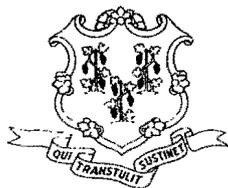


State of Connecticut
GENERAL ASSEMBLY



PUBLIC SAFETY COMMITTEE
STATE CAPITOL
HARTFORD, CONNECTICUT 06106-1591

**TO: MEMBERS OF THE TASK FORCE CONCERNING INSTALLATION OF
AUTOMATIC FIRE EXTINGUISHING SYSTEMS IN RESIDENTIAL HOMES**

FROM: JOHN VENDETTA, CHAIRMAN

RE: GRAMMATICAL REVISIONS OF FINAL TASK FORCE REPORT

DATE: JANUARY 2, 1997

This is a grammatical revision of the final task report.

If you have any questions please contact Committee Clerk Scott Devico at 240-0570.

TASK FORCE ON FIRE EXTINGUISHING SYSTEMS

Created Pursuant to PA 95-318

Chairperson: *John Vendetta*, Hartford Fire Marshal

Final Report
Submitted December 31, 1996

CHARGE

Section 15 of Public Act 95-318 established a 12 member task force to review and report to the Public Safety Committee by January 1, 1996 on the

- extent to which fire extinguishing systems approved by the state fire marshal have been installed in residential buildings designed for one or more families,
- cost of installing such systems, and
- feasibility of requiring installation (see Appendix 1 for task force membership).

EXECUTIVE SUMMARY

Background

Fire prevention experts have continuously emphasized that fire sprinklers and smoke detectors together with fire prevention educational efforts provide the most protection from fire. Smoke detectors save lives by providing a warning system but cannot extinguish or contain a fire or protect those physically unable to escape on their own, such as the elderly and young children. State law requires fire sprinklers in many types of buildings. But it does not require them in one- and two-family houses, where most fire related deaths occur. Several recent fire tragedies in the state involving one- and two-family houses have underscored the need for greater fire protection in these houses. Smoke detection, fire prevention and protection education, and fire sprinklers provide a balanced, comprehensive approach to protecting people from fire. The total effort is most effective when all three elements are in place.

Because many people do not know how fire sprinklers can save lives, they do not appear willing to spend the extra money for the added security sprinklers provide. Many people believe sprinklers are a potential liability and see them as intrusive and unsightly (although the new designs look more like a coin). They expect sprinklers to go off accidentally, causing extensive water damage. In fact, sprinklers discharge less water than fire department hoses for comparable fires. And water damage from a sprinkler is much less severe than the damage from fire hoses or unabated fires. Because of the general misconceptions and ignorance regarding residential sprinklers, the National Fire Protection Association (NFPA), National Fire Sprinkler Association (NFSA), and American Fire Sprinkler Association (AFSA), are planning to launch a national residential fire sprinkler public awareness program. Connecticut was chosen as the test site because of its progressive public safety efforts.

Findings

1. When properly installed, residential sprinklers reduce deaths and injuries between 73% and 90% of the time (National Institute of Standards and Technology NBSIR 84-2819).
2. Statistical inference indicates there are relatively few one- and two-family houses equipped with sprinklers, however, with new technology and greater public awareness through education, the total number would be expected to grow with each year.
3. Although, one- and two-family houses comprise almost three-quarters of all residential buildings, more than two-thirds of the fires occur in them.

4. The majority of fire related deaths and injuries occur within one- and two-family dwellings which account for 72% of all residential occupancies.

