

Can we use knowledge and experience from other sectors to prove
Water mist's suitability for land applications?



UK Water Mist Seminar
8th March 2016

Mark Davies – Engineering Manager

Background to this presentation.

- Last years IWMC great presentations.
- Technical Meeting on Land Applications.
- ? Why should we always compare to sprinklers? Our own merits.
- ? What more does the IWMA and its members need to do?
- ? The role of the “so called” expert’s in water mist.
- + Water Mist is ...“the gold standard” “The Rolls Royce of fire fighting”

IWMA objective.....growth in the land sector.

“.....We know our product, it appears the decision maker does not.....
.....goes back to sprinklers...”

“Water Mist is <3% of the sprinkler market.”

Q: Are we giving the AHJ's what is actually needed to make the decision..?

A front door to back door solution.

Perception of Partial protection of the building.

Forget the science, make it easy to compare, – EVIDENCE.

A: We are getting much closer.....

Influences and considerations.

- Fire Tests: Approved and witnessed.
- Meaningful fire tests.
- Comparisons to other standards/approvals.

EVIDENCE

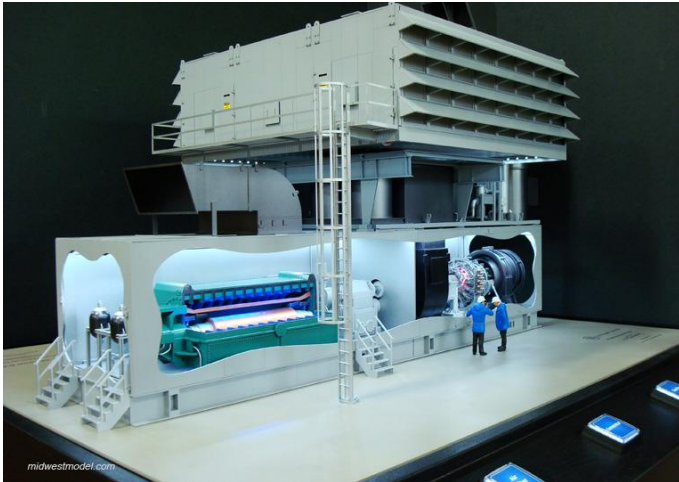
- The experts facing the customers.
- The difference between a “sales” can do and an “engineer” can do.

REPUTATION

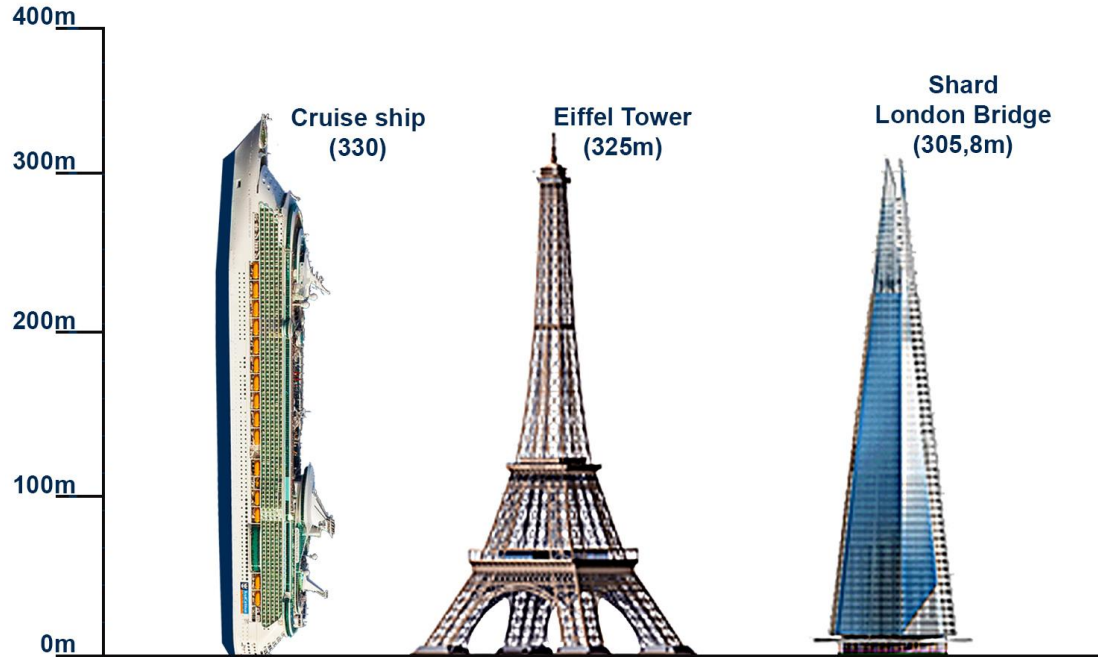
- Not all water mist is the same.
- Engineered solutions, not plumbed.
- Not all want to offer a certified designer or Installer scheme.

