

Loss Prevention Standard

LPS 1283: Issue 1.1

Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies

This Loss Prevention Standard is the property of BRE Global Ltd. and is made publicly available for information purposes only. Its use for testing, assessment, certification or approval must be in accordance with LPCB internal procedures and requires interpretation by BRE Global Ltd, LPCB and BRE experts. Any party wishing to use or reproduce this Loss Prevention Standard to offer testing, assessment, certification or approval must apply to BRE Global for training, assessment and a licence; a fee will normally be charged. BRE Global Ltd. will not unreasonably refuse such applications. BRE Global Ltd. accepts no responsibility for any un-authorised use or distribution by others of this Loss Prevention Standard and may take legal action to prevent such unauthorised use or distribution

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 1 of 19

CONTENTS		PAGE
PARTICIPATING ORGANISATIONS		2
REVISION OF LOSS PREVENTION STANDARDS		2
FOREWORD		3
1	SCOPE	4
2	DEFINITIONS	6
3	REQUIREMENTS	7
4	CLASSIFICATION AND DESIGNATION	16
5	MARKING, LABELLING AND PACKAGING	17
6	ADDITIONAL GUIDANCE DOCUMENTATION	17
7	PUBLICATIONS REFERRED TO	17
APPENDIX A		18
AMENDMENTS ISSUED SINCE PUBLICATION		19

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 2 of 19

PARTICIPATING ORGANISATIONS

This standard was approved by the BRE Global Governing Body and Working Group B. The following organisations participated in the preparation of this standard:-

Association for Specialist Fire Protection (ASFP)
 Association of British Insurers (ABI)
 Association of Insurance Surveyors
 BAA Plc
 British Automatic Fire Sprinkler Association (BAFSA)
 British Property Federation (BPF)
 Chief Fire Officers' Association (CFOA)
 Construction Industry Council (CIC)
 Construction Products Association (CPA)
 Co-op Banking
 Fire Industry Association (FIA)
 Home Builders Federation (HBF)
 Homes & Communities Agency
 Lend Lease
 London Underground Ltd
 NHBC
 RIBA
 RICS
 RISC Authority
 Risktech Ltd
 Sustainability + Architecture
 Sustainable by Design

REVISION OF LOSS PREVENTION STANDARDS

Loss Prevention Standards will be revised by issue of revised editions or amendments. Details will be posted on our website at www.redbooklive.com

Technical or other changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments. (See amendments table on page 19)

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

USERS OF LOSS PREVENTION STANDARDS SHOULD ENSURE THAT THEY POSSESS THE LATEST ISSUE AND ALL AMENDMENTS.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 3 of 19

FOREWORD

This Standard identifies the evaluation and testing practices undertaken by LPCB for the purposes of approval and listing of products and services. LPCB listing and approval of products and services is based on evidence acceptable to LPCB:-

- that the product or service meets the standard;
- that the manufacturer or service provider has staff, processes and systems in place to ensure that the product or service delivered meets the standard

and on:-

- periodic audits of the manufacturer or service provider including testing as appropriate;
- compliance with the contract for LPCB listing and approval including agreement to rectify faults as appropriate;

The responsibility for ensuring compliance with the technical and managerial process and requirements for the product or service lies with the manufacturer or supplier.

NOTES

Compliance with this LPS does not of itself confer immunity from legal obligations. Users of LPSs should ensure that they possess the latest issue and all amendments.

LPCB welcomes comments of a technical or editorial nature and these should be addressed to “the Technical Director” at enquiries@breglobal.co.uk.

The BRE Trust, a registered charity, owns BRE and BRE Global. BRE Global and LPCB (part of BRE Global) test, assess, certificate and list products and services within the fire and security sectors. For further information on our services please contact BRE Global, Watford, Herts. WD25 9XX or e-mail to enquiries@breglobal.co.uk

Listed products and services appear in the LPCB “List of Approved Products and Services” which may be viewed on our website: www.redbooklive.com or by downloading the LPCB Red Book App from the App Store (for iPhone and iPad), from Google Play (for Android devices) or from the Windows Store (for Windows 8 Phones and Tablets from 2014).

