the drain cover. In a recent evisceration case in Minneapolis, Minn., the drain cover was reported to be floating next to the child's body.

The safety standards now promulgated under the IBC and IRC recognize the need for a safety formula that requires an additional degree of protection to guard against the possibility of body or limb entrapment on a single functioning suction outlet with a missing or broken suction outlet cover.

APSP's guidelines for dual suction outlets as detailed in Section 5 of the Standard are not descriptive enough to provide direction to the Industry or the Code Officials as to how to construct a safe dual drain system.

When two suction outlets are flowing, and one is blocked by a bather, there is a resultant hold down force on the bather proportional to the exposed area of the suction outlet blocked, and proportional to the dynamic pressure drop in the branch piping.

The Standard does require a 3 ft/sec velocity limit in branch suction piping between suction outlets (see 4.4 Water velocity). This limit further restricts branch suction piping velocity to 8 ft/sec when one suction outlet is blocked. While the dynamic pressure drop in the branch piping is proportional to the square of the velocity in the pipe, it is also affected by entrance losses through outlet covers and grates, as well as separation distances and piping configurations.

Thorough testing for one of the ASTM 15.51 Sub-Committees has shown that the 3ft/sec can not be accomplished when 2" PVC piping is used in the interconnecting piping (see figure 1- Pipe Velocity of section 4.4). How is a building inspector to know what the velocity is before OR after the pool/spa is built?

Figure 4 of this section states "*minimum distance 3 feet apart*". Testing shows that there is a definite increase in hold down force the further apart the suction outlets are placed.

The Standard does not provide the Industry or the Code Officials with the necessary criteria in terms of suction outlet covers, piping configurations and allowable fittings, and maximum allowable suction outlet separation distances. Lacking this information, the Standard does not adequately protect the bathing public from the risk of entrapment due to dynamic hold-down forces on dual suction outlets.

APSP's guidelines for Engineered Vent Systems detailed in Section 7.2 of the Standard are not descriptive enough to provide direction to the Industry or the Code Officials as to how to construct a safe vent line system.

So called "Engineered" vent line systems have been used in Florida for the past five years, with no consideration given to static differential forces, and the hold-down force that results when a bather blocks a single functioning suction outlet. The Standard lacks descriptive information regarding the requirement for hydrostatically balanced vent line designs, to mitigate the affect of static differential hold-down forces.

In April of 2004, Mr. Art Kamm, P.E. wrote a letter to the Florida Building Commission's Plumbing Technical Advisory Committee, detailing the resulting affect caused by static differentials in improperly designed vent lines. The hold-down force created by an evacuated deep vent line in a 6 foot deep pool, can exceed 100 lbs on a single operating open suction outlet sump. This force is excessive and dangerous.

The Standard does not provide the Industry or the Code Officials with the necessary criteria in terms of hydraulically balanced vent line design. Lacking this information, the Standard does not adequately protect the bathing public from the risk of entrapment due to static differential hold-down forces on a single functioning suction outlet.

APSP-7 allows alternative methods to be determined by the "*authority having jurisdiction*". This loophole was used in Florida to allow the use of the Hayward "Drain Flapper" as a substitute for the SVRS for years before the Florida Building Commission found it to unsafe and reversed the position allowing it's use as a final layer of protection.

APSP-7 exempts pools at commercial water parks.

These arguments and others were presented to the IBC and the IRC when APSP attempted to remove the requirement for atmospheric vacuum relief systems. To date, the ICC has appropriately rejected these arguments during the last two code cycles.

Cost Impact: This code change will increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, APSP 7 (2006), for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before January 15, 2008.

PART I – IRC

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

PART II – IBC GENERAL

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

RB227–07/08

AG 106.1, AG106.2, AG106.3, AG106.4, AG106.4.1, AG106.4.2, AG106.4.3, AG106.4.4, AG106.4.5, AG106.5, AG106.6, AG 108; IBC 3109.5, 3109.5.1, 3109.5.2, 3109.5.3, 3109.5.4, Chapter 35

Proponent: Lorraine Ross, Intech Consulting, Inc., representing the Association of Pool and Spa Professionals

THESE PROPOSALS ARE ON THE AGENDA OF THE IRC BUILDING/ENERGY AND THE IBC GENERAL CODE DEVELOPMENT COMMITTEES AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IRC

