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Personal Protection Systems (PPS)

Guidance on the use, deployment and limitations of Personal Protection Watermist Systems in the homes of vulnerable people

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Introduction

1.1 This document provides guidance on the use, deployment and limitations of local application watermist systems for use as Personal Protection Systems (PPS) in residential and domestic occupancies within buildings. It is aimed at providing guidance for those involved in the selection and implementation of these systems.

1.2 The background to the development of PPS was a detailed analysis of the underlying causes of fatal fires in dwellings indicating that a significant percentage of victims are at greater risk because, due to physical and/or mental health impairment they are unable to easily escape without assistance. They may also have a higher than average likelihood of fire in their home due to factors such as lifestyle or mental capacity.

1.3 A typical risk profile would be a person who, because of mental and/or physical health issues, spends the majority of their time in either a bed or chair and who would be unable to easily escape in the event of a fire. They could be in close proximity to the seat of the fire when clothing or bedding catches alight. The fire hazard can therefore be considered to be localised to a specific area within a dwelling. PPS should be designed to detect and suppress a fire at a very early stage before significant heat and smoke has developed and caused serious injury.

1.4 PPS units are a portable risk reduction measure, which means that they have the potential to be quickly installed to protect a vulnerable person and also moved or re-used as required. However, care needs to be taken to ensure that the risk profile of the vulnerable person is appropriate for this type of system. For example a vulnerable person who is mobile and therefore has the potential to be affected by a fire anywhere in their home would usually require a suppression system that covers all risk areas (see appendix 1 for flow chart).

1.5 PPS systems have also been used as a risk reduction measure in other types of applications, for example where a home is at risk from an arson attack. This guidance note is specific solely to PPS deployment to protect vulnerable people in their homes. Where PPS are being considered to reduce other types of fire risk, there should be sufficient fire test evidence that demonstrates that the system is likely to be effective in reducing that risk.

1.6 Having identified that an individual is vulnerable from fire it will be necessary to carry out a specific assessment to assess the level of risk (see appendix 2) and the benefits of a range of potential control measures (see appendix 3). This step will often follow on from a more general risk assessment carried out by a care or housing provider or a “home fire safety check”, carried out by a fire & rescue service.

Scope and limitations

2.1 PPS are local application watermist systems designed to protect a specific area within a room from fire. They are designed to be effective against normal domestic fire hazards.

2.2 A typical PPS is self- contained and consists of a water container connected to an open watermist nozzle. An internal control panel automatically activates the system when a fire is detected causing watermist to be sprayed from the nozzle onto the risk area. Because PPS are designed to activate at an earlier stage of fire* development than traditional sprinkler systems they have a faster response to a fire and this can help to prevent significant heat and smoke development. PPS are portable and are usually designed to be plugged in to an existing electrical socket. An internal battery provides resilience in the event of a power outage.

*The current generation of PPS are activated by Automatic Fire Detection (AFD) rather than heat impinging onto a fusible bulb.

2.3 Because PPS are designed for local area application i.e. to suppress a fire within a specific discharge area, care must be taken to ensure that the risk profile is appropriate. The risk assessment needs to indicate that the principal fire hazard (a bed or chair for example) is within the discharge area, of one or more PPS. If the fire hazard is not localised then a suppression system that covers the whole of the dwelling or risk area should be specified.

2.4 The manufacturer's system manual should clearly indicate the coverage and spray pattern of the PPS.

2.5 The performance and effectiveness of PPS should be evidence based and validated by appropriate third party testing and certification. For example LPS 1655 "*Requirements and test methods for LPCB approval and listing of personal protection watermist systems*".

2.6 Examples of types of hazard which may not be suitable for protection by PPS include;

- Fire loads associated with significant hoarding
- Where the risk assessment has identified that the principal fire hazard is not confined to a specific area.

The listed examples are illustrative.