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 4 of 19

1. SCOPE

This document specifies the requirements and test methods for LPCB approval of fixed watermist systems for use in commercial low hazard occupancies within buildings. It is underpinned by the requirements of DD 8489 Part 1, *Fixed fire protection systems. Industrial and commercial watermist system systems. Code of practice for design and installation.*, DD 8489 Part 7 : 2011. *Fixed fire protection systems. Industrial and commercial watermist system systems. Tests and requirements for watermist systems for the protection of low hazard occupancies.* and includes additional requirements.

Installers of the LPS 1283 approved watermist systems for use in commercial low hazard occupancies should be approved to LPS 1284 to verify their competency for design, installation and maintenance. End users of watermist systems are responsible for the on-going maintenance of watermist systems and in particular maintenance of the fire load and fire hazard classification in-line with the watermist system design.

A fixed watermist system is a fire suppression system designed to protect an enclosed volumetric space from fire. For the purposes of approval, the watermist system comprises a set of components, a set of design parameters, a system manual, a design software/calculation method and a scope of application.

Watermist systems covered by this document are for the protection of specific areas within buildings and are not intended for whole building protection. Some areas found in buildings can not be protected by the watermist systems covered by this standard (see excluded areas and spaces below) and will require other solutions.

Listed below are some examples of types of use of areas or spaces which can be protected by an LPCB approved watermist system. All the examples have limitations related to their dimensional configurations and the hazard posed; see Section 4 and Table 3. This information will appear on the LPCB approval certificate.

Examples of types of areas or spaces which can be protected by an LPCB approved watermist system in accordance with LPS 1283 typically include;

- Seating areas
- Classrooms and office areas
- Entrances foyers and display areas
- Bedrooms and sleeping areas
- Common rooms in apartments, nursing or convalescent homes and residential facilities not covered by DD 8458-1:2010 *Fixed fire protection systems. Residential and domestic watermist systems. Code of practice for design and installation.*
- Corridors
- Data processing areas

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 5 of 19

Examples of types of areas or spaces which are unsuitable for protection by an LPCB approved watermist system in accordance with LPS 1283 typically include;

- Storage areas
- Bin stores, recycling areas and facilities
- Void areas, e.g. floor and ceiling
- Libraries
- Maintenance areas, service areas
- Workshop areas
- Machinery areas
- Laboratories
- Areas containing flammable or combustible liquids
- Kitchen areas, e.g. commercial restaurants
- Theatres and auditoria
- Atria
- Garages, parking areas, car parks, vehicle sheds and appliance bays

The listed examples are illustrative.

Particular configurations of these excluded areas or spaces can be considered, subject to suitable fire performance testing as defined and agreed with LPCB. This information will appear on the LPCB Approval certificate, see clause 4.

1.1 Categories of watermist system protection

DD 8489 Part 7 defines three categories of commercial low hazard occupancy watermist system protection:

- Category 1 – systems that cover rooms up to 37m² containing low hazard fire loads
- Category 2 – systems that cover rooms above 37m² containing low hazard fire load
- Category 3 – systems that cover rooms containing obstructed low hazard fire loads

This document employs the same categories, but specifies additional requirements.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 6 of 19

2 DEFINITIONS

2.1 Commercial low hazard occupancy

non-storage, non-manufacturing occupancy where the quantity and/or combustibility of the contents is low and fires with relatively low rates of heat release are expected. This descriptor is different from 'light' and 'ordinary hazard' as described in International sprinkler standards.

