British Automatic Fire Sprinkler Association
bafsa

INFORMATION FILE

#9

Watermist Systems

Over the past thirty years watermist technology has increasingly been offered as a viable alternative to sprinkler systems for providing fire suppression in certain types of buildings.

INTRODUCTION

This BAFSA information file (BIF) provides a quick introduction to the most appropriate applications for watermist systems. It provides a guide to the types of systems which are available and the standards to which systems must be designed and installed. The BIF also provides some helpful guidance for end-users and authorities on what to look for when specifying and reviewing systems.

More detailed information and guidance will be found in BAFSA Technical Guide No 3: Using water mist system in buildings and structures. www.bafsa.org.uk/bafsa/basfa-resources

Virtually all water mist systems are "project specific" with each particular hazard or occupancy requiring its own bespoke design. It is therefore not possible to design a mist system simply by reference to one of the various standards available – unlike sprinkler systems where reference to BS 9251 or BS EN 12845 enables a full design to be produced and a fully compliant system to be installed.

TYPES OF MIST SYSTEMS

Water mist systems generally fall into one of two categories:

LOW PRESSURE	HIGH PRESSURE
Head pressure, typically 5-10 bar but less than 12 bar	Head pressure typically not less than 35 and usually at least 50 bar. For cylinder-based systems, system pressure may be up to 200 or more
Steel or copper – CPVC may be appropriate in some cases; pipework 20 – 65mm	Smaller bore, stainless pipework, typically 12mm – 30mm
Normally uses stored water and electric pumps	Can be either stored water (tanks) & high-pressure pumps, or high-pressure cylinders
Maintenance regime similar to sprinkler systems but extra checks of nozzles may be needed to ensure these are not blocked	Maintenance regime may be more onerous than LP systems due to pump and tank specifications. Cylinder based systems require 10 year pressure test
Fire service may be able to supplement stored water supply by pumping-in subject to availability of connections	Fire service may be able to supplement stored water for tank systems provided filters are in place
Can share water supply with other water-based fire protection systems	Cylinder systems cannot share existing water supplies with other water-based fire protection.
Nominal water flux density 2 – 3.5 lpm/m³	Nominal water flux density 1 – 2 lpm/m³
Wet and dry systems available (dry using separate fire detection)	Wet and dry systems available (dry using separate fire detection)

Table 1: Types of Mist Systems

IN THE UK, WATER MIST SYSTEMS SHOULD BE DESIGNED AND INSTALLED IN ACCORDANCE WITH ONE OF THE TWO REFERENCED STANDARDS

✓ **BS 8458**

✓ **BS 8489**

✓ **BS EN 14972-1**

THERE ARE MANY ALTERNATIVE OR INNOVATIVE FIRE SUPPRESSION SYSTEMS AVAILABLE. WHERE THESE ARE USED IT IS NECESSARY TO ENSURE THAT SUCH SYSTEMS HAVE BEEN DESIGNED AND TESTED FOR USE IN BUILDINGS AND ARE FIT FOR THEIR INTENDED PURPOSE.

SYSTEMS DESIGN COMPLIANCE

In the UK, watermist systems should be designed and installed in accordance with one of the two referenced standards, BS 8489 (likely to be withdrawn in late 2025/early 2026) and or BS EN 14972-1. The standards require that the system application complies with the Scope laid down in the standard. For example, Table 1 of BS EN 14972-1 sets out suitable occupancies for mist systems, indicates a minimum design area, the minimum quantity of nozzles needed and quotes the relevant test protocol be followed to. For example:

From: BS EN 14972-1: Table 1

PROBLEMS WITH DESIGN COMPLIANCES

One of the principal differences between sprinkler and water mist systems is that there is no universality of design, and this situation is exacerbated by the fact that watermist nozzle design is unique to each manufacturer. The usual approach to managing mist system design is for the system manufacturer (usually also the nozzle manufacturer) to issue a Design, Installation, Operation and Maintenance manual (DIOM) *(See 4.2.2 of BNS BS EN 14972-1)* which allows the generation of a detailed design for the system in respect of a specific fire risk in an identifiable property or risk. The critical components in watermist systems are the nozzles and these are unique to each manufacturer. Additionally, high pressure watermist pumps also tend, to be manufacturer specific as are compressed gas systems.

Locations where watermist can be used without reservation with careful observance of the stated limitations are those where there is an approved test protocol. Tthe Table below summarises the main applications for which BS EN test protocols exist.

