



Limit Local Amendments to Residential Sprinkler Requirements

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Introduction

Home fire sprinklers are a contentious issue in many parts of the country. California, however, has successfully implemented the requirement to build new homes and townhomes with residential fire sprinkler systems. This acceptance in California should not be taken for granted. Proponents of home fire sprinklers must carefully steward the implementation of this requirement; otherwise, it will be jeopardized. One important consideration is limiting local amendments to these requirements.

All nationally developed codes regulating newly constructed one- and two-family dwellings now require the installation of automatic fire sprinklers. Smoke alarms have been required for nearly four decades, and their introduction cut fire fatalities in half. However, statistics still show that that around 80% of all fire fatalities in the United States occur in residential occupancies, and the number of fire fatalities has remained consistent for decades. Clearly, the nation's fire problem is primarily in the home, and fire sprinklers will significantly reduce the number of fire fatalities. If you have a reported fire in your home, the risk of dying decreases by 83 percent when sprinklers are present. This is the reason the national codes are now requiring fire sprinklers in newly constructed homes.

Automatic fire sprinklers have been around a long time. Developed in the mid-nineteenth century, the technology behind their effectiveness has been scrutinized by a multitude of experts over the years. The result is an efficient and effective fire safety system that properly reacts to anticipated fire scenarios. Constant review of associated standards and resulting improvements assure that the components and the arrangement of fire sprinkler systems are appropriate for the type of fire anticipated in the occupancy. This careful and constant effort to improve performance of automatic fire sprinkler systems has led to different types of systems

which incorporate sometimes radically different purposes and design features. For example, there are significant differences in automatic fire sprinkler systems protecting high-rack storage and single-family dwellings.

Component Testing

Manufacturers of sprinkler system components test and evaluate their products to ensure that they function reliably in a manner that is expected. Component test standards are scientifically developed and conducted. Laboratories utilized are subject to the approval of the Authority Having Jurisdiction (AHJ), and are usually accredited. All of the environmental conditions that components must endure are included in the testing sequence. Once successfully tested to a standard, the performance of components can be reliably anticipated.

Underwriters Laboratories (UL) has developed a test standard for residential fire sprinklers: UL 1626, *Residential Sprinklers for Fire-Protection Service*. This standard sets forth over 18 different tests for residential fire sprinklers, from load and strength tests of the heat responsive element to corrosion resistance of the sprinkler.

Some components critical to the success of a sprinkler system go through a listing process. To be listed, the tested products are evaluated, to ensure that the appropriate designated standards have been followed, or that they have been tested for the appropriate, specified purpose. Listings also require that the manufacturing process is periodically inspected to ensure that the product is made within the specified process requirements and quality controls.

Test standards are reevaluated periodically to ensure they remain appropriate. Thus, product standards are also fine tuned to ensure they are current with modern technologies. Ultimately, the result is that the manufactured components are tested and proven to perform beyond their intended use.

Design and Installation Standards

Fire sprinkler system design and installation standards are developed to ensure that systems are appropriate for the anticipated fire from the use within the occupied space. Without them, there is no guarantee that the fire sprinkler systems will work as expected, and who wants to expend the effort and cost without that guarantee?

The National Fire Protection Association (NFPA) promulgates three fire sprinkler installation standards. NFPA 13, *Standard for the Installation of Sprinkler Systems*, NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies*, and NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, are the primary nationally recognized standards for the design and installation of automatic fire sprinkler systems, each addressing a specific scope and purpose. These standards have their origins in a document first published by NFPA in 1897. As a result of continually updating, the original document has been fine tuned into three different standards, each specifying attributes of sprinkler systems with different purposes.

Developed in an open, consensus-based process overseen by the American National Standards Institute (ANSI), seven technical committees oversee the ongoing development of these documents. ANSI requires that there be a balance of interests on these committees so that it is not dominated by one particular interest. Accordingly, consideration for the make-up of the committees includes not only breadth of knowledge, but also a diversity of industry interests. Stakeholders include design engineers, product manufacturers, firefighters, authorities having jurisdiction, testing laboratories, insurance industry representatives, sprinkler installers, contractors, academia and builders.

These standards are updated triennially in order to address changes in occupancy fire behavior scenarios, technology advances in fire suppression systems, and changes in construction techniques. Product test standards are referenced in these design and installation standards. These updates run through a 24-month “gauntlet” to ensure that the standards are properly vetted, with ample opportunity for the general public to provide suggestions and information in the input, comment, and appeals phases of the process.