1. Delete and substitute as follows:

AG106.1 ~~General.~~ ~~Suction outlets shall be designed to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or multiple suction outlets, whether isolated by valves or otherwise, shall be protected against user entrapment.~~

AG106.1 <u>Suction entrapment avoidance</u><u>. Pools, spas, hot tubs, catch basins and other similar bather accessible bodies of water associated with swimming pool construction shall be designed to produce circulation throughout the body of water and provide means to protect against user suction entrapment in accordance with ANSI/APSP 7.</u>

2. Delete without substitution:

~~**AG106.2 Suction fittings.** Pool and spa suction outlets shall have a cover that conforms to ANSI/ASME A112.19.8M, or an 18 inch×23 inch (457mmby 584 mm) drain grate or larger, or an approved channel drain system.~~

~~**Exception:** Surface skimmers~~

~~**AG106.3 Atmospheric vacuum relief system required.** Pool and spa single- or multiple-outlet circulation systems shall be equipped with atmospheric vacuum relief should grate covers located therein become missing or broken. This vacuum relief system shall include at least one approved or engineered method of the type specified herein, as follows:~~

1. ~~Safety vacuum release system conforming to ASME A112.19.17; or~~
2. ~~An approved gravity drainage system.~~

~~**AG106.4 Dual drain separation.** Single or multiple pump circulation systems shall be provided with a minimum of two suction outlets of the approved type. A minimum horizontal or vertical distance of 3 feet (914 mm) shall separate the outlets. These suction outlets shall be piped so that water is drawn through them simultaneously through a vacuum-relief-protected line to the pump or pumps.~~

~~**AG106.5 Pool cleaner fittings.** Where provided, vacuum or pressure cleaner fitting(s) shall be located in an accessible position(s) at least 6 inches (152 mm) and not more than 12 inches (305 mm) below the minimum operational water level or as an attachment to the skimmer(s).~~

3. Add standard in Section AG108 as follows:

<u>ANSI/APSP-7-06</u> <u>Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins</u>

Reason: This proposal adds a new standard, ANSI/APSP 7 Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins into IRC Section AG 106. It also deletes Sections AG 106.2 through AG 106.6 because all of these requirements have been incorporated into ANSI/APSP 7.

The current code language was an early response to body entrapment only. New information and technology has contributed to this new ANSI/APSP consensus standard and addresses all forms of entrapment, including the underlying causes of entrapment.

Although rare, entrapment of bathers at suction outlets in pools and spas has gained considerable attention over the last decade, resulting in voluntary standards, building codes, and proposed national legislation to prevent these tragic accidents.

A survey of the Epidemiological Reports on Suction Entrapment collected by the U.S. Consumer Product Safety Commission by the Association of Pool and Spa Professionals (APSP) Technical Committee yielded 5 distinct modes of Entrapment:

Entrapment Type	Percentage of Incidents
Hair Entrapment - Hair becomes knotted or snagged in an outlet cover	**33%**
Limb Entrapment – A limb sucked or inserted into an opening of a circulation outlet with a broken or missing cover resulting in a mechanical bind or swelling .	**28%**
Body Entrapment – Suction applied to a large portion of the body or limbs resulting in an entrapment	**33%**
Evisceration/Disembowelment – suction applied directly to the intestines by a circulation outlet with a broken or missing cover.	**3%**
Mechanical Entrapment - Potential for jewelry, swimsuit, hair decorations, finger, toe, or knuckle to be mechanically caught in an opening of a suction outlet or cover.	**Included in limb**

Early actions to address entrapment were aimed at *body* entrapment by attempting to control the suction pressure at the drain itself. Unfortunately, these devices do not protect against the major forms of entrapment: hair or evisceration. **Additionally**, ***if the pool circulation pump is off - meaning no suction at the outlet - a child can still get a limb trapped if there is a broken or missing cover***.

Suction is only one factor to control in entrapment avoidance.

In order to address avoidance of all forms of entrapment, a comprehensive study of the causes of all types of entrapment was undertaken. It is now known that there are three basic underlying physical phenomena that govern all 5 modes of entrapment:

- Suction (or delta pressure)
- Water flow rate through the outlet or cover
- Mechanical binding

The Technical Committee of the Association of Pool and Spa Professionals (APSP) examined various means to prevent these types of entrapments recognizing the diverse nature of pool construction. Using this knowledge, a new national consensus standard was developed in accordance with the American National Standards Institute (ANSI) process. ANSI/APSP 7 *Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot tubs, and Catch Basins (ANSI/APSP 7)* is based upon sound engineering principles, research, and field experience, that, when applied properly, provides the most comprehensive approach to protect bathers against all modes of entrapment. The ANSI standard approval process itself ensured that a wide variety of stakeholders were involved in the development of this standard, including building code officials, governmental health and pool industry experts.