INNOVATION

What CAN, and DO we protect?



Is it a big deal?



~40m wide, 18 decks, 2,700 passenger cabins



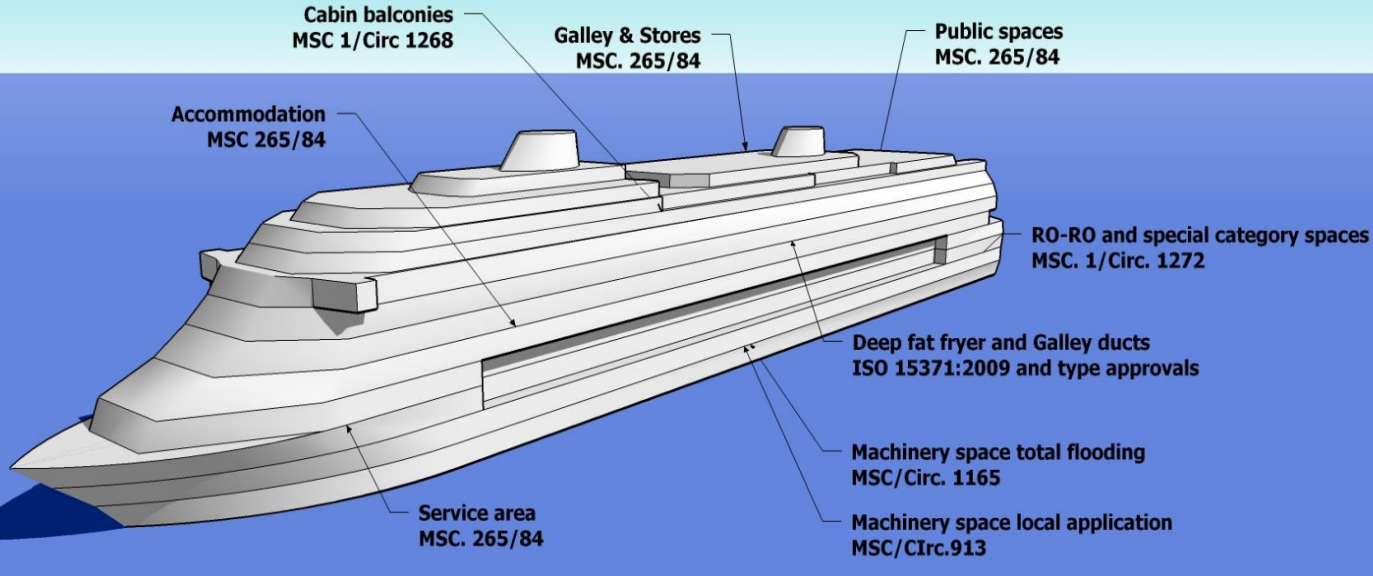
775 ROOMS IN BUCKINGHAM PALACE



1608 ROOMS IN JW Marriott Marquis Dubai

~13,000 nozzles, ~1000l/min, up-to 42mm piping.

What DO we PROTECT?



What we protect at sea – generally accepted on land.