Consideration of proposed changes includes appropriate levels of protection, as well as costs associated with these levels of protections. Having already been tested, components are once again evaluated and subsequently cited for specific purposes in the design and installation standards. The result is a new edition of the standard with the most up-to-date construction techniques considered for modern occupancies.

Different types of fire sprinkler systems have evolved from the original standard. For example, NFPA 13D came about as a result of the desire to address standardization of automatic fire sprinkler systems specifically for one- and two-family dwellings and townhouses. As a result, NFPA 13D is intent to provide an affordable automatic fire sprinkler system in homes while maintaining a high degree of life safety for the occupants. It is not by happenstance that fire

sprinkler systems have been fine-tuned, but by a deliberate, methodical and scientific testing and evaluation process.

State and Local Adoption

Nationally developed design and installation standards are voluntary. They are not enforced unless specifically adopted at the state or local levels. The State of California adopts nationally developed codes and standards rather than developing them independently. As set in statute, local jurisdictions in California must use the codes and standards adopted at the State level, but are also allowed to amend the State's adopted requirements under certain circumstances.

California citizens benefit from adopting nationally developed standards because they take advantage of the input provided from national and international experts participating in the process. This national process includes technical and cost/benefit considerations. California taxpayers benefit from the cost savings because they do not bear the cost for developing these national standards.

An open rulemaking process is established in California for adoption of the national codes and standards. In some cases, California considers amendments to the national codes and standards. The State process is open and provides opportunity for stakeholders, including local building and fire agencies, to participate. This allows for all stakeholders to consider impacts of the State adoption, and to provide for appropriate amendments based on California issues.

Once adopted by the State, the requirements apply at the local level. This is intended to encourage consistency of regulations throughout the State, maintain a high level of reliability of design, installation and enforcement, and to keep the cost of construction as low as possible. Local jurisdictions have the ability to amend the State requirements, but local amendments must be more restrictive than the State and must be only for local topographic, geographic and climatic reasons.

California's Home Fire Sprinkler Adoption Process

At the national level, the requirement for fire sprinklers in newly constructed homes proved to be contentious. The State of California then considered whether to adopt this provision during the adoption of the International Residential Code. A process was established by the State, and all stakeholders were invited to participate in the evaluation of not only the residential code, but also the sprinkler standard.

Ultimately, three task groups were formed to focus on issues. Phase I was the Residential Fire Sprinkler/Water Supply Task Force, which addressed residential fire sprinklers from the water main to the first flange of the fire sprinkler riser. Phase II was the Residential Fire Sprinkler Installation Task Force, which addressed installation issues on the dwelling side of the water meter. And lastly, Phase III, Residential Fire Sprinkler Training/Outreach Task Force developed a proposal designed to educate the affected stakeholders with the necessary information to prepare for the implementation of the new statewide requirements.

These three task groups completed their evaluations with reports and recommendations. These can be found on the State Fire Marshal's website using the following link:

<http://osfm.fire.ca.gov/codedevelopment/residentialsprinklerandcacodes.php>

The final task force reports were the result of exhaustive evaluations of issues surrounding the requirement for fire sprinklers in all newly constructed homes.

Local Add-ons Are Unnecessary

The State requirement for providing fire sprinklers in all newly constructed homes has reached the local level. What should the local building or fire agency do? Is there a need to revise the requirement to be more restrictive for local issues?

NFPA 13D was developed to provide a cost effective means to provide occupants ten minutes to evacuate a home safely. It was not designed to protect against an external fire threat, nor was it designed to confine or suppress fires beyond that needed to allow for timely occupant evacuation.

The attributes of a fire sprinkler system must fit the fire threat. Changing design or installation requirements for perceived added benefit could be disastrous. What may appear to be minor amendments to the sprinkler system design and installation standard can have a significant effect on the proper operation during a fire incident. In fact, there is often no benefit to show for the further amendment.

If all jurisdictions changed the requirements in one way or another, there would be no consistency in the provisions across the State. Not only can local amendments adversely impact those who install fire sprinklers by creating confusion, but it can also negatively affect the building industry by unnecessarily increasing construction costs. Local amendment

“patchwork” of the standard ultimately jeopardizes the State’s ability to require fire sprinklers in newly constructed homes due to complaints of inconsistent regulations.

Note the following recommendation from the California Task Force: “The fewer local amendments the better. Those 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).”

Regarding local amendments this California Task Force recommendation suggested the following: “Coordinate requirements with surrounding jurisdictions. Consistency statewide will be very difficult to achieve but even on a countywide level it will be extremely helpful to developers and contractors.”

