2007/2008 PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE

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TENTATIVE ORDER OF DISCUSSION

2007/2008 PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE

PLUMBING/MECHANICAL

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

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does **not** necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair.

IRC PLUMBING

P1-07/08, Part II
P2-07/08, Part II
RP1-07/08
P13-07/08, Part II
P8-07/08, Part II
P7-07/08, Part II
P9-07/08, Part II
P32-07/08, Part II
P33-07/08, Part II
P34-07/08, Part II
P27-07/08, Part II
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P52-07/08, Part II
P48-07/08, Part II
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P50-07/08, Part II
P51-07/08, Part II
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P43-07/08, Part II
P45-07/08, Part II
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P55-07/08, Part II
P56-07/08, Part II
RP2-07/08
RP3-07/08
RP7-07/08
P58-07/08, Part II
P59-07/08, Part II
P60-07/08, Part II
P61-07/08, Part II
P62-07/08, Part II
RP4-07/08
P69-07/08, Part II
P70-07/08, Part II
P71-07/08, Part II
P73-07/08, Part II
RP5-07/08
P80-07/08, Part II
P81-07/08, Part II
P84-07/08, Part II
P89-07/08, Part II
P86-07/08, Part II
RP6-07/08

IRC MECHANICAL

FG17-07/08, Part III
M10-07/08, Part II
M11-07/08, Part II
M9-07/08, Part II
M16-07/08, Part II
M17-07/08, Part II
RM1-07/08
RM2-07/08
RM3-07/08
M6-07/08, Part II
RM4-07/08
RM5-07/08
RM6-07/08
M91-07/08, Part II
M92-07/08, Part II
RM7-07/08
M30-07/08, Part II
RM8-07/08
RM9-07/08
RM10-07/08
M32-07/08, Part II
M33-07/08, Part II
RM11-07/08
RM12-07/08
RM13-07/08
RB28-07/08
EC72-07/08, Part III
RM14-07/08
M79-07/08, Part II
M80-07/08, Part II
RM15-07/08
RM16-07/08
RM17-07/08
RM18-07/08
FG46-07/08, Part III
M88-07/08, Part II
EC76-07/08, Part II
RM19-07/08
M103-07/08, Part II
M104-07/08, Part II
F88-07/08, Part II
RM20-07/08

RP1–07/08
P2503.5.1

Proponent: Michael Cudahy, representing Plastic Pipe and Fittings Association

Revise as follows:

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or, for piping systems other than plastic, by air with no evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than 10 feet (3048 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes.

Reason: To carry over the language on air testing of plastic piping systems from the IPC to the IRC. This change would correct an oversight in the IRC section.

IPC Section 312.1 "Required tests", contains the specific language:

*"All plumbing system piping shall be tested with either water or, **for piping systems other than plastic,** by air. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submitted to final tests."*

The reason for this language is that under some conditions, air testing poses additional risks for installers. The IRC should reflect the language found in the IPC.

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

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

RP2–07/08
P2903.10

Proponent: Jud Collins, JULYCO, representing himself

Revise as follows:

P2903.10 Hose bibb valve. ~~Hose bibbs subject to freezing, including the "frost-proof" type, shall be equipped with an accessible stop-and-waste type valve inside the building so that they can be controlled and/or drained during cold periods.~~ A full–open valve shall be installed on the water supply pipe to each hose bibb. Such valve shall be provided with access.

Exception: Frost-proof hose bibbs installed such that the stem extends through the building insulation into an open heated or semiconditioned space need not be separately valved (see Figure P2903.10).

Reason: The current text seems confusing. It says that "frost-proof" hose bibbs require an accessible stop-and-waste valve inside the building then the exception says they are not required if the valve is installed as intended. The proposed language will require the full-open valve rather than a stop-and-waste valve and the current exception will remain in place for "frost-proof" hose bibbs.

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

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

RP3–07/08
P2904 (New), Chapter 43 (New)

Proponent: Tom Lariviere, Fire Department, Madison, MS, representing Fire & Life Safety Section of the International Association of Fire Chiefs (IAFC)

1. Add new section as follows:

SECTION P2904
MULTIPURPOSE FIRE SPRINKLER SYSTEMS

P2904.1 General. A multipurpose fire sprinkler system shall provide domestic water to both fire sprinklers and plumbing fixtures and shall be in accordance with NFPA 13D or Section P2904. Section P2904 shall be considered equivalent to NFPA 13D.

P2904.1.1 Required sprinkler locations. Sprinklers shall be installed to protect all areas of a dwelling unit.

Exceptions:

1. Attics, crawl spaces, and normally unoccupied concealed spaces that do not contain fuel-fired appliances do not require sprinklers. In attics, crawl spaces, and normally unoccupied concealed spaces that contain fuel-fired equipment, a sprinkler shall be provided above the equipment; however, sprinklers shall not be required in the remainder of the space.
2. Clothes closets, linen closets and pantries not exceeding 24 square feet in area, with the smallest dimension not greater than 3 feet and having wall and ceiling surfaces of gypsum board.
3. Bathrooms not greater than 55 square feet in area.
4. Garages; carports; exterior porches; unheated entry areas, such as mud rooms, that are adjacent to an exterior door; and similar areas.

P2904.2 Sprinklers. Sprinklers shall be listed residential sprinklers and shall be installed in accordance with the sprinkler manufacturer's installation instructions.

P2904.2.1 Temperature rating and separation from heat sources. Except as provided for in Section P2904.2.2, sprinklers shall have a temperature rating of not less than 135°F and not more than 170°F. Sprinklers shall be separated from heat sources as required by the sprinkler manufacturer's installation instructions.

P2904.2.2 Intermediate temperature sprinklers. Sprinklers shall have an intermediate temperature rating not less than 175°F and not more than 225°F where installed in the following locations:

1. Directly under skylights, where the sprinkler is exposed to direct sunlight.
2. In attics.
3. In concealed spaces located directly beneath a roof.
4. Within the distance to a heat source as specified in Table P2904.2.2

TABLE P2904.2.2
LOCATIONS WHERE INTERMEDIATE TEMPERATURE SPRINKLERS ARE REQUIRED

HEAT SOURCE	RANGE OF DISTANCE FROM HEAT SOURCE WITHIN WHICH INTERMEDIATE TEMPERATURE SPRINKLERS ARE REQUIRED [a,b] (inches)
Fireplace, Side of Open or Recessed Fireplace	12 to 36
Fireplace, Front of Recessed Fireplace	36 to 60
Coal and Wood Burning Stove	12 to 42
Kitchen Range Top	9 to 18
Oven	9 to 18
Vent Connector or Chimney Connector	9 to 18
~~Heating Duct, Not Insulated~~	~~9 to 18~~

TABLE P2904.2.2
LOCATIONS WHERE INTERMEDIATE TEMPERATURE SPRINKLERS ARE REQUIRED
(continued)

HEAT SOURCE	RANGE OF DISTANCE FROM HEAT SOURCE WITHIN WHICH INTERMEDIATE TEMPERATURE SPRINKLERS ARE REQUIRED [a,b]
Hot Water Pipe, Not Insulated	6 to 12
Side of Ceiling or Wall Warm Air Register	12 to 24
Front of Wall Mounted Warm Air Register	18 to 36
Water Heater, Furnace, or Boiler	3 to 6
Luminaire Up to 250 Watts	3 to 6
Luminaire 250 Watts Up to 499 Watts	6 to 12

a. Sprinklers shall not be located at distances less than the minimum table distance unless the sprinkler listing allows a lesser distance.
b. Distances shall be measured in a straight line from the nearest edge of the heat source to the nearest edge of the sprinkler.

P2904.2.3 Freezing areas. Piping shall be protected from freezing as required by Section P2603.6. Where sprinklers are required in areas that are subject to freezing, dry-sidewall or dry-pendent sprinklers extending from a non-freezing area into a freezing area shall be installed.

P2904.2.4 Sprinkler coverage. Sprinkler coverage requirements and sprinkler obstruction requirements shall be in accordance with Sections P2904.2.4.1 and P2904.2.4.2.

P2904.2.4.1 Coverage area limit. The area of coverage of a single sprinkler shall not exceed 400 square feet and shall be based on the sprinkler listing and the sprinkler manufacturer's installation instructions.

P2904.2.4.2 Obstructions to coverage. Sprinkler discharge shall not be blocked by obstructions unless additional sprinklers are installed to protect the obstructed area. Sprinkler separation from obstructions shall comply with the minimum distances specified in the sprinkler manufacturer's instructions.

P2904.2.4.2.1 Additional requirements for pendent sprinklers. Pendent sprinklers within 3 feet of the center of a ceiling fan, surface-mounted ceiling luminaire or similar object shall be considered to be obstructed, and additional sprinklers shall be provided.

P2904.2.4.2.2. Additional requirements for sidewall sprinklers. Sidewall sprinklers within 5 feet of the center of a ceiling fan, surface-mounted ceiling luminaire or similar object shall be considered to be obstructed, and additional sprinklers shall be provided.

P2904.2.5 Sprinkler installation on systems assembled with solvent cement. The solvent cementing of fittings shall be completed and threaded adapters for sprinklers shall be verified as being clear of excess cement prior to the installation of sprinklers on systems assembled with solvent cement.

P2904.2.6 Sprinkler modifications prohibited. Painting, caulking or modifying of sprinklers shall be prohibited. Sprinklers that have been painted, caulked, modified or damaged shall be replaced with new sprinklers.

P2904.3 Sprinkler piping system. Sprinkler piping shall comply with all requirements for cold water distribution piping. Sprinkler piping shall connect to and be a part of the cold water distribution piping system.

P2904.3.1 Nonmetallic pipe and tubing. Nonmetallic pipe and tubing, such as CPVC and PEX, shall be listed for use in residential fire sprinkler systems.