*IMO MSC .265(84) Sec 5
Cabins*



*IMO MSC .265(84) Sec 6
Main Galleys*



What we protect at sea – generally accepted on land.



*IMO MSC .265(84) Sec 5
Corridors*



*IMO MSC .1165 Sec 4
Cat A Machinery Space*



If we can PROTECT.

Can we protect?



*IMO MSC .265(84) Sec 6
Public Spaces*



*IMO MSC .265(84) Sec 8
Store rooms & pantries*



If we can PROTECT.

Can we protect?



IMO MSC .1268 Sec 3 & 4
Cabin balconies



IMO MSC .265(84) Sec 6
Control Stations.



The IMO, SOLAS Reg II-2/12 and water mist.

International Water Mist Conference, Istanbul October 22-23, 2014

The background and development of the guidelines in IMO Resolution A.800(19)

Magnus Arvidson

SP Fire Research

SP Technical Research Institute of Sweden



SP Technical Research Institute of Sweden



Summary : IMO Approved Solutions

- Accommodation spaces, cabins, stores according to IMO MSC Res 265/84 (IMO Res A800) - **SAS F13003**
- Total flooding in machinery spaces according to IMO MSC Circ 1165 for volumes up to 3348 m³ – **SAS F120152**
- Local application in machinery spaces according to IMO MSC/Circ. 913 IMO MSC/Circ. 1387– **SAS F130034**
- RoRo/Special category spaces for 5.0m & 2.5m heights according to IMO MSC Circ 1430 – **SAS F130156**
- Cabin balconies according to IMO MSC Circ 1268 – **SAS F130034**
- Deep fat fryers: ISO 15371:2009 – **MED 1550206**
- Galley duct protection UL300 – **F20989**

HOW DO WE PROVE IT?

Q:as individual companies or together as IWMA ?

- **LISTEN** to the thoughts of AHJ's.

Give **EVIDENCE** – a need, not a nice to have for AHJ.

- Make it simple, **DATA** of test protocols, cross ref to alternative approvals.
- **INFORM** - educate.
 - Reliable, Accurate and up to date information is a given.

What is the evidence? (IMO)

ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. SAS F130033

Table 2-1, Recommended Nozzle Arrangements for Passenger Ships carrying more than 36 Passengers.

Space Designation ⁽¹⁾	Fire Risk Category ⁽¹⁾	Maximum Area of Space m ²	Nozzle Designation /K-Factor of Nozzle Washers	Spacing m	Maximum Distance to Bulkheads m
Control Stations	1	Unlimited	603-260-061-B/3.21 or 603-300-061-B/3.61	5.3 ⁽²⁾ or 5.3 ⁽³⁾	2.65 ⁽²⁾ or 2.65 ⁽³⁾
Stairways or Corridors (Width ≤ 1.5m) ⁽⁶⁾	2 or 3	Unlimited	603-19-B/1.9 or 603-1-035-B-W/1.35 ⁽⁴⁾	5.3 ⁽²⁾ or 4.0 ⁽²⁾	0.75 or Sidewall ⁽⁴⁾ 1.5 depth ⁽²⁾
Stairways or Corridors (Width > 1.5m) ⁽⁶⁾	2 or 3	Unlimited	603-260-061-B/3.21 or 603-300-061-B/3.61	5.3 ⁽²⁾ or 5.3 ⁽³⁾	2.65 ⁽²⁾ or 2.65 ⁽³⁾

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Non IMO evidence.