The report also states, “Unique jurisdictional sprinkler ordinances defeat the cost savings intended by the drawing of standardized plans, since the plans have to be revised to a varying degree for each unique ordinance.”

Examples of local add-on requirements introduced during the local adoption that provide little or no benefit, cause confusion, change the intent of the design and installation standard, and jeopardize the statewide residential sprinkler requirement include the following:

Attic Sprinklers: Adding a requirement to provide sprinkler protection in an attic space raises questions that are not clearly answered. Is this really necessary for life safety, which is the intent of NFPA 13D? What type of sprinkler should be installed in an attic, and how is the system demand calculated, with the two sprinkler design? These issues are not addressed in the standard.

Small Area Coverage: Going “above and beyond” the standard and requiring small areas like closets and bathrooms, which are omitted in the standard, does not seem to provide much benefit for the added cost. Such add-on’s may add to the calculated demand, and increase system requirements for supply lines and meter sizing. Statistics indicate that few fires occur in these areas and installing sprinklers does not significantly increase occupant safety.

Increased Calculation Requirements: Increasing the calculation requirement to four sprinklers, as opposed to the required two, increases the water supply sizing requirements significantly. This will likely lead to larger pipe sizes and meter sizes and significantly increases the costs of the systems and potentially any monthly service fee.

Exterior Bell: Requiring a water flow detection device, such as a bell, can significantly impact the type of sprinkler system designed. Such requirements virtually eliminate the possibility of a multipurpose or a “passive purge” system, which may mean giving up an alternative method that often eliminates consideration of back flow devices.

Backflow Device: Requiring a backflow device will add significant friction loss to the pressure loss calculation and increase the sizing of components and thus the cost of the sprinkler system. Such an add-on may be completely unnecessary given the extremely low adverse risk of backflow for sprinkler systems, especially those that are integral with the potable water supply in the home. In general, a clear hazard class should exist for backflow devices to be required, something fairly rare in a typical home on a public water system.

Minimum Meter Size: The design of the system should dictate the size of the water meter. Specifying a minimum meter size without clear hydraulic calculations using water system operating pressure considerations can unnecessarily increase the size of the house service lateral pipe and more importantly the water meter, if a water meter is required. This not only increases the cost associated with the system, but it can increase the costs to the home owner where the water purveyor charges monthly meter service fees.

Separate Water Tap: Requiring a separate water tap to the water main solely for a sprinkler system increases the cost for the installation and likely the monthly service fee as well. This also limits design options for the type of sprinkler utilized, preventing the use of multipurpose systems, which in many cases will be less expensive.

The NFPA 13D standard is specifically for sprinklers installed in one- and two-family dwellings and townhouses. It was developed to encourage the use of fire sprinklers in homes. This was accomplished by reducing the requirements – and the cost – of an NFPA 13 compliant automatic fire sprinkler system. The goal was to provide the greatest life safety for occupants of residential dwellings at the lowest possible cost. Doing so reduced the complete property protection aspect of the NFPA 13 standard.

An NFPA 13D system provides life safety of the occupants in a home to allow for self-rescue. The purpose is neither to protect property nor to aid in firefighting, although statistics indicate an excellent record of doing both as an unintended consequence.

The reductions to the NFPA 13 compliant standard that create the NFPA 13D standard are the result of a significant vetting process. If additional requirements, such as those identified above, are included in a local adoption, the resulting sprinkler systems installed would not be considered an NFPA 13D system. Yet without all the requirements of NFPA 13, such systems cannot be considered NFPA 13 compliant. More importantly, it would defeat the intent of a cost effective life safety sprinkler system.

Conclusion

Extensive technical expertise has been invested in the development of the national standards for automatic fire sprinklers. Similar expertise has been invested in the adoption and amendment of the national standards at the state level. Often local amendments disregard all the work at the national and state level which was accomplished to develop these national and state requirements.

With good, but perhaps misguided intentions, some local jurisdictions amend the sprinkler requirements in an attempt to provide an added benefit to systems within their jurisdictions. Unknowingly, those that enact local amendments usually do not get the benefits they want. Such add-ons jeopardize the California residential fire sprinkler requirement because they confuse the uniform sprinkler requirements throughout the state and unnecessarily increase the cost of the systems. Complaints regarding local amendments could jeopardize this important, proven safety tool and California's requirement for automatic fire sprinklers in newly constructed homes could be put at risk. Indirectly, this could also have a negative effect on other states that may be considering adoption of this important, life-saving requirement.

Local agencies are encouraged to contact the California Fire Sprinkler Coalition or the Office of the State Fire Marshal before recommending residential fire sprinkler amendments to their respective local governing bodies.