

Local area fire protection using automatic suppression

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Part of the BRE Trust

New standards developed to meet market needs

- Personal Protection Watermist Systems (LPS 1655)
- Condensed Aerosol Generators (LPS 1656)
- Catering Equipment Extinguishing Systems (LPS 1223)
- Direct local application for small enclosures (LPS XXXX)

- **Loss Prevention Standards:** Help ensure that products meet the needs of users by
 - Setting performance benchmarks
 - Testing both individual component and complete system reliability
 - Review of manufacturers quality systems
 - Design, installation, operation and maintenance
 - Appropriate and repeatable fire test protocols that simulate “most onerous” extinguishing scenarios
 - Functional requirements such as system monitoring, annunciating and actuation.

Stakeholder engagement through Suppression Industry Liaison Group

- Representatives from
 - BAFSA and FIA,
 - Insurers
 - Manufacturers
 - Fire and Rescue Services
- Regular meetings for discussion
- Draft standards circulated for comment.
- Feedback incorporated in final draft

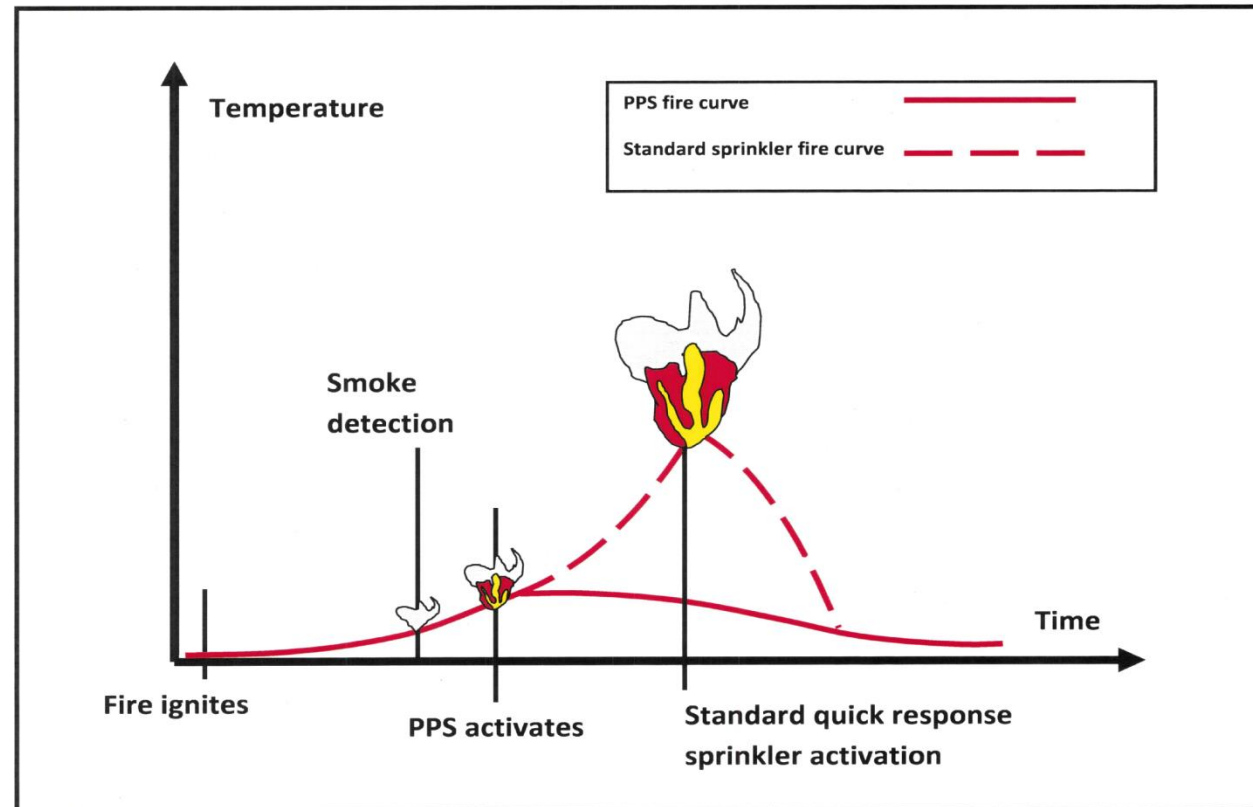
Range of applications with common themes