P2904.3.1.1 Nonmetallic pipe protection. Nonmetallic pipe and tubing systems shall be protected from exposure to the living space by a layer of not less than 3/8 inch thick gypsum wallboard, 1/2 inch thick plywood, or other material having a 15 minute fire rating.

Exceptions.

1. Pipe protection shall not be required in areas that are not required to be protected with sprinklers as specified in Section P2904.1.1.

2. Pipe protection shall not be required where exposed piping is permitted by the pipe listing.

P2904.3.2 Shutoff valves prohibited. With the exception of shutoff valves for the entire water distribution system, valves shall not be installed in any location where the valve would isolate piping serving one or more sprinklers.

P2904.3.3 Single dwelling limit. Piping beyond the service valve located at the beginning of the water distribution system shall not serve more than one dwelling.

P2904.4 Determining system design flow. The flow for sizing the sprinkler piping system shall be based on the flow rating of each sprinkler in accordance with Section P2904.4.1 and the calculation in accordance with Section P2904.4.2.

P2904.4.1 Determining required flow rate for each sprinkler. The minimum required flow for each sprinkler shall be determined using the sprinkler manufacturer's published data for the specific sprinkler model based on all of the following:

1. The area of coverage
2. The ceiling configuration
3. The temperature rating
4. Any additional conditions specified by the sprinkler manufacturer.

P2904.4.2 System design flow rate. The design flow rate for the system shall be based on the following:

1. The design flow rate for a room having only one sprinkler shall be the flow rate required for that sprinkler, as determined by Section P2904.4.1.
2. The design flow rate for a room having two or more sprinklers a shall be determined by identifying the sprinkler in that room with the highest required flow rate, based on Section P2904.4.1, and multiplying that flow rate by 2.
3. Where the sprinkler manufacturer specifies different criteria for ceiling configurations that are not smooth, flat and horizontal, the required flow rate for that room shall comply with the sprinkler manufacturer's instructions.
4. The design flow rate for the sprinkler system shall be the flow required by the room with the largest flow rate, based on Items 1, 2 and 3.
5. For the purpose of this section, it shall be permissible to reduce the design flow rate for a room by subdividing the space into two or more rooms, where each room is evaluated separately with respect to the required design flow rate. Each room shall be bounded by walls and a ceiling. Openings in walls shall have a lintel not less than 8 inches in depth and each lintel shall form a solid barrier between the ceiling and the top of the opening.

P2904.5 Water supply. The water supply shall provide not less than the required design flow rate for sprinklers in accordance with Section P2904.4.2 at a pressure not less than that used to comply with Section P2904.6.

P2904.5.1 Water supply from individual sources. Where a dwelling unit water supply is from a tank system, a private well system, or a combination of these, the available water supply shall be based on the minimum pressure control setting for the pump.

P2904.5.2. Required capacity. The water supply shall have the capacity to provide the required design flow rate for sprinklers for a period of time as follows:

1. 7 minutes for dwelling units less than 2,000 square feet in area
2. 10 minutes for dwelling units equal to or greater than 2,000 square feet in area.

Where a well system, a water supply tank system, or a combination thereof, is used, any combination of well capacity and tank storage shall be permitted to meet the capacity requirement.

P2904.6 Pipe sizing. The piping to sprinklers shall be sized for the flow required by Section P2904.4.2. The flow required to supply the plumbing fixtures shall not be required to be added to the sprinkler design flow.

P2904.6.1 Method of sizing pipe. Piping supplying sprinklers shall be sized using the prescriptive method in Sections P2904.6.2 or by hydraulic calculation in accordance with NFPA 13D. The minimum pipe size from the water supply source to any sprinkler shall be 3/4 inch nominal. Threaded adapter fittings at the point where sprinklers are attached to the piping shall be a minimum of ½ inch nominal.

P2904.6.2 Prescriptive pipe sizing method. Pipe shall be sized by determining the available pressure to offset friction loss in piping and identifying a piping material, diameter and length using the equation in Section P2904.6.2.1 and the procedure in Section P2904.6.2.2.

P2904.6.2.1 Available pressure equation. The pressure available to offset friction loss in the interior piping system (P_t) shall be determined in accordance with the Equation 29-1.

$$P_t = P_{sup} - PL_{svc} - PL_m - PL_d - PL_e - P_{sp} \quad \textbf{(Equation 29-1)}$$

Where:

P_t = Pressure used in applying Tables P2904.6.2(4) through P2904.6.2(9).
P_{sup} = Pressure available from the water supply source.
PL_{svc} = Pressure loss in the water-service pipe.
PL_m = Pressure loss in the water meter.
PL_d = Pressure loss from devices other than the water meter.
PL_e = Pressure loss associated with changes in elevation.
P_{sp} = Maximum pressure required by a sprinkler

2904.6.2.2 Calculation procedure. Determination of the required size for water distribution piping shall be in accordance with the following procedure:

Step 1 - Determine P_{sup}
Obtain the supply pressure that will be available from the water main from the water purveyor, or for an individual source, the available supply pressure shall be in accordance with Section P2904.5.1. The pressure shall be the residual pressure available at the flow rate used when applying Table P2904.6.2(1).

Step 2 – Determine PL_{svc}
Use Table P2904.6.2(1) to determine the pressure loss in the water service pipe based on the selected size of the water service.

Step 3 – Determine PL_m
Use Table P2904.6.2(2) to determine the pressure loss from the water meter. based on the selected water meter size.

Step 4 – Determine PL_d
Determine the pressure loss from devices, other than the water meter, installed in the piping system supplying sprinklers, such as pressure-reducing valves, backflow preventers, water softeners or water filters. Device pressure losses shall be based on the device manufacturer's specifications. The flow rate used to determine pressure loss shall be the rate from Section P2904.4.2, except that 5 gpm shall be added where the device is installed in a water-service pipe that supplies more than one dwelling. As alternative to deducting pressure loss for a device, an automatic bypass valve shall be installed to divert flow around the device when a sprinkler activates.

Step 5 – Determine PL_e
Use Table P2904.6.2(3) to determine the pressure loss associated with changes in elevation. The elevation used in applying the table shall be the difference between the elevation where the water source pressure was measured and the elevation of the highest sprinkler.

Step 6 – Determine P_{sp}
Determine the maximum pressure required by any individual sprinkler based on the flow rate from Section P2904.4.1. The required pressure is provided in the sprinkler manufacturer's published data for the specific sprinkler model based on the selected flow rate.

Step 7 – Calculate P_t
Using Equation 29-1, calculate the pressure available to offset friction loss in water-distribution piping between the service valve and the sprinklers.

Step 8 – Determine the maximum allowable pipe length

Use Tables P2904.6.2(4) through P2904.6.2(9) to select a material and size for water distribution piping. The piping material and size shall be acceptable if the developed length of pipe between the service valve the most remote sprinkler does not exceed the maximum allowable length specified by the applicable table. Interpolation of P_t between the tabular values shall be permitted.

The maximum allowable length of piping in Tables P2904.6.2(4) through P2904.6.2(9) incorporates an adjustment for pipe fittings, and no additional consideration of friction losses associated with pipe fittings shall be required.

P2904.7 Instructions and signs. An owner's manual for the fire sprinkler system shall be provided to the owner. A sign or valve tag shall be installed at the main shutoff valve to the water distribution system stating the following: "Warning, the water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign."

P2904.8 Inspections. The water distribution system shall be inspected in accordance with Sections P2904.8.1 and P2904.8.2.

P2904.8.1 Pre-concealment Inspection. The following items shall be verified prior to the concealment of any sprinkler system piping:

1. Sprinklers are installed in all areas as required by Section P2904.1.1.
2. Where sprinkler water spray patterns are obstructed by construction features, luminaires or ceiling fans, additional sprinklers are installed as required by Section P2904.2.4.2.
3. Sprinklers are the correct temperature rating and are installed at or beyond the required separation distances from heat sources as required by Sections P2904.2.1 and P2904.2.2.
4. The pipe size equals or exceeds the size used in applying Tables P2904.6.2(4) through P2904.6.2(9) or, if the piping system was hydraulically calculated in accordance with Section P2904.6.1, the size used in the hydraulic calculation.
5. The pipe length does not exceed the length permitted by Tables P2904.6.2(4) through P2904.6.2(9) or, if the piping system was hydraulically calculated in accordance with Section P2904.6.1, pipe lengths and fittings do not exceed those used in the hydraulic calculation.
6. Non-metallic piping that conveys water to sprinklers is listed for use with fire sprinklers.
7. Piping is supported in accordance with the pipe manufacturer's and sprinkler manufacturer's installation instructions.
8. The piping system is tested in accordance with Section P2503.6

P2904.8.2 Final Inspection. The following items shall be verified upon completion of the system:

1. Sprinkler are not painted, damaged or otherwise hindered from operation.
2. Where a pump is required to provide water to the system, the pump starts automatically upon system water demand.
3. Pressure reducing valves, water softeners, water filters or other impairments to water flow that were not part of the original design have not been installed.
4. The sign or valve tag required by Section P2904.7 is installed and the owner's manual for the system is present.

