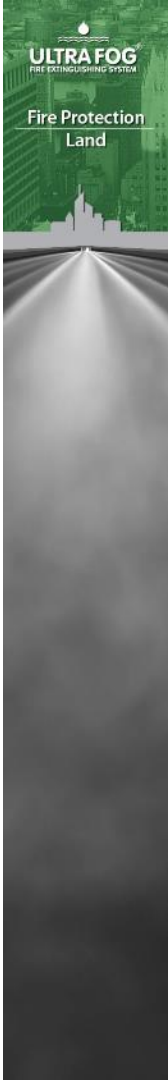


Delivering High Quality Water Mist Solutions

16th IWMC in Vienna (Austria)

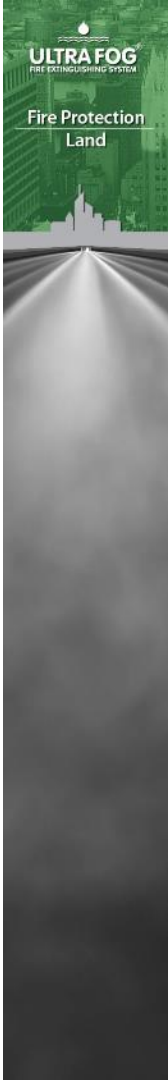
21st/22nd September 2016

Mark Davies – Engineering Manager Ultra Fog UK

Background to this presentation.

- The science/technology is proven.
- Compliance to the standards relating to the design & installation of a water mist system.
- “So called” experts in water mist ~ Disassociate from the “un-professional”.
- “Water Mist is the future”

- ✓ **Water Mist, <u>is not</u> a new/risky technology/prototypes or scientific models.**
- ✓ **Water Mist, <u>is</u> a full scale, established solution that is produced globally.**
- ✓ **Water Mist, <u>is</u> a high quality proven solution.**



Content.

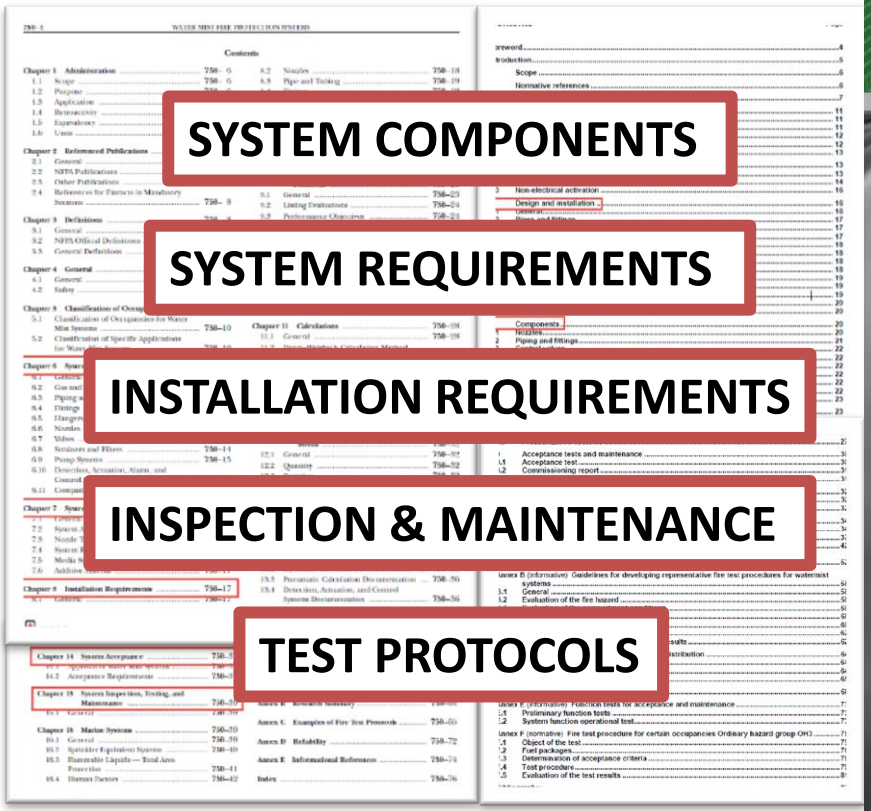
- As well as compliance with international standards;
  - Plus good working practices and manufacturing techn
    delivering Quality Water Mist Solutions.
- By sharing examples of the “solutions”, we d vidence of the high quality of the product throughout the nufacturing process.