2.2 Equivalent fire load density

fire load density expressed as an equivalent mass of wood rather than in terms of its calorific value

2.3 Fire load

sum of the calorific energies, which could be released by the complete combustion of all the combustible materials in a space including the facing of the walls, partitions, floors and ceilings

2.4 Fire load density

fire load divided by the floor area

2.5 Fire suppression

reduction in the heat release rate and prevention of re-growth of a fire over the discharge duration

2.6 Minimum/maximum nozzle pressure

Limiting parameter for a watermist nozzle, the minimum/maximum allowed water pressure measured at the nozzle

2.7 System manual

controlled document containing design, installation and maintenance rules for all details of a watermist system designed to protect an enclosed volumetric space

2.8 Volume protection system

watermist system designed to protect an enclosed volumetric space

2.9 Watermist system

distribution system connected to a water supply, fitted with one or more watermist nozzles and intended to suppress a fire.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 7 of 19

3 REQUIREMENTS

3.1 Documentation

Prior to system examination and testing an applicant shall provide LPCB with comprehensive information about the components and system. All documents shall be dated and given a reference number, issue and title. These documents shall include:

- Document Register (containing date, issue and status of all documents)
- Production Drawings (including materials and finish)
- Full material specification of components, manufacturer and designation
- Details of jointing compounds/materials/tools and procedures (including manufacturers of tools, materials and compounds)
- System manual
- Full user documentation
- Details of any training which may be available or required

Documents shall be sufficient so that LPCB can carry out a full review of the system design. If the applicant is not the manufacturer i.e. is a supplier, then an application must be accompanied by written permission for testing from the manufacturer(s).

3.2 Design requirements

Watermist systems shall be designed in accordance with DD 8489-1 and DD 8489-7.

Water shall be supplied by a pumped system.

Watermist systems shall be designed so that it is possible for periodic testing and inspection of a nozzle (including actuation, operation, flow and removal), strainers, filters and pumps; by means of an hydraulically most remote test connection, incorporating a nozzle.

3.3 System manual

The system manual for LPCB approved watermist systems shall:

- Reference and employ design criteria specified in DD 8489-1 and DD 8489-7.
- Contain full instructions for the design, installation, commissioning operation and maintenance of the system.
- Identify all system and component requirements specific to low hazard occupancies and sub-categories.
- Contain the scope of the LPCB approval .

In particular, the system manual shall include the sections and details listed in Table 1.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 8 of 19

Table 1 System manual layout

Section	Details in section – to include, but not limited to
Scope	System scope and applications, inclusions and exclusions
Definitions, terms, abbreviations	Metric units
Roles and responsibilities	Manufacturer, installer, owner, authorities, installer scheme
Approvals	Component, system and installation approval details: <ul style="list-style-type: none"> • Approval body • Scope of approval • Standards/criteria against which approvals obtained • Date of approvals
Standards	Suitable reference to relevant standards
Legislation	Applicable legislation, e.g. PED, TPED, WRAS
General information	<ul style="list-style-type: none"> • System description • System types • Commercial low hazard categories • Commercial low hazard applications • Safety considerations • Environment effects
Components	For each component, full descriptions, including: <ul style="list-style-type: none"> • model identification, drawings • materials • limits of use (e.g. exposure to temperature, pressure), • warnings, • compatibility statements, • maximum and minimum design parameters, • optimum design parameters

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 9 of 19

Section	Details in section – to include, but not limited to
Design	<p>Planning</p> <p>Design guidance for the selection of system type for the low hazard occupancy.</p> <p>For each system type, full descriptions of aspects of the mechanical and electrical design, including:</p> <ul style="list-style-type: none"> • Selection of component parameters (e.g. tank size, pump flowrate, orifice size, detector type), • Arrangement and positioning of components (e.g. nozzle spacing, nozzle location with respect to obstructions, nozzle position with respect to the ceiling, ceiling height, flowrate and area of coverage) • Operational arrangement (e.g. alarms, delays, zones, number of operating nozzles, shut-down of equipment, frost, vibration, pressure) • Limitations of the design (e.g. fire load, floor area, ceiling height, obstructions, ventilation) <p>Design guidance for the determination of the size of the water supply.</p> <p>Design guidance for interaction with the building, equipment, other systems and ventilation.</p> <p>Design guidance for hydraulic calculation of the system, including determination of the hydraulically most remote favourable and unfavourable areas, pump requirements, water/medium stored quantity, pressure/flow at nozzles.</p>
Installation & commissioning	Guidance, procedures, warnings, markings & identification
Handover	Operator manual, log book, responsibilities
Maintenance	Procedures, routines and schedules

3.4 Fire performance tests

The watermist system design criteria for the protection of low hazard occupancies shall be verified by fire testing. The parameters verified by testing are: nozzle spacing, nozzle location, nozzle flow and pressure, nozzle height, additive quantity, discharge time and effective discharge duration.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 10 of 19

Category 3 (see 3.4.1) simulated work station fire test protocol shall be undertaken to verify the fire performance of the watermist system design. This watermist system design shall also be deemed acceptable for Category 1 and Category 2.

