### REVISION RECORD FOR THE STATE OF CALIFORNIA

#### **EMERGENCY SUPPLEMENT**

**January 1, 2011** 

2010 Title 24, Part 2.5, California Residential Code

PLEASE NOTE: The date of this supplement is for identification purposes only. See the History Note Appendix for the adoption and effective dates of the provisions.

It is suggested that the section number, as well as the page number be checked when inserting this material and removing the superseded material. In case of doubt, rely on the section numbers rather than the page numbers because the section numbers must run consecutively.

It is further suggested that the superseded material be retained with this revision record sheet so that the prior wording of any section can be easily ascertained.

Please keep the removed pages with this revision page for future reference.

#### Note

Due to the fact that the application date for a building permit establishes the California Building Standards Code provisions that are effective at the local level, which apply to the plans, specifications, and construction for that permit, it is <u>strongly recommended</u> that the removed pages be retained for historical reference.

#### **Part 2.5**

Remove Existing Pages	Insert Blue Pages
85 and 86	85 and 86
547 and 548	547 and 548
703 and 704	703 and 704

combination of well capacity and tank storage shall be permitted to meet the capacity requirement.

*R313.3.6* **Pipe sizing.** The piping to sprinklers shall be sized for the flow required by Section *R313.3.4.2*. The flow required to supply the plumbing fixtures shall not be required to be added to the sprinkler design flow.

*R313.3.6.1* **Method of sizing pipe.** Piping supplying sprinklers shall be sized using the prescriptive method in Section *R313.3.6.2* 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 (19 mm) nominal. Threaded adapter fittings at the point where sprinklers are attached to the piping shall be a minimum of  $^{1}/_{2}$  inch (13 mm) nominal.

**R313.3.6.2** 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 R313.3.6.2.1 and the procedure in Section R313.3.6.2.2.

**R313.3.6.2.1** 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.

$$P_{t} = P_{sup} - PL_{svc} - PL_{m} - PL_{d} - PL_{e} - P_{sp}$$
(Equation 29-1)

where:

 $P_t$  = Pressure used in applying Tables R313.3.6.2(4) through R313.3.6.2(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.

*R313.3.6.2.2* 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 static 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 *R313.3.5.1*.

#### Step 2-Determine *PL*<sub>svc</sub>

Use Table *R313.3.6.2(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 *R313.3.6.2(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 *R313.3.4.2*, except that 5 gpm (0.3 L/S) 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 *R313.3.6.2(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 *R313.3.4.1*. 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 R313.3.6.2(4) through R313.3.6.2(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 and 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 *R313.3.6.2(4)* through *R313.3.6.2(9)* incorporates an adjustment for pipe fittings, and no additional consideration of friction losses associated with pipe fittings shall be required.

R313.3.7 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."

**R313.3.8 Inspections.** The water distribution system shall be inspected in accordance with Sections *R313.3.8.1* and *R313.3.8.2*.

**R313.3.8.1** Preconcealment 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 *R313.3.1.1*.
- 2. Where sprinkler water spray patterns are obstructed by construction features, luminaires or ceiling fans, additional sprinklers are installed as required by Section *R313.3.2.4.2*.
- 3. Sprinklers are the correct temperature rating and are installed at or beyond the required separation distances from heat sources as required by Sections *R313.3.2.1* and *R313.3.2.2*.
- 4. The pipe size equals or exceeds the size used in applying Tables *R313.3.6.2(4)* through *R313.3.6.2(9)* or, if the piping system was hydraulically calculated in accordance with Section *R313.3.6.1*, the size used in the hydraulic calculation.
- 5. The pipe length does not exceed the length permitted by Tables *R313.3.6.2(4)* through *R313.3.6.2(9)*

- or, if the piping system was hydraulically calculated in accordance with Section R313.3.6.1, pipe lengths and fittings do not exceed those used in the hydraulic calculation.
- 6. Nonmetallic piping that conveys water to sprinklers is listed for use with fire sprinklers.
- 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 *the California Plumbing Code*.

*R313.3.8.2* **Final inspection.** The following items shall be verified upon completion of the system:

- 1. Sprinkler are not painted, damaged or otherwise hindered from operation.
- 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 *R313.3.7* is installed and the owner's manual for the system is present.

### TABLE R313.3.6.2(1) WATER SERVICE PRESSURE LOSS $(PL_{svc})^{a,b}$

	3/4 INCH WATER SERVICE PRESSURE LOSS (psi)			1 INCH WATER SERVICE PRESSURE LOSS (psi)			1 <sup>1</sup> / <sub>4</sub> INCH WATER SERVICE PRESSURE LOSS (psi)					
FLOW RATE <sup>c</sup>	Lengt	h of water s	service pipe	(feet)	Length of water service pipe (feet)			Length of water service pipe (feet)				
(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

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 0.063 L/s, 1 pound per square inch = 6.895 kPa.