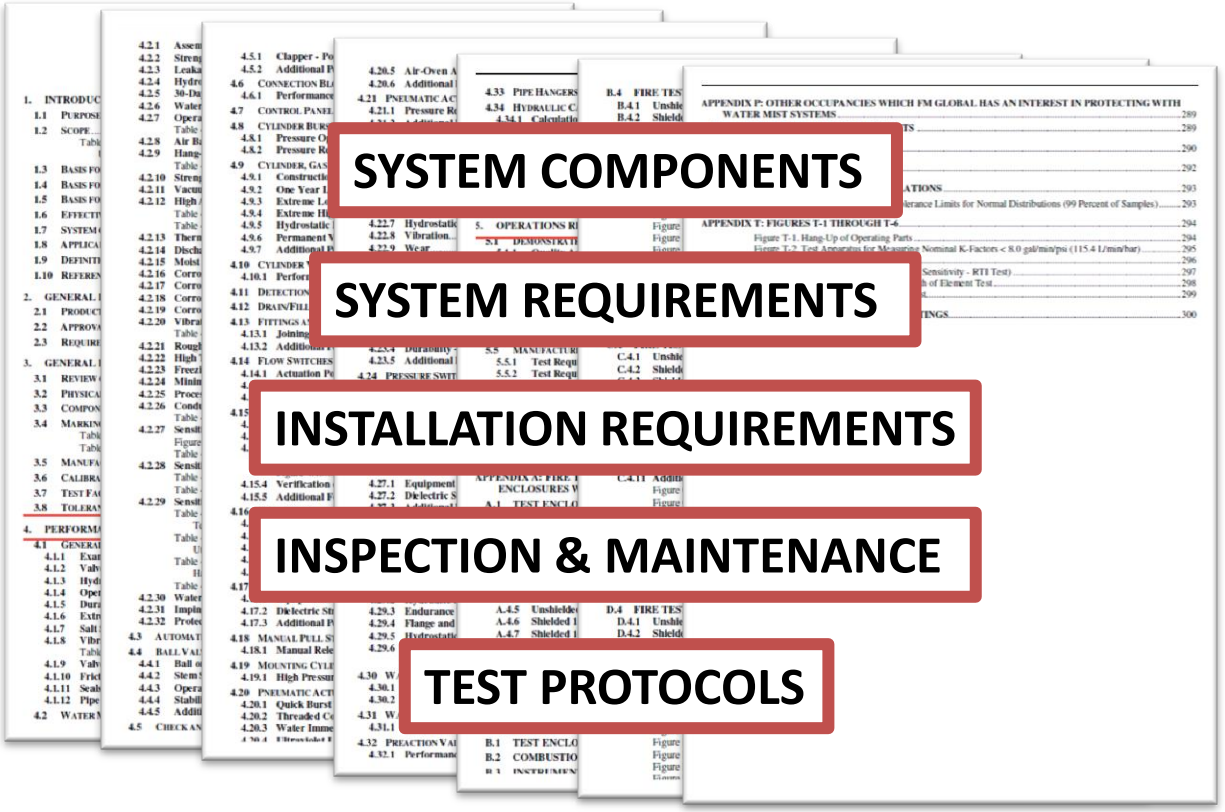
- Product Design and n.
- Product M and Testing.
- S allation and Testing.
- stem Maintenance.

To give an insight into the Quality of Water Mist systems.

Defined Quality

- NFPA 750
- FM5560
- CEN/TS 14972
- BS8458-1 & BS8498
- INSTA 900
- IMO

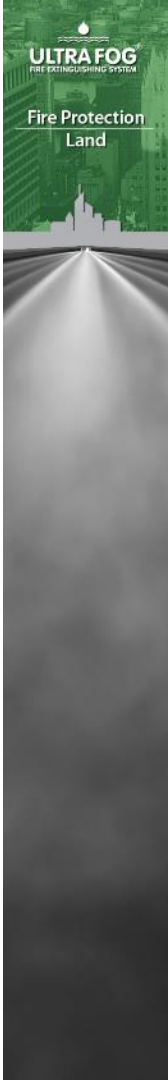




ULTRA FOG
FIRE EXTINGUISHING SYSTEM

Fire Protection
Land

Product Design and Verification.