- **Protection of Non-Storage Occupancies, Hazard Category 1 (HC-1) – FM.**
- **Office Building - OH1: CEN/TS 14972:2011**
- **Store/shopping centres - OH3: CEN/TS 14972:2011**
- **High ceilings up to 12m - OH4: CEN/TS 14972:2011**
- **INSTA 900-3:2012 Watermist systems equivalent to residential sprinklers**

Protection of Non-Storage Occupancies (HC-1) – FM5560 Appendix G




Member of the FM Group

FM Approve
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P.O. Box 100, Temple, TX 76788 USA
T: 817.297.4300 F: 817.297.4300 www.fmapprove.com

January 23, 2011

Mr. Joseph Cavasina
Global Fire Development Ltd.
Via Genova 10
Varese (S27) 21100
Italy

Customer ID: 134478
Subject: Renovation and Possible FM Approval of Ultra-Fire Rated Screen for the Protection of Non-Storage Occupancies, Hazard Category 1 (HC-1) – ~~Exempt~~
System Address:
Project ID: 1048117


Mr. Cavasina,

This letter is to formally advise the current status of the authorization for possible FM Approval of the Ultra-Fire rated door system for the protection of Non-Storage Occupancies, Hazard Category 1 (HC-1), P. 2.10-0323.

Over the time period of 5 January 2011 through 15 January 2011, all of the data being required for the authorization was successfully completed at Ditech Fire Laboratories in Grand Rapids, Michigan. The testing was performed in accordance with FM Approvals Class Number 1-60, Approval Standard for Ultra-Fire Rated Systems, November 2011; Appendix G, and was witnessed by authorized representative from FM Approve. The following is a summary of the successful testing:

Smoke Tests: 610-200-051.8

1. Small Compartment Test (G 4.1) was conducted with a smoke pressure of 47 bar with the smoke detector inside the protected area as required.
2. Large Compartment Test (G 4.2) was conducted with a smoke pressure of 47 bar and with a smoke opening of 4.7 meters (15.57 meters from walls).
3. Open Space Test - Under One Minute (G 4.3) was conducted with a smoke pressure of 47 bar with a smoke opening of 4.7 meters.



High ceilings up to 12m pertaining to OH4: CEN/TS 14972:2011

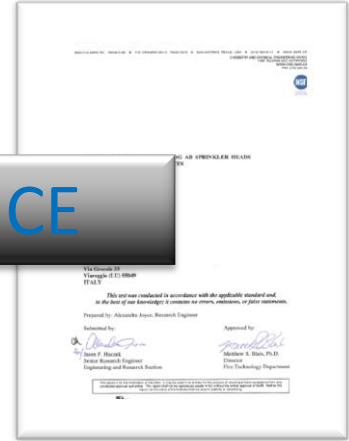


Figure B-10. Test No. 3 – Sprinkler Head Activation.



Figure B-18. Test No. 6 – During Test.

MUST EXCEED SPRINKLER PERFORMANCE



INSTA 900-3:2012 Watermist systems equivalent to residential sprinklers



Accurate Information



APPLICATION DATA SHEET: Protection of Non Storage Occupancies, Hazard Category 1 (HC-1)



Approval	FM5560 HC-1
Technology	
Max Height	5m / NA
Nozzle	603-300-061-B-F

Application: Hazard Categories based on Occupancy

Occupancy	Description of occupancy	Exceptions
<ul style="list-style-type: none"> Apartments Churches Concealed spaces Hospitals and hospital laboratories Hotel Rooms Institutions Kitchens Libraries Meeting Rooms in Convention Centres and hotels Nursing or convalescent homes Offices Restaurant seating areas Unused attics 	<p>Lightly loaded non storage and non manufacturing areas with ordinary combustibles.</p> <p>Except fires with relatively low rates of heat release in these occupancies.</p>	<p>Libraries with stack rooms larger in size than defined in Appendix A: facilities with storage of electronic and plastic media (see the applicable storage data sheet).</p> <p>Laboratories where exposed storage and processing of flammable liquids is considered excessive (see the applicable flammable liquids data sheet).</p>

Technical Data

Nozzle Type	Spacing (max)	Installation Height (max)	Covering Area	Mounting	Working Pressure	K Value (K=)	Water Density
603-300-061-B	4,5m	Up to 5m	21m ²	Ceiling	65bar	3,61	1.57 l/m ² /min

- FM Approval number: 3043823 in progress.
- Fire Test Protocols: FM5560: Appendix G:
- Water Quality: Potable

Description of Ultra Fog System

The ULTRA FOG system produces High Pressure Water Mist.

