



Ontario Association of Fire Chiefs Position Paper Residential Fire Sprinklers

The Ontario Association of Fire Chiefs (O AFC) supports changes to the Ontario Building Code to require that all new residential dwellings require the installation of residential fire sprinklers. The O AFC believes that the requirement for residential fire sprinklers will save lives, will reduce serious injuries to people and will reduce property damage to homes throughout Ontario.

Many lives continue to be unnecessarily lost in residential occupancies due to fire. Based on statistics from the Ontario Office of the Fire Marshal, there were 81 lives lost in fires in Ontario in 2006. Many of these lives may have been saved had their homes been protected with automatic sprinklers. While smoke alarms have had a significant impact on reducing the number of fatalities over the past 10 years, the National Fire Protection Association reports that a combination of fire sprinklers and smoke alarms can cut the risk of dying in a home fire by about 80%. The presence of automatic sprinklers would also serve to reduce risks faced by firefighters when fighting fires in buildings constructed from lightweight engineered wood framing systems.

Fire Departments are committed to achieving a high level of public safety. Residential sprinkler systems in residential occupancies will:

- Save many lives
- Significantly reduce property loss
- Reduce the impact on the environment due to limited release of toxic and other hazardous combustion products
- Reduce some construction costs due to offsets

The Spread of Fire and Vulnerable Victims:

Flashovers in home fires lead to many of the injuries and deaths in residences. Over the years, increased use of combustible furnishings in homes has reduced the period of time between the start of a free-burning fire and flashover to between 2.2 and 4.3 minutes. This means that flashover can easily occur in a home fire prior to the arrival of Fire Services. Residential sprinklers suppress the fire before flashover occurs.

Fatal residential fires most often occur between the hours of midnight and 6:00 am, when victims are asleep. Victims are disproportionately children and the elderly because they are physically less capable of escaping. When a fire occurs, occupants of

a house may not be able to respond to smoke alarms and escape in the few minutes before flashover occurs.

Ontario Building Code Does Not Mandate Residential Fire Sprinklers:

The Ontario Building Code (OBC) provides uniform minimum standards for the construction of buildings and is enforced by municipalities. Provisions to make sprinklers mandatory in high-rise residential construction are not included in the Code. Such requirements are in force in the rest of Canada.

The Ontario Building Code (OBC) contains comprehensive minimum requirements to protect buildings and their occupants from the potential of fire. It is estimated that over half of the provisions of the OBC are related to fire protection. Various provisions of the Code intersect and inter-relate to each other to provide this protection. These include design standards (e.g. path of travel to exits), requirements related to assemblies and materials' fire rating, fire detection and alarm systems, smoke detection and alarm systems, emergency systems (e.g. standpipe and hose), and fire suppression systems, such as sprinklers.

The OBC also contains "trade-off" provisions that allow for the reduction of some construction requirements, permit an increase in travel distance to building exits and increase the permitted area of a building when sprinkler systems are installed. The installation of automatic sprinkler systems permit waiving certain smoke control measures and sprinklers can be used in lieu of fire detectors. Construction cost savings can be found based on the "trade-off" provisions.

Fire Sprinklers are an Added Layer of Protection to Smoke Alarms:

A review of fatal fire data over a three-year period in the Province of Ontario found that in the 52,990 fires that occurred, 43% of smoke alarms did not work (usually due to a dead or missing battery/power source). In 197 fatalities, 67% of the alarms were not connected to power and 5% were remote or separated from the place of fire. The following provides an overview of the limitations of smoke alarms:

- A smoke alarm may not function due to improper location, age, or being located too far from the smoke or fire location
- They may not detect fires in a remote area, in chimneys or walls, on roofs, or on the other side of closed doors
- Units which meet standards may not be audible through closed doors, above other activities, or by hearing or otherwise impaired individuals or sound sleepers
- Smoke alarms may not have time to activate before fire itself causes damage, injury or death
- Due to the location or nature of the fire, smoke may not reach the unit immediately
- Smoke alarms are not foolproof
- Smoke alarms have a limited life span and need to be replaced every ten years
- Smoke alarms cannot operate without power

Smoke alarms alone cannot get the job done. The logical next step is to introduce residential fire sprinklers in order to create safe homes. Residential fire sprinklers will extinguish smoke and fire in homes before it spreads to deadly proportions. Without containment there can be extensive damage to life, property, and the environment as well as the risk of the spread of fire in built up cities and towns.

Addressing the Risks:

Residential fire sprinklers are a logical response to fire risk. Because the large majority of fire deaths and injuries occur in residential fires, fire protection measures which target residential properties have the potential to prevent injuries and save lives.

Residential fire sprinklers to suppress fires complement the early warning capabilities of smoke alarms and other required fire suppression and containment measures. When a fire starts, the heat sensitive element in the sprinkler detects heat and releases water in a fine mist. Each sprinkler head responds independently. The sprinkler suppresses or extinguishes fire, preventing its spread and preventing the production and spread of lethal smoke. The questions and answers section at the end of this paper clearly outlines the myths and realities of residential fire sprinklers.