The ANSI/APSP 7 standard applies to both commercial and residential pools, for flow rates from a few gallons per minute to thousands of gallons per minute. Although it includes the use of devices or systems that prevent suction, it also expands the lists of options for the pool contractor, while maintaining necessary protective principles.

ANSI/APSP-7 contains design performance criteria including components, devices and related technology installed to protect against entrapment. Analysis of past entrapments along with extensive testing shows:

●An outlet cover that complies with ASME/ANSI A112.19.8 will protect against limb, evisceration and mechanical entrapment

If the cover is missing or broken, there is no single device or system that can protect against entrapment. ***For example, if the pool circulation pump is off - meaning no suction at the outlet - a child can still get a limb mechanically trapped,***

Therefore, ANSI/APSP 7 contains a warning to shut down the pool.

Unlike suction release devices that must be tested monthly, a pool owner can easily see of the cover is broken or missing. Having a SVRS with a missing or broken cover does not protect against limb, hair or mechanical entrapment and may give a pool owner a false sense of security regarding entrapment prevention.

●The maximum water flow rate in ANSI/APSP-7 is based on 6 fps and when combined with the required outlet cover provides protection against hair, limb, evisceration and mechanical entrapment.

Testing shows that water flow has a significant impact on entrapment avoidance.

●When used with a proper outlet cover and maximum water flow rate, options to address body entrapment in ANSI/APSP-7 include:
- -Dual Outlets at least 36” apart, measured center to center
- -Three or more outlets
- -Single Unblockable
- -Swim Jet
- -Alternative Suction System
- -Gravity Flow Systems
- -Outlet pumps in Series plus
  - ▪SVRS, or
  - ▪Vent, or
  - ▪Additional Suction

The ability of dual drains to prevent body entrapment was recently demonstrated by a series of tests conducted by the APSP Technical Committee. Results showed that even with one drain blocked and a missing cover on the other, the low water flow rate mandated by ANSI/APSP -7 prevented the necessary suction to hold down the 15 lb buoyant block used as a “pass” criteria when testing SVRS.

This test series illustrates the importance of water flow at the outlet when developing entrapment avoidance measures.

ANSI/APSP-7 utilizes the most comprehensive approach to outlet entrapment because it considers all underlying causes: suction, water flow and mechanical – while recognizing the diverse nature of pool and spa design. It covers all 5 forms of entrapment.

Tests conducted on dual outlets configured as described in ANSI/APSP-7 demonstrate:

●The size of the outlets and piping do have an effect on safe installation
●Water velocity of 6 fps (ANSI/APSP-7 maximum) *passed* an analogous ASME/ASTM SVRS test protocol,
●The combination of maximum water flow rates and dual outlets prevent body entrapment (with no SVRS), even if one outlet is blocked.
●Dual outlets, when installed according to ANSI/APSP-7, pass the same test criteria as the SVRS in both ASME/ANSI A112.19.17-2002 and ASTM F2387-2003, reacting faster than the 3 seconds response time and work properly in combination with skimmers.

Using submerged piping as is found in pools and spas, tests conducted on SVRS systems and both the ASME/ASTM SVRS standards demonstrate:

●Not all SVRS tested to the ASME/ASTM SVRS Standards will reliably "trip" when combined with dual outlets and/or skimmers – Those that fail seem to interpret residual flow from the second outlet as a priming pump.
●Not all SVRS tested to the ASME/SVRS Standards “trip" with partial outlet blockage.
●Water dynamics, in particular water hammer can facilitate release. Once the block is forced off the cover by these spikes in pressure, it floats to the surface. Neutrally buoyant blocks have been documented to “hammer” on and off open pipes for several seconds.
●Water dynamics continue for several seconds. The longest on an SVRS test lasted 2.72 seconds, which may call into question the 3 second limit.