Product Design and Verification.

System Performance Testing:

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

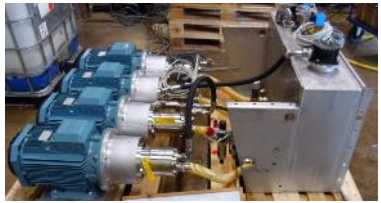
Component Performance Testing:

- Sealing / Leakage.
- Durability / cycling.
- Extreme Temperature.
- Corrosion / vibration.

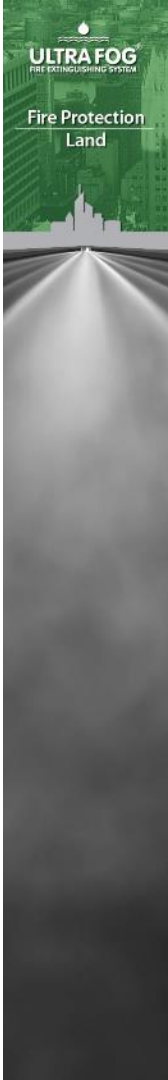
Design for competitive edge.

Innovation:

- Performance.
- Maintainability.
- Modular design.
- Engineered Solutions.
- Customer Feedback.

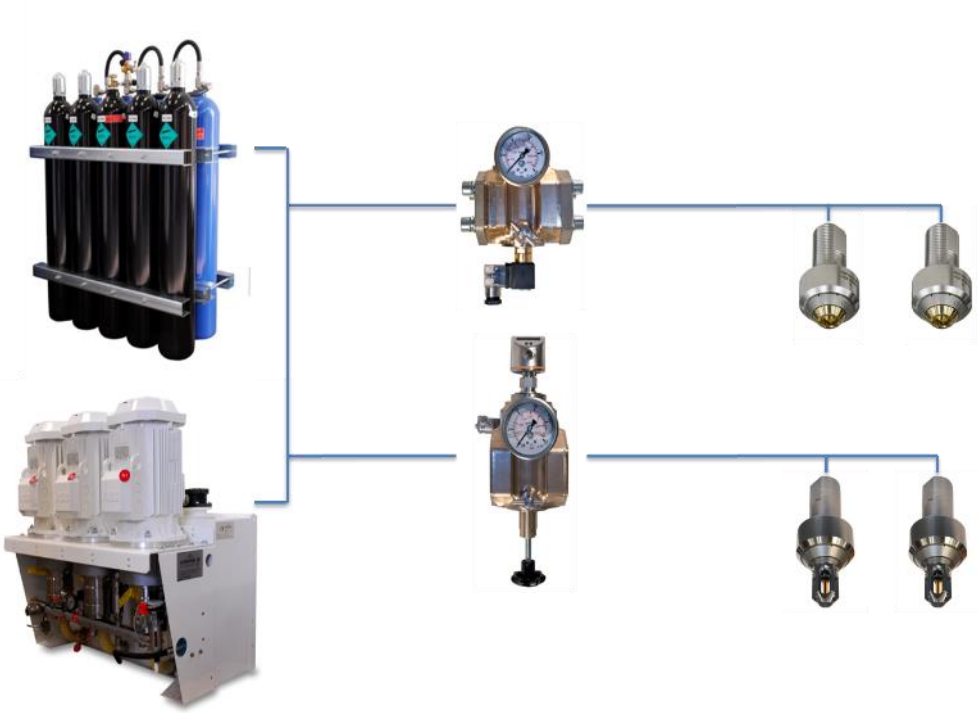


Product Manufacture & Testing.



Product Manufacture and Testing.