TABLE P2904.6.2(1)
WATER SERVICE PRESSURE LOSS (PL_{SVC})[a, b]
(Underlining of table omitted for clarity)

Flow Rate[c]	3/4" Water Service Pressure Loss (psi)				1" Water Service Pressure Loss (psi)				1-1/4" Water Service Pressure Loss (psi)			
(gpm)	40' or less	41' to 75'	76' to 100'	101' to 150'	40' or less	41' to 75'	76' to 100'	101' to 150'	40' or less	41' to 75'	76' to 100'	101' to 150'
8	5.1	8.7	11.8	17.4	1.5	2.5	3.4	5.1	0.6	1.0	1.3	1.9
10	7.7	13.1	17.8	26.3	2.3	3.8	5.2	7.7	0.8	1.4	2.0	2.9
12	10.8	18.4	24.9	NP	3.2	5.4	7.3	10.7	1.2	2.0	2.7	4.0
14	14.4	24.5	NP	NP	4.2	7.1	9.6	14.3	1.6	2.7	3.6	5.4
16	18.4	NP	NP	NP	5.4	9.1	12.4	18.3	2.0	3.4	4.7	6.9
18	22.9	NP	NP	NP	6.7	11.4	15.4	22.7	2.5	4.3	5.8	8.6
20	27.8	NP	NP	NP	8.1	13.8	18.7	27.6	3.1	5.2	7.0	10.4
22	NP	NP	NP	NP	9.7	16.5	22.3	NP	3.7	6.2	8.4	12.4
24	NP	NP	NP	NP	11.4	19.3	26.2	NP	4.3	7.3	9.9	14.6
26	NP	NP	NP	NP	13.2	22.4	NP	NP	5.0	8.5	11.4	16.9
28	NP	NP	NP	NP	15.1	25.7	NP	NP	5.7	9.7	13.1	19.4
30	NP	NP	NP	NP	17.2	NP	NP	NP	6.5	11.0	14.9	22.0
32	NP	NP	NP	NP	19.4	NP	NP	NP	7.3	12.4	16.8	24.8
34	NP	NP	NP	NP	21.7	NP	NP	NP	8.2	13.9	18.8	NP
36	NP	NP	NP	NP	24.1	NP	NP	NP	9.1	15.4	20.9	NP

NP - Not permitted. Pressure loss exceeds reasonable limits

a. Values are applicable for underground piping materials listed in Table P2904.4 and are based on an SDR of 11 and a Hazen Williams C Factor of 150.

b. Values include the following length allowances for fittings: 25% length increase for actual lengths up to 100 feet and 15% length increase for actual lengths over 100 feet.

c. Flow rate from Section P2904.4.2. Add 5 gpm to the flow rate required by Section P2904.4.2 where the water-service pipe supplies more than one dwelling.

TABLE P2904.6.2(2)
MINIMUM WATER METER PRESSURE LOSS (PL_M)[A]

FLOW RATE (GPM)[B]	5/8" METER PRESSURE LOSS (PSI)	3/4" METER PRESSURE LOSS (PSI)
8	2	1
10	3	1
12	4	1
14	5	2
16	7	3
18	9	4
20	11	4
22	NP	5
24	NP	5
26	NP	6
28	NP	6
30	NP	7
32	NP	7
34	NP	8
36	NP	8

NP - Not permitted unless the actual water meter pressure loss is known.

a. Table 2904.6.2(2) establishes conservative values for water meter pressure loss or installations where the water meter loss is unknown. Where the actual water meter pressure loss is known, P_m shall be the actual loss.

b. Flow rate from Section P2904.4.2. Add 5 gpm to the flow rate required by Section P2904.4.2 where the water-service pipe supplies more than one dwelling.

TABLE P2904.6.2(3)
ELEVATION LOSS (PL_E)

ELEVATION (FEET)	PRESSURE LOSS (PSI)
5	2.2
10	4.4
15	6.5
20	8.7
25	10.9
30	13
35	15.2
40	17.4

TABLE P2904.6.2(4)
ALLOWABLE PIPE LENGTH FOR ¾ INCH TYPE M COPPER WATER TUBING
(Underlining of table omitted for clarity)

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	3/4	217	289	361	434	506	578	650	723	795	867
9	3/4	174	232	291	349	407	465	523	581	639	697
10	3/4	143	191	239	287	335	383	430	478	526	574
11	3/4	120	160	200	241	281	321	361	401	441	481
12	3/4	102	137	171	205	239	273	307	341	375	410
13	3/4	88	118	147	177	206	235	265	294	324	353
14	3/4	77	103	128	154	180	205	231	257	282	308
15	3/4	68	90	113	136	158	181	203	226	248	271
16	3/4	60	80	100	120	140	160	180	200	220	241
17	3/4	54	72	90	108	125	143	161	179	197	215
18	3/4	48	64	81	97	113	129	145	161	177	193
19	3/4	44	58	73	88	102	117	131	146	160	175
20	3/4	40	53	66	80	93	106	119	133	146	159
21	3/4	36	48	61	73	85	97	109	121	133	145
22	3/4	33	44	56	67	78	89	100	111	122	133
23	3/4	31	41	51	61	72	82	92	102	113	123
24	3/4	28	38	47	57	66	76	85	95	104	114
25	3/4	26	35	44	53	61	70	79	88	97	105
26	3/4	24	33	41	49	57	65	73	82	90	98
27	3/4	23	30	38	46	53	61	69	76	84	91
28	3/4	21	28	36	43	50	57	64	71	78	85
29	3/4	20	27	33	40	47	53	60	67	73	80
30	3/4	19	25	31	38	44	50	56	63	69	75
31	3/4	18	24	29	35	41	47	53	59	65	71
32	3/4	17	22	28	33	39	44	50	56	61	67
33	3/4	16	21	26	32	37	42	47	53	58	63
34	3/4	NP	20	25	30	35	40	45	50	55	60
35	3/4	NP	19	24	28	33	38	42	47	52	57
36	3/4	NP	18	22	27	31	36	40	45	49	54
37	3/4	NP	17	21	26	30	34	38	43	47	51
38	3/4	NP	16	20	24	28	32	36	40	45	49
39	3/4	NP	15	19	23	27	31	35	39	42	46
40	3/4	NP	NP	18	22	26	29	33	37	40	44

NP - Not permitted

a. Flow rate from Section P2904.4.2

TABLE P2904.6.2(5)
ALLOWABLE PIPE LENGTH FOR 1 INCH TYPE M COPPER WATER TUBING
(Underlining of table omitted for clarity)

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler (feet)									
8	1	806	1075	1343	1612	1881	2149	2418	2687	2955	3224
9	1	648	864	1080	1296	1512	1728	1945	2161	2377	2593
10	1	533	711	889	1067	1245	1422	1600	1778	1956	2134
11	1	447	596	745	894	1043	1192	1341	1491	1640	1789
12	1	381	508	634	761	888	1015	1142	1269	1396	1523
13	1	328	438	547	657	766	875	985	1094	1204	1313
14	1	286	382	477	572	668	763	859	954	1049	1145
15	1	252	336	420	504	588	672	756	840	924	1008
16	1	224	298	373	447	522	596	671	745	820	894
17	1	200	266	333	400	466	533	600	666	733	799
18	1	180	240	300	360	420	479	539	599	659	719
19	1	163	217	271	325	380	434	488	542	597	651
20	1	148	197	247	296	345	395	444	493	543	592
21	1	135	180	225	270	315	360	406	451	496	541
22	1	124	165	207	248	289	331	372	413	455	496
23	1	114	152	190	228	267	305	343	381	419	457
24	1	106	141	176	211	246	282	317	352	387	422
25	1	98	131	163	196	228	261	294	326	359	392
26	1	91	121	152	182	212	243	273	304	334	364
27	1	85	113	142	170	198	226	255	283	311	340
28	1	79	106	132	159	185	212	238	265	291	318
29	1	74	99	124	149	174	198	223	248	273	298
30	1	70	93	116	140	163	186	210	233	256	280
31	1	66	88	110	132	153	175	197	219	241	263
32	1	62	83	103	124	145	165	186	207	227	248
33	1	59	78	98	117	137	156	176	195	215	234
34	1	55	74	92	111	129	148	166	185	203	222
35	1	53	70	88	105	123	140	158	175	193	210
36	1	50	66	83	100	116	133	150	166	183	199
37	1	47	63	79	95	111	126	142	158	174	190
38	1	45	60	75	90	105	120	135	150	165	181
39	1	43	57	72	86	100	115	129	143	158	172
40	1	41	55	68	82	96	109	123	137	150	164

a. Flow rate from Section P2904.4.2

TABLE P2904.6.2(6)
ALLOWABLE PIPE LENGTH FOR ¾ INCH CPVC PIPE
(Underling of table omitted for clarity)

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	3/4	348	465	581	697	813	929	1045	1161	1278	1394
9	3/4	280	374	467	560	654	747	841	934	1027	1121
10	3/4	231	307	384	461	538	615	692	769	845	922
11	3/4	193	258	322	387	451	515	580	644	709	773
12	3/4	165	219	274	329	384	439	494	549	603	658
13	3/4	142	189	237	284	331	378	426	473	520	568
14	3/4	124	165	206	247	289	330	371	412	454	495
15	3/4	109	145	182	218	254	290	327	363	399	436
16	3/4	97	129	161	193	226	258	290	322	354	387
17	3/4	86	115	144	173	202	230	259	288	317	346
18	3/4	78	104	130	155	181	207	233	259	285	311
19	3/4	70	94	117	141	164	188	211	234	258	281
20	3/4	64	85	107	128	149	171	192	213	235	256
21	3/4	58	78	97	117	136	156	175	195	214	234
22	3/4	54	71	89	107	125	143	161	179	197	214
23	3/4	49	66	82	99	115	132	148	165	181	198
24	3/4	46	61	76	91	107	122	137	152	167	183
25	3/4	42	56	71	85	99	113	127	141	155	169
26	3/4	39	52	66	79	92	105	118	131	144	157
27	3/4	37	49	61	73	86	98	110	122	135	147
28	3/4	34	46	57	69	80	92	103	114	126	137
29	3/4	32	43	54	64	75	86	96	107	118	129
30	3/4	30	40	50	60	70	81	91	101	111	121
31	3/4	28	38	47	57	66	76	85	95	104	114
32	3/4	27	36	45	54	63	71	80	89	98	107
33	3/4	25	34	42	51	59	68	76	84	93	101
34	3/4	24	32	40	48	56	64	72	80	88	96
35	3/4	23	30	38	45	53	61	68	76	83	91
36	3/4	22	29	36	43	50	57	65	72	79	86
37	3/4	20	27	34	41	48	55	61	68	75	82
38	3/4	20	26	33	39	46	52	59	65	72	78
39	3/4	19	25	31	37	43	50	56	62	68	74
40	3/4	18	24	30	35	41	47	53	59	65	71

a. Flow rate from Section P2904.4.2

TABLE P2904.6.2(7)
ALLOWABLE PIPE LENGTH FOR 1 INCH CPVC PIPE
(Underlining of table omitted for clarity)