Where a different watermist system design is employed for Category 2, the watermist system design shall be verified by testing to the associated fire test protocol, i.e. large compartment and open space sofas. This watermist system design shall also be deemed acceptable for Category 1.

Where a different watermist system design is employed for Category 1, the watermist system design shall be verified by testing to the associated fire test protocol, i.e. small compartment and large compartment.

All tests shall be undertaken with the watermist system components (e.g. nozzles, pipe, valves, strainers, pumps, tanks) configured exactly as defined in the system manual (which shall use design criteria specified in DD 8489-1 and DD 8489-7). Testing shall be undertaken with any additive that forms part of the system, using the test arrangement considered by LPCB to be the most appropriate.

3.4.1 Category 3 fire performance tests

The watermist system shall be tested against the simulated work station fire test protocol defined in DD 8489 Part 7:2011 Category 3. The test procedures, test room, fuel package, pass/fail criteria are defined in clause 5, 6.1, 6.8, Annex A.4, Annex B.4, clause 7 f.

One test shall be repeated with the maximum nozzle pressure, using the test arrangement considered by LPCB to be the most challenging test for a maximum nozzle pressure system.

An additional optional test programme can be undertaken to determine baseline low hazard requirements at a second lower ceiling height.

3.4.2 Category 2 fire performance tests

Category 2 requires fire testing to two fire test programmes; large compartment and open space sofas.

3.4.2.1 Large compartment fire test programme

The watermist system shall be tested against the corner crib and simulated furniture fire test protocol, DD 8489 Part 7:2011 Category 2. The test procedures, test room, fuel package, pass/fail criteria are defined in clauses 5, 6.1, 6.3, Annex A.2, Annex B.2, clause 7 b.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 11 of 19

Four additional tests shall be undertaken:

- (i) One test with a modified fuel package (specified in DD 8458 Part 1:2010 Figure A.5) placed between two nozzles
- (ii) One test with a modified fuel package (specified in DD 8458 Part 1:2010 Figure A.5) placed under one nozzle
- (iii) One test with a 1 m/s ventilation rate (arrangement specified in DD 8458 Part 1:2010 A.4 d)), using the test arrangements that resulted in the least suppression
- (iv) One test with the maximum nozzle pressure, using the test arrangement considered by LPCB to be the most challenging test for a maximum nozzle pressure system.

3.4.2.2 Open space sofas fire test programme

The watermist system shall be tested against the sofas fire test protocol DD 8489 Part 7 : 2011 Category 2. The test procedures, test room, fuel package, pass/fail criteria are defined in clauses 5, 6.1, 6.4, 6.5, 6.6, Annex A.3, Annex B.3, clause 7 c), d), e).

One test shall be repeated with the maximum nozzle pressure, using the test arrangement considered by LPCB to be the most challenging test for a maximum nozzle pressure system.

3.4.3 Category 1 fire performance tests

Category 1 requires fire testing to two fire test programmes; large compartment and small compartment.

3.4.3.1 Large compartment fire test programme

The watermist system shall be tested against the corner crib and simulated furniture fire test protocol, DD 8489 Part 7 : 2011 Category 2. The test procedures, test room, fuel package, pass/fail criteria are defined in clauses 5, 6.1, 6.3, Annex A.2, Annex B.2, clause 7b.