Simplified System:



The Ultrafog Sprinkler Nozzle

A. **Stainless steel 304/ or greater**
B. **Aluminium bronze**
C. **Stainless steel, 316/316L**

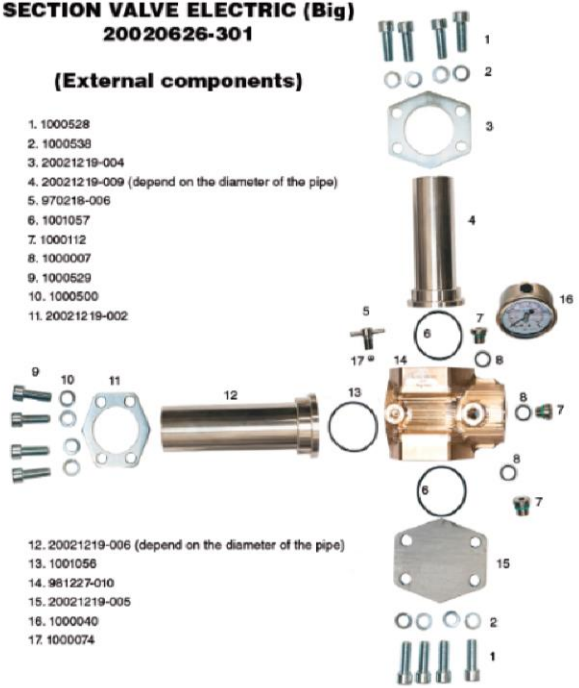
- **Stainless steel components have been treated to increase corrosion resistance**.

ULTRA FOG
FIRE EXTINGUISHING SYSTEM

SECTION VALVE ELECTRIC (Big)
20020626-301

(External components)

1. 1000528
2. 1000538
3. 20021219-004
4. 20021219-009 (depend on the diameter of the pipe)
5. 970218-006
6. 1001057
7. 1000112
8. 1000007
9. 1000529
10. 1000500
11. 20021219-002
12. 20021219-006 (depend on the diameter of the pipe)
13. 1001056
14. 981227-010
15. 20021219-005
16. 1000040
17. 1000074

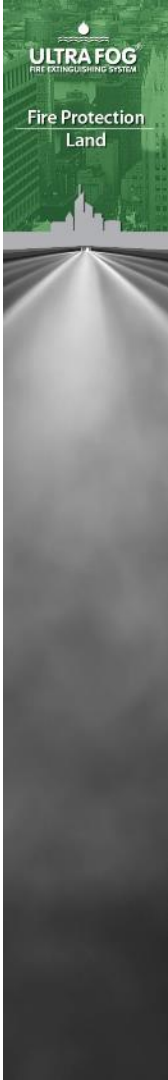


ULTRA FOG
FIRE EXTINGUISHING SYSTEM

SECTION VALVE ELECTRIC (Big)
20020626-301

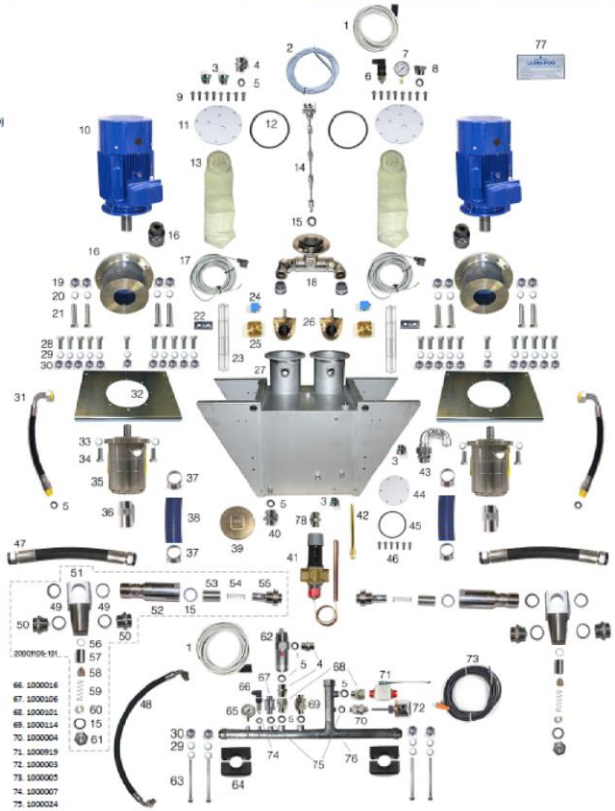
(Internal components)

1. 1000112
2. 1000007
3. 20020626-011
4. 20020626-002
5. 1000068
6. 1001059
7. 1001061
8. 20140217-002
9. 20140217-001
10. 20020626-014
11. 20020626-003
12. 1001060
13. 1001063
14. 1000024
15. 981227-007
16. 1000078
17. 981227-027
18. 1000054
19. 981227-008
20. 1000056
21. 1000055



ULTRA FOG
FIRE EXTINGUISHING SYSTEM

Pump Unit Main 2 Pumps	Date: 21/09/2015
20000815-001	Rev. 1.4 E.M.



