The requirements of BS8489-1 Watermist Fire System standard and how to demonstrate compliance

Bob Whiteley C. Eng.; F.I.Mech.E.; M.I.Fire E.; B.Tech(Hons)
Chair: BSI Watermist Working Group
Overview

What is watermist
Testing protocols
Consultations
Local application and volume protection
Watermist system design
AMAO and hydraulics
Components
Water supplies
Summary
So what is a watermist system?

- Specifically designed nozzles in pipework secured to a building and connected to a water supply via control valves.

- Key property – the large surface area of water droplets enables high heat absorption and efficient cooling.
What can a Watermist system do?

- Flammable liquids – flame extinguishment
- Ordinary combustibles – fire suppression
- Property protection and life safety
BS8489-1 requirements - testing

Testing

Specific area within building can be protected by watermist where relevant fire test protocols exist.

Test protocols

Test protocols must be representative of actual conditions, thus:

- Similar fuel  √
- Comparable compartment volume  √
- Compartment height is comparable  √
- Similar ventilation conditions  √
- Obstructions are representative  √
- Duration of protection is compatible with the protection needed  √
BS8489-1 requirements – testing cont’d

• Desirability of third party testing and certification.
• Test facilities that operate a quality system with watermist in their scope of accreditation. √
• Test protocol recognised √
• Test lab record published √
• Equipment and systems have demonstrated performance √
• Equipment and components listed for their intended application √
• Design uses components tested. ✓
• Design as per successful test results/ test report ✓
• Maximum and minimum nozzles heights and spacing per report ✓
• Minimum flows and pressures in tests to be met or exceeded. ✓
• Installed as per manufacturer’s design manual and training to replicate the system as tested. ✓
BS8489-1 Consultations

- Water Mist system designers need to consult with:
  - Fire Authority
  - Licencing Authority
  - Building Control
  - Insurer
  - Water undertaker
BS8489-1 requirements - Protection

• **Local Application:**
  • extinguishing systems designed for object protection with design parameters established by representative fire tests.
  • Where the potential exists for fire to spread and involve adjacent objects the design should encompass the combined hazards.

• **Volume Protection:**
  • Either open nozzles or automatic nozzles
  • Systems designed for hazards within a volume with design parameters established by representative fire fire tests.
BS8489-1 Volume protection test requirements

- Tests must mimic the volume to be protected and the hazards identified.  
- Use of previous testing – verified by AHJ/Test Lab.  
- Tests for specific hazards per tables 1 and 2 of BS8989-1  
- Other tests may be used IF shown to give acceptable/equivalent results.  
- Test for applications other than those specified may be used if:
  a) Repeatable  
  b) Clear pass/fail criteria  
  c) Third party verified
BS8489-1 Design Nozzle layouts

- Position/orientation per manufacturer’s design manual  √
- Within maximum /minimum tested heights.  √
- Within maximum / minimum spacings.  √
- Within maximum / minimum distances from walls  √
- Obstruction addressed per manufacturer’s design manual  √
- Ceiling construction (flat/sloping etc) mist design factors included.  √
- Within maximum / minimum nozzle pressure/flows tested.  √
- Additives identified where used.  "

Tyco Fire & Integrated Solutions
BS8489-1 piping hydraulics - AMAO

Most Unfavourable AMAO

Most Favourable AMAO
BS8489-1 requirements - components

- In accordance with LPS1283/FM5560 or equivalent
- Consider components supported by accredited third party assessment
- Nozzles;
  - corrosion resistant
  - permanently marked
  - open nozzles blockage prevention
  - automatic nozzles – thermal release per BSEN12259-1 quick response
- Piping:
  - Stainless steel
  - Copper
  - Galvanised steel (with strainers)
BS8489-1
water supplies - duration

- Extinguishing systems – 2 times the duration to extinguish and prevent re-ignition as established by test. √

- Suppression systems:
  - to suit hazard (per table 1) with 60 minutes minimum √
  - automatic nozzle systems flow based upon the **most favourable** ‘Assumed Maximum Area of Operation’ (AMAO) – minimum 4 nozzles √

- System piping – hydraulically designed. √
• Capable of supplying both the hydraulically most unfavourable AND the most favourable AMAOs. √
• Wholesome/demineralised/deionised/ sweet industrial water √
• Towns main
• One or more automatic starting pumpsets ( manual stop)
• One or more pressurised cylinders
• Ensure continuity and reliability √
• Pump suction tanks > 30% of full capacity -where infill rate is sufficient to meet discharge duration requirements and can be tested. √
• Dedicated pump house: 60 min. fire resistance if separate building, 120minutes if adjacent to or within a watermist protected building. √
BS8489-1 requirements – water supplies cont’d

• Permanent pump flow/pressure test facility  √
• Cylinders – permanent means to check pressure and water content.  √
• Pump driver power 110% of rated power demand  √
• Pump continuous flow to prevent overheating  √
• Pump suction strainer  √
• Multiple pumps :
  • common suction  √
  • individual pump isolation  √
  • sequence starting  √
• Starting to ensure sustained system pressure  √
BS8489-1 requirements – water supplies cont’d
BS8489 -1 compliance

- Presentation – check list
- Due diligence by AHJ
- Installer Schemes – audited and certified.
- Fire test reports readily made available.
- Fire tests relevant for identified hazards.
Thankyou !!