

**RESIDENTIAL CODE OF THE CITY OF LAWRENCE, KANSAS,  
APRIL 17, 2017, EDITION**

Amending Article 3

**OF CHAPTER V OF THE CODE OF THE CITY  
OF LAWRENCE, KANSAS**



**City of Lawrence**

Incorporated By Reference Pursuant to K.S.A. 12-3009, *et seq.*, K.S.A. 12-3301 *et seq.*,  
and the Home Rule Authority of the City

Passed by the Governing Body of the City of Lawrence, Kansas

**Ordinance No. 9342**

Effective April 17, 2017

**SECTION 1.** Chapter V, Article 3 of the Code of the City of Lawrence, Kansas, 2015 Edition, and amendments thereto, is hereby amended to read as follows:

**ARTICLE 3. RESIDENTIAL CODE**

**5-301 RESIDENTIAL CODE ADOPTED AND INCORPORATED.**

The *2015 International Residential Code*, published by the International Code Council, Inc., other than those portions hereinafter specifically deleted, modified, or amended, is hereby adopted as the City's Residential Code and is incorporated herein by reference as if set forth in full.

**5-302 OFFICIAL COPY.**

Not less than one (1) copy of the *2015 International Residential Code* shall be marked or stamped "OFFICIAL COPY AS INCORPORATED BY ORDINANCE No. 9342," with all sections or portions deleted, modified, or amended clearly marked as such, and to which one (1) copy of this ordinance shall be affixed, shall be filed with the City Clerk, shall be open to inspection, and shall be available to the public during reasonable business hours. Additional official copies shall, at the cost of the City, be supplied to those officials and agencies charged with enforcement of the City's Residential Code.

**5-303 AMENDMENTS TO THE 2015 INTERNATIONAL RESIDENTIAL CODE .**

The *2015 International Residential Code* is amended as set forth in the succeeding sections of this Article. These amendments shall not serve to delete, modify, or amend any discretely numbered section or subsection of the *2015 Residential Code*, unless the section or subsection is specifically identified as being deleted, modified, or amended.

**5-304 APPENDICES.**

Unless specifically adopted herein, all appendices to the *2015 International Residential Code* are hereby deleted.

- (a) Appendix E, "MANUFACTURED HOUSING USED AS DWELLINGS," to the *2015 International Residential Code*, is hereby specifically adopted.
- (b) Appendix F, "PASSIVE RADON GAS CONTROLS," to the *2015 International Residential Code*, is hereby specifically adopted.
- (c) Appendix J, "EXISTING BUILDINGS AND STRUCTURES," to the *2015 International Residential Code*, is hereby specifically adopted.
- (d) Appendix M, "Home DAY CARE - R-3 OCCUPANCY," to the *2015 International Residential Code*, is hereby specifically adopted.

**5-305 The *2015 International Residential Code* is hereby amended by deleting CHAPTER 1, "SCOPE AND ADMINISTRATION."**

**5-306 Section R301.2 of the *2015 International Residential Code* is hereby amended to read as follows:**

**R301.2 Climatic and geographic design criteria.** Buildings shall be constructed in accordance with the provisions of this section. ~~Additional criteria shall be established by the local jurisdiction and set forth in Table R301.2(1), the 2015 International Residential Code, as adopted and modified by the provisions of this Article. Additional criteria are hereby established and are set forth in Table R301.2(1).~~

5-307

**Table R301.2(1), "Climatic and Geographic Design Criteria," of the 2015 International Residential Code** is hereby amended to read as follows:

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

GROUND SNOW LOAD	WIND DESIGN				SEISMIC DESIGN CATEGORY <sup>1</sup>	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP <sup>6</sup>	ICE BARRIER UNDERLAYMENT REQUIRED <sup>7</sup>	FLOOD HAZARD <sup>9</sup>	AIR FREEZING INDEX <sup>8</sup>	MEAN ANNUAL TEMP <sup>5</sup>
	Speed <sup>2</sup>	Topographic effects <sup>3</sup>	Special wind region <sup>4</sup>	Wind- borne debris zone <sup>10</sup>		Weathering <sup>a</sup>	Frost line depth <sup>b</sup>	Termite <sup>c</sup>					
20 lbs	115	No	No	No	A	Severe	30"	Moderate to Heavy	4	No	COL Code Chapter 20 Article 12	778	56.0

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

- a. Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The weathering column shall be filled in with the weathering index, "negligible," "moderate" or "severe" for concrete as determined from Figure R301.2(3). The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.
- b. The frost line depth may require deeper footings than indicated in Figure R403.1(1). The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.
- c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.
- d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(4)A]. Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.
- e. The outdoor design dry-bulb temperature shall be selected from the columns of 97 1/2-percent values for winter from Appendix D of the International Plumbing Code. Deviations from the Appendix D temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official.
- f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.
- g. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of the currently effective FIRMs and FBFMs or other flood hazard map adopted by the authority having jurisdiction, as amended.
- h. In accordance with Sections R905.1.2, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."
- i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."
- j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."
- k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
- l. In accordance with Figure R301.2(4)A, where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with "YES" and identify any specific requirements. Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
- m. In accordance with Section R301.2.1.2.1, the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

5-308

**The 2015 International Residential Code is hereby amended by adding Section R310.1.2, which reads as follows:**

**R310.1.2 Existing dwelling units.** Basements of existing dwelling units or basements of dwelling units that were under construction prior to the adoption date of the *2006 International Residential Code on January 1, 2008*, shall have at least one operable emergency escape and rescue opening in accordance with Section R310.1, when the finished area of the basement equals fifty percent or more of the total square footage of the basement area, or when sleeping room(s) are located in the basement.

