The challenges of using water mist as an alternative to sprinklers.

Gary Howe FIFireE
Fire Protection Engineer
Zurich Risk Engineering UK

Biography

- Fellow of the Institution of Fire Engineers (IFE)
- Executive member of the National Fire Sprinkler Network (http://www.nfsn.co.uk)
- Panel member of the British Standards Institution BS 8489 water mist development group, FIA/BAFSA water mist working group.
- Building Research Establishment (BRE/LPCB) Fire Suppression Liaison Group,
- British Standards Institute - BSi FSH 18/2 WG5 TG2 -EN12845 - UK delegate
- BSi FSH 18/2 fire systems, BSi FSH 18/5 water mist panel member
- BSi FSH 14/-/7 BS 9999 committee member.
- International Water Mist Association (IWMA) insurer representative.

Water mist

- **Many** specific applications water where mist system is suitable.
- Zurich have been actively involved in BS8489
- We work actively with water mist contractors and manufactures to gain insurance acceptance for projects we insure.
- Zurich actively promote water mist where proven and back up by suitable fire test data.
- We collaborate with international fire test laboratory's to ensure test protocols are fit for purpose.
- We are different we are actively involved from the start to the end!

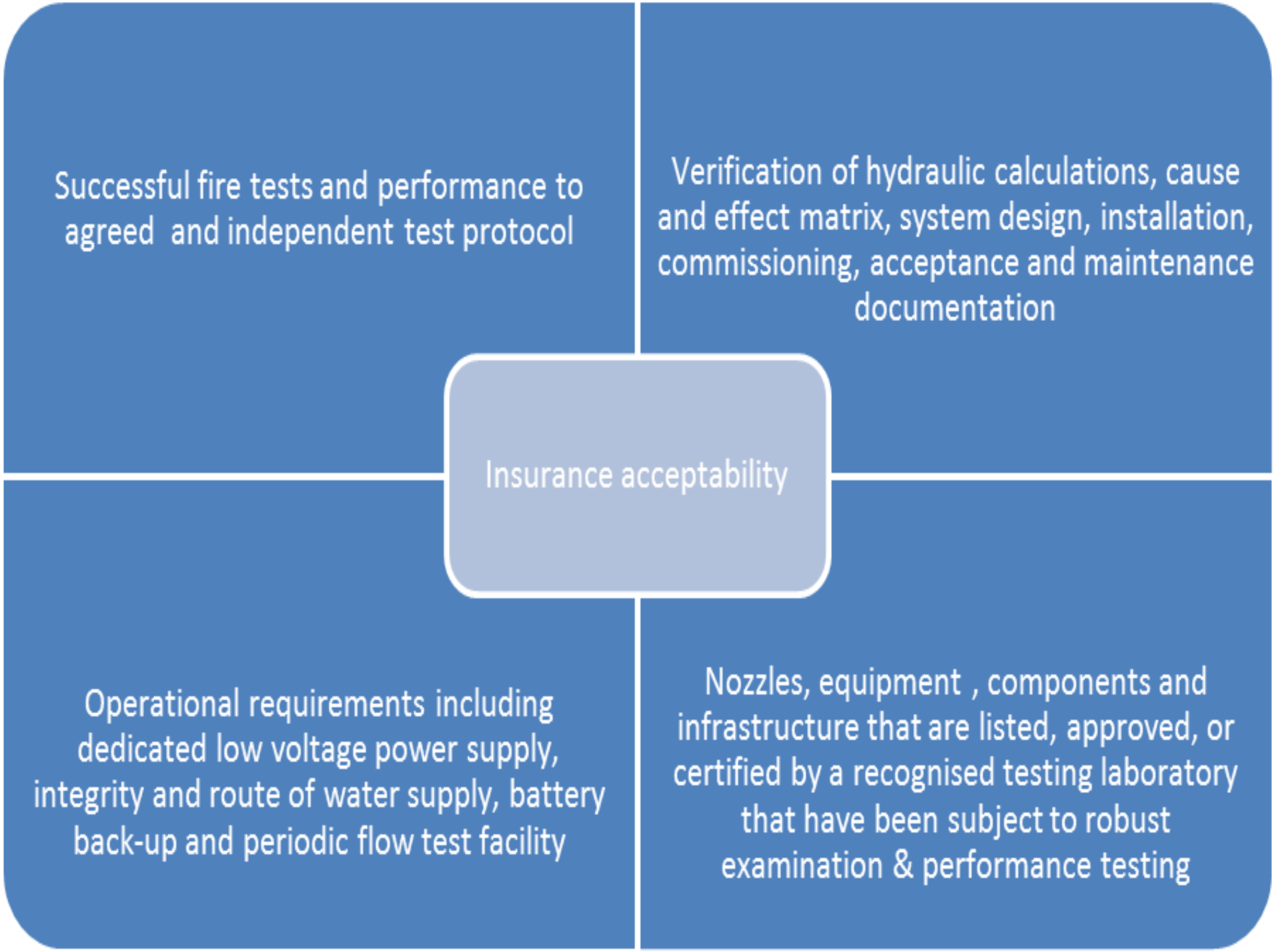
Institution of Fire Engineers Journal
Published Zurich articles.