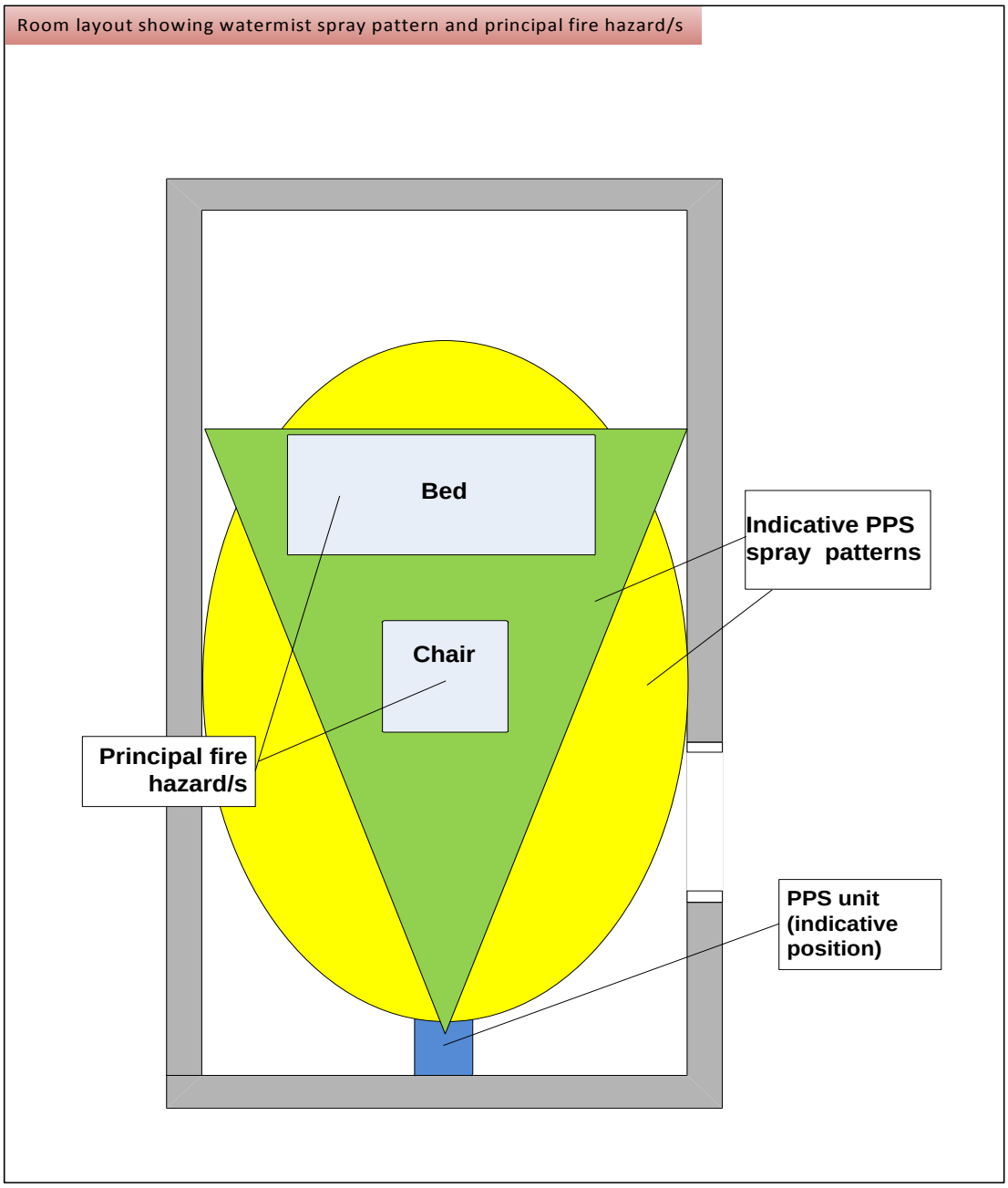

Figure 1: Room layout showing indicative spray patterns and location of principal fire hazards

Definitions

Watermist spray pattern

3.1 Area in which the system is expected to suppress a fire (as determined by the manufacturer and detailed in the system manual).

System manual

3.2 Controlled document containing design, installation and maintenance rules for all details of a Personal Protection System.

Personal Protection System (PPS)

3.3 Automatic fire suppression system, fitted with one or more watermist nozzles and intended to suppress a fire in a defined area of a dwelling.

Vulnerable person

3.4 Person who is at a higher than average risk from fire due to their:

- propensity to contribute to the starting of or development of a fire
- capacity to respond appropriately to signs of a fire or other cues
- ability to escape

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Recommendations

Third party accreditation

4.1 All systems should be subjected to independent third party certification using standards such as LPS 1655 "*Requirements and test methods for LPCB approval and listing of personal protection watermist systems*".

Control and indicating facilities

4.2 It is important that there is a clear visual indication that the unit is ready for operation and if the unit becomes faulty. The system should have green light/s to indicate that there are no faults that would prevent system function and amber light/s to indicate a fault.

Duration of application

4.3 A PPS shall spray water onto the risk area for a minimum of 10 minutes. This is in line with the domestic sprinkler and watermist standards.