5-309

**Section R313.2 of the 2015 International Residential Code** is hereby amended to read as follows:

**R313.2 One- and two-family dwellings automatic fire systems.** An automatic residential fire sprinkler system shall may be installed in one- and two-family dwellings.

**Exception:** ~~An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential sprinkler system.~~

5-310

**Section R602.7.5 of the 2015 International Residential Code** is hereby amended to read as follows:

**R602.7.5 Supports for headers.**

Headers shall be supported on each end with one or more jack studs or with approved framing anchors in accordance with Table R602.7(1) or R602.7(2). The full-height stud adjacent to each end of the header shall be end nailed to each end of the header with four-16d nails (3.5 inches x 0.135 inches). The minimum number of full-height studs at each end of a header shall be in accordance with Table R602.7.5.

**~~TABLE R 602.7.5~~**  
**~~MINIMUM NUMBER OF FULL HEIGHT STUDS~~**  
**~~AT EACH END OF HEADERS IN EXTERIOR WALLS~~**

HEADER SPAN (feet)	MAXIMUM STUD SPACING (inches) [per Table R602.3(5)]	
	16	24
<u>&lt;3'</u>	4	4
<u>4'</u>	2	4
<u>8'</u>	3	2
<u>12'</u>	5	3
<u>16'</u>	6	4

**TABLE R 602.7.5**  
**MINIMUM NUMBER OF FULL HEIGHT STUDS**  
**AT EACH END OF HEADERS IN EXTERIOR WALLS**

<u>MAXIMUM HEADER SPAN (feet)</u>	<u>ULTIMATE DESIGN WIND SPEED AND EXPOSURE CATEGORY</u>	
	<u>&lt;140mph, Exposure B or ,130 mph, Exposure C</u>	<u>&lt;115mph, Exposure B<sup>b</sup></u>
<u>4</u>	<u>1</u>	<u>1</u>
<u>6</u>	<u>2</u>	<u>1</u>
<u>8</u>	<u>2</u>	<u>1</u>
<u>10</u>	<u>3</u>	<u>2</u>
<u>12</u>	<u>3</u>	<u>2</u>
<u>14</u>	<u>3</u>	<u>2</u>
<u>16</u>	<u>4</u>	<u>2</u>
<u>18</u>	<u>4</u>	<u>2</u>

- a. For header spans between those given above, use the minimum number of full-height studs associated with the larger header span.
- b. The tabulated minimum number of full-height studs is applicable where jack studs are provided to support the header at each end in accordance with Table R602.7.1(1). Where a framing anchor is used to support the header in lieu of a jack stud in accordance with footnote "d" of Table R602.7(1), the minimum number of full-height studs at each end of a header shall be in accordance with requirements for wind speed < 140 mph, Exposure B.

5-311

**Section N1101.14 (R401.3) of the 2015 International Residential Code** is hereby amended to read as follows:

**N1101.14 (R401.3) Certificate (Mandatory).** A permanent certificate shall be completed by the builder or registered design professional and posted on ~~a wall in the space where the furnace is located, a utility room or an approved location inside the building the electrical panel.~~ ~~Where located on an electrical panel, the~~ certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawl space wall and/or floor) and ducts outside conditioned spaces; *U-factors* for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing done on the building. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list "gas-fired unvented room heater," "electric furnace," or "baseboard electric heater," as appropriate. An efficiency shall not be listed for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.

5-312

**Table 1102.1.1 (R402.1.1), "Insulation and Fenestration Requirements by Component," of the 2015 International Residential Code** is hereby amended to read as follows:

**TABLE N1102.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT**

CLIMATE ZONE	FENESTRATION U-FACTOR <sup>b</sup>	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAMED WALL	MASS WALL R-VALUES <sup>i</sup>	FLOOR R-VALUE	BASEMENT <sup>c</sup> WALL R-VALUE	SLAB <sup>d</sup> R-VALUE AND DEPTH <sup>hi</sup>	CRAWL <sup>c</sup> SPACE WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5 <sup>h</sup>	8/13	19	5/13 <sup>f</sup>	0	5/13
4 except Marine	0.35	0.55	0.40	49	20-19-or 13+5-2 <sup>h</sup>	8/13	19	10/13	10, 2 ft <sup>j</sup>	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5 <sup>h</sup>	13/17	30 <sup>g</sup>	15/19	10, 2 ft <sup>j</sup>	15/19
6	0.32	0.55	NR	49	20+5 or 13+10 <sup>h</sup>	15/20	30 <sup>g</sup>	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	38	20+5 or 13+10 <sup>h</sup>	19/21	38 <sup>g</sup>	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

- a. R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.  
**Exception:** Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.
- e. There are no SHGC requirements in the Marine Zone.
- f. Basement wall insulation is not required in warm-humid locations as defined by Figure N1101.10 and Table N1101.10.
- g. Or insulation sufficient to fill the framing cavity, R-19 minimum.
- h. The first value is cavity insulation, the second value is continuous insulation, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation.
- i. The second R-value applies when more than half the insulation is on the interior of the mass wall.
- j. Slab edge insulation may be eliminated for slab on grade floors when heating systems efficiency rating is 90% or better.

