2016 Wildfire Protection Building Construction Task Force

Task Force Report and Recommendations

Comment [WU1]: New Pics

CAL FIRE – Office of the State Fire Marshal
DRAFT July 6, 2016

Message from the State Fire Marshal

TONYA L. HOOVER
State Fire Marshal
CAL FIRE – OFFICE OF THE STATE FIRE MARSHAL

Acknowledgements

This report was developed through the culmination through outstanding collaborative efforts of the many disciplines involved with the Office of the State Fire Marshal **2016 Wildfire Protection Building Construction Task Force**.

Members of the Flammability Standards for Building Insulation Materials Working Group:

Andrew Henning – CAL FIRE - Office of the State Fire Marshal, Code Development and Analysis Divison
Bob Raymer – California Building Industry Association (CBIA)
Bruce Lecair – National Fire Sprinkler Association (NFSA)
David Hoover – HYT Corporation
Eric Price – Engineered Fire Systems
Greg Andersen – CAL FIRE - Office of the State Fire Marshal, Code Development and Analysis Divison
James Carver – El Segundo Fire Department, representing California Fire Chiefs Association Fire Prevention Officers Section, South Division
Jeff Hudson – National Fire Protection Association
Jose Colin –Woodland Fire Protection Department, representing California Fire Chiefs Association Fire Prevention Officers Section, North Division
Kevin Reinertson – Riverside County Fire Department, representing California Fire Chiefs Association Fire Prevention Officers Section, South Division
Ray Bizal – National Fire Protection Association
Rian Evitt – San Ramon Valley Fire Protection District, representing California Fire Chiefs Association Fire Prevention Officers Section, North Division
Steve Hart – Consultant
Steve Leyton – Protection Design
Steve Fox – Sprinkler Fitters U.A. Local 483

Comment [WU2]: Update- Henning

The Office of the State Fire Marshal thanks each member and their organizations for their assistance with this important work.

Table of Contents

Executive Summary

Working Group Scope

The scope of the project was to review and evaluate the current California Code of Regulations, Title 24 – 2013 California Building Code (CBC), Wildfire Protection Building Construction provisions, to determine if revisions (amendments) are needed for the 2016 Intervening Code Adoption Cycle (effective July 1, 2018).

Narrative on past Working Group

The specific items that Working Group discussed was:

- **Skylights**- the Office of the State Fire Marshal (OSFM) posted Code Interpretation 15-006 on December 3, 2015. The Working Group was asked to review the Code Interpretation, and provide codification of OSFM's original intent when residential fire sprinklers were adopted into the 2010 CRC.
- **ASTM Standards**- when water supplies serve both domestic and fire sprinkler systems, 5 gpm must be added to where the systems are interconnected. The Working Group was asked to identify where the 5 gpm should be added in multipurpose systems.
- **General Cleanup**- when the Residential Fire Sprinkler Installation Task Force finalized the Phase II report in 2009, the committee amended the CRC to require tanks and pumps to serve both domestic and fire sprinkler systems. This Working Group evaluated if the existing state amendment, to see if a standalone tank and pump can be used to supply fire sprinkler systems only.

Recommendations

Skylights

NFPA 13D and the International Residential Code (model code for California Residential Code) allows standalone fire pump and water storage tanks. The Residential Fire Sprinkler Installation Task Force finalized the Phase II report in 2009, the committee amended the CRC to require tanks and pumps to serve both domestic and fire sprinkler systems. The Phase II Working Group's justification for this was:

Comment [WU3]: Do we need. The report, without local amendment reprint is 6 pages.

Comment [WU4]: Add- SFM Staff

Comment [WU5]: Skylight Group to provide short narrative.

Comment [WU6]: ASTM Group to provide narrative.

Comment [WU7]: General Notes on garage, accessory structures, and Organized Camps

Comment [WU8]: Get picture.