Table 1
Fire Incidents One- and Two-Family Dwellings

	1993	1994	1995
Residential Fires	63.9	69.5	81.8
Fire Deaths	52.4	67.9	52.9
Fire Injuries	56.5	58.8	55.9

CT Fire Incident Reporting System

5. Home Builders Association of Connecticut (HBA-CT) estimates the average cost of installing sprinklers in one- and two- family buildings is \$2.00 per square foot adding approximately \$4,500 to \$6,600 to the cost of building the average new home.
6. New small diameter flow through grid technology has the potential for reducing the cost per square foot. NFSA has cited examples of new technology systems installed for less than \$.50 per square foot, demonstrating the industry's commitment to reducing costs.
7. To overcome a general lack of public awareness of the life safety benefits of residential sprinklers, a strong public education program is needed to promote them. The NFPA, NFSA and AFSA have selected Connecticut as the first state in which to present such a program.
8. Tax, insurance, and construction development incentives are needed to encourage sprinkler installation. Assessment credits could reduce property taxes, decreased loss experience could reduce total insurance premiums, and residential sprinklers would increase the value of new homes.
9. The true value of sprinkler protection must be assessed by comparing the reduction in fire related deaths and injuries, reduced property losses, and reduced municipal fire protection costs, with the investment in installation, financing and maintenance of the systems. The City of Hartford intends to lead by example in the construction of 90 single family homes with sprinklers.

Conclusion

The task force agrees that installing automatic fire sprinklers in one- and two- family houses would considerably reduce fire related fatalities and property damage. Installation increases construction costs, making new houses less affordable. The task force believes that residential sprinklers can be marketed as a good economic investment if residential installations are afforded the same incentives currently available for commercial sprinklers. However, the present economic conditions and the shortage of demand due to a lack of public awareness makes the requirement of residential sprinklers in one- and two-family homes by legislation not practical at this time.

Recommendations

The task force recommends the following:

1. Require that any sprinklers installed in one- and two-family buildings comply with the standards adopted by the state fire marshal to assure the quality, reliability and effectiveness of installations statewide.
2. Require that the Department of Consumer Protection make available a separate residential sprinkler license to any licensed plumber who demonstrates a working knowledge of technology and methods for installing residential sprinklers.
3. Require that the task force reconvene in January, 1998 to:
 - re-evaluate new fire sprinkler technology,
 - revisit status of recommendations, and
 - reassess original findings.
4. Create a task force consisting of representatives from regulatory agencies, Department of Economic and Community Development, water companies, and the building and sprinkler industries to investigate methods to reduce costs, increase public awareness of and demand for residential fire sprinklers, and explore the investment potential of residential sprinklers against the initial installation cost to determine the long term economic benefit.

INVESTIGATION, RESEARCH AND ANALYSIS

BACKGROUND

Citing that a majority of fire related deaths and injuries occur in house fires, several jurisdictions throughout the country have reviewed their fire codes to require fire sprinklers in new one- and two-family houses. Fire prevention experts have continuously emphasized that both fire sprinklers and smoke detectors are needed to provide effective protection from fire. Smoke detectors have reduced fire related deaths. But homeowners sometimes deliberately deactivate them or fail to replace batteries.

One- and Two-Family Houses

Annually, between 1989 and 1995, an average of 7,300 one- and two-family houses were constructed in the state, according to a state Department of Economic Development report (*Connecticut Housing Production and Permit Authorized Construction, 1995*). The report shows that one- and two-family houses accounted for 71.4% of new residential construction in 1995. Based on the report, the estimated value of one- and two-family houses constructed in 1995 was \$1,197,240,000 or \$159,483 for the average house, including land.

The Law

Connecticut law does not require fire sprinklers in one- and two-family houses. But it requires approved sprinklers on each floor of (1) hotels or motels with more than five guest rooms and sleeping accommodations for more than 16 people, if they were issued new occupancy permits after January 1, 1987; (2) new buildings with more than four stories; (3) existing buildings over four stories occupied primarily by the elderly; and (4) residential buildings occupied primarily by or designed primarily for the elderly if the buildings have more than 12 living units and are issued new occupancy permits or substantially renovated on or after January 1, 1997 (CGS Sec. 29-315).