5-313 **Section N1102.2.9 (R402.2.9) of the 2015 International Residential Code** is hereby amended to read as follows:

**N1102.2.9 (R402.2.9) Basement walls.** Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Section N1102.1.2 and N1102.2.8.

**Exception:** Basement walls that are otherwise exposed shall be insulated from the top of the basement wall down to 3 feet (914mm) below grade or the basement floor, whichever is less.

5-314 **Sections N1103.3.2 (R403.3.2), N1103.3.3 (R403.3.3), and N1103.3.5 (R403.3.5) of the 2015 International Residential Code** are hereby amended to read as follows:

**N1103.3.2 (R403.3.2) Sealing (Mandatory).** Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with either the International Mechanical Code, as adopted by the City, or Section M1601.4.1 of this code, as adopted by the City, as applicable.

**Exceptions:**

1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.
2. ~~For ducts having a static pressure classification of less than 2 inches of water column (500 Pa), additional closure systems shall not be required for e~~Continuously welded joints and seams and locking-type joints shall be permitted without additional joint seals.  
~~and seams of other than the snap-lock and button-lock types.~~

**N1103.3.3 (R403.3.3) Duct Testing (Mandatory).** Ducts shall be pressure tested to determine air leakage by one of the following methods:

1. Rough-in test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. All registers shall be taped or otherwise sealed during the test.
2. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Registers shall be taped or otherwise sealed during the test.

**Exceptions:** A duct air leakage test shall not be required where: ~~the ducts and air handlers are located entirely within the building thermal envelope.~~

1. The ducts and air handlers are located entirely within the building thermal envelope; or
2. A whole house air leakage test is performed.

~~**N1103.3.5 (R403.3.5) Building cavities (Mandatory).** Building framing cavities shall not be used as ducts or plenums.~~

5-315 **Section N1103.5.1.1 (R403.5.1.1) of the 2015 International Residential Code** is hereby amended to read as follows:

**N1103.5.1.1 (R403.5.1.1) Circulation systems.** Heated water circulation systems ~~shall~~ may be provided with a circulation pump. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. ~~Gravity and thermo-siphon circulation systems shall be prohibited.~~ Controls for circulating hot water system pumps shall start the pump based on the identification of a demand for hot water within the occupancy. The controls shall automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is no demand for hot water.

5-316 **Section N1103.5.3 (R403.5.3) of the 2015 International Residential Code** is hereby amended to read as follows:

**N1103.5.3 (R403.5.3) Hot water pipe insulation (Prescriptive).** Insulation for hot water pipe with a minimum thermal resistance (R-value) of R-3 shall be applied to the following:

1. Piping 3/4-inch (19 mm) and larger in nominal diameter.
2. Piping serving more than one dwelling unit.
- 3.1. Piping located outside the conditioned space.
- 4.2. Piping from the water heater to a distribution manifold.
- 5.3. Piping located under a floor slab.
- 6.4. Buried in piping.
- 7.5. Supply and return piping in recirculation systems other than demand recirculation systems.

5-317

**Section N1106.4 (R406.4) of the 2015 International Residential Code** is hereby amended to read as follows:

**N1106.4 (R406.4) ERI-based compliance.** Compliance based on an ERI analysis requires that the rated design be shown to have an ERI less than or equal to the appropriate value listed in Table N1106.4 when compared to the ERI reference design.

**TABLE N1106.4 (R406.4)  
MAXIMUM ENERGY RATING INDEX**

CLIMATE ZONE	ENERGY RATING INDEX
1	52
2	52
3	51
4	70
5	55
6	54
7	53
8	53

5-318

**Section M1307.3 of the 2015 International Residential Code** is hereby amended to read as follows:

**M1307.3 Elevation of ignition source.** Permanently fixed mechanical equipment and Appliances having an ignition source, including but not limited to motors, relays, or other electrical devices, shall be elevated such that the ~~source of ignition is not less than 18 inches (457 mm) above the floor~~ bottom of the cabinet is not less than 14 inches above the floor for upflow furnaces and 18 inches above the floor for downflow furnaces in garages. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate with a private garage through openings shall be considered to be part of the garage.



**Exceptions:**

1. Elevation of the ignition source is not required for appliances that are listed as flammable-vapor-ignition resistant.
2. Where the blower compartment is equipped with a gasketed door and locking fasteners, the furnace may be installed on the garage floor.

5-319

**Section M1401.3 of the 2015 International Residential Code** is hereby amended to read as follows:

**M1401.3 Equipment and appliance sizing.** Heating and cooling equipment and appliances shall be sized in accordance with ACCA Manual S or other approved sizing methodologies based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies. Prior to permit issuance, those calculations shall be provided to the Building Safety Division of the Department of Planning and Development Services and shall include the following:

1. The capacity of each piece of heating and cooling equipment;
2. The calculation shall include, but is not limited to window efficiency and sizes, insulation R-values for floor, wall, and ceiling, orientation of the house, house color, and roof color; and
3. The calculations shall be submitted with every new one- and two-family dwelling or any addition that will change the heating and cooling load of such a dwelling.

