

## Residential Fire Sprinklers in California – A 5-year Update

In the spirit of “Where did the time go?” I am writing to give everyone a 5-year update on the California Residential Fire Sprinkler Regulation. Residential fire sprinklers have been in regulation throughout the Golden State since January 1, 2011. For those of you who are unaware, throughout the state, all newly constructed one and two family homes and townhomes are built with NFPA 13D residential fire sprinkler systems. The state still continues to build and sell new housing.

In fact, California continues to build and sell homes in large numbers. The California Building Industry Association (CBIA) reports in the [graph below that](#) since January 1, 2011 through to the projected numbers for 2014, 130,416 single family homes and 151,261 multi-family homes have been built. While the numbers are not up to the pre-recession years of 2005 and 2006, it is clear that states will still build and sell new homes in large numbers with a statewide residential fire sprinkler requirement.

Being the first at anything is always groundbreaking, especially when a state adopts a statewide residential fire sprinkler regulation. In fact there can be challenges along the way. During the pre-adoption process before the state regulation was adopted, the Office of the State Fire Marshal (OSFM) developed positive relationships with stakeholders that are usually not proponents of residential fire sprinklers. These relationships, which have become stronger during the last five years, have led to a successful regulation in California. We have kept our promises made to the CBIA, as well as are our friends in water industry, building and fire officials and other state regulators to work together to resolve challenges that came along with the new regulation. Most of these issues could not have been anticipated during the pre-adoption process. We have learned much through utilizing our relationships. We have worked together and shared our experiences over that last five years with the other states in order to ease the process. The following are some of the challenges that have been addressed since the regulation was adopted on January 1, 2011.

One of the first challenges that carried over from the pre-adoption process was the issue of backflow. This was the one of the first issues tasked to the Residential Fire Sprinkler Installation Task Force. In spite of the recommendations incorporated into the State Fire Marshal’s [final report](#) and the 27 classes conducted throughout the state during the summer of 2010, backflow remained a challenge requiring additional attention.

In response to the need for additional information and discussion, three forums were conducted in 2011 in Ontario, Roseville, and Carlsbad. Attendance was open to water purveyors, fire service members, building officials and public health officials. These forums were all widely attended and included morning presentations from members of the three work groups on NFPA 13D system design, issues relating to the water purveyors, the state’s regulation requirements, and an overview of the backflow requirements contained in the California Residential, Plumbing, and Health and Safety Codes. The afternoon featured a question and answers session and open forum with a panel of experts. The forums were generally successful and many of the water purveyors changed their views on the need for additional meters, backflow devices and standby fees as a result of the additional education.

Ultimately the backflow issues was resolved with the California State Fire Marshal Interpretation Bulletin, [“California State Fire Marshal Interpretation Bulletin, Backflow December 20, 2013 Interpretation 13-001.”](#) The question submitted by the author of this article on behalf of the NFSA contractor members in California was as follows; “Is it the intent of Section R313.3.5.3 of the 2013

California Residential Code (CRC) to require backflow protection to separate a stand-alone residential fire sprinkler system from a potable water source supplying the system?” The conclusion of the interpretation was “Based upon code sections above, backflow prevention is not required in fire sprinkler systems that are constructed of materials that are approved for potable water.” This bulletin was distributed throughout the state and is still believed by many fire prevention and building officials to be a must have document in their files when backflow becomes an issue locally.

Antifreeze was the next issue challenging the state’s regulation. While California is generally known for its sunshine and great weather, there are many jurisdictions that face severe cold and low temperatures affecting homeowners with residential fire sprinkler systems requiring the use of antifreeze. As such fire and building officials in communities such as Lake Tahoe, Lake Arrowhead, and others needed clarification and guidance. Once again, the State Fire Marshal gathered stakeholders to identify the issues and provide guidance on how to make residential fire sprinklers effective in those areas of the state requiring the use of additional protection from freeze. The result was the release on [December 30, 2013 of California State Fire Marshal Information Bulletin – IB13-009, “Antifreeze Use in NFPA 13D \(2013 Edition\) Residential Fire Sprinkler Systems as Referenced In the 2013 California Building Standards Code.”](#)

The Information Bulletin references the NFPA Standards Council meeting held on August 2013 and informs the reader of the final decision that was made to issue the tentative interim agreement ([TIA 13-1, TIA Log #1067, on NFPA 13D 2013 edition](#)). The TIA addresses the use of antifreeze solutions within all NFPA 13D applications (One- and Two-Family Dwellings).