BS EN 14972	Part 2: Shopping areas
BS EN 14972	Part 3: Offices, school classrooms and hotel
BS EN 14972	Part 4: Non-storage occupancies
BS EN 14972	Part 5: Car garages
BS EN 14972	Part 6: False floors and false ceilings
BS EN 14972	Part 7: Low hazard occupancies
BS EN 14972	Parts 8 and 9: Machinery spaces
BS EN 14972	Part 10: Atrium protection
BS EN 14972	Part 11: Cable tunnels
BS EN 14972	Part 12: Commercial deep fat fryers
BS EN 14972	Part 13: Wet benches
BS EN 14972	Parts 14 and 15: Combustion turbines
BS EN 14972	Part 16: Industrial oil cookers
BS EN 14972	Part 17: Residential occupancies

Table 2: Test Protocols under BS EN 14972

SYSTEMS PRODUCT COMPLIANCE

A compliant design and approved test protocol is only part of the requirement. The equipment to be installed must also comply with fire test standards (which prove that the system will perform as required) and an appropriate equipment or product standard (which include a variety of tests concerning through-life reliability and durability). It simply is not enough for a manufacturer or installer to claim that a nozzle has been 'tested'.

The following UK-based TPC schemes for watermist systems and equipment are active as at 31 August 2025.

BRE/LPCB CERTIFICATION

LPS 1283: Requirements and test methods for the approval of watermist systems and nozzles for use in commercial low hazard occupancies:

- LPS 1285: Requirements and test methods for the approval of watermist systems for use in domestic and residential occupancies
- LPCB: Watermist nozzles to SD0231 Appendix 4

DESIGNER/INSTALLER SCHEMES

Fire Protection Association IFC Certification KIWA Ltd

Note: The FIRAS BS 8458 Certification scheme was closed w.e.f 30 August 2025. BAFSA is not able to advise on the ongoing validity of nozzle test certificates under Annex C of BS 8458 at this time.

To summarise and for the avoidance of doubt, it should be understood from that for any company to be able to make an authentic claim of full third-party certification for a particular watermist **system**, the body undertaking the test must be nationally accredited for that purpose and the standard against which the test has been run must be for the type of equipment and the relevant application. Additionally to accredited fire testing, the system components, system design and installation (and the DIOM) should have successfully been assessed and listed in an accredited certification provider's system certification scheme. In the U,K this means accredited by the Government's United Kingdom Accreditation Service (UKAS).

Fire testing alone (even if performed by an accredited laboratory) does not constitute a certified system.

WATER MIST SYSTEMS IN WALES

In Wales, where all new residential properties are required to be fitted with automatic fire suppression, concern has been expressed at the variety of non-compliant systems which were being installed. This has resulted in the publication of a guidance document which should be used by specifiers and regulators (including Approved Inspectors and insurers) to ensure that water mist systems being installed will be fit for purpose.

CHECKLISTS FOR SPECIFIERS AND END USERS

The 2025 revision of BS EN 14972-1 includes an informative National Annex NA which sets out a set of criteria which, when completed together incorporate a Contractor's Declaration of Conformity. The requirements are similar to those in the Welsh guidance document.

Additionally, BAFSA recommends that specifiers and end-users ensure that the proposed installer/contractor can satisfactorily provide answers to the following questions:

CHECKLIST FOR SPECIFIERS AND END-USERS WHEN REVIEWING WATER MIST PROPOSALS

Has the system been tested and approved by a third-party approval body such as LPCB, FPA, IFCC KIWA, VdS, UL or FM for the specific application intended?
Has all testing been carried out by an accredited capable laboratory such as BRE, FM, UL, VdS,?
Are products and components specific to the system approved for such use by a qualified third-party approval body?
Can all claims made by the system supplier be verified? Have copies of test and approval certificates been provided
Is there a formal agreement between manufacturer and installer? Has the installer received training from the manufacturer?
Does the testing and approval data correspond to the intended use of the system, including hazard classification?
Does the geometry of the space to be protected, including ceiling height, correspond to the testing and approval data?
Where insurers are the AHJ, ensure compliance with the insurer's own requirements /questionnaire / checklist.

Table 3: Checklist prior to procuring a mist system

PRESENTED BY

British Automatic Fire Sprinkler Association
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BRITISH AUTOMATIC FIRE SPRINKLER ASSOCIATION
PO BOX 28683
Edinburgh EH4 9GN
info@bafsa.org.uk www.bafsa.org.uk

facebook.com/SprinklersSaveLives
twitter.com/BAFSAfocus Find us on LinkedIn: BAFSA