- Additional to “normal” fire safety measures
- Enhanced fire protection - based on risk assessment
- Dedicated - system specific detection
- Actuate early in the fire development phase
- Maximise effect of a limited quantity of agent
- Localised application

Benefits and challenges

- Significant reduction in fire damage and therefore risk
- Ability to be quickly installed and retrofitted
- Cost effective fire suppression or extinguishment
- Limited quantity discharged over a limited duration
- Balance between early and unwanted actuation
- Need to ensure agent reaches fire in sufficient quantity or concentration

Indicative time/temperature graph



Looking at these four new standards in more detail

- Personal Protection Watermist Systems (LPS 1655)
- Condensed Aerosol Generators (LPS 1656)
- Catering Equipment Extinguishing Systems (LPS 1223)
- Direct local application for small enclosures (LPS XXXX)

LPS 1655: Typical PPS

Installation time: About an hour

Resilient power supply: Capable of operating independent of mains power for at least 3 days

Detection: Actuate at early stage of fire development

Tank: 110 litres of water

Active for minimum of 10 mins

Flow rate approx. 10 litres/min

Protected area approx. 16m²

Application rate < 1 litre/m²/min

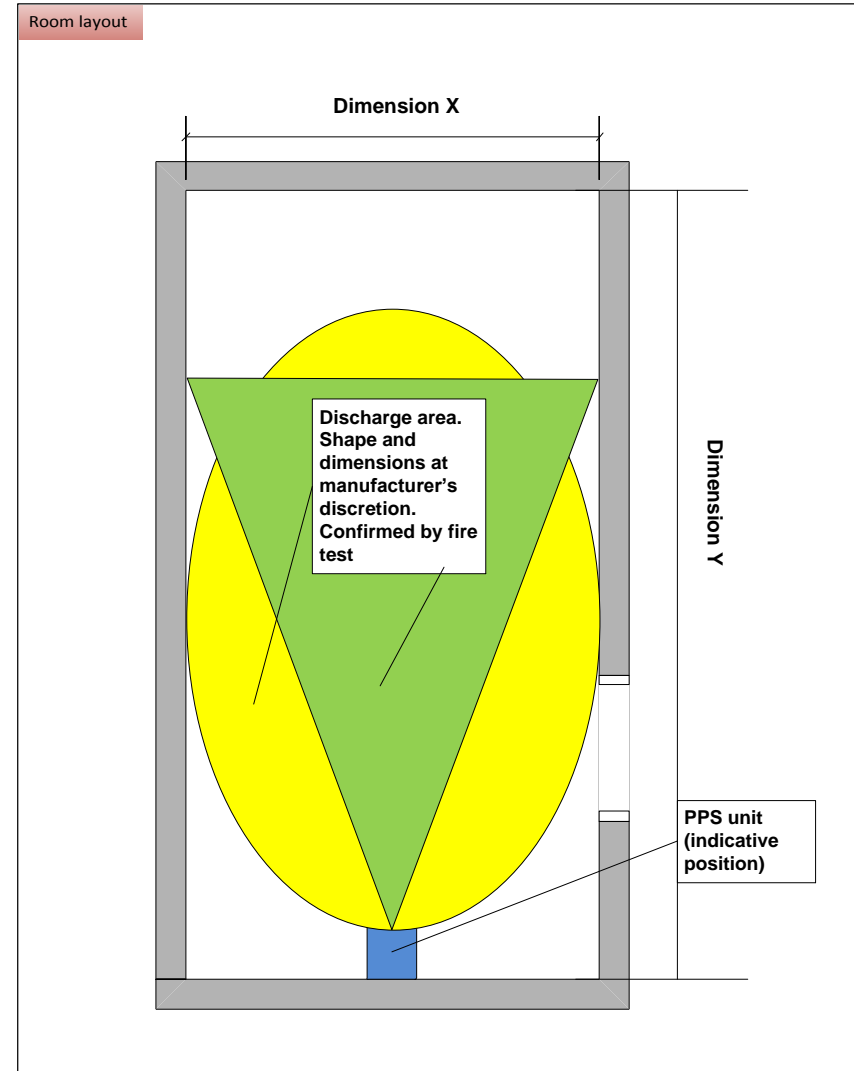


Background to Personal Protection Systems

- Most fire deaths and injuries occur in people's homes.
- Vulnerable people most at risk
 - **Older people**
 - **People living alone**
 - **Mental and/or physical health issues**
 - **Smokers**
- USA fatal fire data
 - “nearly 50% of older people are close to fire when clothing/bedding is ignited”
- LFB fatal fire data
 - 50% of older people were smokers with physical or cognitive impairment. 1/3 in receipt of care package

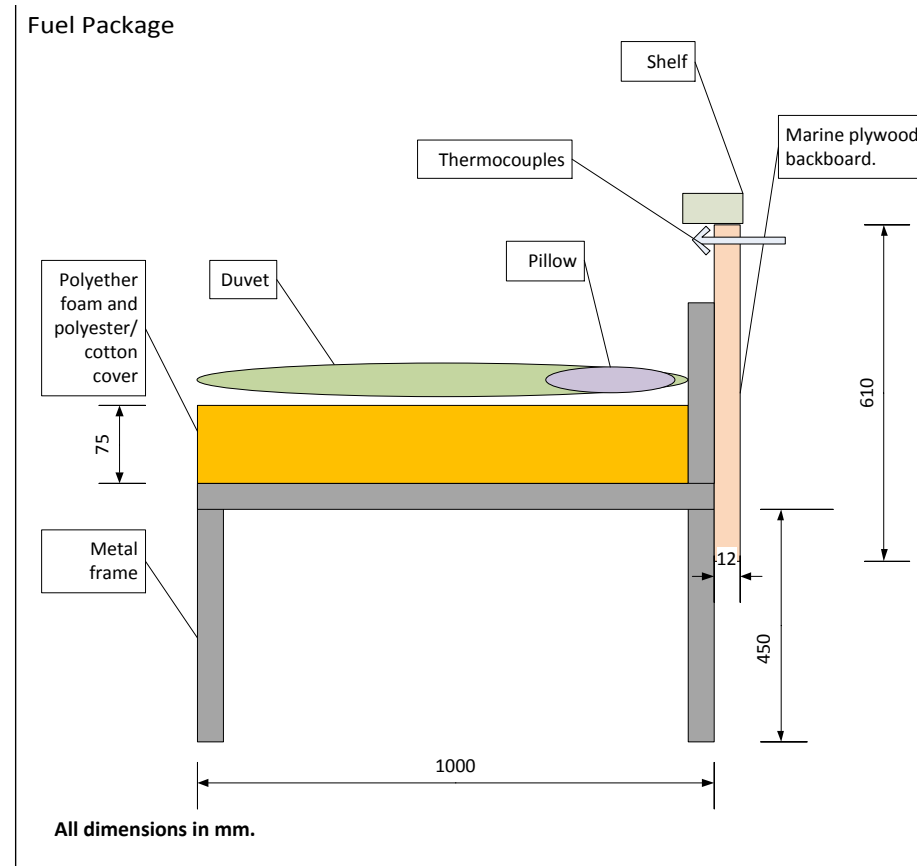
Discharge area

- Principle fire risk is within area
- Defined in installation manual
- Verified by testing using collection array to define discharge density and pattern
- Further verification during fire tests