Fire Incidents in One- and Two-Family Houses

Although most residential fires occur in one- and two-family houses, the law does not require fire sprinklers to be installed in them. Nationally, according to NFPA, 75% of all residential fires, 52% of fire injuries, and 66% of fire deaths in 1995 were in one- and two-family houses.

The Connecticut data is similar to the national data. For example, one- and two-family houses accounted for 63.9% of all reported residential fires in the state in 1993, 69.5% in 1994 and 81.9% in 1995. Most fire related injuries and deaths also occur in these houses. For example, one- and two-family houses accounted for 56.5% of fire injuries and 52.4% of fire deaths in the state in 1993, 58.8% of fire injuries and 67.9% of fire deaths in 1994, and 55.9% of fire injuries and 52.9% of fire deaths in 1995 (Connecticut Fire Incident Reporting System).

In 1995, the estimated value of property loss from fires in one- and two- family houses was \$23,333,840 (Connecticut Fire Incident Reporting System).

Fire Sprinklers

An automatic sprinkler system consists of valves, pipes, and sprinklers with heat sensitive heads. The system is connected to a water supply system such as a city main or water tank. When heat from a fire raises the temperature, it melts a fusible element located in the sprinkler near the fire, thus releasing water. Each sprinkler head operates independently, distributing water only over the area of the fire. The melting temperature of the fusible element (usually 135-degrees Fahrenheit) is referred to as the rating of the sprinkler. The design and installation of the conventional system are specified by the NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes. Connecticut has adopted the NFPA standards by reference.

The most effective way to minimize threats from a fire is to put it out when it is small. A small fire can spread to an entire room in less than five minutes, producing heat and toxic gases while blocking escape routes. Fire prevention experts say fire sprinklers are the single most effective means of controlling the growth of a fire in its early stages. They say sprinklers are especially effective because, among other things, (1) sprinklers operate automatically where a fire originates, preventing it from growing undetected to a dangerous size (while properly installed smoke detectors simultaneously sound an alarm), (2) contain fast-developing fires, and (3) protect escape routes by controlling heat and the production of poisonous gases.

The effectiveness and reliability of fire sprinklers are well-documented in fire protection literature. When properly installed, they reduce fire deaths and injuries by 73% to 90% (*National Institute of Standards and Technology, 1984, NBSIR 84-2819*). The Prince George's County residential sprinkler task force report of July, 1996 indicated that residential sprinklers were installed in 21,627 homes. Since 1989, activated sprinklers in 56 fire incidents saved 16 lives. Prince George's County is less than one-quarter the population of Connecticut, therefore, the potential lives saved would be expected to be proportionally greater.

Public Health Regulations and Backflow Preventers

Connecticut Department of Public Health (DPH) regulations require either an air gap or a reduced pressure principle backflow preventer (RPD) (1) on fire sprinklers that use foam; (2) on fire sprinklers that use chemicals; (3) on new fire sprinklers with siamese connections; and (4) beginning January 1, 1999, on existing fire sprinklers with siamese connections, unless they have a double check valve assembly (DCVA). Any system that uses chemicals must have an RPD. New sprinklers are those installed after October 1, 1992 (Conn. Agencies Reg. § 19-13-B38a(c)). Although residential sprinklers are not subject to these conditions, they may require backflow prevention based on the installation method. Sprinklers must be designed and installed in compliance with NFPA 13. (Backflow preventers prevent contaminants from entering the public water supply system. RPDs prevent backflow by a combination of checkvalves and a relief valve. An air gap prevents backflow through the physical separation of inflow and outflow pipes. DCVAs prevent backflow through the use of check valves.) The

public health code requires 25 pounds per square inch of pressure (psi) at the water main. Backflow prevention devices result in a 10 psi pressure loss. Thus, a system installed on a public health code minimum water main may lack sufficient pressure to operate the system.

According to a report by the U.S. Fire Administration, Federal Emergency Management Agency, the risk of death or injury from a fire is 11.1 times higher than it is of risk of illness from a waterborne disease. It must be noted that the water purveyor is responsible for water quality. Stagnant water in the sprinkler system may adversely affect its presentability, thus, backflow prevention will become a factor.