Our nozzles are designed to spray the water under high pressure and produce extremely small droplets (10µm-80µm) as efficiently as possible and to distribute them throughout the room. These droplets help cool the surrounding area more effectively as well as limiting the water damage done to the surrounding area. This ensures that systems can return to being fully operational in a shorter space of time.

The nozzle's water consumption is 29.1 liters/min at 65 bar (36.1 liters/min at 100bar).

The ULTRA FOG system can operate at temperatures ranging from +4.4° C to +50° C (40° F to 122° F) heating or cooling, for other temperature ranges can be reviewed on a case by case basis.

1. System Overview

Pressurized water can be created by electric pump, diesel pump or accumulator.

The electric pump system consists of high pressure pump units, the pump station can be master, micro or P35 series; each pump station type is modular and can be configured with different quantities of pumps, depending on the requirement of the area to be protected. The pump station can have a spare/back up pump if required. The water feed can be either requires water supply is greater than 2bar pressure at desired flow rate for most demanding area or using a pilot pump/water storage tank.

The accumulator unit is driven by a compressed gas, which is stored in cylinders at a pressure of 200 bar, a regulator attached to the solenoid valve reduces this to the design pressure of 110 bar, this compensates for the pressure drop in the pipes, for the working pressure at the nozzle.

The number of cylinders supplied with the accumulator system is determined by the water requirement for the hazard and then the pressure drop calculation. One gas cylinder (Master) is fitted with a solenoid actuated valve. All other gas cylinders (Slave) valves are fitted with a pneumatic actuator. Upon activation, the gas valve is opened, releasing the gas which in turn pressurizes the water cylinders.

Each section can be equipped with a "section valve".

In the event of fire, one or more of the heat sensitive nozzle bulbs ruptures, causing water at standby pressure to flow through the opened nozzles. This flow is measured at the section valve and a signal sent to the pump station to start the first high pressure pump. After that the pumps are starting in a sequence, according to the necessary conditions.

The electrical control cabinets are located on or close to the pump station and is normally equipped with the following:

- Automatic handover between main and emergency power.
- Motor protection relay for each pump in the unit.
- Sequential start of each high pressure pump.
- Logic-PLC controller which controls all functions.
- Spare batteries and charging unit for 24 VDC. Runtime is at least 1.5 hours for PLC, operational panel and alarms.
- Separate start and stop buttons for each pump, including fresh water pump.

2. The Protected Area - Design Parameters.

The water supply and capacity are calculated based on several factors:

- Room size/area and Ceiling height
- Room function/classification/Fire risk category
- Maximum nozzle spacing
- Minimum water pressure
- To size the pump/accumulator - the most hydraulic demanding area shall be calculated based on the following:
 - Minimum Design Area: 140m² (1500ft²)
 - Demand duration is 60minutes.

Accurate Information

Primary Components

Pump station: 35 to >1000/min



MASTER PUMP (P4H6) - 2 to 8 PUMPS



MICRO PUMP (P4H6) - 2 PUMPS

F2 (D225) - 1 to 3 PUMPS

Function Valves:



WEIGHT 100 SECTION VALVE

Tubing:

	D (mm)	d (mm)	t (mm)	Key
	12	3	1.5	Ø12
	22	18	2	Ø22
	28	24	2	Ø28
	42	36	3	Ø42

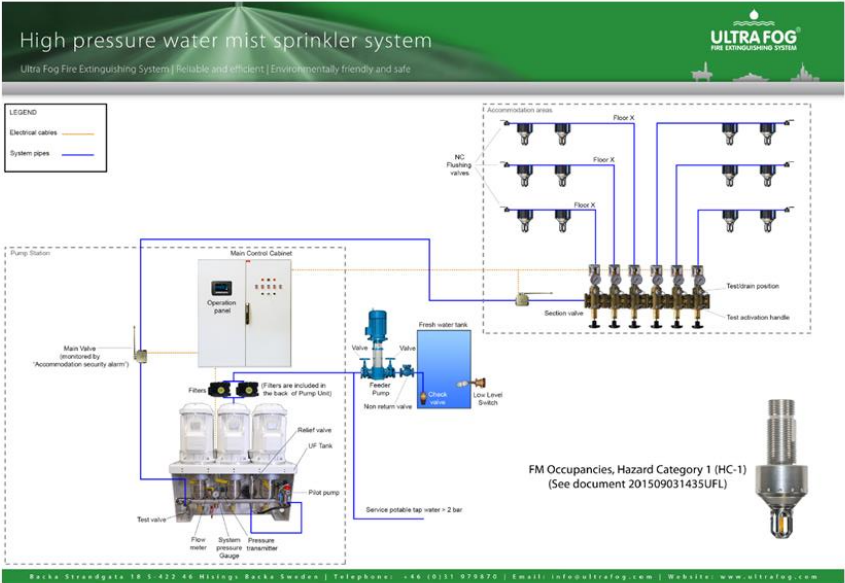
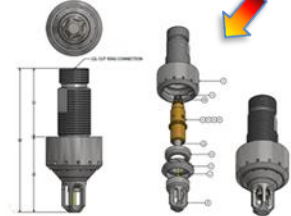
	Recommended	Alternative
Material:	DIN 17457 TC. 1	AISI 316L A269 1P or AISI 304L A269 1P
Type:	Welded hydraulic St DIN 2463 T01	Seamless hydraulic St DIN 2463
Tolerance:	Class D4/T3 with weld factor = 1	Class D4/T3
Certificate:	EN 10204 3.2	EN 10204 3.1

All tubing should be suitable for a working pressure of 160 bar.

Accumulator Unit



Nozzle:



UFED-010 REV AA

Checked approved: MD7?

FEBRUARY 2016

Typical System Schematic



Manuals

Delivering fire protection solutions for industry, buildings, occupants and property

Engineering Document:

Systems supplied by electric pump – I

Installation:

Systems supplied by electric pump – I

Engineering Document:

Systems supplied by electric pump – Ope

Engineering Document:

Systems supplied by electric pump – Land applications

Maintenance Manual:

Systems supplied by electric pump – Land applications

UFED 404
REV AA

Delivering fire protection solutions for industry, buildings, occupants and property

AZ Protection of Non-Storage Occupancies, Hazard Category 1 (HC-1)
Ceiling mounted – multiple nozzles.

1. Non-Storage Occupancies, Hazard Category 1 (HC-1) – FM (Constant Pressure)
AZ Protection of Non-Storage Occupancies, Hazard Category 1 (HC-1)
Ceiling mounted – single nozzle.

ULTRAFOG SOLUTIONS FOR PROTECTION OF:
Protection of Non-Storage Occupancies, Hazard Category 1 (HC-1)
CENT'S 14972:20 Annex AZ Hazard Group 1
Accommodation, public space and service areas – IMO MSC/Circ.265(84)

603-300-061-B-F (Bulb Nozzle) – FM APPROVED (Drawing No. 20130822-101)
603-300-061-B (Bulb Nozzle) – CEN/IMO APPROVED (Drawing No. 20110210-603)

Technology	FM	FM/IMO	IMO	Public space
Max height / Arms	5m / NA	4m / NA	5m / 4800' public space	5m / Public space
Nozzle	603-300-061-B-F	603-300-061-B	603-300-061-B	603-300-061-B

FEATURES

- Ceiling and Wall mounted options available.
- Unique patented design offers high performance for cooling effect and low consumption of water.
- Manufactured including fire, can be tested with patented test flow tool.
- Requires Potable Water only.

NOZZLE OVERVIEW

Nozzle Approval Type	System Pressure Type and Delivery method	Working Max. (psi)	Max. Setting Height Max. (m)	Pressure	Min. Nozzle Coverage Arms (m/ft)
FM	Constant Pressure or Accumulation	4.5	6	600psi	20.5m
CEN/TS	Constant Pressure or Accumulation	6.3	6	900psi	>28.1
IMO	Constant Pressure or Accumulation	6.94MPa	6	1000psi	>28.1

UFED-001 REV 00 By Approver: MD771 January 2016

How do we continue to inform and educate?