The bulletin also includes the OSFM adoption and intent providing clarification on NFPA 13D Section 9.2.2.1 that requires the use of listed antifreeze, NFPA 13D Section 9.2.2.1.1 that allows non-listed antifreeze solutions in premix only with limitations on the concentration for existing systems, NFPA 13D Section 9.2.2.2 that provides an exemption for the enforcing agency to approve a non-listed solution in the case of antifreeze concentrations for premixed glycerin at or below 48% or premixed Propylene Glycol at or below 38% where documentation justifies the use of those concentrations for specific portions of the home. It also clarifies NFPA 13D Section 9.2.2.2.1 requiring that documentation be presented to the enforcing agency to substantiate the use of the antifreeze solution. The bulletin concludes that the OSFM’s adoption of NFPA 13D specifically Section 9.2.2.1 and 9.2.2.2 does not prohibit non-listed antifreeze, but rather affords the use of premixed solutions that maintain limited concentration levels.

The next challenge facing the State’s Residential Fire Sprinkler Regulation came from an unexpected California stakeholder, our friends in the State Energy Commission who are tasked with managing the state’s energy conservation needs and the California Energy Code.

In an effort to see if residential fire sprinklers had an effect on the release of energy in a home, State’s energy officials conducted a minor test using a very small survey sample that resulted in a minimal release of energy in residential fire sprinklers in a home. Not to minimize the findings, but the release equated to the sound of muffled noise similar to a person overhearing a conversation from an attic. Based upon the study and in response to the CBIA and the California’s energy officials, the State Fire Marshal brought together stakeholders from the fire sprinkler industry (NFSA), fire and building officials, National Fire Protection Association (NFPA), the California Energy Commission, and the California Fire Sprinkler Coalition to discuss the issues and make

recommendations. The recommendations would then be formed into an information bulletin for use throughout the state.

After several meetings and presentations from the Energy Commission and the Fire Sprinkler Industry, [California State Fire Marshal Information Bulletin 13-007, "Residential Fire Sprinklers and Energy Regulations,"](#) was issued on November 18, 2013. As stated in the bulletin, the document was written to provide guidance to contractors, fire sprinkler installers, code officials, and energy providers on how to work together to provide the proper installation of fire sprinkler life safety systems. The bulletin urges stakeholders such as fire sprinkler installers and the building and energy industry to work collaboratively to advance sprinkler design, while providing a more limited air flow needed by the home builders and energy stakeholders to address California's energy regulation requirements. The bulletin contains 9 best management practices agreed upon after the presentations and discussions that include management of air filtration, the use of concealed sprinklers, collaboration of system design, installation in accordance with manufacturer's instructions, and other useful tips.

The next challenge facing the state's residential fire sprinkler regulation was the issue of spray polyurethane foam (SPF) on CPVC pipe during the construction of a new home. The issue was brought forward to the OSFM Automatic Extinguishing Systems (AES) Advisory Committee by a local authority in Southern California. The fire prevention official was addressing failures in CPVC pipe when exposed to SPF after the foam was installed improperly when compared to the manufacturer's installation guidelines. The AHJ reported that when the SPF was improperly installed, the internal foam temperature caused by the exothermic polyurethane reaction increased and resulted in failure of the CPVC pipe when directly exposed to the SPF.

A committee comprised of members of the AES Advisory Committee, the State Fire Marshal's Office and state fire prevention officers, and the poly-urethane foam industry was brought together. After many meetings and a tour of the SPF plant by members of the State Fire Marshal's Office, the [Information Bulletin 14-004, May 27, 2014, "Non-Metallic Piping Systems, Fire Sprinklers and Spray Polyurethane Foam Applications](#) was completed. The information bulletin contains four guidelines to provide proper installation. It encourages AHJ's, spray foam installers and the fire sprinkler industry to work together. Also included are websites and information for those in need of additional assistance.

The challenges of local authorities adopting more stringent local amendments in addition to the minimum requirements contained in the California Residential Code are becoming less frequent over time. To address the issue of "add-ons" that were discouraged as a best practice in the State Fire Marshal's [final report](#), two papers have been written and efforts have been made by the California Fire Sprinkler Coalition to limit this practice.