Four additional tests shall be undertaken:

- (i) One test with a modified fuel package (specified in DD 8458 Part 1:2010 Figure A.5) placed between two nozzles,
- (ii) One test with a modified fuel package (specified in DD 8458 Part 1:2010 Figure A.5) placed under one nozzle
- (iii) One test with a 1 m/s ventilation rate (arrangement specified in DD 8458 Part 1:2010 A.4 d)), using the test arrangements that resulted in the least suppression
- (iv) One test with the maximum nozzle pressure, using the test arrangement considered by LPCB to be the most challenging test for a maximum nozzle pressure system.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 12 of 19

3.4.3.2 Small compartment fire test programme

The watermist system shall be tested against the bunk beds fire test protocol, DD 8489 Part 7 : 2011 Category 1. The test procedures, test room, fuel package, pass/fail criteria are defined in clauses 5, 6.1, 6.2, Annex A.1, Annex B.1, clause 7 a.

3.5 System verification method

For confirmation of real application design methodologies and practices, a complete watermist system shall be designed and installed with the following attributes:

- Designed in accordance with the system manual
- Hydraulically calculated by systems software
- Installed with components in accordance with the system manual
- Installed with pumped water supply

3.5.1 Test apparatus

The system shall be installed within a building.

Measurements shall be made of water pressure, water flow rate and temperature.

3.5.2 Environmental conditions

Temperature 15 °C +/- 10 °C.

3.5.3 System design

The watermist system shall employ a set of components specified by the client in agreement with LPCB.

Three designs of the watermist system shall be tested. The arrangements shall be agreed with LPCB and typically include:

- The four nozzle arrangement employed in the system fire performance tests (Section 3.4)
- An eight nozzle watermist system arrangement at 9 m height
- A one nozzle watermist system arrangement at 1 m height

Additional tests may be required for other system design arrangements (depending on the test schedule).

Full details of the hydraulic calculation for each test shall be provided to LPCB before testing.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 13 of 19

3.5.4 Test method

For each arrangement of the watermist system, nozzle(s) selected by LPCB shall be forcibly operated at selected times. The following measurements shall be made:

3.5.4.1 Discharge time

Measurements shall be made of the following times: pump start, first water delivery, water delivery at design flow rate.

3.5.4.2 Maximum flow

Measurements shall be made of pressure and flow at the pump and pressure at selected location(s) in relation to particular components, e.g. nozzle(s).

3.5.4.3 Pass/fail criteria

All watermist system components shall operate to their specified design criteria.

The predicted hydraulic calculation shall be representative of the measured pressure and flow for all tests.

The pump and systems delay time before attainment of design flow rate shall be less than 30s.

3.6 Component examination and test methods

Set out below are the outline requirements, assessments and test methods which LPCB will consider when assessing the performance of the major components in a watermist system. The assessment will be defined by LPCB, in consultation with the applicant, based on both LPCB experience and changes in standards currently under development from bodies such as BS, CEN and ISO.

Examples of components required to be assessed by LPCB for approval include:

- Water distribution nozzles
- Water control valves
- Water check valves
- Water pumps
- Water pipe, fittings and couplings
- Water strainers and filters
- Water flow switches
- Water tank
- Water ball valves and drain valves

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 14 of 19

- Water level switch
- Water sight glass
- Water flexible connectors
- Water pressure switches
- Water manifold
- Water pressure reducing valves
- Water pipe hangers
- Manual release
- Water additive

The assessment and test of all components shall, as a minimum, include the following, as appropriate:

- Examination
- Marking
- Strength test
- Internal pressure test
- Leakage test
- Corrosion tests
- Function/operation tests
- Long term ageing tests
- Thermal shock test
- Nozzle clogging test
- Pump running test

The test programme required for a particular system will depend on its design and method of operation as described in the system manual. The test programme shall be developed in a test schedule (provided by the LPCB).

4 CLASSIFICATION AND DESIGNATION

The watermist system comprises: a set of components, a set of design parameters, a system manual, design software/calculation method and a scope of application.

Watermist systems shall be designated commercial low hazard occupancy, Category 1, Category 2 and/or Category 3.

Category 3 watermist systems are of use with all commercial low hazard occupancies, Category 1 and Category 2 have restricted use.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 15 of 19

4.1 Scope of application

LPCB approved watermist systems shall have a scope of application for each type of area and space. Examples of the scope of application and limits are detailed in Table 2.