- By individual companies or combined as IWMA ?
- Self Promotion! – Google! - YouTube!
- Don't keep it to ourselves!
- Ensure up to date and ACCURATE data is used.



EVIDENCE

Water Mist Merits.

- **>25 years..... >35 years.**
 - **Small pipes / Less weight / Less water – quick return to operation.**
 - **Reduced install and maintenance times.**
 - **No corrosion.**
 - **Aesthetics, doesn't look 100 years old!**
 - **Can use local water supply / small tank.**
-
- **Innovation - Nozzle tool for 100% inspection.**
 - **Can engineer solutions.**
 - **Above and beyond compliance.**



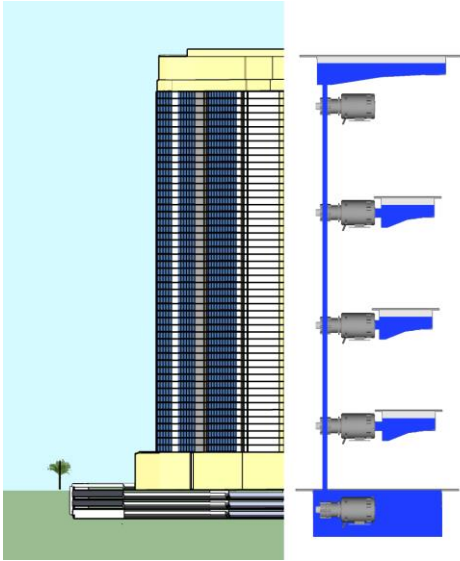
Water Mist Merits.



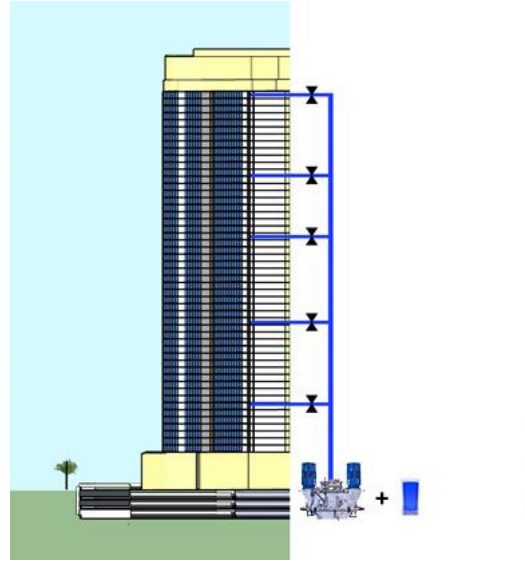
Protection of ceiling voids

Water Mist Merits.

Traditional sprinkler



ULTRA FOG water mist



Multi level installations



In-line monitoring

Water Mist Merits.