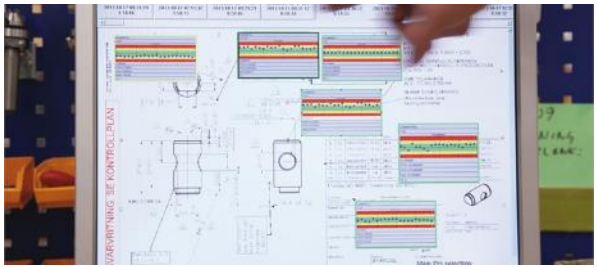
1. 1000002
2. 1001010
3. 1000112
4. 1000907
5. 1000008
6. 1000015
7. 1000018
8. 1000110
9. 1003110
10. 1003129 (or 1003109)
11. 20001107-023
12. 1000172
13. 1001036
14. 20001126-001
15. 1000009
16. 1000087
17. 1000140
18. 20001213-001
19. 1000535
20. 1000537
21. 1000516
22. 1001003
23. 1001002
24. 1000089
25. 1000088
26. 1000021
27. 20001107-001
28. 1000503
29. 1000502
30. 1000506
31. 20001219-001
32. 20001211-002
33. 1000514
34. 1000513
35. 1000053 *
36. 1000108
37. 1000037
38. 1000035
39. 1000109
40. 1000904
41. 1000033
42. 1000034
43. 20020410-101
44. 20001107-022
45. 1001073
46. 1000539
47. 20001219-003
48. 20001219-009
49. 1000010
50. 1000116 **
51. 20001104-001
52. 20001104-002
53. 20001104-004
54. 1000081
55. 20001104-003
56. 1000063
57. 20021222-002
58. 20021222-001
59. 1001055
60. 20021222-003
61. 1000117
62. 1000022
63. 1003495
64. 1000509
65. 1000102
66. 1000017
66. 1000016
67. 1000106
68. 1000101
69. 1000114
70. 1000004
71. 1000919
72. 1000003
73. 1000005
74. 1000007
75. 1000024
76. 20001025-001
77. 20020110-012
78. 1000107

* It can be different

** If the Main Pump Unit do not have extentions one of these is a 100139

The Component Manufacture

The Component Inspection



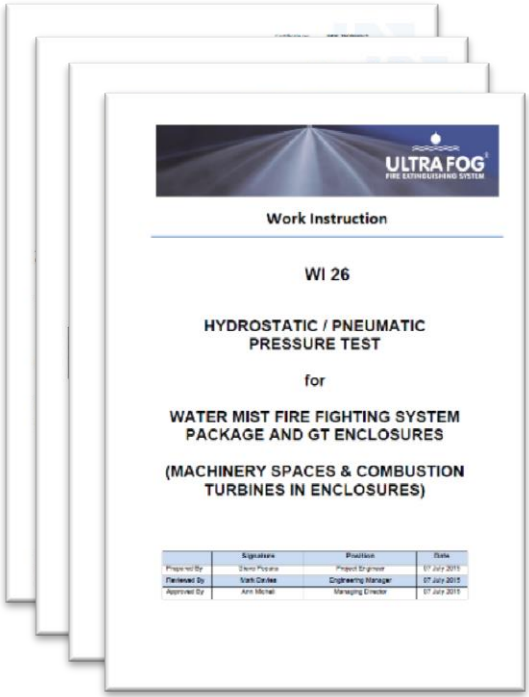
The System Manufacture

ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

The Component/System Manufacture

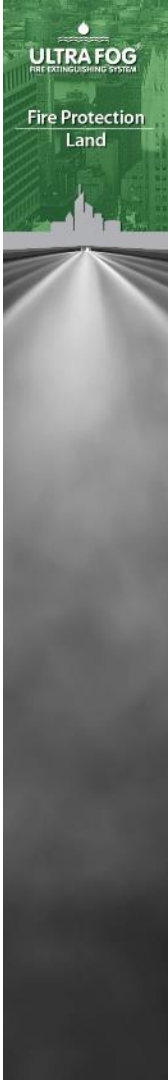
- External Control: Approved and witnessed.