LPCB approved watermist systems shall have limiting parameters for each designated category. Examples of the limiting parameters for each of the categories are detailed in Table 3.

Table 2 Scope of application for each type of area and space

Area type	Occupancy	Limits of use
Seating areas	Hospital Hotel Museum Office School and college	Category 2 or 3, subject to Table 3 restrictions
Classrooms and office areas	Hospital Hotel Museum Office School and college	Category 2 or 3, subject to Table 3 restrictions
Entrances foyers and display areas	Hospital Hotel Museum Office School and college	Category 2 or 3, subject to Table 3 restrictions
Bedrooms and sleeping areas	Hospital Hotel School and college	Category 1, 2 or 3, subject to Table 3 restrictions
Common rooms	Hospital Hotel School and college Flats Homes (nursing, convalescent or residential) <i>(for rooms not covered by DD 8458-1:2010 'Fixed fire protection systems. Residential and domestic watermist systems. Code of practice for design and installation'.)</i>	Category 2 or 3, subject to Table 3 restrictions
Corridors	Hospital Hotel Museum Office School and college	Category 1, 2 or 3, subject to Table 3 restrictions
Data processing areas (i.e. computer room, excluding storage)	Hospital Hotel Museum Office School and college	Category 2 or 3, subject to Table 3 restrictions

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 16 of 19

Table 3 Limiting parameters for each designated category

Parameter	Category 1	Category 2	Category 3
Floor area ^{Note 0}	≤ 37 m ²	No limit	No limit
Ceiling height ^{Note 1}	≤ 2.4 m	Tested height up to 5 m	Tested height up to 5 m
Ventilation ^{Note 2}	≤ 1 m ³ /s total, from any source	≤ 1 m ³ /s total, from any source	≤ 1 m ³ /s total, from any source
Equivalent fire load density ^{Note 3}	≤ 9 kg/m ²	≤ 9 kg/m ² for rooms protected by up to 4 nozzles ≤ 8 kg/m ² in spaces protected by more than 4 nozzles	≤ 29 kg/m ²
Fire growth rate ^{Note 4}	≤ medium	≤ medium	≤ medium
Height of combustibles	≤ 2.4 m	≤ 2.4 m for rooms protected by up to 4 nozzles 1 m in spaces protected by more than 4 nozzles	≤ 2.4 m
Obstructed fire load ^{Note 5}	Not permitted	Not permitted	"Normal" layouts covered

Note 0: Floor area gives the compartment size. All compartment boundaries shall be appropriately designed and protected to ensure that they will be maintained during a fire event.

Note 1: Minimum ceiling height = 2 m.

Note 2: The limit for ventilation is based on the air movement imposed in the LPS 1283 Cat 1 & Cat 2 large compartment test, a fan installed in single a doorway.

Note 3: The limit for the equivalent fire load density for each category is based on the fuel packages used in the fire tests. Category 3 systems are for use in areas where the fire load corresponds to a typical office work station. Category 1 and Category 2 are for use in areas where the fire load is less, and corresponds to a lightly furnished hotel bedroom or foam seating areas in spaces protected by more than 4 nozzles. Further explanation is given in Appendix A and;

1. FB 29:2011 'Design fires for use in fire safety engineering' C. Mayfield and D Hopkins, IHS BRE Press
2. PD 7974-1:2003 'Application of fire safety engineering principles to the design of buildings', British Standards Institution.

Note 4: Fire growth rates for different occupancies and commodities are given in FB 29 and PD 7974-1. The limit for the fire growth rate is based on design fire experience.

Note 5: Category 1 and Category 2 systems are for use in areas where the fire load is not obstructed, e.g. no combustible materials placed under seats, beds, desks, shelves etc. Category 3 systems are for use in areas where the fire load includes obstructed combustible materials, as well as unobstructed.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 17 of 19

5 MARKING, LABELLING AND PACKAGING

The manufacturer or supplier shall provide appropriate marking, labelling and packaging for the safe transport and subsequent use of the components and system as well as clear details of the manufacturer or supplier, their contact address, the components and system model identifications and any other safety requirements. Requirements for LPCB approval are described in the Scheme Document and PN103 "Use of the BRE Global Certification Marks" and not in this standard.