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler (feet)									
8	1	1049	1398	1748	2098	2447	2797	3146	3496	3845	4195
9	1	843	1125	1406	1687	1968	2249	2530	2811	3093	3374
10	1	694	925	1157	1388	1619	1851	2082	2314	2545	2776
11	1	582	776	970	1164	1358	1552	1746	1940	2133	2327
12	1	495	660	826	991	1156	1321	1486	1651	1816	1981
13	1	427	570	712	854	997	1139	1281	1424	1566	1709
14	1	372	497	621	745	869	993	1117	1241	1366	1490
15	1	328	437	546	656	765	874	983	1093	1202	1311
16	1	291	388	485	582	679	776	873	970	1067	1164
17	1	260	347	433	520	607	693	780	867	954	1040
18	1	234	312	390	468	546	624	702	780	858	936
19	1	212	282	353	423	494	565	635	706	776	847
20	1	193	257	321	385	449	513	578	642	706	770
21	1	176	235	293	352	410	469	528	586	645	704
22	1	161	215	269	323	377	430	484	538	592	646
23	1	149	198	248	297	347	396	446	496	545	595
24	1	137	183	229	275	321	366	412	458	504	550
25	1	127	170	212	255	297	340	382	425	467	510
26	1	118	158	197	237	276	316	355	395	434	474
27	1	111	147	184	221	258	295	332	368	405	442
28	1	103	138	172	207	241	275	310	344	379	413
29	1	97	129	161	194	226	258	290	323	355	387
30	1	91	121	152	182	212	242	273	303	333	364
31	1	86	114	143	171	200	228	257	285	314	342
32	1	81	108	134	161	188	215	242	269	296	323
33	1	76	102	127	152	178	203	229	254	280	305
34	1	72	96	120	144	168	192	216	240	265	289
35	1	68	91	114	137	160	182	205	228	251	273
36	1	65	87	108	130	151	173	195	216	238	260
37	1	62	82	103	123	144	165	185	206	226	247
38	1	59	78	98	117	137	157	176	196	215	235
39	1	56	75	93	112	131	149	168	187	205	224
40	1	53	71	89	107	125	142	160	178	196	214

a. Flow rate from Section P2904.4.2

TABLE P2904.6.2(8)
ALLOWABLE PIPE LENGTH FOR ¾ INCH PEX TUBING
(Underlining of table omitted for clarity)

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	3/4	93	123	154	185	216	247	278	309	339	370
9	3/4	74	99	124	149	174	199	223	248	273	298
10	3/4	61	82	102	123	143	163	184	204	225	245
11	3/4	51	68	86	103	120	137	154	171	188	205
12	3/4	44	58	73	87	102	117	131	146	160	175
13	3/4	38	50	63	75	88	101	113	126	138	151
14	3/4	33	44	55	66	77	88	99	110	121	132
15	3/4	29	39	48	58	68	77	87	96	106	116
16	3/4	26	34	43	51	60	68	77	86	94	103
17	3/4	23	31	38	46	54	61	69	77	84	92
18	3/4	21	28	34	41	48	55	62	69	76	83
19	3/4	19	25	31	37	44	50	56	62	69	75
20	3/4	17	23	28	34	40	45	51	57	62	68
21	3/4	16	21	26	31	36	41	47	52	57	62
22	3/4	NP	19	24	28	33	38	43	47	52	57
23	3/4	NP	17	22	26	31	35	39	44	48	52
24	3/4	NP	16	20	24	28	32	36	40	44	49
25	3/4	NP	NP	19	22	26	30	34	37	41	45
26	3/4	NP	NP	17	21	24	28	31	35	38	42
27	3/4	NP	NP	16	20	23	26	29	33	36	39
28	3/4	NP	NP	15	18	21	24	27	30	33	36
29	3/4	NP	NP	NP	17	20	23	26	28	31	34
30	3/4	NP	NP	NP	16	19	21	24	27	29	32
31	3/4	NP	NP	NP	15	18	20	23	25	28	30
32	3/4	NP	NP	NP	NP	17	19	21	24	26	28
33	3/4	NP	NP	NP	NP	16	18	20	22	25	27
34	3/4	NP	NP	NP	NP	NP	17	19	21	23	25
35	3/4	NP	NP	NP	NP	NP	16	18	20	22	24
36	3/4	NP	NP	NP	NP	NP	15	17	19	21	23
37	3/4	NP	NP	NP	NP	NP	NP	16	18	20	22
38	3/4	NP	NP	NP	NP	NP	NP	16	17	19	21
39	3/4	NP	NP	NP	NP	NP	NP	NP	16	18	20
40	3/4	NP	NP	NP	NP	NP	NP	NP	16	17	19

NP - Not permitted.

a. Flow rate from Section P2904.4.2.

TABLE P2904.6.2(9)
ALLOWABLE PIPE LENGTH FOR 1 INCH PEX TUBING
(Underlining of table omitted for clarity)

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	1	314	418	523	628	732	837	941	1046	1151	1255
9	1	252	336	421	505	589	673	757	841	925	1009
10	1	208	277	346	415	485	554	623	692	761	831
11	1	174	232	290	348	406	464	522	580	638	696
12	1	148	198	247	296	346	395	445	494	543	593
13	1	128	170	213	256	298	341	383	426	469	511
14	1	111	149	186	223	260	297	334	371	409	446
15	1	98	131	163	196	229	262	294	327	360	392
16	1	87	116	145	174	203	232	261	290	319	348
17	1	78	104	130	156	182	208	233	259	285	311
18	1	70	93	117	140	163	187	210	233	257	280
19	1	63	84	106	127	148	169	190	211	232	253
20	1	58	77	96	115	134	154	173	192	211	230
21	1	53	70	88	105	123	140	158	175	193	211
22	1	48	64	80	97	113	129	145	161	177	193
23	1	44	59	74	89	104	119	133	148	163	178
24	1	41	55	69	82	96	110	123	137	151	164
25	1	38	51	64	76	89	102	114	127	140	152
26	1	35	47	59	71	83	95	106	118	130	142
27	1	33	44	55	66	77	88	99	110	121	132
28	1	31	41	52	62	72	82	93	103	113	124
29	1	29	39	48	58	68	77	87	97	106	116
30	1	27	36	45	54	63	73	82	91	100	109
31	1	26	34	43	51	60	68	77	85	94	102
32	1	24	32	40	48	56	64	72	80	89	97
33	1	23	30	38	46	53	61	68	76	84	91
34	1	22	29	36	43	50	58	65	72	79	86
35	1	20	27	34	41	48	55	61	68	75	82
36	1	19	26	32	39	45	52	58	65	71	78
37	1	18	25	31	37	43	49	55	62	68	74
38	1	18	23	29	35	41	47	53	59	64	70
39	1	17	22	28	33	39	45	50	56	61	67
40	1	16	21	27	32	37	43	48	53	59	64

a. Flow rate from Section P2904.4.2.

2. Add standard to Chapter 13 as follows:

NFPA

13D-2007 Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason: Fire sprinklers are universally recognized as the most effective means of reducing America's fire losses and preventing firefighter deaths and injuries associated with firefighting operations. Both of these objectives are fundamental to the mission of the International Association of Fire Chiefs (IAFC). Through this proposal, the IAFC hopes to encourage more widespread use of residential sprinklers by establishing a simple, straightforward design methodology for residential sprinklers that should appeal to homebuilders and code officials.

Many stakeholders in the residential construction industry have conveyed in testimony before ICC that the IRC must include a prescriptive requirements for designing residential sprinklers before they can be mainstreamed into new home construction. While it is recognized that many people would simply prefer to reference NFPA 13D, this approach would be inconsistent with the underlying principle of the IRC, which is to serve as a stand-alone document for residential construction. That principle is reflected in the way that the IRC handles requirements for structural, mechanical, electrical and plumbing systems, and it makes sense for the IRC to handle fire-protection systems in a similar fashion.

As an organization dedicated to the advancement of residential sprinklers, IAFC chose to undertake the challenge of sponsoring this code change proposal to advance this concept. Provisions contained in this proposal were developed with input from a variety of interested parties, including the National Association of Homebuilders, and although NAHB was unable to consider endorsing this proposal prior to the code change submittal deadline, their input was helpful in developing the proposed text.

The proposed Section P2904 provides a simple, prescriptive and cost-effective approach to residential fire sprinkler systems that is fully contained in the IRC. This text will allow a contractor or homebuilder to install a residential sprinkler system without referencing another code or standard.

The requirements are intended to be fully consistent with NFPA 13D, but are simplified since Section 2904 only applies to multipurpose systems. Homebuilders will still have the option of using the nationally recognized standard, NFPA 13D, which allows an engineered design option and other piping configurations. The approach of including prescriptive tables in the IRC, but still permitting an engineered design alternative based on recognized standards, is utilized elsewhere in the IRC, and it is a logical way to handle residential sprinkler requirements. For example, consider the IRC's approach to structural design. In the case of floor systems, the IRC provides prescriptive span tables as a simple basis of design, but Section R301 gives the homebuilder an option to use an engineered design based on the IBC and ASCE 7, if desired.