Tests conducted on a U-Tube Vent on a single 18 x 18 suction outlet demonstrates:

●A single 18 x 18 drain grate can be successfully vented operating at 420 gpm with a 1 inch PVC vent pipe.
●Release is very fast – shortest release was 2.5 seconds
●While it was difficult to completely block the drain using a Human test subject, it was possible to do so sufficiently to trip the vent. The actual suction sensation of this experience was far less than what is experienced when an 8 inch sump is blocked.

ANSI/APSP -7 is the appropriate national consensus standard that is recommended for adoption in building codes. It has taken into account the initial steps taken in the building codes for specific devices and has expanded entrapment protection to include all 5 forms of entrapment by controlling all 3 underlying entrapment causes. In short, pool and spas designed and installed in accordance with ANSI/APSP – 7 are safer that those that rely upon a single device alone.

The technical committee of APSP is committed to continuing the effort to seek new understanding and knowledge regarding entrapment avoidance. Education of building code officials, legislators, pool designers and contractors and pool owners will always be a major activity of the APSP.

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

PART II – IBC GENERAL

1. Delete and substitute as follows:

~~**3109.5 Entrapment avoidance.** Suction outlets shall be designed to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or other such multiple suction outlets whether isolated by valves or otherwise shall be protected against user entrapment.~~

<u>**3109.5 Suction entrapment avoidance.** Pools, spas, hot tubs, catch basins and other similar bather accessible bodies of water associated with swimming pool construction shall be designed to produce circulation throughout the body of water and provide means to protect against user suction entrapment in accordance with ANSI/APSP 7.</u>

2. Delete without substitution:

~~**3109.5.1 Suction fittings.** All pool and spa suction outlets shall be provided with a cover that conforms to ASME A112.19.8M, a 12-inch by 12-inch (305 mm by 305 mm) drain grate or larger, or an approved channel drain system.~~

~~**Exception:** Surface skimmers.~~

~~**3109.5.2 Atmospheric vacuum relief system required.** All pool and spa single- or multiple-outlet circulation systems shall be equipped with an atmospheric vacuum relief approved or engineered method of the type specified herein, as follows:~~

1. ~~Safety vacuum release systems conforming to ASME A112.19.17; or~~
2. ~~Approved gravity drainage system.~~

~~**3109.5.3 Dual drain separation.** Single- or multiple-pump circulation systems shall be provided with a minimum of two suction outlets of the approved type. A minimum horizontal or vertical distance of 3 feet (914 mm) shall separate such outlets. These suction outlets shall be piped so that water is drawn through them simultaneously through a vacuum- relief-protected line to the pump or pumps.~~

~~**3109.5.4 Pool cleaner fittings.** Where provided, vacuum or pressure cleaner fitting(s) shall be located in an accessible position(s) at least 6 inches (152 mm) and not greater than 12 inches (305 mm) below the minimum operational water level or as an attachment to the skimmer(s).~~

3. Add standard to Chapter 35 as follows:

<u>ANSI/APSP-7-06</u> <u>Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins</u>

Reason: This proposal adds a new standard, ANSI/APSP 7 Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins into IBC Section 3109.5. It also deletes Sections 3109.5.1 through 3109.5.5 because all of these requirements have been incorporated into ANSI/APSP 7.

The current code language was an early response to body entrapment only. New information and technology has contributed to this new ANSI/APSP consensus standard and addresses all forms of entrapment, including the underlying causes of entrapment.

Although rare, entrapment of bathers at suction outlets in pools and spas has gained considerable attention over the last decade, resulting in voluntary standards, building codes, and proposed national legislation to prevent these tragic accidents.

A survey of the Epidemiological Reports on Suction Entrapment collected by the U.S. Consumer Product Safety Commission by the Association of Pool and Spa Professionals (APSP) Technical Committee yielded 5 distinct modes of Entrapment:

Entrapment Type	**Percentage of Incidents**
Hair Entrapment - Hair becomes knotted or snagged in an outlet cover	**33%**
Limb Entrapment – A limb sucked or inserted into an opening of a circulation outlet with a broken or missing cover resulting in a mechanical bind or swelling .	**28%**
Body Entrapment – Suction applied to a large portion of the body or limbs resulting in an entrapment	**33%**
Evisceration/Disembowelment – suction applied directly to the intestines by a circulation outlet with a broken or missing cover.	**3%**
Mechanical Entrapment - Potential for jewelry, swimsuit, hair decorations, finger, toe, or knuckle to be mechanically caught in an opening of a suction outlet or cover.	**Included in limb**

Early actions to address entrapment were aimed at *body* entrapment by attempting to control the suction pressure at the drain itself. Unfortunately, these devices do not protect against the major forms of entrapment: hair or evisceration. **Additionally**, ***if the pool circulation pump is off - meaning no suction at the outlet - a child can still get a limb trapped if there is a broken or missing cover***.

