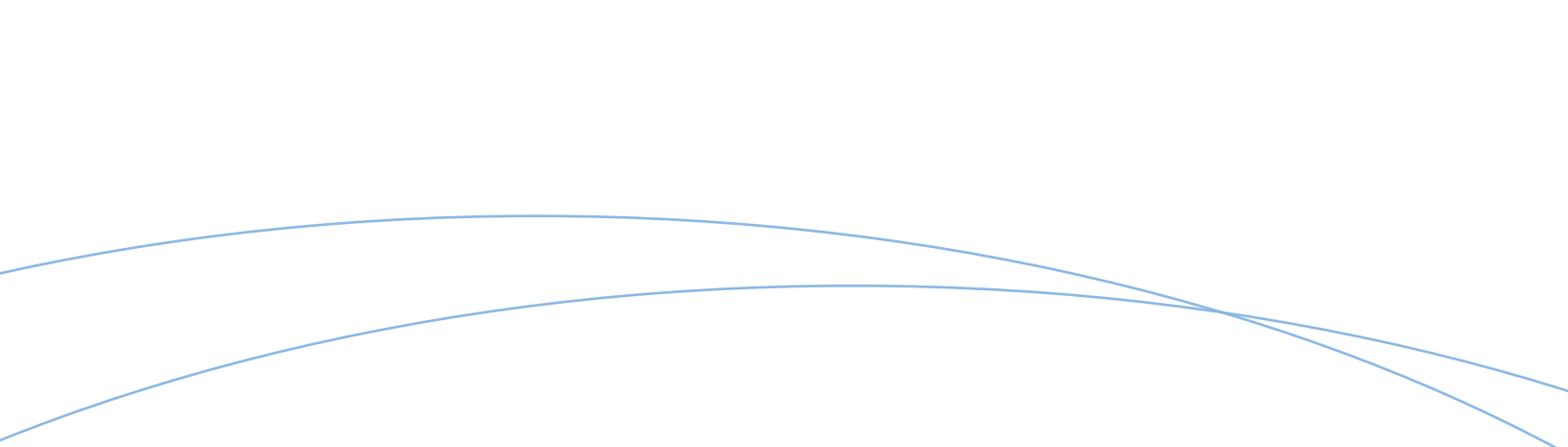


Fire Sprinkler Systems in Senior Living

Design Decisions, Risk Exposure
and the Evolving Insurance Reality

By Donna Settle





Executive Summary

Fire sprinkler systems are widely accepted as a foundational life safety feature in senior living communities. However, the presence of a sprinkler system alone does not define the level of protection provided. In practice, significant variation exists between system types, particularly those designed under the NFPA 13, 13R and 13D standards. These differences materially influence how fires develop, how damage is contained and how insurers evaluate risk.

Senior living operators are increasingly facing a more disciplined insurance market, where underwriters are no longer evaluating buildings as simply “sprinklered” or “unsprinklered.” Instead, they are assessing the **extent, completeness and reliability of protection**. At the same time, capital providers and regulators are placing greater emphasis on resilience, continuity of operations and protection of vulnerable populations.

This whitepaper examines how sprinkler-system decisions are made in practice, where gaps commonly occur, and how those decisions are influencing underwriting outcomes, capital planning, resilience, and the long-term cost of risk in the senior living sector.



The Unique Risk Profile of Senior Living

Senior living communities occupy a distinct position between residential and healthcare occupancies. Residents often require assistance with mobility, may experience cognitive impairment and rely heavily on staff intervention during emergencies. These characteristics extend evacuation timelines and increase reliance on built-in automatic fire protection systems to control or suppress fire conditions.

The National Fire Protection Association (NFPA) has consistently noted that automatic sprinkler systems significantly reduce fire-related fatalities and property damage. According to NFPA data, the civilian death rate in sprinklered properties is substantially lower than that in non-sprinklered properties, and property damage is reduced by a meaningful margin.¹

However, these statistics are often interpreted too broadly. They reflect the presence of sprinklers, not the **performance differences between system types**. In senior living, where evacuation is more complex, these distinctions become critical. A system designed primarily to support occupant escape may not provide the same level of property protection or fire control needed to prevent large-scale loss.

Understanding Sprinkler System Design in Practice

Sprinkler-system selection is typically driven by a combination of code requirements, construction costs and project feasibility. While engineers design systems in accordance with applicable standards, the **choice of which standard to apply** is often made early in the development process.

NFPA 13 systems are intended to provide comprehensive protection. These systems are designed to control or suppress fires in a wide range of scenarios and generally include coverage in both occupied and certain concealed spaces. As a result, they are more effective at limiting fire spread and reducing total-loss exposure.²

By contrast, **NFPA 13R systems** were developed with a narrower objective: to support **life safety in residential occupancies** by allowing occupants time to escape. These systems permit the omission of sprinklers in specific concealed spaces, such as attics, where fire spread can occur outside the reach of suppression.³

NFPA 13D systems provide an even more limited level of protection, intended primarily for **one- and two-family dwellings**. Their application in senior living environments is typically restricted and may not align with the actual risk characteristics of these facilities.