6 ADDITIONAL GUIDANCE DOCUMENTATION

BRE Trust report, FB34 *'Water mist fire protection in offices – Experimental testing and development of a test protocol'*, K Annable and L Jackman, published by IHS BRE Press, 2011.

RISC Authority, Form IQ1 Version 1.0 April 2011 *'Water Mist Questionnaire: Building Protection'*. Issued by FPA.

7 PUBLICATIONS REFERRED TO:

DD 8489-1:2011 *'Fixed fire protection systems. Industrial and commercial watermist system systems. Code of practice for design and installation.'*, published by British Standards Institution.

DD 8489-7:2011. *'Fixed fire protection systems. Industrial and commercial watermist system systems. Tests and requirements for watermist systems for the protection of low hazard occupancies.'*, published by British Standards Institution.

DD 8458-1:2010 *'Fixed fire protection systems. Residential and domestic watermist systems. Code of practice for design and installation'*, published by British Standards Institution.

FB 29:2011 *'Design fires for use in fire safety engineering'* C. Mayfield and D Hopkins, published by IHS BRE Press

PD 7974-1:2003 *'Application of fire safety engineering principles to the design of buildings'*, published by British Standards Institution.

LPS 1284 *'Watermist installers scheme'*, in preparation, to be issued by LPCB.

For undated references please refer to the latest published issue.

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 18 of 19

APPENDIX A

British Standard PD 7974-1 Table A.19 excerpt below gives the following indicative fire load density data for different occupancies.

A.8 Fire load densities in different occupancies				
Table A.19 shows the fire load densities in various occupancies.				
Table A.19 — Fire load densities				
Occupancy	Fire load density ²			
	Average MJ/m ²	Fractile ^b MJ/m ²		
		80 %	90 %	95 %
Dwelling	780	870	920	970
Hospital	230	350	440	520
Hospital Storage	2 000	3 000	3 700	4 400
Hotel bedroom	310	400	460	510
Offices	420	570	670	760
Shops	600	900	1 100	1 300
Manufacturing	300	470	590	720
Manufacturing and storage ^c	1 180	1 800	2 240	2 690
Libraries	1 500	2 250	2 550	—
Schools	285	360	410	450

NOTE 1 *Limits.* The fire load densities given in this table assume perfect combustion, but in real fires, the heat of combustion is usually considerably less.

NOTE 2 The values given in this table included only the variable fire loads (i.e. building contents). If significant quantities of combustible materials are used in the building construction, this should be added to the variable fire load to give the total fire load.

^a Derived from surveys: see CIB W14 Workshop Report, 1983 [1].

^b The 80 % fractile is the value that is not exceeded in 80 % of the rooms or occupancies.

^c Storage of combustible materials at less than 150 kg/m².

Equivalent fire load densities for the above occupancies have been calculated assuming that wood based fire loads will have a calorific value of 18 MJ/kg. Occupancies highlighted in grey are covered in this standard, subject to given limitations given in Tables 2 and 3.

Occupancy	Equivalent fire load densities			
	Average kg/m ²	Fractile		
		80%	90%	95%
Hospital	13	19	24	29
Hotel bedroom	17	22	26	28
Office	23	32	37	42
Schools	16	20	23	25

Issue 1.1	LOSS PREVENTION STANDARD	LPS 1283
Date: Jan. 2014	Requirements and test methods for the approval of watermist systems for use in commercial low hazard occupancies	Page 19 of 19

Amendments Issued Since Publication

DOCUMENT NO.	AMENDMENT DETAILS	SIGNATURE	DATE
LPS 1283-1.1	<ol style="list-style-type: none"> 1. New front cover 2. Title added to header 3. Contents page moved to Page 1 4. Notes added on Page 3 5. Repagination 6. Changes to copyright information 	DC	Jan. 2014