British Standard 8458 - Residential and Domestic Water Mist Standard

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UK Water Mist Seminar 2016, IWMA
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According to UK statistics[10], most fires in buildings attended by local authority fire and rescue services each year occur in dwellings.

Most fire deaths and injuries occur as a result of people being overcome by smoke or toxic gases.

Accidental fires that result in deaths in dwellings most frequently start in rooms defined as ‘the lounge, living room or dining room’ followed by rooms defined as ‘the bedroom or bed sitting room’.

Most injuries are caused by accidental fires that start in the kitchen of a dwelling.
UK domestic and residential studies

- 1989 Front Room Fire (VHS)
- 2000s UK experimental research
  - House fires and calorimetry fires
  - Compartment fires
  - Benchmark sprinkler fires
  - Care homes
  - Concealed/recessed

In addition
- 2007+ Watermist test
  - Prisons & office tests
  - DD8458 Domestic and residential tests

http://www.bre.co.uk/page.jsp?id=402
Fire hazard

Simulated furniture, stylized test protocol - estimate
BS 8458:2015
Fixed fire protection systems – Residential and domestic watermist systems – Code of practice for design and installation
Standards

FOC Sprinkler Rules
- BS 5306pt2
- LPS1039
- BSEN12845
- BSEN12259

Dom&Res Sprinkler
- DD251
- DD252
- BS9251
- BS9252
- BS9251
- "prENpt14"

Dom&Res Watermist
- DD8458
- BS8458
- LPS1285

AMAO – assumed maximum area of operation
Std - standard
Manu – manufacturer’s
BS 8458:2015 overview

– 1 Scope
– 2 Normative references
– 3 Terms and definitions
– 4 Preliminary work and consultation
– 5 System actuation
– 6 Design
– 7 Installation, commissioning and documentation
– 8 Maintenance
Application

- Domestic occupancies include individual single family dwellings, houses of multiple occupancy (HMOs), bed and breakfast accommodation, boarding houses, blocks of flats 18m or less in height and with a maximum total floor area of 2400m².

- Residential occupancies for multiple occupation include blocks of flats greater than 18m in height, sheltered and extra care housing, residential care premises, residential rehabilitation accommodation, dormitories (e.g. attached to educational establishments) and hostels.

- **Building height limit, 45m**
Preliminary work and consultation

- 4.1 Initial considerations
- ..
- 4.5 Use of watermist systems as a compensatory feature
- 4.6 Special circumstances
- Annex B (informative) Watermist performance, reliability and resilience for systems installed in the homes of vulnerable people
Fire tests

- Clause 6.1 used to establish:
  - Operating pressure (i.e. nozzle flow)
  - Nozzle spacing
    • 2 to 4m, 4 to 5 m
  - Room size
    • 32, 50, 80 m²
  - Ceiling height
    • 3.5, 5.5 m
- Annex C (normative)
- Room fire tests for watermist systems with automatic nozzles
BS 8458 – test procedure

a) Corner fuel package
b) Between two nozzles
c) Beneath one nozzle
d) Ventilation – greatest challenge fuel
e) Open room (option)
   i. greatest challenge fuel
   ii. next greatest challenge fuel
f) Increased ceiling height (option)
   • a), b), c), d), e)

- Additional tests for minimum pressure, additives……
- a),b),c),d) – unchanged from DD8458
Other design criteria

- Hydraulic calculations + Annex D (normative)
- Domestic occupancies
  - 10 minutes, test room/largest room (up to 64m\(^2\) AMAO)
- Residential occupancies
  - 30 minutes, 64m\(^2\) AMAO
- Stored water supply, effective capacity
- Water quality
- Strainers
Installation, commissioning, maintenance

- Leak test, functional test, alarm test
- Compliance certificate
- Documentation
  - Log book
- System data label + Annex E
- Inspection of hazard
- Inspection of nozzles...
- Routine tests (pump)
- Log book

### Watermist system data

<table>
<thead>
<tr>
<th>Installed at</th>
<th>123 Main Street, Town, County, Postcode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation date</td>
<td>month/year</td>
</tr>
<tr>
<td>Design specification</td>
<td></td>
</tr>
<tr>
<td>Code of practice</td>
<td>BS 8458:2015</td>
</tr>
<tr>
<td>Category of system</td>
<td>Domestic/Residential</td>
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<tr>
<td>Hydraulic data</td>
<td></td>
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<tr>
<td>Nozzles operating</td>
<td>2 No.</td>
</tr>
<tr>
<td>Flow/pressure demand</td>
<td>100 L/min @ 5 bar</td>
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<tr>
<td>Installing contractor</td>
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</tr>
<tr>
<td>Name</td>
<td>Contract Reference No.</td>
</tr>
<tr>
<td>Address</td>
<td>AB1234</td>
</tr>
<tr>
<td>Logo</td>
<td></td>
</tr>
<tr>
<td>Third party certification body, if appropriate</td>
<td>Name</td>
</tr>
<tr>
<td>Certificate URN</td>
<td>CD5678</td>
</tr>
</tbody>
</table>
Components
Components

<table>
<thead>
<tr>
<th>Water nozzles</th>
<th>Water pumps</th>
<th>Water strainers and filters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water control valves</td>
<td>Water tank and valves</td>
<td>Water pipe hangers</td>
</tr>
<tr>
<td>Water check valves</td>
<td>Water flow, level</td>
<td>Manual release</td>
</tr>
<tr>
<td>Water pipe, fittings and couplings</td>
<td>Water manifold</td>
<td>Water additive</td>
</tr>
</tbody>
</table>

Tests

- Examination
- Marking
- Strength test
- Internal pressure test
- Leakage test
- Corrosion tests
- Function tests
- Operation tests
- Long term ageing tests
- Thermal shock test
- Nozzle clogging test
- Pump running test
Watermist component approval

- Nozzle challenge:
  - Wet valve held closed, under pressure, and expected to operate after 10+ years
  - Full flow required through small orifices
- Testing:
  - Aging (@ 121degC)
  - Corrosion (with exposed seals)
  - Leakage...
- Type audit testing (annual)
- Three yearly testing of samples taken from installation
Certification of manufacturer’s product

– Assessment of performance requirements against standardised methodologies
– Assessment of quality control, ISO 9001
– On-going assessments of product, system and management through regular Factory Production Control (FPC) and product audits.
Specifier/AHJ/end user

- Compliance with BS 8458
- Understand risk to be protected, type of occupancy, any special circumstances
- Check water supply requirements and availability
- Inspect BS 8458 or DD 8458 fire performance reports
  - Check test house credentials
  - Check test report compliance to scope and standard
- Check watermist system details
  - NOTE: small differences in parameters (system or test) can make a big difference to the outcome
- Check component and system approvals, LPS 1285
- Check compliance certificate, documentation
Thank you

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Redbook listing for:
Watermist components, e.g. nozzle
Watermist systems – LPS 1285
Third party approvals - increase confidence in product and system performance