It was determined that where homes are supplied by a well, pump, tank or combination of those components, that the water reliability of the water supply is best underwritten by requiring that both domestic and fire systems be supplied by the same source. This finding was based on empirical and anecdotal evidence obtained through on-line surveys of fire sprinkler industry and fire service members and from within the task force. Several respondents from the fire service, particularly in the Eastern United States where booster pumps are more commonly required because of low working pressures in water mains, had personally experienced non-functioning fire sprinkler water supplies due to failed testing and maintenance. This was also the experience of contractor members of the sub-group in California.

The current Working Group evaluated the need to have standalone tank and pumps that only supply the residential fire sprinkler system. These systems would commonly be used where residential sprinklers are being added to existing buildings (detached garage conversions), when water supplies can supply the domestic water demand but not fire sprinkler demand, and areas where the cost to provide an upgraded water meter for fire sprinklers was cost prohibitive.

Standalone pump and tank packages are an ideal option when connecting to a local water purveyor is cost prohibitive or the city water does not supply the required demand for the sprinkler system. The Working Group evaluated the existing state amendment, and determined with a set of conditions that a standalone tank and pump can be used to supply residential fire sprinkler systems only. The conditions needed to overcome the 2009 Phase II Working Group Concerns are:

- *The pump shall be connected to a circuit breaker shared with a common house hold appliance (refrigerator, range, dryer)*. When a pump controls both domestic and fire sprinkler systems the occupant will ensure that the pump is on and functioning. Within a standalone pump, there is potential to the pump to be turned off and not function in a fire situation. The Working Group felt that by requiring the pump to be connected to another major appliance, that the pump would not be accidently or intentionally turned off at the electrical panel.
- *The pump shall be a stainless steel 240 volt pump*. There was concern with the 2009 Phase II Working Group that the pump may not be used for a number of years. When a fire event did occur, there was potential for the pump to be seized. The current Working Group felt that a stainless steel 240 volt pump would be able to overcome not being used for several years.

- *A valve shall be provided to exercise the pump. The discharge of the exercise valve shall drain to the tank. A sign shall be provided stating "Valve must be opened monthly for 5 minutes."* As with the item above the current Working Group felt that there needed to be a way to exercise the pump. The Working Group felt a valve should be provided that discharges directly back into the tank to allow he occupant to easily exercise the pump. The Working Group also felt that a sign should be provided for the occupant to know how often and the duration needed to properly exercise the pump.

The Working Group felt that with the bullet points above would mitigate the concerns and potential risk concerns that the 2009 Phase II Working Group had. Occupants will need to be responsible for the fire safety, as they are with maintaining smoke alarms and carbon monoxide alarms.

Proposed Code Changes to the California Residential Code

The Working Group proposed two code changes to codify this into the next code cycle.

R313.3.5.2 **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 one story in height and less than 2,000 square feet (186 m2) in area. *For the purpose of determining the area of the dwelling unit, the area of attached garages and attached open carports, porches, balconies and patios shall not be included.*
2. 10 minutes for dwelling units two or more stories in height or equal to or greater than 2,000 square feet (186 m2) in area. *For the purpose of determining the area of the dwelling unit, the area of attached garages and attached open carports, porches, balconies, and patios shall not be included.*

R313.3.5.2.1 Where a well system, a water supply tank system, a pump, or a combination thereof, is used, *the configuration for the system shall be one of the following:*

1. ~~t~~The water supply shall serve both domestic and fire sprinkler systems. Any combination of well capacity and tank storage shall be permitted to meet the capacity requirement.

2. A standalone tank is permitted if the following conditions are met:
2.1 The pump shall be connected to a circuit breaker shared with a common house hold appliance (refrigerator, range, dryer),

2.2 The pump shall be a stainless steel 240 volt pump,
2.3 A valve shall be provided to exercise the pump. The discharge of the exercise valve shall drain to the tank, and
2.4 A sign shall be provided stating "Valve must be opened monthly for 5 minutes."

Comment [WU9]: Skylight Group to provide justifications and code changes.

ASTM Standards

Multipurpose residential fire sprinkler systems are being installed across the State. The 2013 edition NFPA 13D *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes* defines a *Multipurpose Piping Sprinkler System* as "a piping system intended to serve both domestic needs in excess of a single fixture and fire protection needs from one common piping system throughout the dwelling unit(s)." In multipurpose sprinkler systems and plumbing systems are supplied from the cold water distribution system.