A fundamental assumption of P2904 is that piping will comply with all of the requirements applicable to a residential plumbing system established by IRC Chapters 25-29. For this reason, there is no need to address special subjects, for example freeze protection, in P2904 since all residential plumbing is required to be protected by freezing, and installers of potable water systems will be familiar with local requirements for freeze protection.

Another fundamental assumption of Section 2904 is that the designer and installer will make use of the manufacturers' instructions for sprinklers and sprinkler pipe and that the instructions will include all of the basic requirements necessary to design and install these components. For this approach to be effective, it will be necessary for sprinkler manufacturers to agree to provide certain criteria, such as required separations from obstructions and installation requirements for complex ceilings, in the installation instructions. Currently, this information is provided by some manufacturers, while others simply defer to NFPA 13D. Efforts to establish minimum criteria for manufacturers instructions, based on the listing requirements, are already underway, and progress will be reported at ICC's public hearing.

Efforts have also been made to reach out to NFPA to explore the possibility of utilizing NFPA 13D text more directly in Section 2904, not unlike how provisions of the National Electrical Code are directly incorporated in the IRC electrical provisions in IRC Chapter 33.

Perhaps the most notable aspect of the proposed section is the tabular approach to dealing with hydraulic design. In an effort to simplify the design of residential sprinkler systems, comprehensive pipe sizing tables have been provided, which address elevation loss and all sources of pressure loss in a system as a basis for prescribing a maximum pipe length between the water supply and the most remote sprinkler. The tables accommodate different sizes for underground and aboveground piping and different meter sizes.

Given that a substantial portion of the cost of a sprinkler system installation can be associated with interior piping materials, a well-informed designer will consider cost-effective ways to increase the available pressure to interior piping (P_t) to permit smaller, less expensive interior piping and fittings. Equation 29-1 provides a framework for this approach by showing each source of pressure loss separately to facilitate this analysis. For example:

1. **For PL_{svc}:** Increasing the size of the water service pipe, which tends to be inexpensive, will reduce pressure loss in the service and increase available pressure to offset losses in water-distribution piping. This may result in being able to use smaller diameter water-distribution piping and fittings and in a reduction to overall system cost. It should be noted that much of the loss associated with the water service is often caused by friction loss in the service pipe versus loss in the water meter, and increasing the service pipe diameter while maintaining a smaller meter can be an inexpensive way to increase P_t.
2. **For PL_m:** Increasing the size of the water meter, may or may not be cost effective versus reducing the size of water distribution piping. In cases where the water purveyor charges capital recovery fees or standby charges for larger meters, using the smallest meter size, even if it results in larger water distribution piping, may be yield the lowest overall cost. Where upsizing the meter (or if it is permitted, using a different meter brand with better loss characteristics, without changing the meter size) can be done inexpensively, it can be a good way to increase available pressure to offset losses in water-distribution piping. This may result in being able to use smaller diameter water-distribution piping and fittings and in a reduction to overall system cost.

For simplicity, water distribution system tables have been developed for the three common interior piping materials used in these systems, copper, CPVC, and PEX. Because each material has a different inside diameter, separate tables are necessary to accommodate the different friction loss associated with each type of piping. Also for simplicity, the tables only address common pipe sizes used for residential sprinkler systems, which are ¾ and 1 inch, and the tables assume that pipe sizes will not be mixed. If different pipe sizes are desired to gain a hydraulic advantage, then the system must be hydraulically calculated.

Overall, the tables reflect conservative design assumptions. These include:

1. The tables use the Hazen-Williams equation for calculating the allowable length of pipe, which correlates with NFPA 13D.
2. The C-factor used for each piping material in the Hazen-Williams calculation was 150. This correlates with C-factors assigned by NFPA 13D.
3. Conservative values were used in calculating the limits on pipe length. A fitting factor that assumes a 25 percent increase over the actual pipe length to accommodate additional friction loss associated with pipe fittings. This means that the length of piping specified by the tables has been adjusted to accommodate a reasonable number of pipe fittings that would be expected. With the fittings already calculated into the length numbers in the tables, there is no need to separately consider losses in fittings.
4. A factor of safety is provided by assuming that the sprinkler requiring the greatest pressure and the room with the highest flow demand are always located at the most remote point in the system and that the most remote point in the system is always at the highest elevation, which typically will not be the case.

In conclusion, Section P2904 represents a major advancement in the effort to make residential sprinkler systems simple and affordable, and this proposal will serve as a basis for incorporating a prescriptive approach to residential sprinkler systems in the IRC.

Cost Impact: This proposal is expected to reduce the cost of construction by reducing design costs.

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

RP5–07/08
P3005.2.6

Proponent: Jud Collins, JULYCO, representing himself

Revise as follows:

P3005.2.6 Base of stacks. ~~Accessible cleanouts~~ A cleanout shall be provided ~~near~~ at the base of each ~~vertical~~ waste or soil stack. ~~Alternatively, such cleanouts shall be installed outside the building within 3 feet (914 mm) of the building wall.~~

Reason: The sentence proposed for deletion does not give enough information. How close does the stack have to be to the building wall? Which building wall is being referenced? As currently written, a stack could be located in the center of a dwelling 20 feet from any wall and the cleanout for the base of the stack could be located within 3 feet of any of the dwelling walls. This is clearly not the intent of the code. Therefore, the sentence needs to be deleted.

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

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

RP7–07/08
Chapter 43

Proponent: Standards writing organizations as listed below.

Revise standards as follows:

ASTM	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959
Standard reference number	Title
A 197/A197M—00(2006)	Specification for Cupola Malleable Iron
D 3035— 06 ~~03a~~	Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based On Controlled Outside Diameter

UL	Underwriters Laboratories 333 Pfingsten Road Northbrook, IL 60062
Standard reference number	Title
103—01	Factory-built Chimneys, for Residential Type and Building Heating Appliances with Revisions through ~~December 2005~~ June 2006

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 is 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 Plumbing and Mechanical 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.

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

RP8–07/08

AP101, All New Sections: AP101.1, AP102.1, AP102.2, AP102.3, Table AP102.3, AP103.1, AP104.1, AP104.2, AP105.1, AP105.1, AP105.2, AP106.1, AP106.1.1, AP106.2, AP106.3, AP107.1, AP107.2, AP107.2.1, AP108.1, AP108.2, AP108.3, AP109.1, AP109.2 AP109.3, AP109.3.1, AP109.3.2, AP110.1, T. AP109.2.1(1), T. AP109.2.1(2), T. AP109.2.1(3), T. AP109.2.1(4), T. AP109.2.1(5), T. AP109.2.1(6), T. AP109.2.1(7), T. AP109.2.1(8), T. AP109.2.1(9)

Proponent: Steven Orlowski, National Association of Home Builders

Revise as follows:

APPENDIX P
~~SPRINKLERS~~

~~**AP101 (Supp) Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new buildings and structures one and two family dwellings and townhouses in accordance with NFPA 13D.~~

FIRE SPRINKLER SYSTEMS

SECTION AP101
GENERAL

AP101.1 Scope. The provisions of this appendix shall control the design and installation of automatic fire sprinkler system in new one- and two-family dwellings and townhouses.

Exception: Residential fire sprinklers installed in accordance with NFPA 13D shall be permitted.

SECTION AP102
REQUIREMENTS FOR SPRINKLERS

AP102.1 Sprinklers. Sprinklers shall be listed residential sprinklers. Residential sprinklers shall be installed in accordance with the manufacturer's installation instructions.

AP102.2 Temperature rating and separation from heat sources. Sprinklers shall have a temperature rating of 135-170°F and shall be separated from heat sources as required by the manufacturer's instructions.

Exception: Sprinklers shall have a temperature rating of 175-225°F where installed in the following areas:

1. Directly under skylights where exposed to direct sunlight.
2. In attics or concealed spaces located directly beneath a roof.

AP102.3 Intermediate temperature sprinklers. Sprinklers located within the distance to a heat source as specified in Table AP102.3 shall have a temperature rating of 175-225°F.

TABLE AP102.3
DISTANCE FROM HEAT SOURCE

HEAT SOURCE	LOCATION OF SPRINKLER WITHIN DISTANCE TO HEAT SOURCE (INCH)
Fireplace, Side of Open or Recessed Fireplace	36
Fireplace, Front of Recessed Fireplace	84
Coal and Wood Burning Stove	42
Kitchen Range Top	18
Oven	18
Vent Connector or Chimney Connector	18
Heating Duct Not Insulated	18
Hot Water Pipe Not Insulated	12
Side of Ceiling or Wall Warm Air Register	24
Front of Wall Mounted Warm Air Register	36
Water Heater, Furnace, or Boiler	6
Luminaire, Up to 250 Watts	6
Luminaire, 251 Watts Up to 499 Watts	12

SECTION AP103
SPRINKLER COVERAGE

AP103.1 General. The area of coverage of the residential sprinklers shall be based on the manufacturer's installation instruction. The minimum area of coverage shall be 12 feet by 12 feet for each sprinkler. The maximum area of coverage shall be 20 feet by 20 feet.

SECTION AP104
SPRINKLER HYDRAULIC DEMAND

AP104.1 General The hydraulic demand, flow rate and minimum pressure, for each sprinkler shall be based on the area of coverage as specified in the manufacturer's installation instructions.

AP104.2 Hydraulic requirements. Where more than one sprinkler is located in a room, the hydraulic demand for the multiple sprinklers shall be based on two sprinklers discharging. A room shall be considered a space surrounded by walls, windows, doors, or lintels that are 8 inches or more in height.

SECTION AP105
SPRINKLERS REQUIRED

AP105.1 General. Sprinklers shall be provided to protect all areas of the dwelling unit except those areas specified in Section AP105.2.

