

# Residential Fire Sprinklers



# America's Fire Problem

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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## Home Fire Safety Program

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



# Smoke Alarms

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- 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

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- 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

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- 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

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## Do Not

- Detect carbon monoxide
- Extinguish fires



# Carbon Monoxide

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- 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

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- 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

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- 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

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## 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

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## 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

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- 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

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## Components:

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



# Residential Fire Sprinkler Systems

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## 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

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## 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

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## 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

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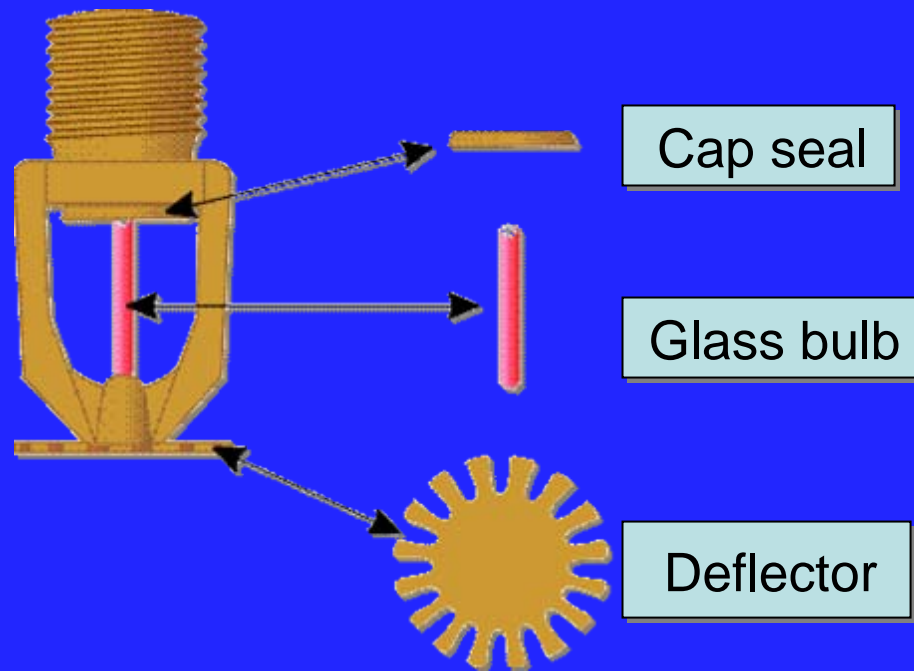
## Residential Sprinkler Heads

- 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

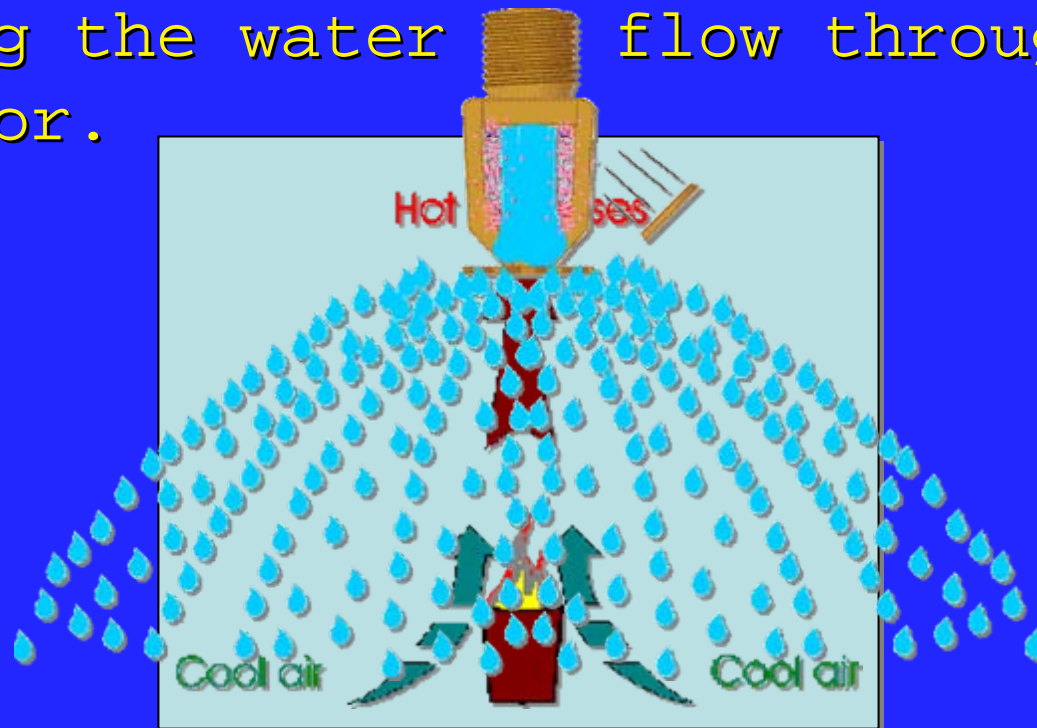
How do Residential Fire Sprinklers work?



# Residential Fire Sprinklers

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



# Residential Fire Sprinkler Heads

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- 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

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## 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

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## 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

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## 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



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**For Further Information:**

**Contact the  
American Burn Association**

**1-800 548 BURN  
[www.ameriburn.org](http://www.ameriburn.org)**

