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Fixed fire protection systems – Residential and domestic watermist systems – Code of practice for design and installation

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 November 2015. It was prepared by Subcommittee FSH/18/5, *Watermist systems*, under the authority of Technical Committee FSH/18, *Fixed fire fighting systems*. A list of organizations represented on these committees can be obtained on request to their secretary.

Supersession

This British Standard supersedes DD 8458-1:2010, which is withdrawn.

Relationship with other publications

Attention is drawn to the requirements of BS EN 806, with particular regard to backflow prevention, and to BS 1710 for guidance on identification and marking of pipework.

Guidance on the application of automatic fire suppression systems is given in BS 9991, BS 9999, the Building Regulations 2010, Approved Document B for use in England [1], [2], Wales [3], [4] and its equivalents in Scotland [5] and Northern Ireland [6].

Information about this document

Watermist fire suppression systems for residential and domestic applications are designed to provide an additional degree of protection of life and property, above that to be achieved by the installation of smoke and/or fire detectors and systems.

This British Standard presumes that the watermist fire suppression system will form part of an integrated fire safety system as part of the building design.

This document converts DD 8458-1 into a full British Standard. It is a full revision of the Draft for Development, and incorporates the following principal changes:

- clarification of the application of residential and domestic building categorizations based on occupancy and risk;
- change to building height limit (from 20 m to 45 m);
- changes to fire test protocols:
    - removal of one ventilation fire test;
    - addition of two optional “open room” fire tests;
- changes to the limits of application dependent on fire tests successfully completed;
- increase in maximum nozzle spacing;
- expanded guidance on water supplies;
- additional measures for vulnerable people;
- additional recommendations for components.

Product certification/inspection/testing. Users of this British Standard are advised to consider the desirability of third-party certification/inspection/testing of product conformity with this British Standard. Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

This British Standard is intended for the use of designers, engineers, architects, surveyors, contractors, installers and authorities having jurisdiction.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions in this British Standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Particular attention is drawn to the Water Supply (Water Fittings) Regulations 1999 [7], the Water Supply (Water Fittings) (Scotland) Byelaws 2014 [8] and the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 [9] in respect of requirements for any fire suppression system which conveys, or is likely to convey, water supplied by a water undertaker or licensed water supplier.

Introduction

Watermist fire suppression systems have demonstrated their value in assisting the protection of life and property in industrial and commercial applications for many years. The advent of watermist nozzles that operate at an earlier stage in the development of a fire, together with the recognition that the largest numbers of deaths from fire occur in the home, have led to the introduction of watermist fire suppression systems specifically designed for residential and domestic occupancies.

A correctly designed, installed and properly maintained watermist fire suppression system can detect, suppress and control a fire at an early stage of development, and activate an alarm. Operation of the system rapidly reduces the rate of production of heat and smoke, allowing more time for the occupants to escape to safety or be rescued.

This British Standard accordingly covers design, installation, water supplies, maintenance and testing of residential and domestic watermist fire suppression systems installed to reduce the risk to life.

However, fire-fighting and life protection encompasses a wide field of endeavour and as such it is impracticable to cover every possible factor or circumstance that might affect implementation of this British Standard.

Residential and domestic watermist systems are seen as emerging technology in the market and their performance can be more sensitive than traditional sprinkler systems to small design changes, which can compromise their effectiveness. They can have features such as smaller bore waterways and they generally operate at higher pressures, which poses a number of design and maintenance challenges. They produce smaller droplets of water, which can be prone to being adversely affected by compartment geometry and fire plumes.

Smaller bore waterways and small orifice size in nozzles can be prone to being blocked by particles and debris. Attention to good quality installation and commissioning practices coupled with adequately maintained filtration by means of strainers is therefore essential. Subsequent contamination or deterioration of water supply quality, through ingress of matter, corrosion or microbial activity, could compromise system effectiveness.

The use of components that have been tested and approved in accordance with appropriate component specifications for fire protection applications is also important for system performance and reliability. At the time of writing of this British Standard, the testing and approval of watermist system components for residential and domestic applications is a developing area. In some cases it might be appropriate to select components that have been approved for use in sprinkler or commercial watermist systems.

The fire tests detailed in this British Standard are an important method of demonstrating that the water spray pattern and smaller droplet sizes produced by each specific system are capable of suppressing the test fires and reducing temperatures in the fire test room. The ventilation fire test also provides an assessment of the effect of air flows on the watermist droplets. However, it needs to be recognized that these tests represent a limited range of fire scenarios and there are limits to their applicability to all scenarios that might be encountered in application. The scope of application of this British Standard is therefore limited, as detailed in **6.2**. Attention is also drawn to **4.5** which contains guidance about circumstances when enhanced performance, reliability and resilience measures are to be provided.

Residential and domestic watermist fire suppression systems consist of a water supply, filter, non-return valve, stop valve, priority demand valve (where required), automatic alarm system and pipework to automatic watermist nozzles.

The watermist nozzles are fitted at specified locations, the appropriate watermist nozzle type being used for each location.

The main elements of a typical watermist fire suppression system are shown in Annex A. Automatic watermist nozzles operate at a pre-determined temperature to discharge water over a known area below. The flow of water thus initiated causes the sounding of an alarm. Only those watermist nozzles operate which are individually heated above their operating temperature by the heat from the fire.

The provision of a watermist fire suppression system does not negate the need for other fire precautions or practical measures, which can include structural fire resistance, escape routes, smoke or fire detectors and safe housekeeping practices. Even with the installation of a watermist fire suppression system, normal actions on the discovery of a fire need to be taken, such as immediate evacuation and the calling of the fire and rescue service.

Watermist fire suppression system maintenance is not complex but is essential (see Clause **8**). It is important that owners and occupiers pay particular attention to precautions issued by the watermist system supplier, such as the avoidance of obstructions to the watermist nozzle, or not painting the watermist nozzle or its mounting.

1 Scope

This British Standard gives recommendations for the design, installation, water supplies, commissioning, maintenance and testing of watermist systems with automatic nozzles installed in residential and domestic occupancies up to a maximum ceiling height of 5.5 m. It primarily covers watermist systems used for life safety, but might also provide property protection.

The recommendations of this British Standard are also applicable to any addition, extension, repair or other modification to a residential or domestic watermist system.

The British Standard does not cover watermist systems in industrial and commercial buildings. Recommendations for these systems are given in DD 8489-1 [1)].

2 Normative references

Standards publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM A269-10, *Standard specification for seamless and welded austenitic stainless steel tubing for general service*

ASTM A312, *Standard specification for seamless, welded, and heavily cold worked austenitic stainless steel pipes*

ASTM F442, *Standard specification for chlorinated poly(vinyl chloride) (CPVC) plastic pipe (SDR–PR)*

BS 5839 (all parts), *Fire detection and fire alarm systems for buildings*

BS 7671, *Requirements for electrical installations – IET Wiring Regulations*

[1)] At the time of publication of BS 8458, DD 8489-1 is undergoing conversion to a full British Standard as BS 8489-1.