Anti-Legionella dosing

Accepted solutions

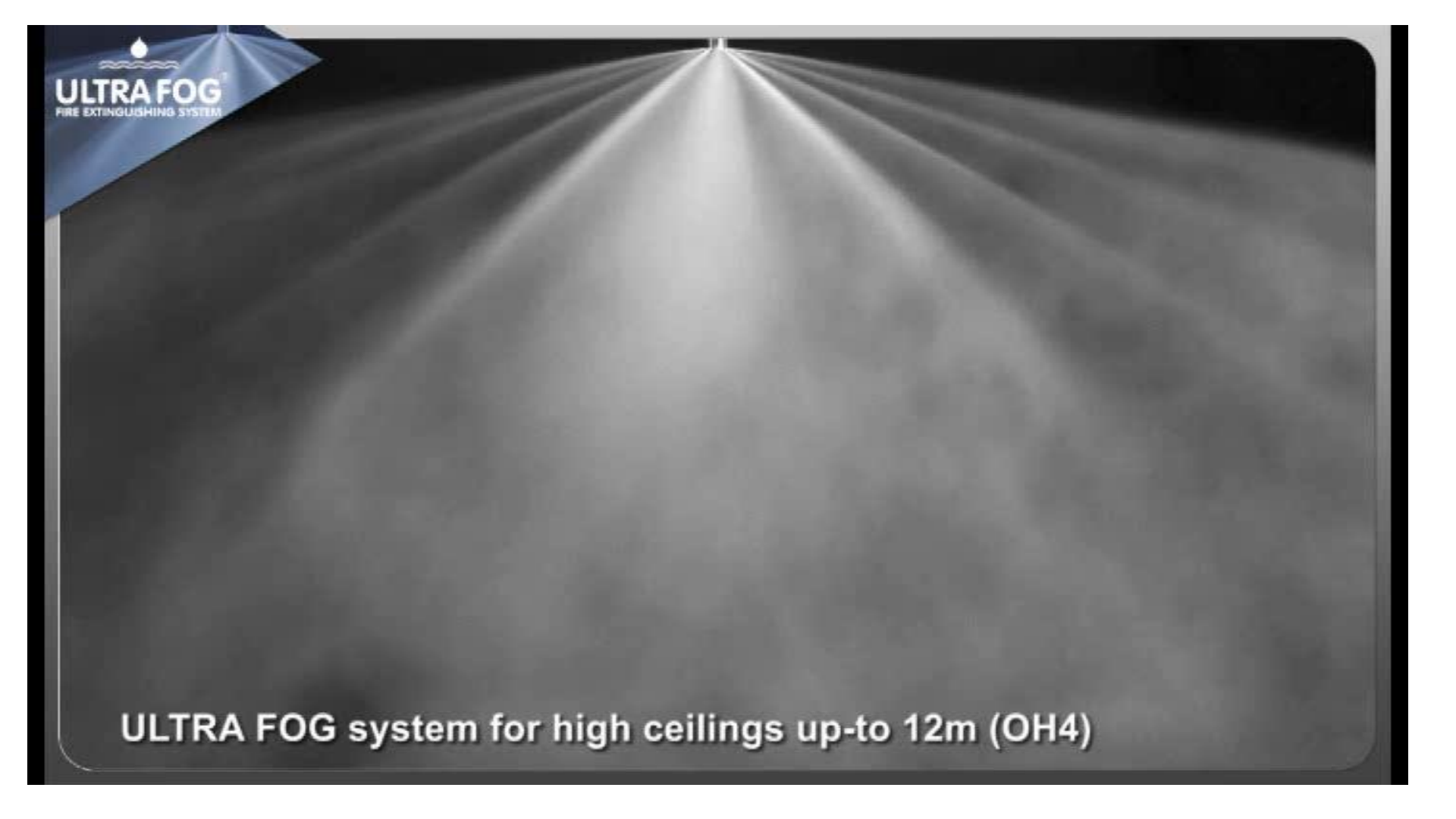


Example Installations





ULTRA FOG
FIRE EXTINGUISHING SYSTEM



ULTRA FOG system for high ceilings up-to 12m (OH4)

SUMMARY

- We must work together on the 97% that is NOT watermist.
- Raise our profile - Google doesn't always have the (best) answers!
- Watermist needs to be given “the opportunity”.
 - Specifications can be restrictive: pressure/flow/piping.
 - What do you specify now? 5, 7.5 or 15 l/min/m²? How can we better it?
- Influence on our strengths, not our weaknesses when compared to sprinklers!
- Continue to PROVE,
DOCUMENT
and EDUCATE.



Thank you for your attention.

Delivering fire protection solutions

Ultra Fog Fire Extinguishing System | Reliable and efficient | Environmentally friendly and safe



ULTRA FOG
FIRE EXTINGUISHING SYSTEM

The logo features a stylized water droplet above three wavy lines, representing water or fog.