Technical Issues - Connections to the Public Water Supply and Metering

Under the current NFPA 13D regulation, the question of where to connect the fire sprinkler system is a complex one. If it is connected to the water supply after the meter, then the meter must be sized and approved for installation on a fire sprinkler system. All meters will cause a loss of pressure to the sprinkler system.

But if the fire sprinkler system is connected to the water supply before the meter, it is not clear how theft of water can be prevented. Some water providers do not allow unmetered connections.

FIRE SPRINKLER DEMAND AND ESTIMATES

Estimates of the number of one- and two-family houses with sprinklers in the state are not available. HBA-CT says no demand exists for them. Its representative stated that a 1993 model home he built in a Middletown subdivision with a fire sprinkler generated no interest or request for installation. But evidence from the Office of State Fire Marshal 1995 fire report indicates a demand for fire sprinklers in one- and two-family houses. According to this report, of the fires reported in one- and two-family houses in 1993, six were in houses with sprinklers, in 1994, nine were in houses with sprinklers, and in 1995, 146 were in houses with sprinklers. Reports of fire incidents in one- and two-family dwellings show a growing number of homes are provided with fire sprinkler systems. The dramatic increase in sprinklered dwellings in 1995 is further reflected by the decrease in fire deaths and injuries in that year. The City of Hartford is presently constructing over 90 single family dwellings which will be equipped with fire sprinkler systems, as an example of municipal commitment to life safety and reflects the growing number of protected residences.

Despite the lack of data, the task force agreed that demand for fire sprinklers in one- and two-family houses is not very high. But the HBA-CT building survey of 1995 showed that the supply for fire sprinklers is not readily available either. Many people still view sprinklers as obtrusive and unsightly, even though sprinklers have been adapted to residential settings. Besides being unobtrusive, new residential sprinklers are designed to operate on domestic water lines instead of separate lines used in commercial sprinklers. Some people also see fire sprinklers as a potential liability because of leakage or accidental discharge. This fear is unfounded as the NFPA reports that the rate of accidental discharge from sprinklers is one in sixteen million (NFPA Fire Protection Handbook, 17th edition). Another common misconception is that all sprinklers in a system discharge at the time of fire. But sprinklers are designed to activate individually, releasing water only to the area of the fire. Further, they are designed to throw a pattern of water droplets thereby reducing the flow and limiting water damage. Sprinklers discharge far less water than high pressure fire department hoses.

SPRINKLER COSTS

Water Supply Costs

The committee identified three ways of supplying water to fire sprinklers. Each has cost implications.

Separate Public Fire Service Water Supply. The first involves installing a separate water service from the main line in the public street to the house at a cost to the homeowner of approximately \$3,500 if a one inch service line is needed and \$4,000 for a one and one-half inch line, however, much of this cost is required for the installation of the domestic service at the same time. Since this method could let unmetered potable water into the house, it would require a meter to prevent cross-connections and water theft. The cost of buying, installing, and maintaining the meter would be very high for the utility, which would be responsible for an extra service to every house in its distribution area and for repairing breaks or hits and marking out the service for the state mandated Call-Before-You-Dig Program. However, in newly constructed homes, these additional service lines would be in a common trench.

Combination Public Fire and Domestic Service. The second method involves installing the fire sprinkler off the domestic plumbing supply in the house and would cost less. The major cost would be for a backflow preventer to keep water from flowing back into the water supply. The cost of backflow preventers varies from a non-testable device costing \$45 plus installation, to a testable device costing \$200, plus installation. The annual test cost of a testable device ranges from \$25 to \$74. Another problem is that the fire sprinkler system must be installed downstream of the meter to avoid water theft. There is one approved meter for use on fire sprinklers.