Institution of Fire Engineers Journal
3 published water mist articles

The Institution of Fire Engineers
The International Organisation for Fire Professionals

Introduction

- Zurich stance -
  - Water mist is a specific application solution which must be proven by **suitable** fire tests at a recognised testing laboratory. *An independent test report should be issued.*
  - Equipment used such as nozzles and controls must be listed or approved for the intended application.
- This is to ensure reliability of the equipment and components and overall system performance for this type of application.
- In the absence of a suitable/recognised published test protocol, one is to be developed.
- *Where a system does not have an appropriate listing or is not covered by an applicable code or standard we have no basis upon which to accept the system for* ***property insurance purposes.***

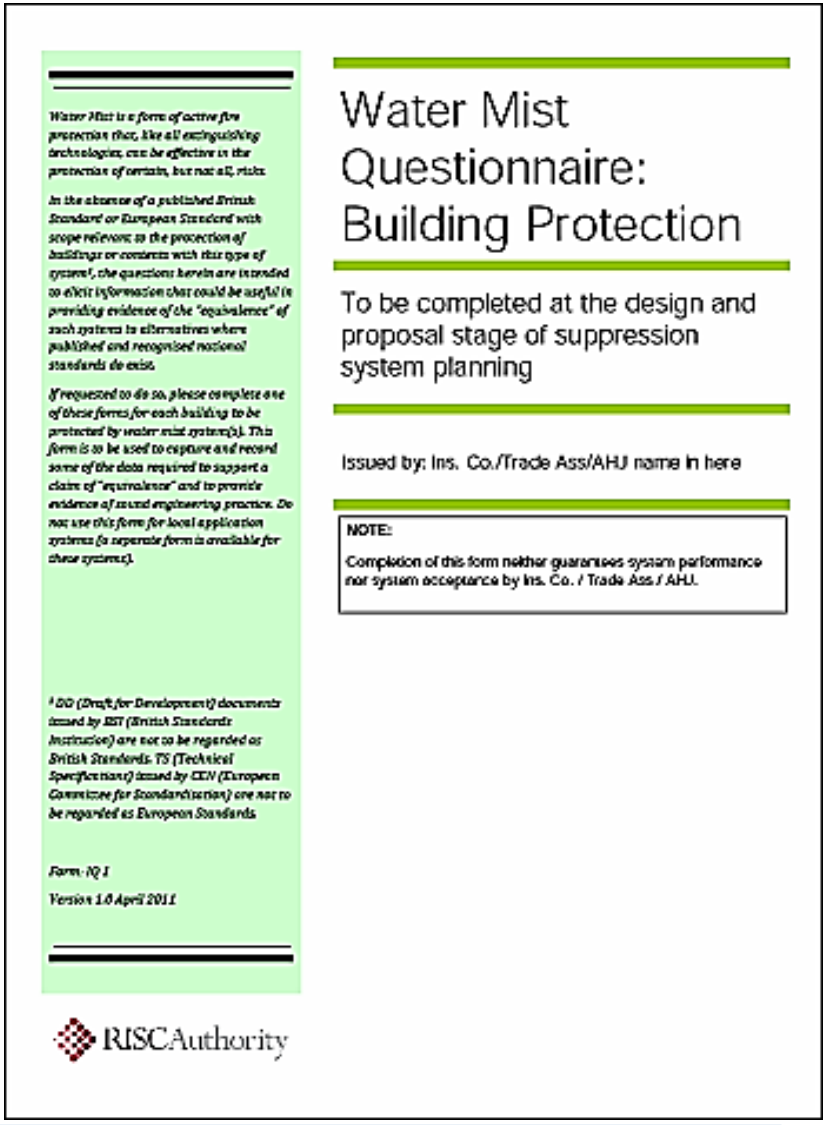

Successful fire tests and performance to agreed and independent test protocol
Verification of hydraulic calculations, cause and effect matrix, system design, installation, commissioning, acceptance and maintenance documentation
Insurance acceptability
Operational requirements including dedicated low voltage power supply, integrity and route of water supply, battery back-up and periodic flow test facility
Nozzles, equipment , components and infrastructure that are listed, approved, or certified by a recognised testing laboratory that have been subject to robust examination & performance testing

Water Mist – The View of an Insurer

FPA RISCAuthority Questionnaire (UK)

ZURICH

- Intended as a tool to gather evidence to scrutinise the suitability of a water mist system.
- Developed and used by major insurers to evaluate proposals
- Zurich, ACE, Allianz, Aviva, AXA, HDI Gerling, Liberty Mutual, QBE, RSA, Tokio Marine & Travellers
- Help us to help you – fill it in.