Suction is only one factor to control in entrapment avoidance.

In order to address avoidance of all forms of entrapment, a comprehensive study of the causes of all types of entrapment was undertaken. It is now known that there are three basic underlying physical phenomena that govern all 5 modes of entrapment:

●Suction (or delta pressure)
●Water flow rate through the outlet or cover
●Mechanical binding

The Technical Committee of the Association of Pool and Spa Professionals (APSP) examined various means to prevent these types of entrapments recognizing the diverse nature of pool construction. Using this knowledge, a new national consensus standard was developed in accordance with the American National Standards Institute (ANSI) process. ANSI/APSP 7 *Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot tubs, and Catch Basins (ANSI/APSP 7)* is based upon sound engineering principles, research, and field experience, that, when applied properly, provides the most comprehensive approach to protect bathers against all modes of entrapment. The ANSI standard approval process itself ensured that a wide variety of stakeholders were involved in the development of this standard, including building code officials, governmental health and pool industry experts.

The ANSI/APSP 7 standard applies to both commercial and residential pools, for flow rates from a few gallons per minute to thousands of gallons per minute. Although it includes the use of devices or systems that prevent suction, it also expands the lists of options for the pool contractor, while maintaining necessary protective principles.

ANSI/APSP-7 contains design performance criteria including components, devices and related technology installed to protect against entrapment. Analysis of past entrapments along with extensive testing shows:

●An outlet cover that complies with ASME/ANSI A112.19.8 will protect against limb, evisceration and mechanical entrapment

If the cover is missing or broken, there is no single device or system that can protect against entrapment. ***For example, if the pool circulation pump is off - meaning no suction at the outlet - a child can still get a limb mechanically trapped,***

Therefore, ANSI/APSP 7 contains a warning to shut down the pool.

Unlike suction release devices that must be tested monthly, a pool owner can easily see of the cover is broken or missing. Having a SVRS with a missing or broken cover does not protect against limb, hair or mechanical entrapment and may give a pool owner a false sense of security regarding entrapment prevention.

●The maximum water flow rate in ANSI/APSP-7 is based on 6 fps and when combined with the required outlet cover provides protection against hair, limb, evisceration and mechanical entrapment.

Testing shows that water flow has a significant impact on entrapment avoidance.

●When used with a proper outlet cover and maximum water flow rate, options to address body entrapment in ANSI/APSP-7 include:

▪Dual Outlets at least 36” apart, measured center to center
▪Three or more outlets
▪Single Unblockable
▪Swim Jet
▪Alternative Suction System
▪Gravity Flow Systems
▪Outlet pumps in Series plus
  -SVRS, or
  -Vent, or
  -Additional Suction

The ability of dual drains to prevent body entrapment was recently demonstrated by a series of tests conducted by the APSP Technical Committee. Results showed that even with one drain blocked and a missing cover on the other, the low water flow rate mandated by ANSI/APSP -7 prevented the necessary suction to hold down the 15 lb buoyant block used as a “pass” criteria when testing SVRS.

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The technical committee of APSP is committed to continuing the effort to seek new understanding and knowledge regarding entrapment avoidance. Education of building code officials, legislators, pool designers and contractors and pool owners will always be a major activity of the APSP.

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

PART I – IRC

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

PART II – IBC GENERAL

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

RB228–07/08
AJ102.5

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

Revise as follows:

AJ102.5 Flood hazard areas. Work performed in existing buildings located in a flood hazard area as established by Table R301.2(1) shall be subject to the provisions of <u>Section R301.2.4 below the design flood elevation and</u> Section R105.3.1.1.

Reason: The proposed code change is to clarify that in addition to Section R105.3.1.1, requirements for floodway and other requirements covered by Section R301.2.4 must be also consistent with the *International Residential Code* as indicated by AJ101.1.

Cost Impact: The code change proposal will not increase the cost of construction given the fact that the code already requires it.