There are two questions related to the service from a public water supply: (1) whether there should be a separate service for the fire sprinkler system (the small diameter flow through grid system in the recently adopted NFPA 13D eliminates this question) and (2) the size of the service pipe. Although residential fire sprinklers generally require no more water than normal domestic needs, water companies may require larger water service for such sprinkler systems. Water company regulations generally do not differentiate between the demand for water by residential and commercial fire sprinkler systems. The size of the water service pipe is a function of the pressure at the street, the length of the service and the height of the highest sprinkler head. Water companies have expressed concern about curbing theft and their liability if they must shut off supply for nonpayment.

No Public Water. The third method uses well water, which must be stored in sufficient quantities to support the sprinkler system. Because the demand for water for residential sprinkler is relatively low (250 to 300 gallons), a storage tank and a small pump or a compressed nitrogen bottle is adequate for a fire sprinkler system that is not on a public water supply.

Systems Cost

The cost of installing residential sprinklers depends on the type of system. The first type is the NFPA 13D system, which can be installed in two ways with its own separate water service or using domestic water supply line. Both methods require backflow prevention devices. Cost estimates range from 37 cents to \$2 per square foot, including basements that are not included in the floor area estimates, but would be included for sprinkler protection. This is equivalent to the cost of a bathroom. Reduced costs are the direct result of newly developed technologies.

Another type is the small diameter flow through grid system, which integrates the sprinkler with the same water lines for domestic appliances. This system requires that pipes be looped and gridded. The advantage of this system is that it requires only one set of pipes for both domestic and sprinkler needs. This system is tested every time the toilet is flushed and requires no backflow prevention device. The system was included in NFPA 13D in 1996.

A third emerging technology is an NFPA 750 system using pressurized water mists. This system requires approximately the same quantity of water stored in a domestic hot water tank.

Design Cost

Each system must be designed to provide sufficient volume and pressure for the sprinkler to operate and these designs must be prepared by a licensed professional. The initial cost has been estimated by HBA-CT at approximately \$500. Cost will be reduced when the systems are designed as a package, as is presently done with restaurant exhaust hood extinguishing systems.

Material Cost

Sprinklers and the pipes used with them may be made of plastic, copper, or steel. Cost will depend on the type of material used to construct the sprinkler. Systems with combined piping would cost less.

Other Costs

The home builders indicated that 20% to 25% of the design, material, and installation costs may be a reasonable amount to add for such items as supervision, warranty, contingency, overhead and profit when determining the total cost of the sprinkler system. In addition, consumer price, financing costs, and permit fees would also be included. For example, a \$5,500 addition to a 30 year mortgage at 8% would add about \$40 to the monthly payments.

DISCUSSION OF THE ISSUESCosts

Builder Expenses. The National Association of Home Builders strongly opposes a mandatory requirement for fire sprinklers in one- and two-family houses largely based on a cost and benefit analysis. The Connecticut Home Builders Association (HBA-CT) estimates that it costs about \$2 per square foot (not including design and profit mark up) to install fire sprinklers in a new one- and two-family house, typically because the area of the basement which must be protected is not added to the average square foot area of the home. This would add about \$4,500 to \$6,600 for the cost of building the average size new house. At an average cost to the homeowner of \$5,000 per new unit, HBA-CT says it would cost \$403,000,000 to save one life (See Table 1).

Table 1*

<i>Cost to Save 1 Life</i>	<i>At \$2.00 per sq. ft.</i>	<i>At \$.37 per sq. ft.</i>
No. 1 & 2 Family and Mobile Homes*	976,527	976,527
Number of Deaths per yr. (3 Yr. Avg)	16	16
1 Death for every...homes (976,526/16)	61,033	61,033
Average number of new homes per year	8,000	8,000
Number of years of new homes to save 1 life (61,033/8,000)	7.63	7.63
Cost to Sprinkle average new home (customer)	6,600	1,721
Cost per year to install sprinklers (6600 X 8000)	52,800,000	13,768,000
(\$52,800,000 X 7.63) Cost to save 1 life	403,000,000	105,037,685
<i>Effect on Reduction of Dollar Loss</i>		
Property Loss (3 Year Average)	23,000,000	23,000,000
Percentage of new to existing	0.82%	0.82%
Reduction of loss if new was sprinkled	188,423	188,423
Years to recover sprinkler cost	212	73