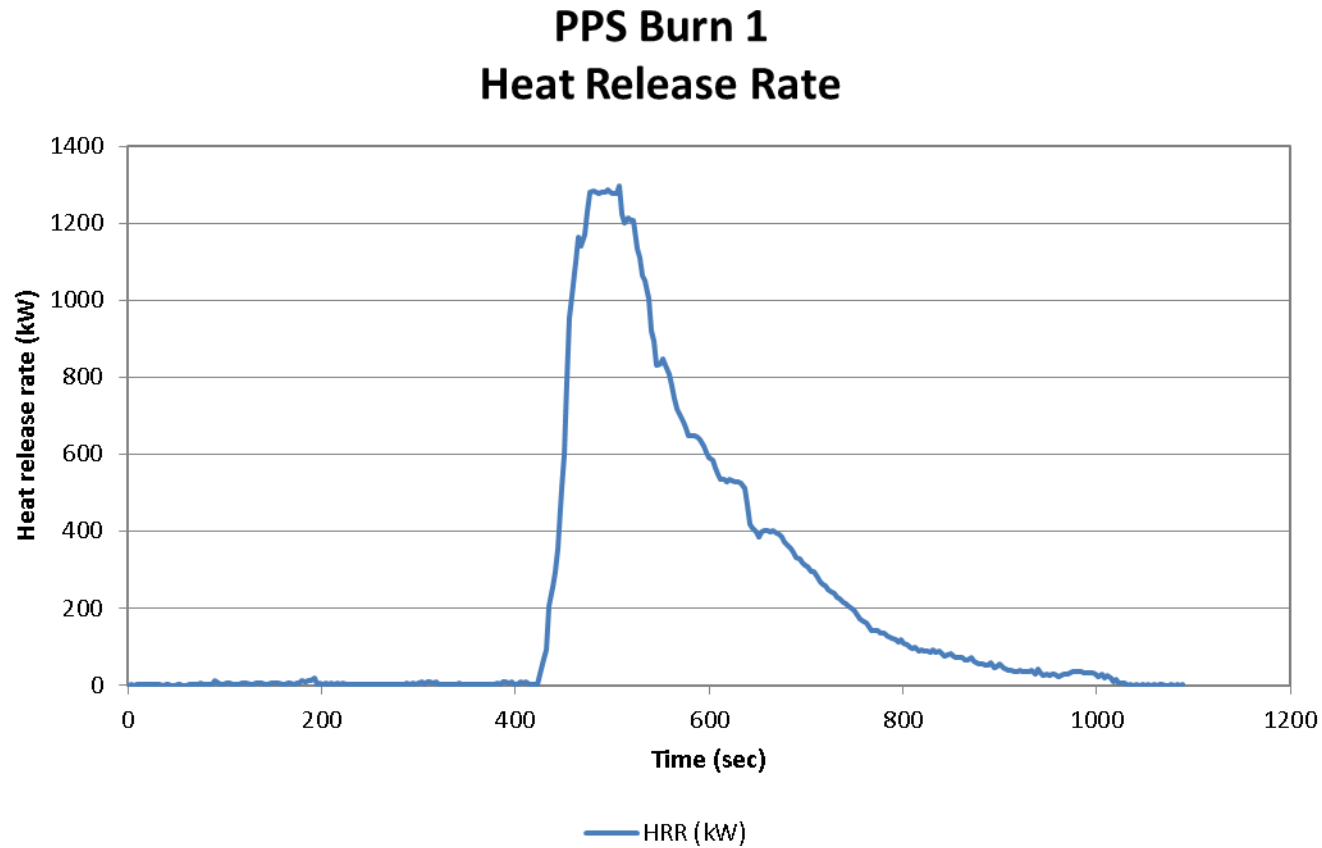


Fuel package

- Simulate bed or chair
- Timber slats and headboard
- Standard ET18 polyether foam
- Polyester duvet & pillow
- Polyester/cotton bedding



Fuel package un-suppressed



LPS 1656 (draft): Condensed Aerosol Generators

- Fast expanding extinguishing aerosol based on potassium compounds
- Dedicated fire detection system to actuate
- Manual actuation also possible
- No persons in area of discharge
- Compound ignited to release aerosol
- Initially used as a Halon replacement and also as a lower cost option for risks typically protected by inert gas systems

LPS 1656 (draft): Condensed Aerosol Generators

- Follows ISO 15779 requirements and methods
- Fire tests for class B liquid fuel
- Fire tests for “surface burning” class A
- Methods to determine design concentrations
- Test series for functional reliability
- Tests to determine service life
- Tests to determine safe deployment distances

Fire tests to determine class B extinguishing density

Defined volume to simulate real world deployment

Size of generator determined by “design density”

Heptane cans strategically located to demonstrate extinguishment in all areas



Fire tests to determine class A extinguishing density

Test protocols include:

- Polymeric fuels
- Wood cribs
- Fires are partially shielded
- Objectives are extinguishment and prevention of re-ignition



LPS 1223: Fixed fire extinguishing systems for catering equipment

Designed for protection of catering equipment such as deep fat dryers, other cooking appliances and associated extract systems.