**Exception:** Building additions less than 100 square feet in area.

5-320

**Sections M1601.1, M1601.1, and M1601.1.2 of the 2015 International Residential Code** are hereby amended to read as follows:

**M1601.1 Duct design.** Duct systems serving heating, cooling and ventilation equipment shall be installed in accordance with the provisions of this section and ACCA Manual D, the appliance manufacturer's installation instructions, or other approved methods. A drawing of each duct system, including the size and length of each duct trunk, branch, and CFM of each duct branch run, shall be on site prior to the rough-in mechanical inspection.

**M1601.1.1 Above-ground duct systems.** Above-ground duct systems shall conform to the following:

1. Equipment connected to duct systems shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions.

3. Fibrous glass duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC Duct Construction Standards—Metal and Flexible except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A 653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. Duct systems shall be constructed of materials having a flame spread index of not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
  - 7.1 These cavities or spaces shall not be used as a plenum for supply air.
  - 7.2 These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
  - 7.3 ~~Stud wall cavities shall not convey air from more than one floor level.~~ Multiple floors shall not utilize the same stud wall cavity to convey air.
  - 7.4 Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section R602.8.
  - 7.5 Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

**TABLE M1601.1.1**  
**DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESS**  
**FOR SINGLE DWELLING UNITS<sup>a</sup>**

ROUND DUCT DIAMETER (inches)	STATIC PRESSURE			
	½ inch water gage		1 inch water gage	
	Thickness(inches)		Thickness(inches)	
	Galvanized	Aluminum	Galvanized	Aluminum
≤12	0.013	0.018	0.013	0.018
12 to 14	0.013	0.018	0.016	0.023
15 to 17	0.016	0.023	0.019	0.027
18	0.016	0.023	0.024	0.034
19 to 20	0.019	0.027	0.024	0.034
RECTANGULAR DUCT DIMENSION (inches)	STATIC PRESSURE			
	½ inch water gage		1 inch water gage	
	Thickness(inches)		Thickness(inches)	
	Galvanized	Aluminum	Galvanized	Aluminum
≤8	0.013	0.018	0.013	0.018
9 to 10	0.013	0.018	0.016	0.023
11 to 12	0.016	0.023	0.019	0.027
13 to 16	0.019	0.027	0.019	0.027
17 to 18	0.019	0.027	0.024	0.034
19 to 20	0.024	0.034	0.024	0.034

For SI: 1 inch = 25.4 mm, 1 inch water gage = 249 Pa.

- a. Ductwork that exceeds 20 inches by dimension or exceeds a pressure of 1 inch water gage (250 Pa) shall be constructed in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible.

**M1601.1.2 Underground duct systems.** Underground duct systems shall be constructed of approved concrete, clay, metal or plastic. The maximum duct temperature for plastic ducts shall not be greater than 150°F (66°C). Metal ducts shall be protected from corrosion in an approved manner or shall be completely encased in concrete not less than 2 inches (51 mm) thick. Nonmetallic ducts shall be installed in accordance with the manufacturer's instructions. Plastic pipe and fitting materials shall conform to cell classification 12454-B of ASTM D 1248 or ASTM D 1784 and external loading properties of ASTM D 2412. Ducts shall slope to an accessible point for drainage. Where encased in concrete, ducts shall be sealed and secured prior to any concrete being poured. Metallic ducts having an approved protective coating and nonmetallic ducts shall be installed in accordance with the manufacturer's instructions.

5-321

**The 2015 International Residential Code is hereby amended by adding Section M1603.1, which reads as follows:**

**1603.1 Flexible Air Connectors.** Flexible air connectors, both metallic and nonmetallic, shall be tested in accordance with UL 181. Such connectors shall be listed and labeled as Class 0 or Class 1 flexible air connectors and shall be installed in accordance with International Mechanical Code Section 304.1.

**1603.1.1 Connector length.** Flexible air connectors shall be limited in length to 14 feet (4267 mm).

**1603.1.2 Connector penetration limitations.** Flexible air connectors shall not pass through any wall, floor or ceiling.

**1603.1.3 Air temperature.** The design temperature of air to be conveyed in flexible air ducts and flexible air connectors shall be less than 250°F (121°C).

**1603.1.4 Flexible air duct and air connector clearance.** Flexible air ducts and air connectors shall be installed with a minimum clearance to an appliance as specified in the appliance manufacturer's installation instructions.

**1603.1.5 Location.** Flexible air connectors may only be used for environmental exhaust when located within conditioned space.