*The figures are based on installing sprinklers in the basements but not in garages and on a design or engineering fee of approximately \$500. The analysis assumes that new residential units would have the same impact on fire related deaths as existing units.

HBA-CT feels that at \$2 per square foot, a mandatory requirement for fire sprinklers in one- and two-family houses is not justified. The association states that if the total overall cost to the consumer can be brought below \$.50 per square foot, the greatest impediment to the installation of sprinklers would be eliminated for them. The National Association of Home Builders supports efforts to reduce cost and may exhibit a demonstration projects at its convention in January 1997.

The National Fire Sprinkler Association says recent studies show that fire sprinklers using the new flow through technology can be installed for as little as .37 cents per square foot. At that rate, the cost of installing a system in a new house with 2,200 square feet would be \$815.00. If the average new house price is conservatively set at \$119,000, the cost of the fire sprinkler would represent less than one percent of the total purchase price. HBA-CT disputes the findings on the grounds that it has not been proven that an entire system can be installed for .37 cents per square foot, and the flow through systems analyzed do not include the cost of design, large water service and ongoing maintenance costs and inspection. Also, if the cost of installing the sprinkler in the basement of a 2,200 square foot home is included in the calculation, the total cost would be \$1,221, plus a design fee of about \$500.

Fire Protection Savings

The actual cost of a sprinkler system can be analyzed as a capital investment. Using the installation costs provided by the HBA-CT, the following financial return on a sprinkler system was developed.

Table 2

Initial Installation Cost	\$5,500	30 year mortgage @ 8% =	-\$14,526
IRS Mortgage Deduction	\$40.35/month X 12 X 28% 136/year	30 year investment @ 5% =	+ \$4,284
Property Tax Reduction	\$4,000/home x 8% Fire Dept Budget* X 50% reduction \$160/year	30 year investment @ 5% =	+ \$10,630
Fire Insurance Deduction	\$400 total premium 10% Community Rate Decrease 10% Fire Premium 10% Sprinkler Reduction \$3.60	30 year investment @ 5% =	+ \$95
Depreciation 30 year	\$183/year X 28% IRS deduction	30 year investment @ 5% =	+ \$1617
BALANCE			\$2100 Profit

If sprinklers are paid for initially as part of the deposit, the investment generates income immediately.

The financial value of lives saved, taxpayers protected, property taxes preserved, reduction of damages, or increased home resale values would provide additional community wide returns and savings.

Cost per alarm to fire department

Without sprinklers

$$(15 \text{ firefighters}) \times (\$20/\text{hr. salaries}) + \text{equipment and expendables} = \$350/\text{alarm}$$

With sprinklers

$$(6 \text{ firefighters}) \times (\$20/\text{hr. salaries}) + \text{equipment and expendables} = \underline{\$150/\text{alarm}}$$

Savings \$200/alarm

Clearly, there are two very different approaches to determining the cost of sprinkler protection. The HBA-CT calculations are based on the assumption that one fire in one new home will save one life in one year. If this were a realistic assumption, then the costs are accurate. Obviously, not all one family homes will have fires nor will most homes have only one resident to be saved.

The fire protection approach views sprinkler protection as a capital investment in a mechanical system. As such, it can derive financial benefits allowed in commercial applications and show a net lifetime profit.

The first method represents a higher cost since a home builder has short term interest in a home while it is under construction and which is relinquished upon its sale. The second method accounts for the lifetime investment potential typically experienced by homeowners. The reader should take into consideration both the short term needs of the home builder and the long term interests of the home owner.