Fire detection

4.4 Systems shall have dedicated fire detection and alarm arrangements, installed in accordance with the system manual.

4.5 All detectors should conform to the relevant British Standard (BS EN 54 series and BS EN 14604 as appropriate). They should be installed in accordance with the relevant parts of BS 5839-1 or BS 5839-6 as appropriate.

Remote monitoring arrangements

4.6 Connection of a PPS to a permanently monitored fire detection or warden/care system is recommended so that if the system actuates, management action can be initiated and the fire and rescue service mobilised if necessary. In many cases a vulnerable person may already have a remote monitoring facility such as telecare and the unit would be connected to this system. In other cases a dedicated GPS auto-dialler can be used to provide this function.

Fire performance

4.7 It is important that PPS systems have been tested for their intended application. In practice this means that there should be relevant fire test data that demonstrates their performance in one or more relevant fire scenario.

Legionella

4.8 The manufacturer or supplier should conduct a legionella risk assessment of the system and its intended application. If a legionella risk is identified, adequate control measures must be introduced to reduce the risk to an acceptable level.

Power supplies

4.9 The system should be capable of operating independently of mains power for a minimum period of three days.

4.10 Any mains power supply should have adequate safeguards against being inadvertently switched off.

4.11 The mains power supply should be labelled “Fire suppression system. Do not switch off”.

Installation

4.12 Installation should be carried out by suitably trained and experienced people and in accordance with the manufacturer’s or supplier’s instructions.

4.13 It would be beneficial for a plan of the risk area showing the watermist spray pattern in relation to the room and principal fire hazard/s to be completed on site as part of installation. A copy of this plan should be left on site to enable local management to regularly check and confirm that changes have not occurred that may prevent the PPS being effective.

4.14 The system should be stable in all operational conditions i.e. when full of water and also when empty of water. If necessary, a method of fixing in place should form part of the installation procedure.

Maintenance

4.15 Users of PPS should ensure that maintenance is carried out in accordance with the manufacturers or supplier instructions and should check that there are no significant changes in the fire load or location of the fire hazard.

4.16 Maintenance should be carried out by suitably trained and experienced people.

4.17 The system should be subject to inspection and maintenance (including a discharge test) at least every 6 months.

4.18 The system should be designed so that periodic discharge testing by actuating the system for the full duration of application can be carried out. The discharge test should, as near as possible, simulate a live actuation.

4.19 The fire detection system should be activated and the system should then actuate as per the system manual. Periodic discharge testing need not discharge water over the protected area, water may be discharged into suitable containment to avoid un-necessary wetting of accommodation spaces. The system will need to be refilled with fresh water after the discharge test.

4.20 Any battery should be tested to ensure that it is still capable of providing sufficient power for a full discharge. The battery charging circuit should be tested to ensure that the battery is receiving sufficient charge.

4.21 The detection arrangements should be maintained in accordance with BS 5839-1 (“*Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises*”) or BS 5839-6 (“*Fire detection and fire alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises”*) as appropriate and in accordance with the manufacturer’s guidelines. Testing of the fire detection arrangements should not cause the PPS unit to activate.