AP105.2 Sprinklers not required. Sprinklers shall not be required in the following areas:

1. Attics and unfinished basements
2. Crawl spaces and closets
3. Bathrooms and toilet rooms
4. Garages and car ports
5. Accessory buildings not having sleeping rooms
6. Balconies, Breezeways, and decks

SECTION AP106
SPRINKLER PIPING

AP106.1 General. The sprinkler piping shall conform to the requirements for cold water distribution piping. Sprinkler piping shall connect to and be a part of the cold water distribution piping system.

AP106.1.1 Pipe protection. CPVC pipe, PEX tubing, PEX-Al-PEX tubing, and PE-AL-PE tubing shall be protected from exposure to the living space by a layer of 3/8 inch thick gypsum wallboard, 1/4 inch thick plywood, or other material having a 15 minute fire rating. Protection of the pipe shall not be required in areas not required to be protected with sprinklers as specified in Section AP105.2.

Exception. Protection shall not be required where exposure is permitted by the third party certification.

AP106.2 Water filtration or treatment systems. An automatic bypass valve shall be installed on all connections of the water distribution system to water filters, water softener or other water treatment systems that are located between the water service and any sprinkler.

Exception. Where hydraulic calculations verify that an automatic bypass valve is not required.

AP106.3 Shutoff valve limitation. A shutoff valve shall be prohibited from being installed in the water piping system such that the valve only isolates the water supply to a sprinkler or sprinklers.

SECTION AP107
PRIVATE WELLS

AP107.1 General. Sprinkler systems supplied by private well shall conform to the requirements of Section AP107.2 through AP107.2.1.

AP107.2 Well pump rating. The pump for a private well shall be rated for a minimum flow required for the entire sprinkler system. The minimum pressure setting of the pump shall be used for sizing the water piping system.

AP107.2.1 Capacity. For a well system, any combination of well capacity and tank storage shall provide a flow of water at the maximum sprinkler flow rate for a period of 7 minutes for dwelling units 2000 square feet or less in area and 10 minutes for dwelling units in excess of 2000 square feet.

SECTION AP108
SYSTEM DESIGN FLOW

AP108.1 Determining system design flow. The flow for sizing the sprinkler piping system shall be based on the flow rating of each sprinkler in accordance with Section AP108.2 and the calculation in accordance with Section AP108.3.

AP108.2 Determining required flow rate for each sprinkler. The minimum required flow for each sprinkler shall be determined using the sprinkler manufacturer's published data for the specific sprinkler model based on all of the following:

1. The area of coverage
2. The ceiling configuration
3. The temperature rating
4. Any additional conditions specified by the sprinkler manufacturer.

AP108.3 System design flow rate. The design flow rate for the system shall be based on the following:

1. The design flow rate for a room having only one sprinkler shall be the flow rate required for that sprinkler, as determined by Section AP108.1.
2. The design flow rate for a room having two or more sprinklers a shall be determined by identifying the sprinkler in that room with the highest required flow rate, based on Section AP108.1, and multiplying that flow rate by 2.
3. Where the sprinkler manufacturer specifies different criteria for ceiling configurations that are not smooth, flat and horizontal, the required flow rate for that room shall comply with the sprinkler manufacturer's instructions.
4. The design flow rate for the sprinkler system shall be the flow required by the room with the largest flow rate, based on Items 1, 2 and 3.
5. For the purpose of this section, it shall be permissible to reduce the design flow rate for a room by subdividing the space into two or more rooms, where each room is evaluated separately with respect to the required design flow rate. Each room shall be bounded by walls and a ceiling. Openings in walls shall have a lintel not less than 8 inches in depth and each lintel shall form a solid barrier between the ceiling and the top of the opening.

SECTION AP109
PIPE SIZING

AP109.1 General The piping to sprinklers shall be sized for the flow required by Section AP108.3. The flow required to supply the plumbing fixtures shall not be required to be added to the sprinkler design flow.

AP109.2 Method of sizing pipe. Piping supplying sprinklers shall be sized using the prescriptive method in Sections AP109.3 or by hydraulic calculation in accordance with NFPA 13D. The minimum pipe size from the water supply source to any sprinkler shall be 3/4 inch nominal. Threaded adapter fittings at the point where sprinklers are attached to the piping shall be a minimum of ½ inch nominal.

AP109.3 Prescriptive pipe sizing method. Pipe shall be sized by determining the available pressure to offset friction loss in piping and identifying a piping material, diameter and length using the equation in Section AP109.3.1 and the procedure in Section AP109.3.2.

AP109.3.1 Available pressure equation. The pressure available to offset friction loss in the interior piping system (P_t) shall be determined in accordance with the Equation AP-1.

$$P_t = P_{sup} - PL_{svc} - PL_m - PL_d - PL_e - P_{sp} \qquad \textbf{(Equation AP-1)}$$

Where:

P_t = Pressure used in applying Tables AP109.2.1(4) through AP190.2.1(9).
$P_{sup.}$ = Pressure available from the water supply source.
PL_{svc} = Pressure loss in the water-service pipe.
PL_m = Pressure loss in the water meter.
$PL_{d.}$ = Pressure loss from devices other than the water meter.
PL_e = Pressure loss associated with changes in elevation.
P_{sp} = Maximum pressure required by a sprinkler

AP109.3.2 Calculation procedure. Determination of the required size for water distribution piping shall be in accordance with the following procedure:

Step 1 - Determine P_{sup}
Obtain the supply pressure that will be available from the water main from the water purveyor, or for an individual source, the available supply pressure. The pressure shall be the residual pressure available at the flow rate used when applying Table AP109.2.1 (1).

Step 2 – Determine PL_{svc}
Use Table AP109.2.1 (1) to determine the pressure loss in the water service pipe based on the selected size of the water service.

Step 3 – Determine PL_m
Use Table AP109.2.1 (2) to determine the pressure loss from the water meter. based on the selected water meter size.

Step 4 – Determine PL_d
Determine the pressure loss from devices, other than the water meter, installed in the piping system supplying sprinklers, such as pressure-reducing valves, backflow preventers, water softeners or water filters. Device pressure losses shall be based on the device manufacturer's specifications. The flow rate used to determine pressure loss shall be the rate from Section AP108.2, except that 5 gpm shall be added where the device is installed in a water-service pipe that supplies more than one dwelling. As alternative to deducting pressure loss for a device, an automatic bypass valve shall be installed to divert flow around the device when a sprinkler activates.

Step 5 – Determine PL_e
Use Table AP109.2.1 (3) to determine the pressure loss associated with changes in elevation. The elevation used in applying the table shall be the difference between the elevation where the water source pressure was measured and the elevation of the highest sprinkler.

Step 6 – Determine P_{sp}
Determine the maximum pressure required by any individual sprinkler based on the flow rate from Section AP108.1. The required pressure is provided in the sprinkler manufacturer's published data for the specific sprinkler model based on the selected flow rate.

Step 7 – Calculate P_t
Using Equation AP-1, calculate the pressure available to offset friction loss in water-distribution piping between the service valve and the sprinklers.

Step 8 – Determine the maximum allowable pipe length
Use Tables AP109.2.1 (4) through AP109.2.1 (9) to select a material and size for water distribution piping. The piping material and size shall be acceptable if the developed length of pipe between the service valve the most remote sprinkler does not exceed the maximum allowable length specified by the applicable table. Interpolation of P_t between the tabular values shall be permitted.

The maximum allowable length of piping in Tables AP109.2.1 (4) through AP109.2.1 (9) incorporates an adjustment for pipe fittings, and no additional consideration of friction losses associated with pipe fittings shall be required.

SECTION AP110
SIGNS

AP110.1 Valve Sign. A sign shall be installed at the main shutoff valve to the water distribution system stating "Warning, the water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign."

TABLE AP109.2.1(1)
WATER SERVICE PRESSURE LOSS (PL_{SVC})[a, b]
(Underlining of table omitted for clarity)

Flow Rate[c]	3/4" Water Service Pressure Loss (psi)				1" Water Service Pressure Loss (psi)				1-1/4" Water Service Pressure Loss (psi)			
(gpm)	40' or less	41' to 75'	76' to 100'	101' to 150'	40' or less	41' to 75'	76' to 100'	101' to 150'	40' or less	41' to 75'	76' to 100'	101' to 150'
8	5.1	8.7	11.8	17.4	1.5	2.5	3.4	5.1	0.6	1.0	1.3	1.9
10	7.7	13.1	17.8	26.3	2.3	3.8	5.2	7.7	0.8	1.4	2.0	2.9
12	10.8	18.4	24.9	NP	3.2	5.4	7.3	10.7	1.2	2.0	2.7	4.0
14	14.4	24.5	NP	NP	4.2	7.1	9.6	14.3	1.6	2.7	3.6	5.4
16	18.4	NP	NP	NP	5.4	9.1	12.4	18.3	2.0	3.4	4.7	6.9
18	22.9	NP	NP	NP	6.7	11.4	15.4	22.7	2.5	4.3	5.8	8.6
20	27.8	NP	NP	NP	8.1	13.8	18.7	27.6	3.1	5.2	7.0	10.4
22	NP	NP	NP	NP	9.7	16.5	22.3	NP	3.7	6.2	8.4	12.4
24	NP	NP	NP	NP	11.4	19.3	26.2	NP	4.3	7.3	9.9	14.6
26	NP	NP	NP	NP	13.2	22.4	NP	NP	5.0	8.5	11.4	16.9
28	NP	NP	NP	NP	15.1	25.7	NP	NP	5.7	9.7	13.1	19.4
30	NP	NP	NP	NP	17.2	NP	NP	NP	6.5	11.0	14.9	22.0
32	NP	NP	NP	NP	19.4	NP	NP	NP	7.3	12.4	16.8	24.8
34	NP	NP	NP	NP	21.7	NP	NP	NP	8.2	13.9	18.8	NP
36	NP	NP	NP	NP	24.1	NP	NP	NP	9.1	15.4	20.9	NP

NP - Not permitted. Pressure loss exceeds reasonable limits

a. Values are applicable for underground piping materials listed in Table P2904.4 and are based on an SDR of 11 and a Hazen Williams C Factor of 150.
b. Values include the following length allowances for fittings: 25% length increase for actual lengths up to 100 feet and 15% length increase for actual lengths over 100 feet.
c. Flow rate from Section AP108.2. Add 5 gpm to the flow rate required by Section AP108.2 where the water-service pipe supplies more than one dwelling.