In practice, **many senior living communities are constructed using NFPA 13R systems** due to cost advantages and code allowances. While compliant, these systems are often not designed to prevent large property losses, particularly in scenarios involving concealed space fires or delayed detection.





Where Code Compliance Falls Short

A recurring issue across the senior living sector is the assumption that compliance with code equates to adequate protection. In reality, **building codes establish minimum life safety requirements**, not optimal risk-mitigation strategies.

Fires originating in concealed spaces, particularly attics with combustible construction, have been a consistent source of large losses. The National Institute of Standards and Technology (NIST) and other research bodies have documented that fires can spread rapidly through unprotected void spaces, bypassing sprinkler coverage and compromising structural elements before effective suppression is achieved.⁴

In senior living facilities, this risk is amplified by building size, interconnected spaces, and the presence of combustible furnishings and medical equipment. When sprinkler coverage is limited to occupied areas, fires that begin outside those zones can grow unchecked until they reach a scale that overwhelms the system or requires extensive fire department intervention.

From an operational perspective, this often results in:

- Significant structural damage
- Extended business interruption
- Resident displacement and relocation challenges

These outcomes are increasingly reflected in underwriting assessments.

The Insurance Market Has Shifted

The property insurance market has undergone a notable shift in recent years, driven by sustained loss activity and increased scrutiny of building characteristics. Insurers are no longer treating all sprinklered properties as equivalent.

Underwriters are now evaluating system type (NFPA 13 vs 13R vs partial systems), the presence of non-sprinklered concealed spaces, water supply adequacy, and maintenance and impairment history.

Industry loss data has shown that fires involving concealed spaces or incomplete sprinkler coverage can result in disproportionately large claims. As a result, insurers are placing greater emphasis on **the completeness of protection**, not just on system presence.

For senior living operators, this shift is translating into:

- Increased underwriting questions and engineering reviews
- Higher deductibles or retentions for less robust systems
- Reduced capacity or participation from certain carriers
- Greater expectations for documented risk-improvement plans

In practical terms, the difference between NFPA 13 and NFPA 13R is no longer theoretical. It is being reflected directly in pricing, terms and availability of coverage.

Regulatory and Industry Direction

While building codes evolve incrementally, the broader industry is moving toward enhanced fire protection and resilience. Several trends are emerging:

- Increased scrutiny of concealed spaces and combustible construction
- Greater emphasis on system reliability and redundancy
- Alignment of protection requirements with occupant vulnerability

Additionally, state and local jurisdictions are beginning to reassess requirements for existing facilities, particularly when renovations or changes in occupancy occur. The Centers for Medicare & Medicaid Services (CMS) has also reinforced requirements tied to life safety compliance in healthcare-related occupancies, which may influence senior living operations depending on licensure and services provided.⁵

These developments suggest a continued shift toward expectations that go beyond minimum compliance, particularly for facilities serving high-risk populations.

Expanding Risk at the Wildland-Urban Interface (WUI)

While much of the discussion around sprinkler system performance focuses on interior fire scenarios, an increasing share of risk for senior living communities is developing outside the building envelope — particularly in areas classified as the wildland-urban interface (WUI).

The WUI represents the transition zone where developed structures meet undeveloped vegetation and natural fuels. In these environments, fire behavior can change rapidly, often producing high-intensity events that expose vulnerabilities in both building construction and fire protection strategies.

Although wildfire exposure is often associated with California, the risk is **national in scope**. Fire authorities estimate that more than 60,000 communities across the United States are exposed to WUI fire conditions.⁷

Recent wildfire events have impacted communities far beyond the West Coast. Significant losses have been documented in:

California, where wildfire events in 2025 damaged or destroyed more than 16,000 structures, many within WUI zones⁸

Colorado, where fires and related incidents have resulted in evacuations and displacement in residential care settings¹²

Texas, where wildfire conditions and structure fires have required the escalation of emergency response in high-risk occupancy types¹⁴

Massachusetts, where a fatal assisted-living facility fire highlighted evacuation and life safety challenges¹¹

Wildfire exposure is also increasing across states such as Arizona, Oregon, Washington and parts of the Southeast, where population growth and land-use patterns are expanding development into fire-prone areas.⁷

For senior living operators, this trend introduces a different category of exposure:

Exterior ignition from embers and radiant heat

Rapid fire spread through landscaping and adjacent vegetation

Simultaneous impacts across multiple buildings within a campus environment

Evacuation under compressed timelines and adverse conditions

In these scenarios, building fire protection systems must function as part of a broader resilience strategy that considers site design, defensible space and exterior ignition resistance, in addition to interior suppression capability.



Heating, Ventilation and Air Conditioning (HVAC) and Smoke Infiltration Risk

While fire protection strategies are often centered on flame control and suppression, wildfire and exterior fire events introduce an additional hazard: **smoke infiltration into occupied spaces**.

During wildfire incidents, smoke can travel significant distances and enter buildings through outdoor-air intakes, mechanical ventilation systems and building-envelope leakage points. In senior living environments, where residents may have increased sensitivity to air quality and limited mobility, interior smoke conditions can quickly render a building unsafe even when flames do not directly impact the structure.