5-322

**Section G2406.2 (303.3) of the 2015 International Residential Code** is hereby amended to read as follows:

**G2406.2 (303.3) Prohibited locations.** Appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, hot tub rooms, storage closets, or surgical rooms, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:

1. The appliance is a direct-vent appliance installed in accordance with the conditions of the listing and the manufacturer's instructions.
2. Vented room heaters, wall furnaces, vented decorative appliances, vented gas fireplaces, vented gas fireplace heaters and decorative appliances for installation in vented solid fuel-burning fireplaces are installed in rooms that meet the required volume criteria of Section G2407.5.
3. A single wall-mounted unvented room heater is installed in a bathroom and such unvented room heater is equipped as specified in Section 621.6, ~~and~~ has an input rating not greater than 6,000 Btu/h (1.76 kW), and a carbon monoxide detector, meeting the requirements of Section R315, is installed in the same room as the appliance. The bathroom shall meet the required volume criteria of Section 304.5.
4. A single wall-mounted unvented room heater is installed in a bedroom and such unvented room heater is equipped as specified in Section 621.6, ~~and~~ has an input rating not greater than 10,000 Btu/h (2.93 kW), and a carbon monoxide detector, meeting the requirements of Section R315, is installed in the same room as the appliance. The bedroom shall meet the required volume criteria of Section 304.5.
5. The appliance is installed in a room or space that opens only into a bedroom or bathroom, and such room or space is used for no other purpose and is provided with a solid weather-stripped door equipped with an approved self-closing device. All combustion air shall be taken directly from the outdoors in accordance with Section G2407.6.

5-323

**Section G2417.4.1 (406.4.1) of the 2015 International Residential Code** is hereby amended to read as follows:

**G2417.4.1 Test pressure.** The test pressure to be used shall be not less than 1 ½ times the proposed maximum working pressure, but not less than 3 10 psig (20 69 kPa gauge), irrespective of design pressure. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe.

- 5-324      **The 2015 International Residential Code is hereby amended by adding Section P2713.4, which reads as follows:**

**P2713.4 Prohibition.** In no case shall bathtubs be installed head-to- head.

- 5-325      **Section P3005.4.2 of the 2015 International Residential Code is hereby amended to read as follows:**

**P3005.4.2 Building drain and sewer size and slope.** Pipe sizes and slope shall be determined from Table P3005.4.2 on the basis of drainage load in fixture units (d.f.u.) computed from Table P3004.1; however, no building sewer shall be less than four (4) inches in diameter.

- 5-326      **The 2015 International Residential Code is hereby amended by adding Section P3113.5, which reads as follows:**

**P3113.5 Aggregate size of vents.** The drainage piping of each building and each connection to a public sewer or a private sewage disposal system shall be vented by means of one or more vent pipes, the aggregate cross-sectional area of which shall not be less than that of the largest required building sewer, as determined from Table 710.1(1) of the *2015 International Plumbing Code*. Vent pipes from fixtures located upstream from pumps, ejectors, backwater valves, or other devices that in any way obstruct the free flow of air and other gases between the building sewer and the outside atmosphere shall not be used for meeting the cross-sectional area venting requirements of this section.

**Exception:** When connected to a common building sewer, the drainage piping of two (2) or more buildings, located on the same lot and under one (1) ownership, may be vented by means of piping sized in accordance with Table 710.1(1) of the *2015 International Plumbing Code*, provided the aggregate cross-sectional area of all vents is not less than that of the largest required common building sewer.

- 5-327      **Sections P3114.2, P3114.3, and P3114.8 of the 2015 International Residential Code are hereby amended to read as follows:**

**P3114.2 Installation.** The valves shall only be installed with prior approval from the Building Safety Division of the Department of Planning and Development Services, in accordance with the requirements of this section, and in accordance with the manufacturer's installation instructions. Air admittance valves shall be installed after the DWV testing required by Section P2503.5.1 or P2503.5.2 has been performed.

**P3114.3 Where permitted.** The valves shall only be permitted in the alterations of existing buildings with prior approval from the Building Safety Division of the

Department of Planning and Development Services. Individual vents, branch vents, circuit vents and stack vents shall be permitted to terminate with a connection to an air admittance valve. Individual and branch type air admittance valves shall vent only fixtures that are on the same floor level and connect to a horizontal branch drain.

**P3114.8 Prohibited installations.** Air admittance valves without an engineered design shall not be used to vent sumps or tanks of any type, and shall not be installed in new construction.

**Exception:** Island fixtures in new construction may be vented by air admittance valves that comply with Section P3114.

5-328      **Section P3201.2 of the 2015 International Residential Code** is hereby amended to read as follows:

**P3201.2 Trap seals and trap seal protection.** Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm).

5-329      **The 2015 International Residential Code is hereby amended by deleting sections P3201.2.1, P3201.2.1.1, P3201.2.1.2, P3201.2.1.3, and P3201.2.1.4.**

5-330      **Section E3604.5.1 of the 2015 International Residential Code** is hereby amended to read as follows:

**E3604.5.1 Strength.** Where a mast is used for support of service-drop conductors, it shall be a galvanized rigid conduit with a minimum trade size diameter of two inches. The service mast shall be of adequate strength or shall be supported by braces or guys to safely withstand the strain imposed by the service-drop or overhead service conductors. Hubs intended for use with a conduit that serves as a service mast shall be identified for use with service-entrance equipment.

5-331      **Section E3605.2 of the 2015 International Residential Code** is hereby amended to read as follows:

**E3605.1 Insulation of service-entrance conductors.** Service-entrance conductors entering or on the exterior of buildings or other structures shall be insulated in accordance with Section E3406.5. Service-entrance conductors shall not exceed six feet in length from the point of entrance of a building. [230.41 Exception].

**Exceptions:**

1. A copper grounded conductor shall not be required to be insulated where it is:
  - 1.1 In a raceway or part of a service cable assembly,
  - 1.2 Directly buried in soil of suitable condition, or

1.2 Part of a cable assembly listed for direct burial without regard to soil conditions.

2. An aluminum or copper-clad aluminum grounded conductor shall not be required to be insulated where part of a cable or where identified for direct burial or utilization in underground raceways. [230.41 Exception].

