

CAMBRIDGESHIRE FIRE & RESCUE SERVICE

PROVISION OF SPRINKLERS TO DOMESTIC PROPERTIES

REPORT TO CAMBRIDGESHIRE HORIZONS JOINT STRATEGIC GROWTH IMPLEMENTATION COMMITTEE

10 SEPTEMBER 2008

1.0 INTRODUCTION

- 1.1. Sprinkler systems have demonstrated their value in protection to life and property in industrial and commercial buildings for many years and have led to the introduction of residential systems designed for domestic dwellings.
- 1.2. Residential sprinklers are a relatively new development in this country. This report is therefore intended to explain what residential sprinklers are: what they do and where it might be appropriate to install such a system.

2.0 SYSTEM DESCRIPTION

- 2.1. A correctly designed and installed sprinkler system can detect and control a fire at an early stage of development and activate an alarm. Operation of the system will rapidly control a fire and reduce the rate of production of heat and smoke.
- 2.2. Residential sprinklers can offer comprehensive fire protection for house-holders, which protects not only lives, but has the added advantage of reducing property and contents damage.
- 2.3. A residential sprinkler system is a series of pipes (plastic or copper) and water spray heads designed to detect and suppress/control a fire when activated. Residential sprinklers are individually heat-activated. They are connected to a network of piping which in turn is filled with water under pressure. When the heat of a fire raises the sprinkler to its operating temperature, usually between 60°C-80°C, a fusible link or glass bulb will activate only that sprinkler over the fire, thereby releasing water over the source of heat and walls, reducing the fire-size temperatures and levels of toxic gases within the room of origin.
- 2.4. The result is to keep a fire from reaching potentially dangerous and life-threatening proportions and giving early detection. Residential sprinklers operate automatically in the event of a fire, even if the householder is not at home, releasing water directly over the source of heat and sounding the alarm.

- 2.5. The guidance standard is BS 9251: 2005 Sprinkler systems for residential and domestic properties, which gives recommendations for the design, installation, components, water supplies, commissioning, maintenance and testing of fire sprinkler systems installed for life safety purposes.

3.0 SCOTTSDALE EXPERIENCE

- 3.1. The vast majority of fire deaths and injuries happen in the home. Some years ago the United States started to use specially designed domestic sprinkler systems to save lives in dwellings. The results have been encouraging.

In Scottsdale Arizona all new homes have been required to be fitted with sprinklers since 1986. Sprinklers now protect 50% of the houses there. Scottsdale published a 15-year report in 2001, which showed for homes fitted with sprinklers:

- No fire deaths
- 80% reduction of fire injuries
- 80% reduction in property damage
- 95% reduction in water usage for fire control

However 13 deaths in houses without sprinklers fitted were recorded in the same period

4.0 COMMUNITY SAFETY

- 4.1. The installation of residential sprinklers should be regarded as part of an overall Community Fire Safety package. The provision of a sprinkler system does not negate the need for other fire precautions or practical measures, which may include smoke alarms, escape routes and safe housekeeping practices. These are all key messages that Cambridgeshire Fire & Rescue Service continues to promote.

- 4.2. One of the most effective features in the Community Fire Safety strategy in recent years has been the smoke alarm. With properly installed and working smoke alarms, occupants are provided with an early warning of fire. Whilst this is the case for able-bodied and fit people, it is not necessarily so for the very young, disabled or mentally disadvantaged. These vulnerable groups in society may require additional protection from the devastating effects of fire and burns.

- 4.3. Although there is not a requirement for sprinklers to be installed in domestic dwellings there are a number of scenarios where it may be advantageous for householders, local authorities or builders to consider fitting a system to ensure a greater protection from fire. These might include:

- 4.3.1. Where access to the premises may be more restricted than recommended in the Approved Document B of the Building Regulations, resulting in difficulties for fire-fighting appliances gaining access to the building and delaying firefighters in tackling a fire;
- 4.3.2. In isolated areas where it would take the fire service some time to arrive at the scene of a fire;
- 4.3.3. In multi-occupied premises, such as houses in multiple occupation (HMOs) and bed sits;
- 4.3.4. Extensions to existing properties, particularly where it is planned to occupy what was originally roof space;
- 4.3.5. Sheltered housing;
- 4.3.6. In residential care premises – in particular converted, older properties;
- 4.3.7. Housing for special needs and at-risk groups:
 - The elderly and infirm
 - The physically disabled
 - People with a history of having fires.
- 4.4. Cambridgeshire Fire & Rescue Service is aware that justification for installing residential sprinklers may be required through a cost-benefit analysis. Issues to be considered should include highlighting the benefits to society of reducing the cost of 'after care' to fire victims provided by health authorities; much reduced fire damage to the affected property; reducing re-housing costs to local authorities for fire victims; reducing cost to the environment, etc.
- 4.5. It may be possible for trade offs in design criteria, such as lower fire resistance for fire doors and partitions, to be agreed which can pay for the systems installation. Some Fire Services have written agreements with Building Control departments setting out what reductions will be acceptable should a sprinkler system be installed

5.0 CONCERNS

- 5.1. There are many misconceptions relation to sprinkler systems. Although no specific research has been done into the general public's view of residential sprinklers Cambridgeshire Fire & Rescue Service are aware that some people are concerned about installing sprinklers in their homes. Concerns range from them being an ugly addition to the home, to units malfunctioning and activating when there is not a fire.

- 5.2. Whilst it is possible for a sprinkler to discharge accidentally it rarely happens. In fact, if a sprinkler is not subjected to freezing, overheating, or mechanical damage, statistics from the USA suggests only 1 in 16,000,000 sprinklers per year will open accidentally.
- 5.3. Concerns over water damage due to fires in sprinklered buildings are often exaggerated, the amount of water which is put on a fire by fire service hoses in an unsprinklered building is approximately 10 times more than that which sprinklers would have discharged. It is also true that if the fire is not controlled in its early stages, then greater damage will be done by the fire and the extinguishing of the fire by the fire service.
During a fire, only sprinkler(s) closest to the fire activate, limiting the total amount of water needed to suppress a fire.
- 5.4. Owing to advance in sprinkler technology, sprinklers generally blend into the décor of a room. As with central heating, the pipes can be concealed behind ceilings, out of sight until needed to extinguish a fire. Sprinkler heads are also available in a range of colours and sizes.
- 5.5. Sprinklers are increasingly less demanding in terms of water flow. In most instances they operate from the domestic water supply and do not require any special water supplies or pumps. However, where water supplies are particularly poor, additional features such as water tanks and pumps may be necessary.
- 5.6. The installation and maintenance of a residential sprinkler system is arguably less complex than that of a conventional domestic plumbing system. A basic concept of sprinkler protection is that sprinklers must be installed throughout all areas of the building. Fitting a system to existing or new buildings can also be made easier by the use of PVC plastic piping.
- 5.7. The cost of a system is dependent on the size of the property and whether the system is installed during the construction stage it is retrospectively fitted. Generally a system for a new property would be 1-2% of the total build cost.

6.0 CONCLUSIONS

- 6.1. Sprinkler systems can detect and control a fire at an early stage, which will reduce the chance of the fire reaching life threatening proportions.
- 6.2. Sprinkler systems will reduce the damage to the property caused by the fire.
- 6.3. Sprinkler systems are of particular benefit in reducing the risk to vulnerable groups in the community.
- 6.4. Trade offs in reduced design criteria for conventional fire safety requirements may pay for the installation of a sprinkler system

7.0 FURTHER INFORMATION

7.1 Help and guidance is available from the following personnel at Cambridgeshire Fire & Rescue Service:

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