Proven that they save lives:

Many jurisdictions in North America have adopted requirements for fire sprinklers in residential buildings. With the exception of Ontario, sprinklers are required in high-rise residential buildings across Canada. In addition to provincial requirements, Vancouver has adopted by-laws requiring sprinklers in all new residential buildings (including low density housing), under the City's statutory authority in British Columbia.

Over 220 jurisdictions in North America have adopted requirements for residential fire sprinklers in residential buildings.

Reviews of effectiveness in Vancouver, B.C. and Scottsdale, Arizona:

There have been reviews of the effectiveness of residential fire sprinklers in two large North American jurisdictions, one in the United States and the other in Canada. Scottsdale, Arizona has had a sprinkler ordinance in place since 1986, and Vancouver, British Columbia has had a by-law since 1990. Both require all new residential developments to be sprinklered. Since the regulations in each jurisdiction came into effect, there have been no fire deaths in sprinklered homes, and over 90 percent of all fires in these homes were contained by the operation of a single sprinkler.

The cost of fire damage or loss has also been significantly reduced. In Scottsdale, the damage in the average sprinklered incident was \$2,166.00 compared with \$45,019.00 in homes without sprinklers. The Vancouver experience has been similar. The average

fire loss in a home with sprinklers was \$1,065.00 compared with \$13,937.00 in a home without sprinklers.

Cost of Installation of Sprinklers:

Fire Service leaders suggest that the range of cost to install residential fire sprinklers is \$1.50 to \$3.00 per sq. ft., depending on the size of the units. It is estimated that savings on property insurance for units with sprinklers can range from 10% to 15%.

The Canadian Automatic Sprinkler Association (CASA) reported as of April 2007 that there were approximately 400-450 residential dwelling units voluntarily being sprinklered throughout the City of Toronto based on the accepted NFPA 13D. CASA reported that the price to the builder was on average \$1.50 per sq. ft., which is approximately 1% to 1.5% of construction cost. The installation of additional units in one residential building or throughout a subdivision would reduce the cost per unit.

Conclusion and Recommendation:

The Ontario Association of Fire Chiefs joins the Canadian Association of Fire Chiefs (CAFC) and the Canadian Council of Fire Marshals and Fire Commissioners (CCFM/FC) in supporting the need for residential fire sprinklers in all residential occupancies – single and multi residential dwellings including hi rise buildings.

The OAFIC supports and advocates for amendments to the Ontario Building Code to require that all new residential dwellings require residential fire sprinklers. The requirement for residential fire sprinklers will save lives and serious injuries to people throughout Ontario.

Myths and Realities of Residential Fire Sprinklers

Question: Do sprinklers go off accidentally?

Answer: No. The odds of a sprinkler going off by accident because of a manufacturing defect are 1 in 16 million. You have a better chance of being hit by lightning than for a properly installed residential fire sprinkler to go off by accident.

Question: What about water damage?

Answer: One of the myths about sprinklers is that they will cause significant water damage. While this may seem logical (after all, they spray water), fire records show that the reverse is actually true. Here is why:

A residential fire sprinkler typically discharges less than 20 gallons per minute in a fine spray that is quite efficient at fire extinguishment. A firefighter's hose line on the other hand discharges more than 200 gallons a minute. In general, a sprinkler system will use between 1/10th and 1/100th of the water used by the Fire Department. The combination of the sprinkler's quick response, the smaller water flow and lower pressure will significantly reduce water and property damage.

Question: Will fire sprinklers leak?

Answer: No. Sprinklers and their piping are tested at the pressures two to three times higher than your plumbing system, even though they use the same pressure as your plumbing. Therefore, the chance of a leaking sprinkler is practically non-existent. Like your plumbing pipes, sprinkler pipes are not exposed to cold areas so they are protected from freezing. They do not leak because, unlike faucets and other fixtures that are operated often throughout their lives, fire sprinklers remain closed until needed and thus do not receive the wear and tear of daily use.

Question: Aren't they unsightly?

Answer: Residential fire sprinklers are much smaller than ones that you see in stores and offices. All residential models come in colors to match popular ceiling and wall colours, and manufacturers will even custom-paint them for you. Many models are partially recessed into the ceiling with about $\frac{1}{4}$ inch – $\frac{3}{4}$ inch below the ceiling.

If you want them completely recessed, these models are also available. A cover plate that is painted to match the ceiling hides them. The cover is held in place by a metallic link that melts in a fire and exposes the sprinkler. It is common to find that visitors do not notice the sprinklers at all unless you point them out, even the ones that are not recessed into the ceiling.

Question: How do sprinklers operate?

Answer: Fire sprinklers are individually heat-activated and connected to a network of water pipes. When the heat from a fire raises the sprinkler to its operating temperature (usually 165°F), only that sprinkler activates delivering water directly to the source of the heat.

Question: Won't they all go off together?

Answer: No! Each sprinkler reacts individually to a fire, so only the sprinkler nearest the fire will open. If that is not sufficient to control the fire then the next nearest will open, and so on. In over 95 percent of cases only one sprinkler operates and this is enough to control or extinguish the fire.