5-332 **Section E3611.2 of the 2015 International Residential Code** is hereby amended to read as follows:

**E3611.2 Accessibility.** All mechanical elements used to terminate a grounding electrode conductor or bonding jumper to the grounding electrodes that are not buried or concrete encased shall be accessible. The location of the grounding electrode conductor connection to the grounding electrode(s) shall be permanently stated on a plaque or directory on the service disconnecting means. [250.68(A) and 250.68(A) Exception].

5-333 **The 2015 International Residential Code is hereby amended by adding Section E3703.7**, which reads as follows:

**E3703.3 Sump Pumps.** Sump pumps shall be served by an individual branch circuit. The circuit and its single receptacle outlet shall be in addition to any other outlets required by E3901.

5-334 **Table E3801.4, "Allowable Applications for Wiring Methods, of the 2015 International Residential Code** is hereby amended to read as follows:

**TABLE E3801.4 (Chapter 3 and 300.2)**  
**ALLOWABLE APPLICATIONS FOR WIRING METHODS<sup>a, b, c, d, e, f, g, h, i, j, k</sup>**

ALLOWABLE APPLICATIONS (applications allowed where marked with an "A")	AC	EMT	ENT	FMC	IMC RMC RNC	LFC <sup>a</sup>	MC	NM	SR	SE	UF	USE
Services	—	A <sup>h</sup>	A	A <sup>i</sup>	A	A <sup>i</sup>	A	—	—	A <sup>—</sup>	—	—
Feeders	A	A	A	A	A	A	A	A	—	A <sup>b</sup>	A	A <sup>b</sup>
Branch circuits	A	A	A	A	A	A	A	A	A	A <sup>c</sup>	A	—
Inside a building	A	A	A	A	A	A	A	A	A	A	A	—
Wet locations exposed to sunlight	—	A	A <sup>h</sup>	A <sup>d</sup>	A	A	A	—	—	A	A <sup>e</sup>	A <sup>e</sup>
Damp locations	—	A	A	A <sup>d</sup>	A	A	A	—	—	A	A	A
Embedded in non-cinder concrete in dry Location	—	A	A	—	A	—	—	—	—	—	—	—
In non-cinder concrete in contact with grade	—	A <sup>f</sup>	A	—	A <sup>f</sup>	—	—	—	—	—	—	—
Embedded in plaster not exposed to Dampness	A	A	A	A	A	A	A	—	—	A	A	A
Embedded in masonry	—	A	A	—	A <sup>f</sup>	A	A	—	—	—	—	—
In masonry voids and cell exposed to dampness or below grade line	—	A <sup>f</sup>	A	A <sup>d</sup>	A <sup>f</sup>	A	A	—	—	A	A	—
Fished in masonry voids	A	—	—	—	—	—	—	—	—	—	—	—
In masonry voids and cells not exposed to dampness	A	A	A	A	A	A	A	A	A	A	A	A
Run exposed	A	A	A	A	A	A	A	A	A	A	A	A
Run exposed and subject to physical damage	—	—	—	—	A <sup>g</sup>	—	—	—	—	—	—	—
For direct burial	—	A <sup>f</sup>	—	—	A <sup>f</sup>	A	A	—	—	—	—	A

For SI: 1 foot = 304.8 mm.

- a. Liquid-tight flexible nonmetallic conduit without integral reinforcement within the conduit wall shall not exceed 6 feet in length.
- b. Type USE cable shall not be used inside buildings.
- c. The grounded conductor shall be insulated except where used to supply other buildings on the same premises.
- d. Conductors shall be a type approved for wet locations and the installation shall prevent water from entering other raceways.
- e. Shall be listed as "Sunlight Resistant."
- f. Metal raceways shall be protected from corrosion and approved for the application. Aluminum RMC requires approved supplementary corrosion protection.
- g. RNC shall be Schedule 80.
- h. Shall be listed as "Sunlight Resistant" where exposed to the direct rays of the sun.
- i. Conduit shall not exceed 6 feet in length.
- J. Liquid-tight flexible nonmetallic conduit is permitted to be encased in concrete where listed for direct burial and only straight connectors listed for use with LFNC are used.
- k. In wet locations under any of the following conditions:
  - (i) The metallic covering is impervious to moisture.
  - (ii) A lead sheath or moisture-impervious jacket is provided under the metal covering.
  - (iii) The insulated conductors under the metallic covering are listed for use in wet locations and a corrosion-resistant jacket is provided over the metallic sheath.