Water Mist is a form of active fire protection that, like all extinguishing technologies, can be effective in the protection of certain, but not all, risks.

In the absence of a published British Standard or European Standard with scope relevant to the protection of buildings or contents with this type of system[1], the questions herein are intended to elicit information that could be useful in providing evidence of the "equivalence" of such systems to alternatives where published and recognised national standards do exist.

If requested to do so, please complete one of these forms for each building to be protected by water mist system(s). This form is to be used to capture and record some of the data required to support a claim of "equivalence" and to provide evidence of sound engineering practice. Do not use this form for local application systems (a separate form is available for these systems).

[1] DD (Draft for Development) documents issued by BSI (British Standards Institution) are not to be regarded as British Standards. TS (Technical Specifications) issued by CEN (European Committee for Standardisation) are not to be regarded as European Standards.

Form: IQ 1

Version 1.0 April 2011

RISCAuthority

Water Mist Questionnaire: Building Protection

To be completed at the design and proposal stage of suppression system planning

Issued by: Ins. Co./Trade Ass/AHJ name in here

NOTE:

Completion of this form neither guarantees system performance nor system acceptance by Ins. Co. / Trade Ass / AHJ.

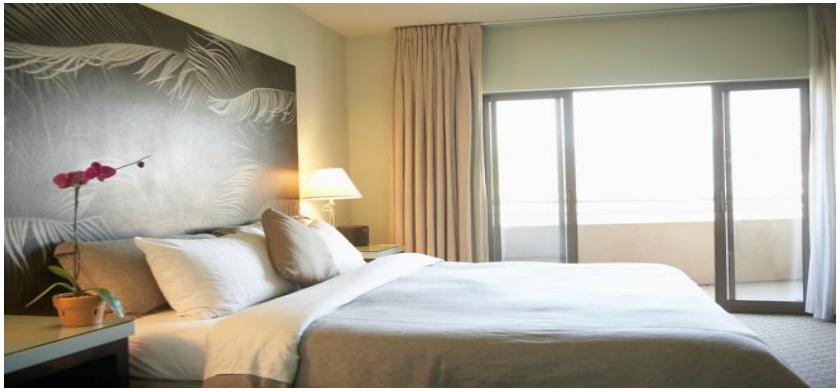
Table 1 – Occupancies and acceptable fire test protocols for an automatic watermist system

Occupancy	Description of occupancy	Exceptions	Fire test protocol
Apartments Churches Concealed spaces Gymnasiums Hospitals and hospital laboratories Hotel rooms Institutions Kitchens Libraries Meeting rooms in convention centres and hotels Metalworking shops with non-hydraulic cutting operations Mineral processing such as glass, cement, ore treating, gypsum processing Museums Nursing or convalescent homes Offices Restaurant seating areas Schools and university classrooms Unused attics	Lightly loaded non-storage and non-manufacturing areas with ordinary combustibles Expect fire with relatively low rates of heat release in these occupancies	Libraries with stack rooms Facilities with storage of electronic and plastic media Hospital laboratories where exposed storage and processing of flammable liquids is considered excessive Facilities with operations involving hydraulic fluid or flammable liquid	BS 8489-7 FM 5560;2012, Appendix G

NOTE The listed test protocols are applicable with the following limited parameters.

- *BS 8489-7 covers Category 1, 2 and 3 systems for:*
  - *fire loads ≤ 500 MJ/m^2;*
  - *ceiling heights ≤ tested height up to 5 m;*
  - *floor area = restricted and unrestricted;*
- *FM 5560:2012, Appendix G covers:*
  - *fire loads ≤ 150 MJ/m^2;*
  - *ceiling heights ≤ tested height up to 5 m;*
  - *floor area = restricted and unrestricted.*

Water Mist – The View of an Insurer



System:

- **Wet** pipe system using **automatic** nozzles

Mist Characteristics:

- Relatively larger droplets, with sprays designed to promote cooling and fuel wetting

Water Mist – The View of an Insurer

LH/OH Occupancies in buildings

ZURICH

- Class A (solid) fuel hazards
- Variety of construction types, often including combustible materials
- Various ventilation conditions
- Wide range of sizes and configurations (hotel rooms to open office areas)

Water Mist – The View of an Insurer

ZURICH

VdS 'Office Test' (Germany)

- The VdS office test could not be replicated by the BRE and produced inconsistent results.