NP - Not permitted. Pressure loss exceeds reasonable limits.

a. Values are applicable for underground piping materials listed in the California Plumbing Code 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 R313.3.4.2. Add 5 gpm to the flow rate required by Section R313.3.4.2 where the water-service pipe supplies more than one dwelling.



National Fire Protection Association 1 Batterymarch Park Quincy, MA 02269

	•	
Standard		Referenced
reference		in code
number	Title	section number
13—10	Installation of Sprinkler Systems as amended*	R302.3

#### \*NFPA 13, Amended Sections as follows:

Revise Section 7.6.2.2 as follows:

**7.6.2.2** Glycerine-water and propylene glycol-water mixtures shown in Table 7.6.2.2 shall be considered suitable for use. *Anti-freeze solutions exceeding 50 percent by volume of glycerine-water or 40 percent by volume of propylene glycol-water mixtures shall not be permitted within dwelling unit portions of the sprinkler system.* 

#### Revise Section 7.6.2.3 as follows:

**7.6.2.3** If potable water is not connected to sprinklers, the commercially available materials indicated in Table 7.6.2.3 shall be permitted for use in antifreeze solutions. *Antifreeze solutions of diethylene glycol-water or ethylene glycol-water mixtures shall not be permitted within dwelling unit portions of the sprinkler system.* 

#### Add new Section 7.6.2.5.1 as follows:

7.6.2.5.1 Antifreeze solutions shall be factory premix solutions within dwelling unit portions of the sprinkler system.

Standard for the Installation of Sprinkler Systems in One-and

#### \*NFPA 13D, Amended Sections as follows: Revise Section 8.3.3.2.3 as follows:

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**8.3.3.2.3** Percent solution by volume of glycerine-water and propylene glycol-water mixtures shall be in accordance with Table 8.3.3.2.3, Figure 8.3.3.2.3(a), and Figure 8.3.3.2.3(b). Antifreeze solutions exceeding 50 percent by volume of glycerine-water or 40 percent by volume of propylene glycol-water mixtures shall not be permitted within dwelling unit portions of the sprinkler system.

#### Revise Section 8.3.3.2.5 as follows:

**8.3.3.2.5** Percent solution by volume of diethylene glycol-water and ethylene glycol-water shall be in accordance with Table 8.3.3.2.5. Antifreeze solutions of diethylene glycol-water or ethylene glycol-water mixtures shall not be permitted within dwelling unit portions of the sprinkler system.

#### Add new Section 8.3.3.2.7 as follows:

**8.3.3.2.7.1** Antifreeze solutions shall be factory premix solutions.

**6.2\* Water Supply Sources.** When the requirements of 6.2.2 are met, the following water supply sources shall be considered to be acceptable by this standard:

- (1) A connection to a reliable waterworks system with or without an automatically operated pump
- (2) An elevated tank
- (3) A pressure tank designed to American Society of Mechanical Engineers (ASME) standards for a pressure wessel with a reliable pressure source
- (4) A stored water source with an automatically operated pump
- (5) A well with a pump of sufficient capacity and pressure to meet the sprinkler system demand. The stored water requirement of 6.1.2 or 6.1.3 shall be permitted to be a combination of the water in the well (including the refill rate) plus the water in the holding tank if such tank can supply the sprinkler system.
- **6.2.2** Where a well, pump, tank or combination thereof is the source of supply for a fire sprinkler system, the water supply shall serve both domestic and fire sprinkler systems, and the following shall be met:
  - (1) A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest sprinkler on the system. The connection shall return water to the tank.
  - (2) Any disconnecting means for the pump shall be approved.
  - (3) A method for refilling the tank shall be piped to the tank.
  - (4) A method of seeing the water level in the tank shall be provided without having to open the tank.
  - (5) The pump shall not be permitted to sit directly on the floor.
- **6.2.2.1** Where a fire sprinkler system is supplied by a stored water source with an automatically operated means of pressurizing the system other than an electric pump, the water supply may serve the sprinkler system only.
- **6.2.4** Where a water supply serves both domestic and fire sprinkler systems, 5 gpm (19 L/min) shall be added to the sprinkler system demand at the point where the systems are connected, to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a sprinkler.
- **8.6.4\*** Sprinklers shall not be required in *detached* garages, open attached porches, carports *with no habitable space above*, and similar structures.

—10 See California Building Code Chapter 35 for amendments to NFPA 13R.

