

Residential Fire Sprinklers



America's Fire Problem

- Most fires and burn injuries occur in the home
- 80% of all fire deaths occur at home

Annually in US:

- 405,000 residential fires
- 18,600 injuries and 3,600 deaths from residential fires
- \$4.7 billion in property loss



America's Fire Problem

- The number of fires and the number of fatal fires has trended down since the 1970's
- Improved building codes
- Smoke alarms



Smoke Alarms

- 94% of all US homes have at least one smoke alarm
- Percentage unchanged over last 10 years and probably at saturation point
- The 6% of homes without a smoke alarm account for 77% of all annual fire deaths



Smoke Alarms

- 59% of homes with smoke alarms have only one alarm
- Up to 32% do not alarm in presence of smoke
- Millions of smoke alarms are beyond the expected 10 year service life
- Many are nonfunctional because of dead or missing batteries



Smoke Alarms

- Smoke alarms detect rather than fight fires
- Fire death high risk groups: elderly, children, mobility challenged, intoxicated
- Knowing that the house is on fire is not the same as being able to escape the fire
- Smoke detectors do not help the people who need them the most



Residential Fire Sprinklers

- Complement the protection of smoke alarms
- Both detect and fight fire
- Used in commercial structures for over 100 years (*Property Safety*)
- With exception of terrorist attacks, there has never been a multiple-fatality fire in any fully sprinklered building
- USFA funded development of residential sprinkler systems in 1970's (*Life Safety*)



Residential Fire Sprinklers

- Fast-reacting (early fire control with less water)
- Intended for one head per room installation
- Special water distribution pattern
- Original design: one head per 144 square feet
- New designs: one head per 400 square feet



Residential Fire Sprinklers

Home Fire Safety Program

- Smoke alarms
- Carbon monoxide detectors
- Portable fire extinguishers
- Escape plan
- Residential fire sprinklers



Smoke Alarms

- May be battery powered, line powered or both
- Can be designed to activate one alarm, all smoke alarms at once or at a central monitoring station
- Ionization smoke alarms
- Photoelectric smoke alarms



Smoke Alarms

- Installation should meet requirements of NFPA 72
- New construction: alarms in each bedroom, outside the bedrooms and a minimum of one alarm per level of house
- Existing construction: alarm installation outside of bedrooms and on each level of the house
- At least 20 feet away from cooking areas



Smoke Alarms

- Test each alarm at least once a month
- Replace batteries twice a year, except in alarms designed to use 10-year batteries
- Replace smoke alarms every 10 years
- Special alarms are available for the hearing impaired. These may strobe, vibrate or shake pillows
- Special alarms are available for young children which allow parents to record escape instructions in their own voices



Smoke Alarms

Do Not

- Detect carbon monoxide
- Extinguish fires



Carbon Monoxide

- A colorless, odorless, tasteless poisonous gas that is not detected by human senses
- Produced in fires
- Produced by vehicle and generator engines
- Malfunction of fireplaces natural gas / propane fired heaters or hot water heaters especially if flue is blocked
- Malfunction of kerosene heaters



Carbon Monoxide Detectors

- May be battery powered, line powered or both
- Installation should follow NFPA 720
- Detectors should comply with UL Standard 2034
- Do not detect smoke
- Install both smoke alarms and carbon monoxide detectors in every home



Portable Fire Extinguishers

- Home use by non-professionals is controversial
- Fire extinguishers are an effective tool *only if you are trained to use the correct type of fire extinguisher for the type of fire you encounter.*
- Otherwise: ***get out, stay out, and call 911.***



Home Fire Safety

Escape Plans

- Identify 2 ways out of every room
- Crawl low under smoke
- Feel door with back of hand
- Designate a safe meeting place
- Call 911 from neighbors house
- Once out, stay out



Home Fire Safety

Escape Plans

- Escape plans work best if they are regularly practiced
- Home escape drills
- Be realistic (at night, lights off)
- Change drills to block some exits, allowing practice of alternate escape routes



Residential Fire Sprinklers

- The ONLY component of a home fire safety program that can both detect and fight the fire
- Automatic Fire Sprinklers are *individually* heat-activated devices that are attached to a network of piping with water under pressure



Residential Fire Sprinkler Systems

Components:

- Water supply
- Water meter
- Plumbing (valves, risers and cross members)
- Water-flow alarm
- Fast-response residential sprinkler heads



Residential Fire Sprinkler Systems

Water Supply

- Street main which already supplies domestic water
- May need to increase size of home water main or install second water meter
- Well water: will require storage tank and pressurizing device
- 300 gallon tank will meet the 10- minute flow requirement in most cases



Residential Fire Sprinkler Systems

Plumbing

- Check valve (backflow valve) prevents sprinkler system water from flowing back into domestic water supply
- Riser: control center of the system
- Cross members: pipes that distribute water
- Plumbing may be plastic (CVPC) instead of metal