A number of high profile fires in fast food outlets, with large impact on business continuity such as:

- Heathrow T1
 - 60 firefighters over 5 hours to deal with
 - Terminal closed for 10 hours, 45,000 passengers affected
- M25 services
 - Major site rebuild
- Many others incidents in retail centers

LPS1223 - Design requirements

- Protect both the extract system and cooking appliances
- Automatic and manual actuation
- Detection of fires in the cooking appliances and within the extract hood
- Shut-down of the heat source on manual actuation or by detection system.
- Discharge nozzles shall be protected against ingress of fat deposits.
- Capable of connection to a fire-bell or other alarm.

LPS1223 – Extinguishing Performance Test

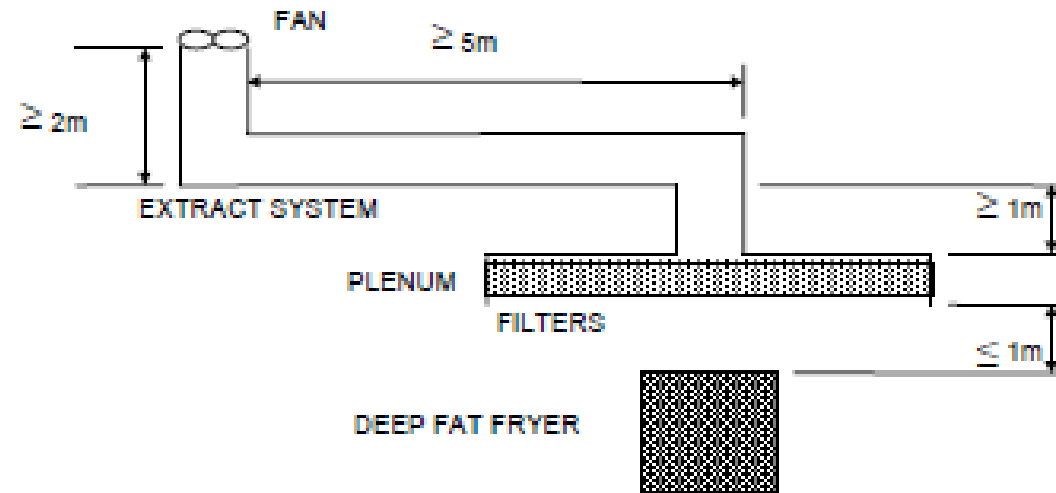


Figure 1. Schematic diagram of test catering equipment

The following requirements shall be met in each test:-

- The fire shall be effectively extinguished within the system discharge time (as previously measured for stored pressure systems or as specified for pumped systems). One minute after the end of the agent discharge there shall be no residual flames burning in any part of the test catering equipment.
- At the end of the system discharge, the temperatures recorded throughout the equipment shall be lower than those taken at the time of system actuation and below auto-ignition temperature of the cooking fat used.
- No re-ignition of the fire in the catering equipment shall occur after discharge of the agent. (To be checked for 10 mins after the end of agent discharge).
- No burning oil shall splash out of the cooking appliance as a result of agent discharge.
- Actuation of the system shall cause shut-down of the heat source.
- Where it is a requirement of the system, manual actuation of the system shall cause shut-down of the extract fan.

LPSxxxx (draft): Direct application extinguishing systems for small enclosures

- Direct application of low pressure fixed fire extinguishing in small enclosures
- Automatic and manual actuation
- Detection by means of heat sensitive pneumatic tube that also delivers extinguishing agent
- Detect, annunciate and extinguish fire at its source
- Isolate power to protected enclosure
- Capable of connection to a fire-bell or other alarm.

Direct local application: Design requirements

- Protect enclosures up to 2m² with up to 10m of pneumatic detection/actuation tube
- Capability for automatic isolation of power supplies
- Self monitoring and fault alarm of system pressure.
- Capability to shut-down extract ventilation
- Capable of connection to a fire-bell or other alarm.