- Internal Control: Testing & Traceability
  - Pump performance + cylinder test.
  - Leakage, Hydrostatic
  - Material Certs – EN10204
  - System operation

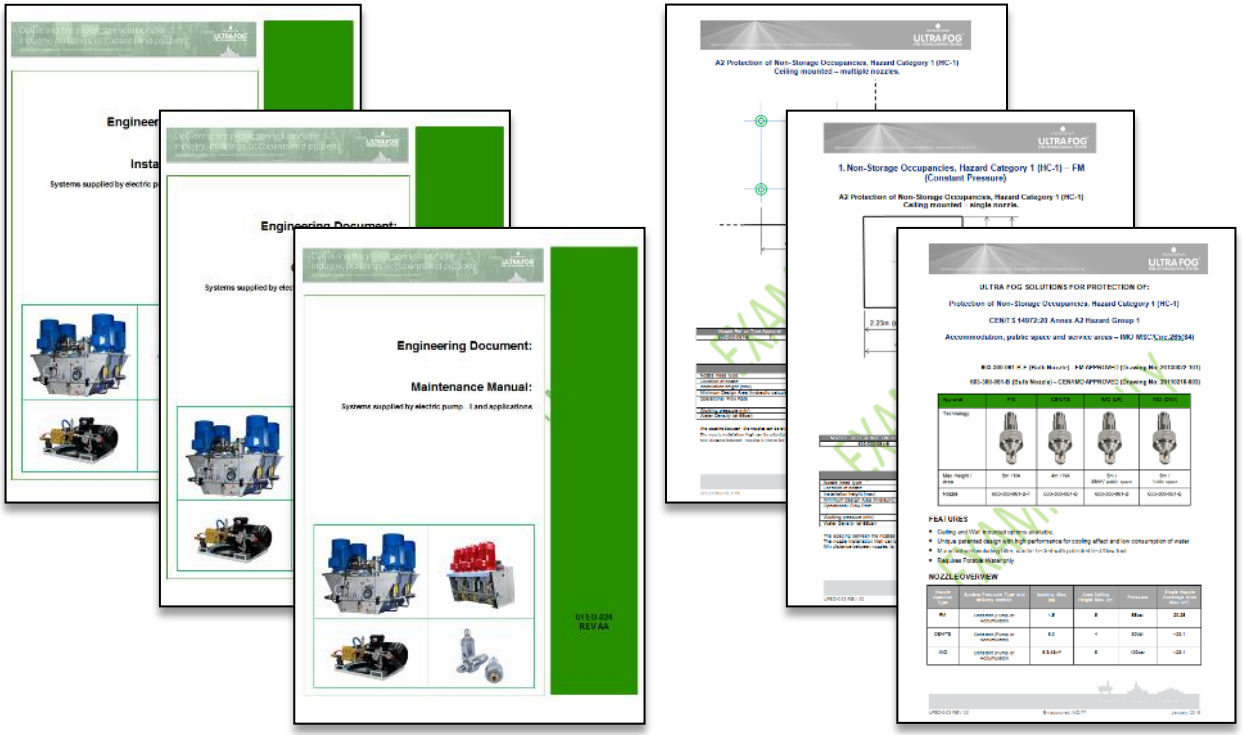


ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

System Installation & Testing.



System installation and Testing.



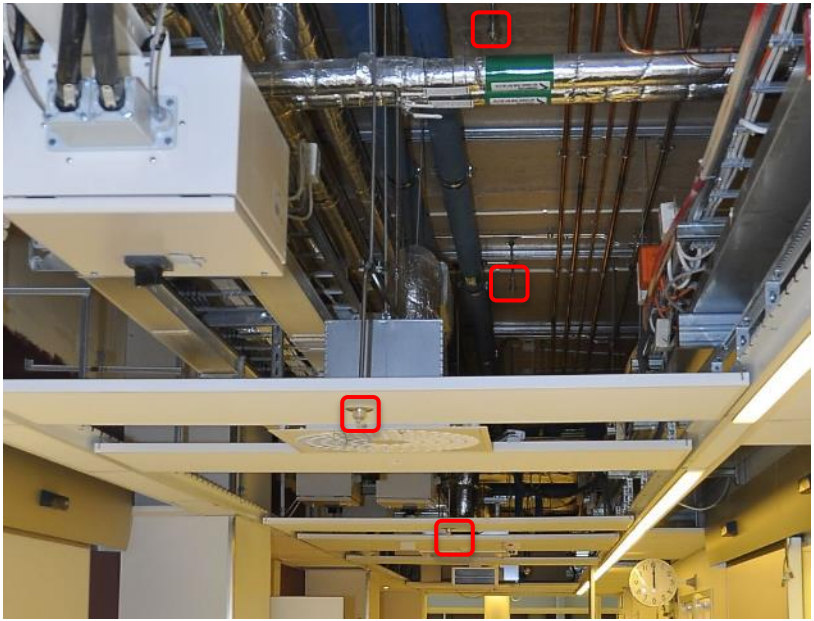
ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