Residential Fire Sprinkler Systems

Alarms

- A water-flow alarm sounds when water is flowing in the system, implying that a fire is present
- Should be audible in all living areas and outside of the house
- May be connected to central station monitoring to facilitate Fire Department notification



Residential Fire Sprinkler Heads

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Residential Fire Sprinkler Systems

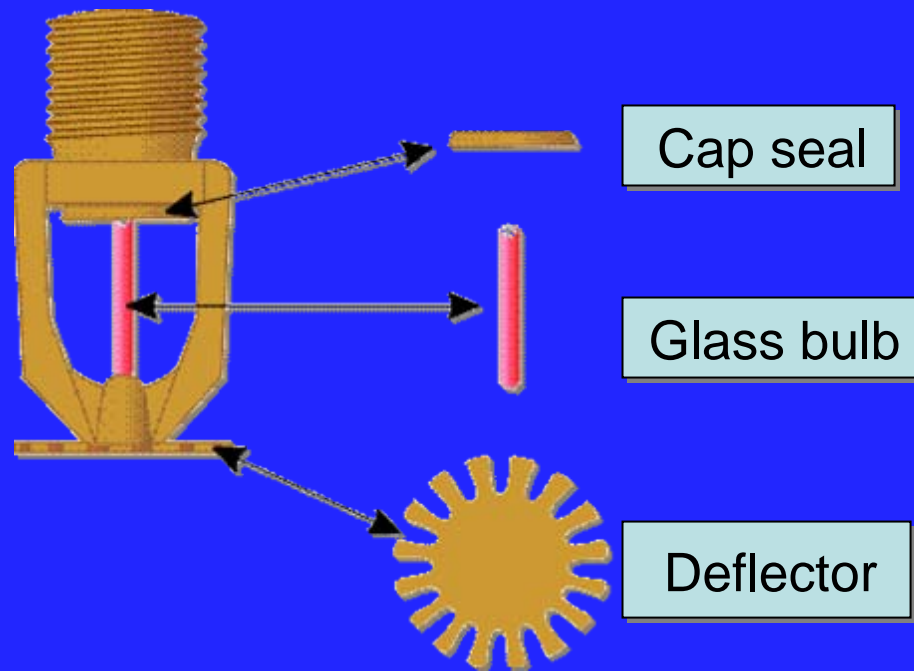
Residential Sprinkler Heads

- Contain a fusible link or glass bulb which melts or shatters when ambient temperatures of 135° F to 165° F are reached
- Normally flows 18 gallons of water per minute at a minimum pressure of 7 pounds per square inch
- Deflector designed to allow water to cover all areas of the room



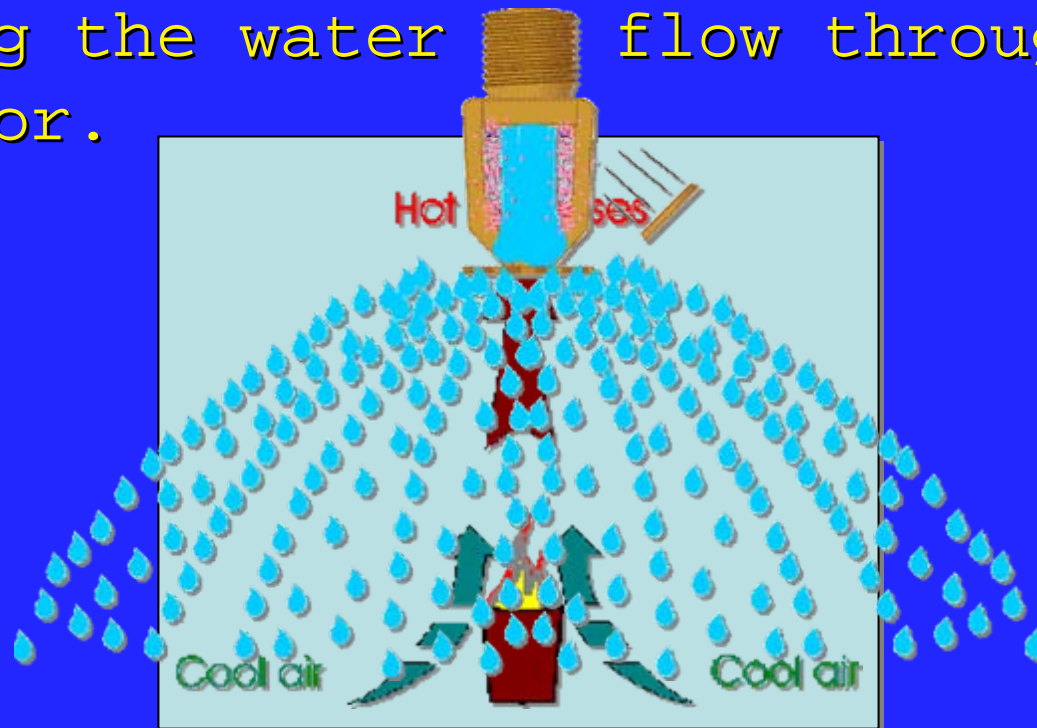
Residential Fire Sprinklers

How do Residential Fire Sprinklers work?