TABLE AP109.2.1(2)
MINIMUM WATER METER PRESSURE LOSS (PL_m)[a]

Flow Rate (gpm)[b]	5/8" Meter Pressure Loss (psi)	3/4" Meter Pressure Loss (psi)
8	2	1
10	3	1
12	4	1
14	5	2
16	7	3
18	9	4
20	11	4
22	NP	5
24	NP	5
26	NP	6
28	NP	6
30	NP	7
32	NP	7
34	NP	8
36	NP	8

NP - Not permitted unless the actual water meter pressure loss is known.

a. Table AP109.2.1(2) establishes conservative values for water meter pressure loss for installations where the water meter loss is unknown. Where the actual water meter pressure loss is known, P_m shall be the actual loss.

b. Flow rate from Section AP108.2. Add 5 gpm to the flow rate required by Section AP108.2 where the water-service pipe supplies more than one dwelling.

TABLE AP109.2.1(3)
ELEVATION LOSS (PL_e)

Elevation (feet)	Pressure Loss (psi)
5	2.2
10	4.4
15	6.5
20	8.7
25	10.9
30	13
35	15.2
40	17.4

TABLE AP109.2.1 (4)
ALLOWABLE PIPE LENGTH FOR ¾ INCH TYPE M COPPER WATER TUBING

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	3/4	217	289	361	434	506	578	650	723	795	867
9	3/4	174	232	291	349	407	465	523	581	639	697
10	3/4	143	191	239	287	335	383	430	478	526	574
11	3/4	120	160	200	241	281	321	361	401	441	481
12	3/4	102	137	171	205	239	273	307	341	375	410
13	3/4	88	118	147	177	206	235	265	294	324	353
14	3/4	77	103	128	154	180	205	231	257	282	308
15	3/4	68	90	113	136	158	181	203	226	248	271
16	3/4	60	80	100	120	140	160	180	200	220	241
17	3/4	54	72	90	108	125	143	161	179	197	215
18	3/4	48	64	81	97	113	129	145	161	177	193
19	3/4	44	58	73	88	102	117	131	146	160	175
20	3/4	40	53	66	80	93	106	119	133	146	159
21	3/4	36	48	61	73	85	97	109	121	133	145
22	3/4	33	44	56	67	78	89	100	111	122	133
23	3/4	31	41	51	61	72	82	92	102	113	123
24	3/4	28	38	47	57	66	76	85	95	104	114
25	3/4	26	35	44	53	61	70	79	88	97	105
26	3/4	24	33	41	49	57	65	73	82	90	98
27	3/4	23	30	38	46	53	61	69	76	84	91
28	3/4	21	28	36	43	50	57	64	71	78	85
29	3/4	20	27	33	40	47	53	60	67	73	80
30	3/4	19	25	31	38	44	50	56	63	69	75
31	3/4	18	24	29	35	41	47	53	59	65	71
32	3/4	17	22	28	33	39	44	50	56	61	67
33	3/4	16	21	26	32	37	42	47	53	58	63
34	3/4	NP	20	25	30	35	40	45	50	55	60
35	3/4	NP	19	24	28	33	38	42	47	52	57
36	3/4	NP	18	22	27	31	36	40	45	49	54
37	3/4	NP	17	21	26	30	34	38	43	47	51
38	3/4	NP	16	20	24	28	32	36	40	45	49
39	3/4	NP	15	19	23	27	31	35	39	42	46
40	3/4	NP	NP	18	22	26	29	33	37	40	44

NP - Not permitted.

a. Flow rate from Section AP108.2.

TABLE AP109.2.1 (5)
ALLOWABLE PIPE LENGTH FOR 1 INCH TYPE M COPPER WATER TUBING

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler (feet)									
8	1	806	1075	1343	1612	1881	2149	2418	2687	2955	3224
9	1	648	864	1080	1296	1512	1728	1945	2161	2377	2593
10	1	533	711	889	1067	1245	1422	1600	1778	1956	2134
11	1	447	596	745	894	1043	1192	1341	1491	1640	1789
12	1	381	508	634	761	888	1015	1142	1269	1396	1523
13	1	328	438	547	657	766	875	985	1094	1204	1313
14	1	286	382	477	572	668	763	859	954	1049	1145
15	1	252	336	420	504	588	672	756	840	924	1008
16	1	224	298	373	447	522	596	671	745	820	894
17	1	200	266	333	400	466	533	600	666	733	799
18	1	180	240	300	360	420	479	539	599	659	719
19	1	163	217	271	325	380	434	488	542	597	651
20	1	148	197	247	296	345	395	444	493	543	592
21	1	135	180	225	270	315	360	406	451	496	541
22	1	124	165	207	248	289	331	372	413	455	496
23	1	114	152	190	228	267	305	343	381	419	457
24	1	106	141	176	211	246	282	317	352	387	422
25	1	98	131	163	196	228	261	294	326	359	392
26	1	91	121	152	182	212	243	273	304	334	364
27	1	85	113	142	170	198	226	255	283	311	340
28	1	79	106	132	159	185	212	238	265	291	318
29	1	74	99	124	149	174	198	223	248	273	298
30	1	70	93	116	140	163	186	210	233	256	280
31	1	66	88	110	132	153	175	197	219	241	263
32	1	62	83	103	124	145	165	186	207	227	248
33	1	59	78	98	117	137	156	176	195	215	234
34	1	55	74	92	111	129	148	166	185	203	222
35	1	53	70	88	105	123	140	158	175	193	210
36	1	50	66	83	100	116	133	150	166	183	199
37	1	47	63	79	95	111	126	142	158	174	190
38	1	45	60	75	90	105	120	135	150	165	181
39	1	43	57	72	86	100	115	129	143	158	172
40	1	41	55	68	82	96	109	123	137	150	164

a. Flow rate from Section AP108.2.

TABLE AP109.2.1 (6)
ALLOWABLE PIPE LENGTH FOR ¾ INCH CPVC PIPE

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler (feet)									
8	3/4	348	465	581	697	813	929	1045	1161	1278	1394
9	3/4	280	374	467	560	654	747	841	934	1027	1121
10	3/4	231	307	384	461	538	615	692	769	845	922
11	3/4	193	258	322	387	451	515	580	644	709	773
12	3/4	165	219	274	329	384	439	494	549	603	658
13	3/4	142	189	237	284	331	378	426	473	520	568
14	3/4	124	165	206	247	289	330	371	412	454	495
15	3/4	109	145	182	218	254	290	327	363	399	436
16	3/4	97	129	161	193	226	258	290	322	354	387
17	3/4	86	115	144	173	202	230	259	288	317	346
18	3/4	78	104	130	155	181	207	233	259	285	311
19	3/4	70	94	117	141	164	188	211	234	258	281
20	3/4	64	85	107	128	149	171	192	213	235	256
21	3/4	58	78	97	117	136	156	175	195	214	234
22	3/4	54	71	89	107	125	143	161	179	197	214
23	3/4	49	66	82	99	115	132	148	165	181	198
24	3/4	46	61	76	91	107	122	137	152	167	183
25	3/4	42	56	71	85	99	113	127	141	155	169
26	3/4	39	52	66	79	92	105	118	131	144	157
27	3/4	37	49	61	73	86	98	110	122	135	147
28	3/4	34	46	57	69	80	92	103	114	126	137
29	3/4	32	43	54	64	75	86	96	107	118	129
30	3/4	30	40	50	60	70	81	91	101	111	121
31	3/4	28	38	47	57	66	76	85	95	104	114
32	3/4	27	36	45	54	63	71	80	89	98	107
33	3/4	25	34	42	51	59	68	76	84	93	101
34	3/4	24	32	40	48	56	64	72	80	88	96
35	3/4	23	30	38	45	53	61	68	76	83	91
36	3/4	22	29	36	43	50	57	65	72	79	86
37	3/4	20	27	34	41	48	55	61	68	75	82
38	3/4	20	26	33	39	46	52	59	65	72	78
39	3/4	19	25	31	37	43	50	56	62	68	74
40	3/4	18	24	30	35	41	47	53	59	65	71

a. Flow rate from Section AP108.2.