BRE 'Office Test' (UK)

- BRE developed their own test protocol, benchmarked against sprinklers.
- EN 12845 - 5mm over 72m2 (US = 0.12 gpm over 775sq ft)

Let’s consider this for today’s market

- Let’s look at some applications proposed for water mist……

- Offices
- Schools
- Hospitals
- Hotels

Challenges

- ETFE roofs with open ventilation
- Timber construction

Construction Challenges

Innovative design

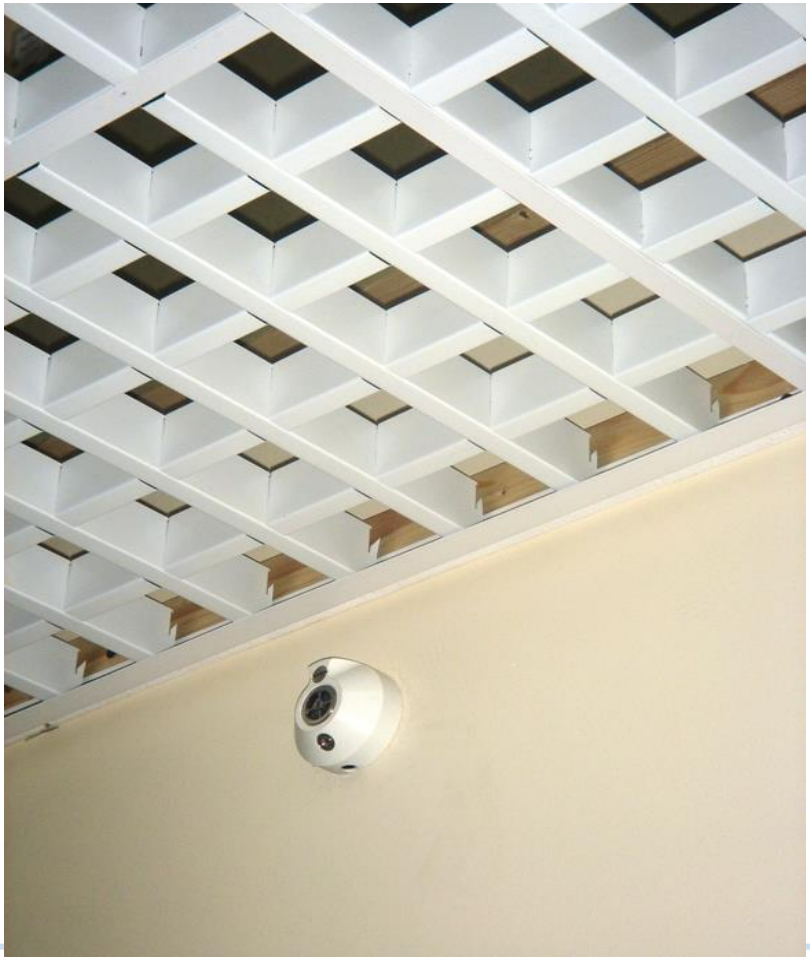
External Canopies

Challenging ceiling features

Open Cell Ceilings

- With Sprinklers

- A mist nozzle



Design solutions for building features

- No requirement for manufacturers to provide solutions in design manual for common issues encountered in premises
  - Ductwork and cable trays
  - Deep beams and bay construction
  - Light wells
  - Open areas between floors
  - Storage areas
  - Ventilated areas

Challenges

Building protection – specific application technology

- Voids
- Canopies
- Ceilings >5m
- Egg crate ceilings
- Sloped ceilings
- Ductwork and cable trays
- Deep beams and bay construction
- Light wells
- Open areas between floors
- Halls
- Atrium
- Plenum’s
- Acoustic
- Obstructions
- Storage areas
- Car parks
- And plant rooms amongst others.

Challenges for Zurich

- A replacement for sprinklers
- Absence of suitable fire test data
- One size fits all
- Value engineering – cost driving the need
- Inappropriate fire test certification
- Ignoring problematic areas
- No means of testing!
- AMAO's – any redundancy?
- No integrity of low voltage power supply – TB210?
- No integrity of water supply
- Lack of coordination with plant isolations/shut downs
- Nozzle type and spacing not matching parameters of test
- Short water duration
- Ventilation
- Covers all areas of the building or does it?

In summary

- As an insurer where proven we can accept water mist for a number of specific applications and where proven by suitable and realistic fire tests that reflect the risk to be protected. Only then can a water mist system act effectively as intended

- Some common features of most premises require consideration in design requirements for each manufacturers design guide

- Can **all** areas of a building be protected from one manufacturer's system?

- It's apparent that not all water mist systems are considered equal

- True sprinkler system equivalency is **not** realistic


Protecting People, Property and
Organisational Resilience through expertise
and collaboration

Any questions?

Gary Howe FIFireE
Zurich Fire Protection Engineer
Zurich Risk Engineering UK
Gary.howe@uk.zurich.com