13D—*10* 

II

#### **REFERENCED STANDARDS**

31—06	Installation of Oil-burning Equipment						
58—08	Liquefied Petroleum Gas Code						
70—08 72—10	National Electrical Code						
	*NFPA 72, Amended Sections as follows:						
	<b>10.3.1</b> Equipment constructed and installed in conformity with this code shall be listed for the purpose for which it is used. Fire alarm systems and components shall be California State Fire Marshal approved and listed in accordance with California Code of Regulations, Title 19, Division 1.						
	<b>10.3.3</b> All devices and appliances that receive their power from the initiating device circuit or signaling line circuit of a control unit shall be <i>California State Fire Marshal</i> listed for use with the control unit.						
	<b>10.6.1</b> Where approved by the authority having jurisdiction, ECS priority signals when evaluated by stakeholders through risk analysis in accordance with 24.4.2.2 shall be permitted to take precedence over all other signals.						
	<b>14.4.7.1 Testing.</b> Household fire alarm systems shall be tested <i>in accordance with the manufacturer's published instructions</i> according to the methods of Table 14.4.2.2.						
	<b>17.15 Fire Extinguisher Monitoring Device.</b> A fire extinguisher monitoring device shall indicate those conditions for a specific fire extinguisher required by <i>California Code of Regulations, Title 19, Division 1, Chapter 1, Section 574.2 (c) and California Fire Code to a fire alarm control unit.</i>						
	<b>23.4.2.2</b> (4) Where the vertically run conductors are contained in a 2-hour rated cable assembly, or enclosed (installed) in a 2-hour rated enclosure or a listed circuit integrity (C.I.) cable, which meets or exceeds a 2-hour fire resistive rating.						
	23.8.5.1.2 Where connected to a supervising station, fire alarm systems employing automatic fire detectors or waterflow detection devices shall include a manual fire alarm box to initiate a signal to the supervising station.						
	Exception: Fire alarm systems dedicated to elevator recall control, and supervisory service and fire sprinkler monitoring.						
	23.8.5.4.1 Systems equipped with alarm verification features shall be permitted under the following conditions:						
	(1) The alarm verification feature is not initially enabled unless conditions or occupant activities that are expected to cause nuisance alarms are anticipated in the area that is protected by the smoke detectors. Enabling of the alarm verification feature shall be protected by password or limited access.						
	(2) A smoke detector that is continuously subjected to a smoke concentration above alarm threshold does not delay the system functions of Sections 10.6 through 10.13, 23.8.1.1, or 21.2.1 by more than 30 seconds.						
	(3) Actuation of an alarm-initiating device other than a smoke detector causes the system functions of 4.4.3, 6.8.1.1, or 6.16.2.1 without additional delay.						
	(4) The current status of the alarm verification feature is shown on the record of completion (see Figure 4.5.2.1, item 10).						
	(5) Operation of a patient room smoke detector in I-2 and R-2.1 Occupancies shall not include an alarm verification feature.						
	<b>29.3.1</b> All devices, combinations of devices, and equipment to be installed in conformity with this chapter shall be approved or listed <i>by the California State Fire Marshal</i> for the purposes for which they are intended.						
	29.7.2.1 The alarm verification feature shall not be used for household fire warning equipment.						
	29.7.5.7.1 The alarm verification feature shall not be used for household fire warning equipment.						
85—07	Boiler and Construction Systems Hazards Code						
211—06	Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances						
252—03	Standard Methods of Fire Tests of Door Assemblies						
257—07	Standard for Fire Test for Window and Glass Block Assemblies						
259—03	Test Method for Potential Heat of Building Materials						
286—06	Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth						
501—05	Standard on Manufactured Housing						
720—09	Installation of Carbon Monoxide (CO) Detection and Warning Equipment						
853—07	Standard for the Installation of Stationary Fuel Cell Power Systems						
NFRC	National Fenestration Rating Council Inc. 8484 Georgia Avenue, Suite 320 Silver Spring, MD 20910						
Standard	Referenced						
C							
reference number	Title section number						

200-2004

400-2004

Procedure for Determining Fenestration Product Solar Heat Gain Coefficients

### **HISTORY NOTE APPENDIX**

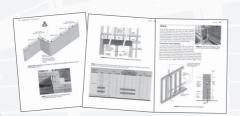
#### California Residential Code (Title 24, Part 2.5, California Code of Regulations)

- 1. (HCD 04/09, SFM 06/09, DWR 01/09) Adoption by reference of the 2009 International Residential Code with necessary state amendments in the 2010 California Residential Code. Effective date on January 1, 2011, for provisions of HCD, DWR and SFM. Effective date of DWR Provisions shall be March 1, 2012, or ninety (90) days after the corresponding maps are completed and readily available to the general public, whichever is the later date.
- 2. Errata to correct editorial errors in preface and Chapters 1-4, 6, 7, 9, Referenced Standards, Appendix F, and Index.



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