4.22 The remote alarm transmission arrangements should also be tested as per the manufacturer’s instructions.

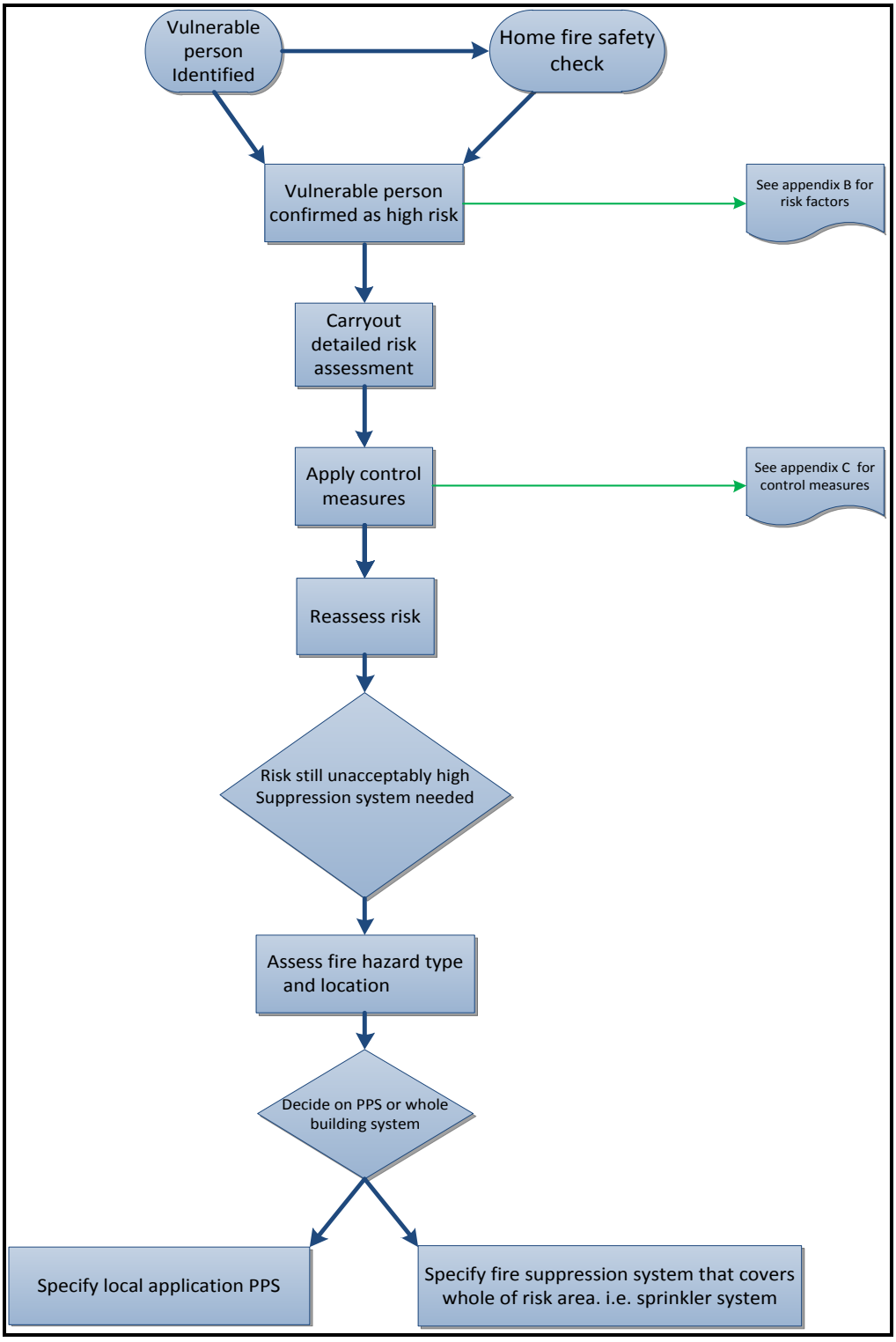
Unwanted actuations

4.23 There is a clear balance to be struck between early actuation of the unit before the fire has developed and caused serious injury and the unit actuating when it is not necessary. Because a PPS discharges a fine watermist at a controlled rate, the amount of water discharged is small in comparison to a traditional sprinkler system.

4.24 Units should have a facility for manual shutdown, normally by means of a key operated switch.

4.25 The connection of the unit to a remote monitoring facility further mitigates against the effect of any unwanted actuations, as management should be aware that the unit has activated and can investigate the circumstances and provide support as necessary.

Appendix 1 - Flow Chart to aid decision making about reducing fire risk to vulnerable people



Appendix 2 – Examples of typical risk factors

Identified fire risk factors for this group include:

- Having previous fires
- Burn marks on carpets, furniture, clothing or bedding
- Evidence of unsafe use of candles
- Poor quality or damaged electrical wiring
- Unsafe use of electrical equipment (overloaded sockets or extension leads)
- Unsafe use of space heaters
- A history of falls
- Suffering from dementia or similar cognitive impairment
- Having mobility difficulties
- Hoarding issues
- Decision making difficulties
- Carelessness with smoking materials
- Alcohol or drug misuse
- Home oxygen use
- Sensory impairment for example being hard of hearing or deaf

This list is indicative of some typical hazard indicators. It is NOT exhaustive and there may be other risk factors.

Appendix 3 - Examples of typical control measures

- Fire safe ashtray
- PAT testing
- Electrical circuit testing
- Space heater fire guard
- Alternative meal arrangements: e.g. Microwave or “meals on wheels”.
- Electric thermostat controlled deep fat fryer
- Cooker fire detector & alarm
- Electric/gas cooker auto cut-off
- Arson control letterbox
- Fire retardant bedding, blankets or clothing
- Sprinklers
- Watermist system
- Personal protection system
- Remote monitoring (e.g. Telecare)

This list is indicative of some typical control measures. It is NOT exhaustive and there may be other measures that can help reduce risk to an acceptable level.