

Residential Fire Sprinklers in the 2010 CA Codes




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Why Sprinklers in Dwellings?

- NFPA Report in 2005
"Fire Loss in the United States During 2005":
 - 25% of structure fires occurred in residential structures
 - 83% of fire deaths in residential structures
 - 77% of fire injuries in residential structures




Why Sprinklers in Dwellings?

- NFPA Report in 2007
"Fire Loss in the United States 2007":
 - 78% of all structure fires occurred in residential structures
 - 3,430 civilian fire deaths, 84% (2877) of which occurred in dwellings
 - Nationwide there was a civilian fire death every 183 minutes




Why Sprinklers in Dwellings?


- NIST reports:
 - In 1975 occupants had 17 minutes to safely escape a dwelling fire
 - In 2003 occupants had only 3 minutes to safely escape a dwelling fire
 - In 2007 the chance of death in a dwelling fire is reduced 82% with fire sprinklers and smoke alarm
 - Over 2,000 fires were reported from 2000 to 2005 in dwellings WITH fire sprinklers
 - There were NO fatalities in any of the fires with sprinklers



NIST Dwelling Fire Test Without Fire Sprinklers



Flashover occurred



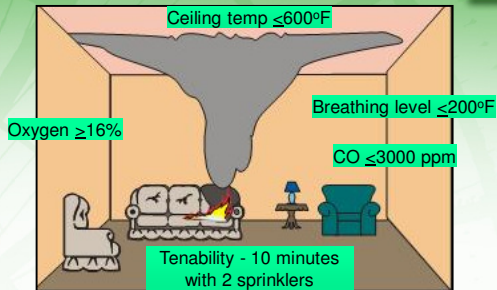
NIST Dwelling Fire Test With Fire Sprinklers



Sprinkler operated



Testing for Tenability



Life Safety System

- Residential Fire Sprinklers (RFS) are designed to protect the occupants
- RFS are a basic, simplified system
- RFS are designed to be reliability and dependability
 - Components for property protection are not included
 - Components needing maintenance are not included
 - Maintenance?

Commercial Fire Sprinkler System Components

- Fire hose water supply (Hose stream)
- FDC
- Water Flow Alarm
- Pressure gauge
- Smoke alarm is only alarm



2010 CRC Requirements

- 2009 Edition of the International Residential Code (IRC) with California Amendments
- 2010 California Residential Code
- California Code of Regulations Title 24, Part 2.5

2010 CRC Requirements

R313.1 Townhouse automatic fire sprinkler systems. An automatic residential fire sprinkler system shall be installed in townhouses.

Exception: An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.

2010 CRC Requirements

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

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

Design Standards



R313.1.1 Design and installation. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with **Section R313.3 or NFPA 13D.**

R313.2.1 Design and Installation. Residential fire sprinkler systems shall be designed and installed in accordance with **Section R313.3 or NFPA 13D.**

Design Standards



R313.3.1 General. Where installed, residential fire sprinkler systems, or portions thereof, shall be in accordance with **NFPA 13D or Section R313.3, which shall be considered equivalent to NFPA 13D.** Section R313.3 shall apply to stand-alone and multipurpose wet-pipe sprinkler systems that do not include the use of antifreeze. A multipurpose fire sprinkler system shall supply domestic water to both fire sprinklers and plumbing fixtures. A stand-alone sprinkler system shall be separate and independent from the water distribution system. A backflow flow preventer shall not be required to separate a stand-alone sprinkler system from the water distribution system.

State Statutory Authority from CA SFM Website



Question: Can a Fire Protection Contractor (C-16) design the fire sprinkler system that he or she is to install?

Answer:

- YES
- B&P Code – Contractors License Law 6737.3

Question: What does CRC say regarding the design and installation of residential fire sprinkler systems?

Answer:

- See CRC §R313.1.1
- R313.1.1 Design and installation. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with *R313.3 or NFPA 13D.*

State Statutory Authority from CA SFM Website



Question: Is it the intent of CRC §R313 to allow residential fire protection systems to be installed by a Fire Protection Contractor (C-16) and/or a Plumbing Contractor (C-36)?

Answer:

Installation of a fire protection system by:

- Fire Protection Contractors (C-16's),
- General Manufactured Housing Contractors (C-47's)
- Owner-Occupied Owner-Builders
- B&P Code – Contractors License Law, Sections 7026.2(a), 7026.3, 7026.11, 7026.12
- B&P Code 7008, 7058, and 7059
- CSLB Regs 832.47 – Class C-47 – General Manufactured Housing Contractor

Fire Sprinkler Installation



- Sprinklers installed in all areas of the dwelling unit
- Excluded areas:
 - Attics, crawl spaces and normally unoccupied concealed spaces, unless these spaces contain a fuel-fired appliance
 - Clothes closets, linen closets and pantries where:
 - Wall and ceiling surfaces are of gypsum board, and
 - The space ≤ 24 ft² and
 - The smallest dimension $\leq 3'$