Fire tests for direct application extinguishing systems for small enclosures

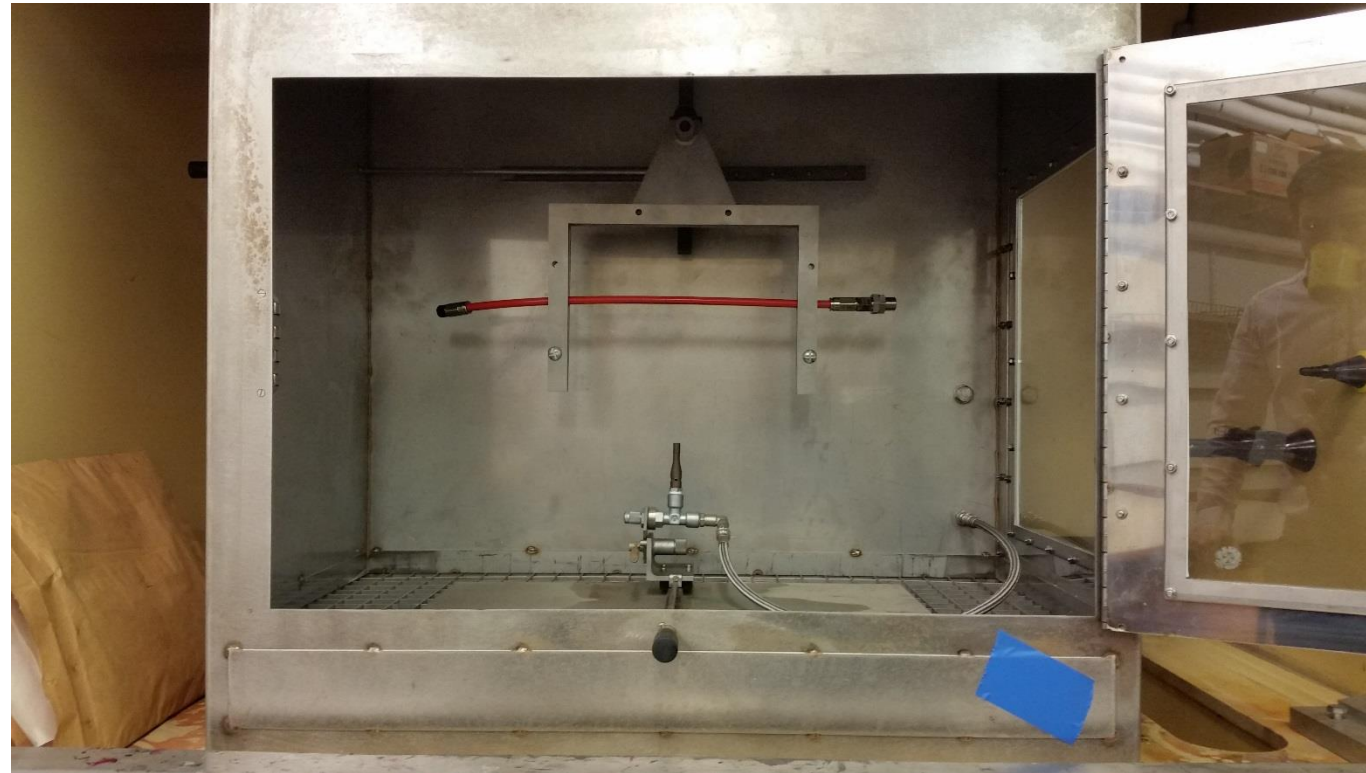
- Agent extinguishment tests
- Cabinet perimeter protection
- Detection tube activation height



Cabinet perimeter tests



Detection height tests for pneumatic nitrogen filled tubing



Lastly all four standards include component testing

- Primarily tested as a complete system, including detection, actuation and “control and indicating” arrangements
- Examination of components and materials
- Function and operation tests
- Accelerated ageing using damp/ heat cyclic tests
- Testing of detection, control and indicating arrangements

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Personal Protection Systems (PPS)

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Thank You --- Any Questions?