A paper published by the author in the September/October 2011 edition of SQ Magazine titled, "[Laying Down a Code Related Bunt in California](#)" addresses the issue of add-ons and encourages readers to "lay down a bunt and take one for the team" while trusting the NFPA 13D committee members and their expertise and experience in residential fire sprinkler design and engineering when creating the national standard.

A white paper, titled, "[Limit Local Amendments to Residential Sprinkler Requirements-June 3, 2014,](#)" written by members of the California Fire Sprinkler Coalition. The paper is available to assist in understanding the impacts of system "add-ons." The authors examine residential fire sprinkler design

and installation standards as they pertain to amendments by local jurisdictions. The paper discusses specific add-ons individually and how amendments may jeopardize the statewide requirement and increase the costs unnecessarily to the homebuyers. It further acknowledges that fewer local amendments the better. Amendments that are absolutely necessary should be based upon specific local conditions relative to climatic, topographical, geological, or resource constraints (access and water supply always being a consideration).

The last of the challenges and the most recent of the information bulletins still in development was really the result of observation and diligence on behalf of a local fire prevention official. While conducting an inspection, a fire official observed a device in the meter box that looked unusual. The device is called a meter setter and is used to connect the meter to the water source from the street to the meter and from the meter to the home. The primary issue was that the friction loss was not accounted during the design of the NFPA 13D residential fire sprinkler system. This was a concern because the jurisdiction was located in the Central Valley of Northern California where water pressures tend to be at minimal pressures. Basically, no one seemed to know anything about the device, its use and what the friction losses were when the system was designed.

As done previously, a committee was formed by the OSFM comprising of members of the AES Advisory Committee with input from the manufacturer of the meter setter and from water purveyors who utilize the devices. The committee studied the issue and the challenges resulting from the use of meter setters and has written a lengthy information bulletin. The bulletin outlines what meter setters are and how meter setters are used. The bulletin provides guidance and information to contractors, fire sprinkler designers, AHJ's, and water purveyors on pressure losses related to the meter setters. The bulletin also details water distribution system design and installation practices that should be known during design and approval of the water source supplying the needs of the residential fire sprinkler system. Included are two example cases and diagrams of how meter setters are configured.

So far you have read about what we have done previously during the first five years. I now want to share with you what we are currently working on in California. Our next project is to get the word out to realtors, homebuilders and new homebuyers, and to those purchasing homes built with residential fire sprinklers. The focus of these efforts will be what residential fire sprinklers are and the value of having fire sprinkler systems in their homes.

The California Fire Sprinkler Coalition is creating a "California Living with Residential Fire Sprinkler Campaign." Utilizing resources from the [Home Fire Sprinkler Coalition](#) website and additional materials provided by the fire sprinkler industry, the Coalition is creating fliers and handouts designed for realtors, homebuilders, and new homebuyers on the benefits to owning a home constructed with a residential fire sprinkler system, how the system works, and how to maintain it. The intent of the Campaign is simple. We want to educate Californians on residential fire sprinkler systems and how the system in their homes will keep their families safe from the effects of fire. Campaign materials will be available to the local authorities and may be modified for their individual communities.

After all that you have just read, I expect that you are wondering if having a statewide residential fire sprinkler requirement has been worth all the trouble. Indeed, it has been absolutely worth it. No doubt about it. Recently, my son and daughter in law purchased their first new home. My heart was busting out of my chest when my son responded to a family member when asked, "What is that in your ceiling?"

My son replied proudly, “That is a fire sprinkler and the reason you will never have to worry about your grandkids dying in a fire in our house. My dad helped make that happen.” I would have followed with, “And anyone who builds a home in California after January 1, 2011 will not have to worry either.” Therefore, I conclude that it is worth all the effort and we are still building and selling homes in California.

Bio: Bruce Lecair is the Associate Director West and Southwest Regional Manager for NFSA and a 30 year Fire Service Veteran having retired from the Woodland, CA. Fire Department in 2007. He has an Associate of Science Degree in Fire Science, a Bachelor of Science Degree in Management and a Master of Science Degree in Emergency Services Administration. Bruce was awarded the 2010 Cal Fire Partnership Award for superior performance and outstanding contribution demonstrating the ability to work in a cooperative partnership with the California Department of Forestry and Fire Protection for his efforts in the initial adoption of the California Fire Sprinkler Regulation.