When performing hydraulic calculations of residential fire sprinkler systems, Section R313.3.5 of the CRC requires 5 gpm to be added to where the systems are interconnected. There has been confusion amongst the design community and AHJs on where the 5 gpm should be added on multipurpose systems.

During the Phase 2 Working Group in 2009, a survey was conducted of jurisdictions with a residential sprinkler ordinance to see if they had a safety factor built in. The results showed the local ordinances required a 5-25 gpm safety factor. The Phase 2 Working Group agreed on a 5 gpm safety factor to ensure that if a plumbing fixture was being used, diminishing water supply would not impact the residential fire sprinkler required water.

After evaluating the original intent of the Phase 2 Working Group amendment to CRC Section R313.3.5, the current Working Group determined 2.5 gpm should be added to each of the two remote plumbing fixtures on multipurpose systems. This requirement would match the original intent of the 5 gpm for standalone sprinkler systems that share a water supply. Figure 1 shows an illustration of a multipurpose system. It shows the two sprinklers be calculated and the two areas where 2.5 gpm are being added to the plumbing fixtures.

Proposed Code Changes to the California Residential Code

The Working Group proposed two code changes to codify this into the next code cycle.

R313.3.5 Water supply. The water supply shall provide not less than the required design flow rate for sprinklers in accordance with Section *R313.3.4.2* at a pressure not less than that used to comply with Section *R313.3.6*. *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. For multipurpose piping systems, the design area shall include 5 gpm (19 L/min) at the two plumbing fixture that produces the greatest hydraulic demand. The 5 gpm (19 L/min) shall be split between the two plumbing fixtures in 2.5 gpm (10 L/min) increments.*

Proposed Code Changes to NFPA 13D

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. For multipurpose piping systems, the design area shall include 5 gpm (19 L/min) at the two plumbing fixture that produces the greatest hydraulic demand. The 5 gpm (19 L/min) shall be split between the two plumbing fixtures in 2.5 gpm (10 L/min) increments.*

Comment [WU10]: ASTM Group to provide justifications and code changes.

General Cleanup

NFPA 13D and the International Residential Code (model code for California Residential Code) allows standalone fire pump and water storage tanks. The Residential Fire Sprinkler Installation Task Force finalized the Phase II report in 2009, the committee amended the CRC to require tanks and pumps to serve both domestic and fire sprinkler systems. The Phase II Working Group's justification for this was:

> It was determined that where homes are supplied by a well, pump, tank or combination of those components, that the water reliability of the water supply is best underwritten by requiring that both domestic and fire systems be supplied by the same source. This finding was based on empirical and anecdotal evidence obtained through on-line surveys of fire sprinkler industry and fire service members and from within the task force. Several respondents from the fire service, particularly in the Eastern United States where booster pumps are more commonly required because of low working pressures in water

mains, had personally experienced non-functioning fire sprinkler water supplies due to failed testing and maintenance. This was also the experience of contractor members of the sub-group in California.

The current Working Group evaluated the need to have standalone tank and pumps that only supply the residential fire sprinkler system. These systems would commonly be used where residential sprinklers are being added to existing buildings (detached garage conversions), when water supplies can supply the domestic water demand but not fire sprinkler demand, and areas where the cost to provide an upgraded water meter for fire sprinklers was cost prohibitive.

Standalone pump and tank packages are an ideal option when connecting to a local water purveyor is cost prohibitive or the city water does not supply the required demand for the sprinkler system. The Working Group evaluated the existing state amendment, and determined with a set of conditions that a standalone tank and pump can be used to supply residential fire sprinkler systems only. The conditions needed to overcome the 2009 Phase II Working Group Concerns are:

- *The pump shall be connected to a circuit breaker shared with a common house hold appliance (refrigerator, range, dryer)*. When a pump controls both domestic and fire sprinkler systems the occupant will ensure that the pump is on and functioning. Within a standalone pump, there is potential to the pump to be turned off and not function in a fire situation. The Working Group felt that by requiring the pump to be connected to another major appliance, that the pump would not be accidently or intentionally turned off at the electrical panel.
- *The pump shall be a stainless steel 240 volt pump*. There was concern with the 2009 Phase II Working Group that the pump may not be used for a number of years. When a fire event did occur, there was potential for the pump to be seized. The current Working Group felt that a stainless steel 240 volt pump would be able to overcome not being used for several years.
- *A valve shall be provided to exercise the pump. The discharge of the exercise valve shall drain to the tank. A sign shall be provided stating "Valve must be opened monthly for 5 minutes."* As with the item above the current Working Group felt that there needed to be a way to exercise the pump. The Working Group felt a valve should be provided that discharges directly back into the tank to allow he occupant to easily exercise the pump. The Working Group also felt that a sign should be provided for the occupant to know how often and the duration needed to properly exercise the pump.

The Working Group felt that with the bullet points above would mitigate the concerns and potential risk concerns that the 2009 Phase II Working Group had. Occupants will need to be responsible for the fire safety, as they are with maintaining smoke alarms and carbon monoxide alarms.

Proposed Code Changes to the California Residential Code

The Working Group proposed two code changes to codify this into the next code cycle.

R313.3.5.2 **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 one story in height and less than 2,000 square feet (186 m2) in area. *For the purpose of determining the area of the dwelling unit, the area of attached garages and attached open carports, porches, balconies and patios shall not be included.*
2. 10 minutes for dwelling units two or more stories in height or equal to or greater than 2,000 square feet (186 m2) in area. *For the purpose of determining the area of the dwelling unit, the area of attached garages and attached open carports, porches, balconies, and patios shall not be included.*

R313.3.5.2.1 Where a well system, a water supply tank system, a pump, or a combination thereof, is used, *the configuration for the system shall be one of the following:*

1. ~~t~~The water supply shall serve both domestic and fire sprinkler systems. Any combination of well capacity and tank storage shall be permitted to meet the capacity requirement.

2. A standalone tank is permitted if the following conditions are met:
2.1 The pump shall be connected to a circuit breaker shared with a common house hold appliance (refrigerator, range, dryer),
2.2 The pump shall be a stainless steel 240 volt pump,
2.3 A valve shall be provided to exercise the pump. The discharge of the exercise valve shall drain to the tank, and
2.4 A sign shall be provided stating "Valve must be opened monthly for 5 minutes."

Comment [WU11]: Each General Cleanup lead will copy and paste there induvial changes and justifications within this section.

Conclusion

The Working Group spent a significant amount of time discussing the three specific issues presented by the OSFM. The members of the Working Group agreed on the following recommendations to the State Fire Marshal:

- Detached garages that are converted to a dwelling require a residential fire sprinkler system. OSFM Code Interpretation 15-006 as well as the intent of the State Fire Marshal when the provisions were adopted into the 2010 California Residential Code is correct. Any change in use (occupancy) of an existing structure and any new detached structure would require residential fire sprinklers.
- Multipurpose systems are also required to meet the 5 gpm from Section R313.3.5 of the CRC. The section needs to be amended to reflect how the 5 gpm should be added to multipurpose systems. For multipurpose systems, 2.5 gpm should be added to each of the two remote plumbing fixtures for a combined total of 5 gpm.
- Standalone pumps and tanks that only supply the fire sprinkler system are a viable option. Specific requirements would be required to be met, to allow a standalone pump. These requirements would ensure that the pump will function when a fire event occurs.
- Key Topics for 2017 Working Group:
    - Garage Doors
    - Preventing Ignition of Structures
    - BOF Changes
    - Realistic Fire Loss Criteria and Expectations
    -

Comment [WU12]: Update- SFM

Comment [WU13]: Quick narrative / conclusion on Skylight. Code Change, Information Bulletin…

Comment [WU14]: Quick narrative / conclusion on ASTM

Comment [WU15]: Bullets as needed on clean up.

Comment [WU16]: Add as needed.

Appendix A- Code Interpretation 15-006

Appendix B- Informaiton Bulletin