Actual and Potential Benefits

Life Safety. Residential sprinklers prevent loss of life and reduce injuries. The resultant impact on the economy, health care, life insurance and well being of every individual go beyond the direct impact of lives saved. In 1995, the number of deaths and injuries in one- and two-family homes declined at the same time that a 16 fold increase in sprinklers was reported from the previous year.

Property Loss. Residential sprinklers are designed for life safety and property protection is an incidental benefit. The Prince George's County residential sprinkler task force report of July 1996 shows that property losses were reduced by 80% in houses with sprinklers. Every municipality benefits from the preservation of its grand list.

Insurance. Basic community-wide insurance rates can be reduced in communities that have sprinklers. Some insurance companies charge lower home insurance premiums to homeowners who have fire sprinklers. These discounts range from a HBA-CT estimate of 15% on the fire portion of the premium to a documented 2% reduction on the entire premium.

Property Tax Reduction. Local property taxes on residential houses with fire sprinklers could be reduced by excluding the sprinklers from the property valuation for tax assessment purposes. A tax reduction of about 10% would help to offset a higher mortgage payment needed to pay for the system.

Reduced Road and Water Main Standards. The HBA-CT says that road widths could be reduced to about 25 feet from 30 to 32 feet if all the houses in a subdivision have fire sprinklers. Environmental (reduced drainage) and traffic safety (slower traffic) benefits would accrue in addition to lower road construction and maintenance costs. However, zoning regulations require minimum road widths to accommodate emergency vehicle access to buildings.

Similarly, subdivisions with fire sprinklers could have water mains sized for residential, rather than fire hydrant, demand. And hydrants might be spaced somewhat farther apart resulting in further savings.

Water companies do not support reducing water mains due to future needs, fires outside of houses, and normal operating pressures. There does not seem to be justification to the claim of reducing the size of mains and that removing hydrants will save a significant amount of money.

Municipal Fire Protection. When an entire subdivision is protected by fire sprinklers, the need for additional stations, large fire fighting apparatus, and fire fighting personnel is significantly reduced. The risk to firefighters is also decreased because sprinklers keep fires small and reduce the need to rescue occupants under adverse conditions.

Regulatory Requirements

Design. Currently, each new house plan must be separately designed and stamped by a licensed civil engineer. Builders who repeat the same plan many times would only need to have a given plan designed and certified once. Changes to the plan would require redesign and certification. But similarly arranged systems may be designed as a package, as are NFPA 96 hood exhaust extinguishing systems.

Regulation. Connecticut has three different kinds of public water providers. Water companies have the authority to write their own rules and regulations and can be more restrictive than state regulation, resulting in inconsistencies across the state.

Zoning. Some Connecticut municipal zoning regulations already require residential sprinklers in specific circumstances to address local issues.

Permits and Inspections

Sprinkler legislation or regulation must address at least the following:

- *whether to make the permit for fire sprinkler installation part of or separate from the building permit. The task force recommends residential sprinklers could be part of the plumbing permit.*
- *whether the building inspector, fire marshal, or other person should inspect and approve the installation of sprinklers. The task force recommends that approval of the installation be through the building inspector, in coordination with the fire marshal.*
- *whether the system should be tested by a licensed contractor.*

Contractor Licensing

A separate license is required to install fire sprinklers. For the most part, licensed fire sprinkler contractors handle commercial, industrial, and multi-family residential installations. Most licensed plumbers are not licensed to install fire sprinklers. This requires either that an additional contractor be hired to install a fire sprinkler or residential sprinkler installations be opened to additional licensed individuals.

If the flow through system is to be used, it would not be practical to have two contractors installing what is essentially one common plumbing system. Therefore, the regular plumber would have to get a fire sprinkler license. A better solution would be to add a limited addition to the current plumbing license for the installation of fire sprinkler systems in one- and two-family houses.

Appendix 1

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