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

RB229–07/08
(All sections New) Appendix R, AR101, AR101.1, AR102, AR102.1, AR103, AR103.1

Proponent: Mike Moore, Newport Partners LLC, representing Dietrich Industries, Inc.

Add new text as follows:

<u>**APPENDIX R**</u>
<u>**PROTECTION FROM FORMOSAN TERMITES**</u>

<u>**SECTION AR101**</u>
<u>**SCOPE**</u>

<u>**AR 101.1 General.** This appendix contains requirements for new construction in jurisdictions where Formosan termites are a threat to the durability of buildings. Inclusion of this appendix shall be determined by the local jurisdiction.</u>

SECTION AR 102
DEFINITIONS

AR 102.1 General. For the purpose of these requirements, the terms used shall be defined as follows:

FORMOSAN TERMITE. A subterranean termite species with the scientific name of *Coptotermes formosanus.*

SECTION AR 103
REQUIREMENTS

AR 103.1 Locations required. Protection from Formosan subterranean termites shall be provided in the following locations by the use of termite resistant materials.

1. First floor framing supported on a crawlspace or pier foundation including sub-floor sheathing, beams, joists, girders, plates, and columns or other supporting elements.
2. Exterior wall framing including framing members and exterior sheathing, and interior wall framing members in direct contact with a slab on ground. Gypsum board and other interior finish materials shall not be required to be of termite resistant materials.
3. Floors in contact with the ground and all foundation walls and footings.
4. Roof trusses, rafters, and other roof framing members; ceiling framing members on the top story of buildings, and roof sheathing. Gypsum board on ceilings shall not be required to be termite resistant.

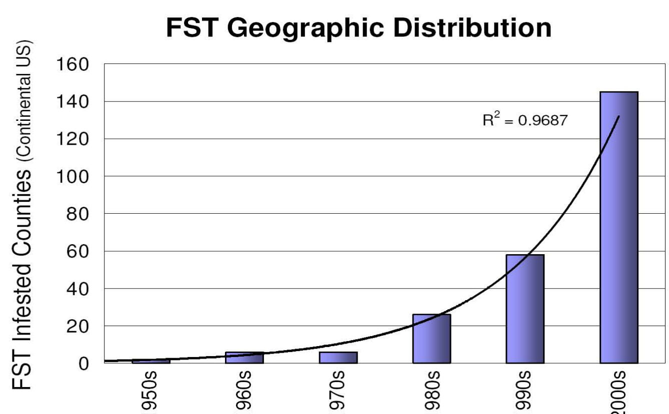
Reason: The purpose of this proposed code change is to add an appendix that can be adopted by jurisdictions and thus provide code text to builders, designers, and code officials who are faced with a growing threat from the Formosan termite. Since 2000, counties with known infestations of the FST have increased by 150%, so many new jurisdictions are now susceptible to the problem of the FST which causes severe damage once well established.[1]

FST infestations 1960s

FST infestations 1980s

FST infestations 1990s

FST infestations 2000s



The change would require protection of a home's structural members in areas subject to the Formosan subterranean termite (FST). Structural protection from this termite deserves special consideration for the following reasons.

- The FST is an invasive species that causes $1 billion[2] in damage and control measures annually – now accounting for half of all U.S. subterranean termite damage despite being in the mainland U.S. for less than six decades.
- FST colonies consume wood very rapidly, placing a home's structure at greater risk.
- The FST is responsible for $100 million in annual control measures and damages in Hawaii. To address this damage and danger, Hawaii has required termite resistant structural members in homes for the past two decades because "an extra level of protection was needed to ensure public safety."[3]
- Gulf Coast states are now sustaining great damage from the FST. For example, in LA, the FST is estimated to account for $500 million in annual control measures and damages.[2] According to the USDA, in New Orleans FSTs "can cost individual homeowners several thousand dollars a year in damage and control costs."[4]
- Low income homeowners are least likely to know about FSTs or maintain termite contracts with pest control operators[5], leaving them and their homes with "no protection."[6]
- When FSTs invade a structure, "there is often little or no external evidence of its presence until the damage is severe enough to cause sagging floors, a leaking roof, or warped walls"[7]

Repeated research has demonstrated that termiticides alone can be insufficient in protecting a structure from Formosan termites. According to the USDA, "the Formosan termite has demonstrated the ability to infest wooden structures even though the soil surrounding them has been treated."[4] Further, a University of Florida study showed that up to 25% of Formosan termite infestations are aerial infestations.[8]

The current code text does not address the Formosan termite and its unique threat compared to native subterranean termites. Thus this proposal is superior to the current code requirements because it adds language to deal with a threat to the durability of buildings that is not covered in the IRC. Further, the appendix approach recognizes that local data is necessary to be able to assess the potential for damage from Formosan termites. Only those jurisdictions that face a real threat should adopt this appendix, and it would not be mandatory elsewhere.