5-335 **Section E3901.4.4 of the 2015 International Residential Code** is hereby amended to read as follows:

**E3901.4.4 Separate spaces.** Countertop spaces separated by range tops, refrigerators, or sinks shall be considered as separate countertop spaces in applying the requirements of Sections E3901.4.1, E3901.4.2 and E3901.4.3. Where a range, counter-mounted cooking unit, or sink is installed in an island or peninsular countertop and ~~the depth of the countertop behind the range, counter-mounted cooking unit, or sink is less than 12 inches (305 mm),~~ the range, counter-mounted cooking unit, or sink has divided the countertop space into two separate countertop spaces as defined in Section E3901.4.4. Each separate countertop space shall comply with the applicable requirements of this section. [210.52(C)(4)]

5-336 **Section E3901.9 of the 2015 International Residential Code** is hereby amended to read as follows:

**E3901.9 Basements, garages and accessory buildings.** At least one receptacle outlet, in addition to any provided for specific equipment, shall be installed in each basement and in each attached garage, and in each detached garage or accessory building that is provided with electrical power. Where a portion of the basement is finished into one or more habitable room(s), each separate unfinished portion shall have a receptacle outlet installed in accordance with this section. Not less than one receptacle outlet shall be installed for each motor vehicle space. [210.52(G)(1), (2), and (3)]

5-337 **The 2015 International Residential Code** is hereby amended by adding **Section E3901.9.1**, which reads as follows:

**E3901.9.1 Garage Door Opener Receptacle Outlets.** A single receptacle outlet shall be installed in the garage ceiling for each vehicle entry door. The single receptacle outlet shall be located near the center of the finished edges of the opening. The single receptacle outlet shall be located from the opening by the sum total of the height of the door plus a minimum of two feet.

5-338 **The 2015 International Residential Code** is hereby amended by adding **Section E3901.9.1**, which reads as follows:



**E3902 General.** Ground-fault circuit-interrupter protection for personnel shall be provided as required in Sections E3901.2 through E3902.13. Arc-fault circuit-Interrupter protection shall be provided as required by Sections E3902.14 through E3902.16.

**Exceptions:**

1. A single receptacle outlet for refrigerators, freezers, garage door openers and sump pumps located within dedicated space for each appliance that, in normal use, are not easily moved from one place to another and that are cord-and-plug connected shall be permitted to be installed in accordance with E3909.
2. Arc-Fault Circuit-Interrupter protection shall be permitted to be omitted from 120 volt single station smoke detectors.

5-339 **Section E902.7 of the 2015 International Residential Code** is hereby amended to read as follows:

**E3902.7 Sink receptacles.** 125-volt, single-phase, 15- and 20-ampere receptacles that are located within 6 feet (1829 mm) of the outside edge of a sink shall have ground-fault circuit-interrupter protection for personnel. Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertops. [210.8(A)(7)]

**Exception:** 125-volt, single-phase, 15- and 20-ampere single receptacles located within dedicated space serving washers, microwave ovens, ice makers, warming ovens, washers and garbage disposals.

5-340 **The 2015 International Residential Code is hereby amended by deleting section E3902.10.**

5-341 **Section E3902.16 of the 2015 International Residential Code** is hereby amended to read as follows:

**E3902.16 Arc-fault circuit-interrupter protection.** Branch circuits that supply 120-volt, single-phase, 15- and 20-ampere outlets installed in ~~kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreations rooms, closets, hallways, laundry areas and similar rooms or areas~~ shall be protected by any of the following: [210.12(A)]

1. A listed combination-type arc-fault circuit interrupter, installed to provide protection of the entire branch circuit. [210.12(A)(1)]
2. A listed branch/feeder-type AFCI installed at the origin of the branch-circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit. [210.12(A)(2)]
3. A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit type

arc-fault circuit interrupter installed at the first outlet box on the branch circuit where all of the following conditions are met:

- 3.1 The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
  - 3.2 The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet (15.2 m) for 14 AWG conductors and 70 feet (21.3 m) for 12 AWG conductors.
  - 3.3 The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit. [210.12(A)(3)]
4. A listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet on the branch circuit in combination with a listed branch-circuit overcurrent protective device where all of the following conditions are met:
  - 4.1 The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
  - 4.2 The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet (15.2 m) for 14 AWG conductors and 70 feet (21.3 m) for 12 AWG conductors.
  - 4.3 The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit.
  - 4.4 The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such. [210.12(A)(4)]
5. Where metal outlet boxes and junction boxes and RMC, IMC, EMT, Type MC or steel-armored Type AC cables meeting the requirements of Section E3908.8, metal wireways or metal auxiliary gutters are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the branch circuit. [210.12(A)(5)]
6. Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 2 inches (50.8 mm) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the branch circuit. [210.12(A)(6)]

~~**Exception:** AFCI protection is not required for an individual branch circuit supplying only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT or steel sheathed armored cable Type AC or Type MC meeting the requirements of Section E3908.8.~~

5-342

**The 2015 International Residential Code is hereby amended by adding Appendix V, SWIMMING POOLS, SPAS, AND HOT TUBS, which reads as follows:**

## **SECTION AV101**

### **GENERAL**

**AV101.1 General.** The provisions of this appendix shall control the design and construction of swimming pools, spas, and hot tubs installed in or on the lot of a one- or two-family dwelling.

**AV101.2 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 Section AV101.2.1 or AV101.2.2.

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

**AV101.2.1 Pools located in designated floodways.** Where pools are located in designated floodways, documentation shall be submitted to the building official that demonstrates that the construction of the pool will not increase the design flood elevation at any point within the jurisdiction.

**AV101.2.2 Pools located where floodways have not been designated.** Where pools are located where design flood elevations are specified but floodways have not been designated, the applicant shall provide a floodway analysis that demonstrates that the proposed pool will not increase the design flood elevation more than 1 foot (305 mm) at any point within the jurisdiction.