Fire Sprinkler Installation



- Sprinklers installed in all areas of the dwelling unit
- Excluded areas:
 - Bathrooms ≤ 55 ft²
 - Unheated entry areas, such as mud rooms, that are adjacent to an exterior door and similar areas
 - Detached garages
 - Carports without habitable space above
 - Open attached porches

Different than NFPA 13D

CRC Requirements vs NFPA 13D



- CRC §R313.3.5 requires the inclusion of 5 gpm for domestic flow
 - Domestic shutoff valves can eliminate this flow
- CRC §R313.3.1.1 requires attached garages to be protected with fire sprinklers
 - Design criteria included in CBC/GFC §903.2.18

CRC Requirements vs NFPA 13D

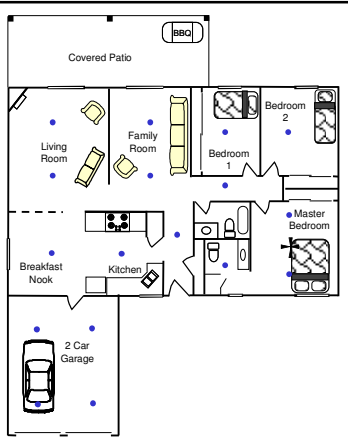


QUESTION – CRC allows the contractor to design under §R313.3 or NFPA 13D. If the contractor chooses to design and install the RFS in accordance with NFPA 13D, do the CA amendments still apply, such as: add 5 gpm, sprinkler the garage, etc?

ANSWER – The CA amendments still apply regardless of which design criteria is used to design the piping system. CA amendments always supersede requirements in the referenced standard.

Dwelling Floor Plan

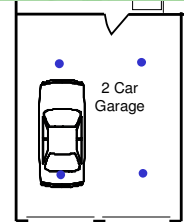
- Sprinklers required in:
 - Living areas
 - Attached garage



Attached Garage Sprinklers



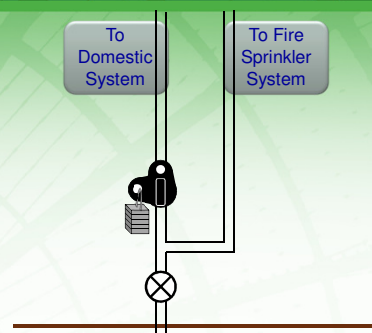
- Residential sprinklers or quick-response sprinklers
- Design criteria:
 - Maximum of 2 sprinklers operating
 - Minimum density of 0.05 gpm/ft²
- Garage doors shall not be considered obstructions with respect to sprinkler placement



Questions???



Optional Control Valves



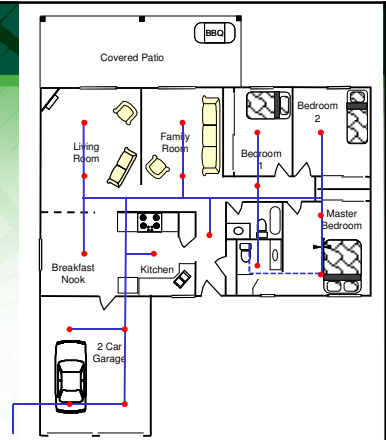
Toilet Connection???



- Passive purge concept
- Toilet is connected remote end of fire sprinkler piping
- Toilet flush operation moves water through the piping system
- Eliminates need for backflow prevention to separate fire sprinkler piping from domestic piping

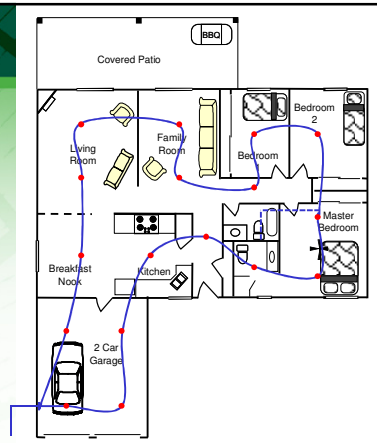
Pipe Tree System

- Connection to toilet
- Allows new water to flow into piping with each toilet operation



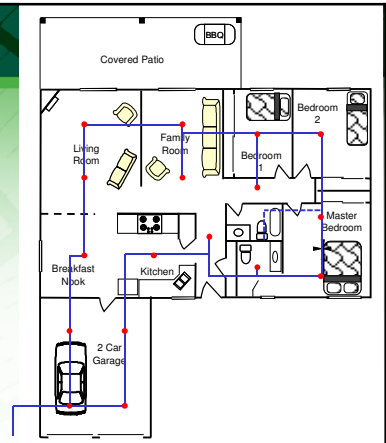
PEX Simple Loop System

- Connection to toilet
- Allows new water to flow into piping
- Water flows each direction



Pipe Loop System

- Connection to toilet
- Allows new water to flow into piping
- Again, water flows each direction



PEX Network System

- Connection to toilet
- Allows new water to flow into piping
- Water flows every direction