Guidance from wildfire mitigation authorities highlights that building survivability and occupant safety depend not only on resisting ignition, but also on managing the movement of smoke and airborne contaminants.¹⁰

Operational considerations for senior living facilities include:

- 1 Evaluating HVAC system operation during wildfire or exterior smoke events.
- 2 Identifying the location and exposure of outdoor-air intakes.
- 3 Developing procedures for reducing or temporarily shutting down outdoor-air intakes when smoke conditions are severe.
- 4 Ensuring that any operational adjustments are coordinated with life-safety requirements and resident care needs.
- 5 Maintaining filtration systems capable of reducing particulate intrusion where feasible.

These measures should be incorporated into broader emergency response and continuity planning. While HVAC control strategies do not replace fire protection systems, they play a critical role in maintaining tenable conditions for occupants during exterior fire events.



Real-World Loss Events Reinforce Exposure

Recent fire incidents in senior living facilities illustrate how quickly conditions can escalate, even in buildings that meet current code requirements.

In 2025, a fire at an assisted-living facility in Fall River, Massachusetts, resulted in multiple fatalities, injuries and large-scale resident displacement. Investigators examined factors, including the ignition source, fire growth and the challenges associated with evacuating residents with limited mobility.¹¹

A 2025 explosion and fire at an assisted-living campus in Denver resulted in multiple hospitalizations and the displacement of dozens of residents, requiring coordinated emergency housing and continuity planning.¹²

Wildfire events introduce additional complexity. During the 2025 Los Angeles-area wildfires, hundreds of residents from senior living and healthcare facilities were evacuated as fires approached or damaged properties, and some facilities were ultimately destroyed.¹³

Even smaller-scale incidents, such as rooftop or exterior equipment fires, can require an escalated emergency response due to smoke conditions and resident vulnerability.¹⁴

These events highlight several consistent outcomes:

- Fire impacts extend beyond the point of origin
- Evacuation is resource-intensive and often disruptive
- Business interruption and reputational impacts can exceed direct property damage



Gallagher Perspective

Gallagher Property Risk Engineering provides an independent, strategic perspective on how fire protection systems perform in real-world conditions and how those systems are evaluated by insurers.

Our role is not to replace design professionals or enforce code compliance. Instead, we focus on the **practical implications of design decisions**, translating technical system characteristics into their impact on loss potential, business continuity and insurability.

In the senior living sector, this perspective is particularly important. Facilities often meet minimum code requirements but still present meaningful exposure due to system selection, incomplete protection, or emerging risks such as WUI fire conditions and smoke infiltration. These gaps are not always visible in drawings or compliance documentation, but they are increasingly visible in underwriting outcomes and loss experience.

Gallagher PRE supports clients by:

- 1 Identifying gaps between code compliance and risk performance**, including limitations associated with system type, coverage and reliability.
- 2 Contextualizing risk for underwriting**, translating engineering characteristics into clear exposure narratives that align with carrier evaluation criteria.
- 3 Prioritizing risk improvement strategies**, focusing on measures that meaningfully reduce loss potential rather than simply increasing capital spending.
- 4 Supporting resilience planning**, including considerations related to wildfire exposure, campus layout and operational readiness.

This approach allows senior living operators to make more informed decisions about where and how to invest in fire protection. It also supports more effective engagement with insurers, providing a defensible and transparent view of risk that aligns technical reality with underwriting expectations.

Ultimately, the value of Gallagher PRE lies in its ability to serve as an independent advisor and advocate, helping clients navigate the intersection of engineering, operations and insurance in an increasingly complex risk environment.

Conclusion

The presence of a sprinkler system is no longer sufficient to define a facility's risk profile. In senior living environments, the type, extent and reliability of fire protection systems play a critical role in determining both safety outcomes and financial performance.

As the insurance market continues to evolve, underwriters are placing greater emphasis on system completeness, concealed-space protection and the ability of a facility to withstand realistic fire scenarios. At the same time, emerging exposures, including wildfire risk in the wildland-urban interface (WUI) and smoke infiltration into occupied spaces, are expanding the definition of what constitutes effective fire resilience.

Operators who rely solely on minimum code compliance may find that their facilities remain vulnerable to loss events that disrupt operations, displace residents and strain access to insurance capacity. By contrast, those who take a more proactive and informed approach, grounded in an understanding of system performance, site-level risk and operational readiness, are better positioned to manage both immediate and long-term risks.

Fire protection decisions should therefore be viewed not as isolated design choices, but as **strategic investments in resilience, continuity and insurability**. Integrating interior suppression, exterior fire considerations, and operational controls such as HVAC management during smoke events creates a more complete and durable risk posture.

In an environment defined by increasing loss severity and tightening underwriting standards, the organizations that succeed will be those that move beyond compliance and toward **intentional, performance-based risk management**.

Resources:

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- ¹⁴FOX 4 Dallas. "Dallas Assisted Living Facility Fire Involving Rooftop Equipment (2025)," <https://www.fox4news.com/news/fire-damages-dallas-assisted-living-center>
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