## **SECTION AV102**

### **DEFINITIONS**

**AV102.1 General.** For the purposes of this Appendix, the following terms shall be defined as follows.

**ABOVE-GROUND/ON-GROUND POOL.** See “Swimming pool.”

**BARRIER.** A fence, wall, building wall, or combination thereof that completely surrounds the swimming pool and obstructs access to the swimming pool.

**HOT TUB.** See “Swimming pool.”

**IN-GROUND POOL.** See “Swimming pool.”

**RESIDENTIAL.** That which is situated on the premises of a detached one- or two-family dwelling, or a one-family townhouse not more than three stories in height.

**SPA, NONPORTABLE.** See “Swimming pool.”

**SPA, PORTABLE.** A nonpermanent structure intended for recreational bathing, in which all controls, water-heating, and water-circulating equipment are an integral part of the product.

**SWIMMING POOL.** Any structure intended for swimming or recreational bathing that contains water more than 24 inches (610 mm) deep. This includes in-ground, above-ground, and on-ground swimming pools, hot tubs and spas.

**SWIMMING POOL, INDOOR.** A swimming pool which is totally contained within a structure and surrounded on all four sides by the walls of the enclosing structure.

**SWIMMING POOL, OUTDOOR.** Any swimming pool which is not an indoor pool.

### **SECTION AV103** **SWIMMING POOLS**

**AV103.1 In-ground pools.** In-ground pools shall be designed and constructed in compliance with ANSI/NSPI-5.

**AV103.2 Above-ground and on-ground pools.** Above-ground and on-ground pools shall be designed and constructed in compliance with ANSI/NSPI-4.

**AV103.3 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 compliance with ASCE 24.

### **SECTION AV104** **SPAS AND HOT TUBS**

**AV104.1 Permanently installed spas and hot tubs.** Permanently installed spas and hot tubs shall be designed and constructed in compliance with ANSI/NSPI-3.

**AV104.2 Portable spas and hot tubs.** Portable spas and hot tubs shall be designed and constructed in compliance with ANSI/NSPI-6.

### **SECTION AV105** **BARRIER REQUIREMENTS**

**AV105.1 Application.** The provisions of this Appendix shall control the design of barriers for residential swimming pools, spas, and hot tubs. These design controls are intended, for safety reasons, to restrict access to residential swimming pools, spas, and hot tubs.

**AV105.2 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 72 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 the passage of a 4-inch-diameter (102 mm) sphere.
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 1¾ inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1¾ 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 1¾ inches (44 mm) in width.
6. Maximum mesh size for chain link fences shall be a 2¼-inch (57 mm) square, unless the fence has slats fastened at the top or the bottom which reduce the openings to not more than 1¾ 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 1¾ inches (44 mm).
8. Access gates shall comply with the requirements of 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 ½ 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;
- 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 as long as the degree of protection afforded is not less than the protection afforded by Item 9.1 or 9.2 described herein.
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 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.

**AV105.3 Indoor swimming pool.** Walls surrounding an indoor swimming pool shall comply with Item 9 of Section AG105.2.

**AV105.4 Prohibited locations.** Barriers shall be located to prohibit permanent structures, equipment or similar objects from being used to climb them.

**AV105.5 Barrier exceptions.** Spas or hot tubs with a safety cover which comply with ASTM F 1346 shall be exempt from the provisions of this appendix.

## **SECTION AV106**

### **ENTRAPMENT PROTECTION FOR SWIMMING POOL AND SPA SUCTION OUTLETS**

**AV106.1 General.** Suction outlets shall be designed and installed in accordance with ANSI/APSP-7.

## **SECTION AV107** **ABBREVIATIONS**

### **AV107.1 General.**

ANSI—American National Standards Institute  
11 West 42nd Street  
New York, NY 10036

APSP—Association of Pool and Spa Professionals  
NSPI—National Spa and Pool Institute  
2111 Eisenhower Avenue  
Alexandria, VA 22314

ASCE—American Society of Civil Engineers  
1801 Alexander Bell Drive  
Reston, VA 98411-0700

ASTM—ASTM International  
100 Barr Harbor Drive  
West Conshohocken, PA 19428

UL—Underwriters Laboratories, Inc.  
333 Pfingsten Road  
Northbrook, IL 60062-2096

## **SECTION AV108** **REFERENCED STANDARDS**

### **AV108.1 General.**

#### **ANSI/NSP**

ANSI/NSPI-3—99 Standard for Permanently Installed Residential Spas AG104.1

ANSI/NSPI-4—99 Standard for Above-ground/On-ground Residential Swimming Pools AG103.2

ANSI/NSPI-5—03 Standard for Residential In-ground Swimming Pools AG103.1

ANSI/NSPI-6—99 Standard for Residential Portable Spas AG104.2

#### **ANSI/APSP**

ANSI/APSP-7—06 Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs and Catch Basins AG106.1

#### **ASCE**

ASCE/SEI-24—05 Flood-resistant Design and Construction AG103.3

## **ASTM**

ASTM F 1346—91 (2003) Performance Specification for Safety Covers and Labeling Requirements for All Covers for Swimming Pools Spas and Hot Tubs  
AG105.2, AG105.5

## **UL**

UL 2017—2000 Standard for General-purpose Signaling Devices and Systems—  
with revisions through June 2004 AG105.2