Residential Fire Sprinklers

- When pre-set temperature is reached, the fusible link burst allowing the water flow through the deflector.



Residential Fire Sprinkler Heads

- Available in many styles and colors to match room décor



- Some styles have a cover plate to hide the sprinkler head



Residential Fire Sprinkler Systems

Design and Installation

- By knowledgeable, licensed and experienced sprinkler contractors
- In compliance with national standards, state and local laws and building codes
- NFPA 13- Installation of Sprinkler Systems
- NFPA 13D- Installation of sprinkler systems in 1 and 2 family dwellings
- NFPA 13R- installation of sprinkler systems in residential structures up to and including 4 stories in height



Residential Fire Sprinkler Systems

Effectiveness

- In 100 years of sprinkler experience before 9/11/2001, there has never been a major (>3 persons) loss-of-life fire in any fully sprinklered building
- Napa CA, Cobb County GA, Prince George's County, MD- all have residential sprinkler legislation and none have experienced a single fire fatality in any sprinkler-equipped residence
- Scottsdale AZ: Fire sprinkler legislation credited with saving up to 52 lives since enacted in 1985



Residential Fire Sprinkler Systems

Effectiveness

- NFPA: Average fire property loss is 38% lower in homes with fire sprinklers

- House fires in Scottsdale AZ:

Average property loss with Fire sprinklers = \$2166

Average loss without sprinklers = \$45,019



Residential Fire Sprinklers

Advantages to Developers and Builders:

- Building code alterations and construction tradeoffs
- Reduced fire-retarding requirements of walls and doors = reduced construction costs
- A value-added feature of new homes
- Increased housing density
- Decreased street width requirements



Residential Fire Sprinklers

Advantages to the Homeowner:

- Gets water on the fire immediately
- Not dependent on Fire Department response time
- May control fire at earlier stage with less water
- Provides extra time for escape of occupants
- Reduction in insurance premiums



Residential Fire Sprinklers

Advantages to the Fire Department:

- Severity of residential fires is reduced
- May delay flashover conditions
- May delay or obviate need for interior rescue
- Potentially reduces or avoids firefighter injury
- Allows overburdened FD to do more with less



Residential Fire Sprinklers

Advantages to the Community:

- Allows increased property density
- Slows the rate of Fire Department growth as the community expands
- Allows reduced street widths
- Allows longer cul-de-sac lengths
- Reduces number of hydrants needed
- Simplifies building codes



Fire Sprinkler Myths

- There are many misconceptions surrounding residential fire sprinkler systems
- These misconceptions hinder homeowner acceptance of residential fire sprinkler systems
- **NONE** of the following myths are true:



Fire Sprinkler Myths-

Sprinklers cause water damage

- Because sprinklers activate early in the course of a fire, the fire can often be controlled with much less water
- Waterflow alarm notification of Central Station = earlier notification of Fire Dept
- Fire sprinklers flow 18 gallons per minute. Fire hoses flow 300 gallons per minute

18 gallons @ 10 minutes = 180 gallons
300 gallons @ 10 minutes = 3000 gallons



Fire Sprinkler Myths-

Installation is expensive

- The cost of fire sprinkler installation in new construction is \$1.00 to \$1.50 per square foot
- Retrofit costs in existing construction is 20-30% higher
- In new construction, the cost of fire sprinkler installation is approximately the same as the cost of installing wall-to-wall carpeting or the cost of installing lawn sprinklers



Fire Sprinkler Myths-

When one head activates, all heads activate

- Sprinkler heads operate independently of each other
- Sprinkler heads are designed to activate only when ambient heat exceeds 135-165° F
- Sprinkler heads are designed to be installed one per room. If the fire is confined to one room, only one head will activate
- Early activation of one sprinkler head often keeps the fire from spreading



Fire Sprinkler Myths-

Sprinkler systems malfunction or leak

- Factory Mutual estimates the incidence of false activation as one activation in 16 million sprinkler heads per year
- Because there is no significant wear and tear, the leak rate of residential sprinkler plumbing is significantly lower than the remainder of the plumbing in the home



Summary

Residential Fire Sprinklers

- Are the only home fire safety device that both detects and controls fires
- Are highly effective in reducing injury and death rates and property loss
- Are reliable
- Have installation costs comparable to wall-to-wall carpeting and lawn sprinklers
- Should be in both your community and in your home



For Further Information:

**Contact the
American Burn Association**

**1-800 548 BURN
www.ameriburn.org**