The appendix is designed to address termite protection in a comprehensive approach, but one that balances protection against the need to minimize the impact on costs. Thus, not all elements are required to be termite resistant, but only those that serve a critical function or are likely to be accessible to termites.

1. Research compiled by Newport Partners based on data provided by Texas A&M University, Mississippi Department of Agriculture and Commerce, *Florida Entomologist*, Louisiana Insurance Pest Control Association, Louisiana State University, Auburn University, *Sociobiology*, San Diego County, University of Georgia, North Carolina State University, and Clemson University.
2. Louisiana State Univeristy. Termite Integrated Pest Management Series, “Formosan Subterranean Termite Damage and Detection”. <http://www.agctr.lsu.edu/NR/rdonlyres/2FD93BF5-A2A8-4F89-BAA0-82EBD0B50232/3287/pub2840termitedetect8.pdf >
3. Grace: Dr. Ken Grace, Professor of Entomology, University of Hawaii. Public Comment to Florida Building Code. <http://www.dca.state.fl.us/fbc/commission/FBC_0106/Structural_Tac/StructuralMods/Mod1870_Comment_1.rtf>.
4. United States Department of Agriculture, Agriculture Research Service. National Formosan Subterranean Termite Program. <http://www.ars.usda.gov/is/br/fullstop/backgrounder.htm>
5. Dunn, M., Bhandari, D., Paudel, K., Guidry, K., and Vlosky, R. Louisiana Homeowners’ Attitudes and Perceptions Concerning Termites, A Report Submitted to the United States Department of Agriculture Agricultural Research Service. LSU AgCenter. 2003.
6. “Florida Building Code Advanced Training: Termites.” August 2003. Florida Building Commission Department of Community Affairs. 24 Aug 2006.
7. Yates, J and Tamashiro, M. The Formosan Subterranean Termite in Hawaii. Cooperative Extension Service, University of Hawaii at Manoa. HSP-2. 1999: 1.
8. Su N-Y, Scheffrahn RH. 1987. Current status of the Formosan subterranean termite in Florida, pp. 27-31. *In:* M. Tamashiro and N.-Y. Su [eds.], Biology and control of the Formosan subterranean termite. College of Tropical Agriculture and Human Resources, University of Hawaii, Honolulu, HI. See also http://creatures.ifas.ufl.edu/urban/termites/formosan_termite.htm.

Cost Impact: In areas where this appendix is adopted, it may increase cost of construction because it extends the components of the building that must be protected. The increased costs would apply independent of the material used in most cases, except to the extent that the building is already being constructed of termite resistant materials for other reasons. In these cases (for example, with a concrete or steel home), there would be no or little increase in costs.

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

RB230 –07/08
R301.2.1.1

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

Revise as follows:

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

1. American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM); or
2. *Southern Building Code Congress International Standard for Hurricane Resistant Residential Construction* (SSTD 10); or
3. *Minimum Design Loads for Buildings and Other Structures* (ASCE-7); or
4. American Iron and Steel Institute (AISI), *Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings (COFS/PM) with Supplement to Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings*.
5. Concrete construction shall be designed in accordance with the provisions of this code.
6. Structural insulated panels shall be designed in accordance with the provisions of this code.
7. Where continuous structural panel sheathing in accordance with Section R602.10.4 is provided on all exterior braced wall lines on all stories, the design of buildings shall be in accordance with the provisions of this code.

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

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

This change mandates use of the continuous sheathing method for wall bracing for dwellings constructed in hurricane-prone regions in order to remain within the IRC provisions for the rest of the design of wind-resisting elements. Testing by NAHB's Research Center, APA and others shows that continuously-sheathed dwellings are substantially stronger than dwellings sheathed with intermittent bracing. Whole-building tests indicate that these dwellings have a resistance of at least double that which would be suggested by simply adding the allowable capacities of the individual walls.

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

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

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

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

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