TABLE AP109.2.1 (7)
ALLOWABLE PIPE LENGTH FOR 1 INCH CPVC PIPE

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler (feet)									
8	1	1049	1398	1748	2098	2447	2797	3146	3496	3845	4195
9	1	843	1125	1406	1687	1968	2249	2530	2811	3093	3374
10	1	694	925	1157	1388	1619	1851	2082	2314	2545	2776
11	1	582	776	970	1164	1358	1552	1746	1940	2133	2327
12	1	495	660	826	991	1156	1321	1486	1651	1816	1981
13	1	427	570	712	854	997	1139	1281	1424	1566	1709
14	1	372	497	621	745	869	993	1117	1241	1366	1490
15	1	328	437	546	656	765	874	983	1093	1202	1311
16	1	291	388	485	582	679	776	873	970	1067	1164
17	1	260	347	433	520	607	693	780	867	954	1040
18	1	234	312	390	468	546	624	702	780	858	936
19	1	212	282	353	423	494	565	635	706	776	847
20	1	193	257	321	385	449	513	578	642	706	770
21	1	176	235	293	352	410	469	528	586	645	704
22	1	161	215	269	323	377	430	484	538	592	646
23	1	149	198	248	297	347	396	446	496	545	595
24	1	137	183	229	275	321	366	412	458	504	550
25	1	127	170	212	255	297	340	382	425	467	510
26	1	118	158	197	237	276	316	355	395	434	474
27	1	111	147	184	221	258	295	332	368	405	442
28	1	103	138	172	207	241	275	310	344	379	413
29	1	97	129	161	194	226	258	290	323	355	387
30	1	91	121	152	182	212	242	273	303	333	364
31	1	86	114	143	171	200	228	257	285	314	342
32	1	81	108	134	161	188	215	242	269	296	323
33	1	76	102	127	152	178	203	229	254	280	305
34	1	72	96	120	144	168	192	216	240	265	289
35	1	68	91	114	137	160	182	205	228	251	273
36	1	65	87	108	130	151	173	195	216	238	260
37	1	62	82	103	123	144	165	185	206	226	247
38	1	59	78	98	117	137	157	176	196	215	235
39	1	56	75	93	112	131	149	168	187	205	224
40	1	53	71	89	107	125	142	160	178	196	214

a. Flow rate from Section AP108.2.

TABLE AP109.2.1 (8)
ALLOWABLE PIPE LENGTH FOR ¾ INCH PEX TUBING

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler-(feet)									
8	3/4	93	123	154	185	216	247	278	309	339	370
9	3/4	74	99	124	149	174	199	223	248	273	298
10	3/4	61	82	102	123	143	163	184	204	225	245
11	3/4	51	68	86	103	120	137	154	171	188	205
12	3/4	44	58	73	87	102	117	131	146	160	175
13	3/4	38	50	63	75	88	101	113	126	138	151
14	3/4	33	44	55	66	77	88	99	110	121	132
15	3/4	29	39	48	58	68	77	87	96	106	116
16	3/4	26	34	43	51	60	68	77	86	94	103
17	3/4	23	31	38	46	54	61	69	77	84	92
18	3/4	21	28	34	41	48	55	62	69	76	83
19	3/4	19	25	31	37	44	50	56	62	69	75
20	3/4	17	23	28	34	40	45	51	57	62	68
21	3/4	16	21	26	31	36	41	47	52	57	62
22	3/4	NP	19	24	28	33	38	43	47	52	57
23	3/4	NP	17	22	26	31	35	39	44	48	52
24	3/4	NP	16	20	24	28	32	36	40	44	49
25	3/4	NP	NP	19	22	26	30	34	37	41	45
26	3/4	NP	NP	17	21	24	28	31	35	38	42
27	3/4	NP	NP	16	20	23	26	29	33	36	39
28	3/4	NP	NP	15	18	21	24	27	30	33	36
29	3/4	NP	NP	NP	17	20	23	26	28	31	34
30	3/4	NP	NP	NP	16	19	21	24	27	29	32
31	3/4	NP	NP	NP	15	18	20	23	25	28	30
32	3/4	NP	NP	NP	NP	17	19	21	24	26	28
33	3/4	NP	NP	NP	NP	16	18	20	22	25	27
34	3/4	NP	NP	NP	NP	NP	17	19	21	23	25
35	3/4	NP	NP	NP	NP	NP	16	18	20	22	24
36	3/4	NP	NP	NP	NP	NP	15	17	19	21	23
37	3/4	NP	NP	NP	NP	NP	NP	16	18	20	22
38	3/4	NP	NP	NP	NP	NP	NP	16	17	19	21
39	3/4	NP	NP	NP	NP	NP	NP	NP	16	18	20
40	3/4	NP	NP	NP	NP	NP	NP	NP	16	17	19

NP - Not permitted.

a. Flow rate from Section AP108.2.

TABLE AP109.2.1 (9)
ALLOWABLE PIPE LENGTH FOR 1 INCH PEX TUBING

Sprinkler Flow Rate[a] (gpm)	Water Distribution Size (inch)	Available Pressure - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable Length of Pipe from Service Valve to Farthest Sprinkler (feet)									
8	1	314	418	523	628	732	837	941	1046	1151	1255
9	1	252	336	421	505	589	673	757	841	925	1009
10	1	208	277	346	415	485	554	623	692	761	831
11	1	174	232	290	348	406	464	522	580	638	696
12	1	148	198	247	296	346	395	445	494	543	593
13	1	128	170	213	256	298	341	383	426	469	511
14	1	111	149	186	223	260	297	334	371	409	446
15	1	98	131	163	196	229	262	294	327	360	392
16	1	87	116	145	174	203	232	261	290	319	348
17	1	78	104	130	156	182	208	233	259	285	311
18	1	70	93	117	140	163	187	210	233	257	280
19	1	63	84	106	127	148	169	190	211	232	253
20	1	58	77	96	115	134	154	173	192	211	230
21	1	53	70	88	105	123	140	158	175	193	211
22	1	48	64	80	97	113	129	145	161	177	193
23	1	44	59	74	89	104	119	133	148	163	178
24	1	41	55	69	82	96	110	123	137	151	164
25	1	38	51	64	76	89	102	114	127	140	152
26	1	35	47	59	71	83	95	106	118	130	142
27	1	33	44	55	66	77	88	99	110	121	132
28	1	31	41	52	62	72	82	93	103	113	124
29	1	29	39	48	58	68	77	87	97	106	116
30	1	27	36	45	54	63	73	82	91	100	109
31	1	26	34	43	51	60	68	77	85	94	102
32	1	24	32	40	48	56	64	72	80	89	97
33	1	23	30	38	46	53	61	68	76	84	91
34	1	22	29	36	43	50	58	65	72	79	86
35	1	20	27	34	41	48	55	61	68	75	82
36	1	19	26	32	39	45	52	58	65	71	78
37	1	18	25	31	37	43	49	55	62	68	74
38	1	18	23	29	35	41	47	53	59	64	70
39	1	17	22	28	33	39	45	50	56	61	67
40	1	16	21	27	32	37	43	48	53	59	64

a. Flow rate from Section AP108.2.

Reason: The exceptions included in this proposal are reasonable allowances for consideration by the IRC Committee and the ICC Membership, should sprinklers be installed in accordance with the proposed prescriptive sprinkler system provisions or NFPA 13D and do not result in a reduction to occupant safety. Several of these exceptions are similar in methodology to other trade exceptions offered in structures that are equipped with an automatic sprinkler system. Some of the proposed exceptions are referenced in other codes that may not have been adopted by the jurisdiction, therefore it is important that they be included in the IRC Appendix P as possible trade exceptions. Below is a list and supporting information for each proposed trade exception;

AP111.1 This proposal exception would allow for the reduction in the fire separation distance between dwellings, require that the 1 hour rating of the exterior wall to be limited to the outside exposed wall. This proposal would also allow one- and two-family dwelling, equipped with an automatic sprinkler system, to be built without a rated exterior wall and unlimited openings up to the property, provided there is setback of a minimum 6 feet. When a dwelling unit is equipped with an automatic sprinkler system most fires can be controlled by one or two sprinklers, thereby reducing the concern about heat exposure from one dwelling to another.

AP111.2 The purpose of the smoke alarm system is to provide the occupant enough time to escape the dwelling upon notification of a fire. Dwellings that are equipped with an automatic sprinkler system should be permitted to reduce the number of smoke alarms required in the dwelling, since they increase the amount of time the occupant has to vacate the dwelling by controlling and sometimes extinguishing the fire.

AP111.3 Emergency escape and rescue openings are required by the code to allow a secondary exit should the primary escape route is blocked. As stated above, the automatic sprinkler system is designed to provide an increased level of safety for the occupant by controlling or suppressing the fire. Similar exceptions are already provided in the International Building Code and Life Safety Code to other R occupancies when the structure is equipped with an approved automatic sprinkler system.

AP111.4 The IRC Commentary explains that Arc-Fault receptacles are required to reduce the number of fires that are associated with electrical arcs. Based on information provided in reports published by the National Fire Protection Association prior to the code requiring arc-fault protection,

the number of fires who's origin was based on an electrical distribution and lighting failure or malfunction accounted for 3% of all residential structure fires and caused the least number of fire fatalities.

AP112 When the sizing of the water meter and distribution line must be increased to accommodate an automatic sprinkler system, the fees assessed by the water purveyor should be based solely on the size meter and distribution lines that would be required to meet the domestic potable demand. Unless the sprinkler is activated, there is no increase in the amount of water consumed by the dwelling. Consumers should not be charged higher rates or fees, just because the sprinkler system design required the distribution system to be increased.

AP113.2 The purpose of this proposal is to follow a precedence that has been established in the *International Residential Code* when referencing another code. The *International Fire Code* allow the Authority Having Jurisdiction to reduce the required fire flow rate by 50 percent when the dwelling is provided with an approved sprinkler system.

AP113.3 Would allow greater distances between fire hydrants in residential developments where all dwellings are equipped with an automatic sprinkler system in accordance with Appendix P. Both the *Uniform fire Code* and the *Urban- Wildland Interface Code* allow for increase to the fire hydrant spacing when all dwelling units in a development are equipped with an automatic sprinkler system. The spacing increase to 1,000 feet would still meet the UFC requirement for response to vehicular accidents and the WUIC requirement for maximum distance to a water source.

AP113.4 This proposed exception would allow for the increase the number of dwelling units allowed before requiring a secondary fire apparatus access road and would allow for the reduction of the access road to less than 20 feet when all the dwellings are equipped with an approved automatic sprinkler system. The *International Fire Code* allows for a single fire apparatus access road for developments that are equipped with an automatic sprinkler system and some jurisdictions have allowed for narrower roads as an exception when dwellings are sprinklered.

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

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