Example Installations

Bobberger
Brandschutz AG

Example Installations.



VEKOS AS

ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

Example Installations

VEKOS AS

Example Installations

ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

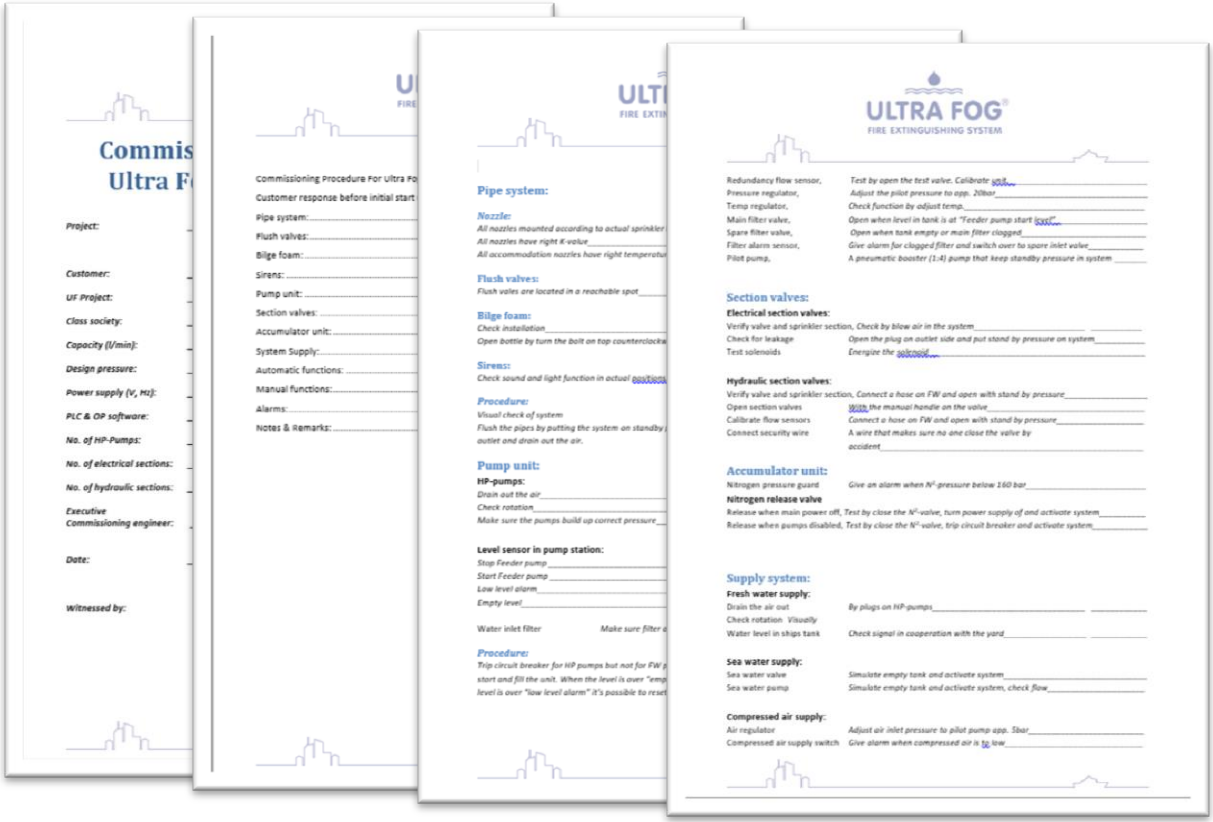
ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

Example Installations

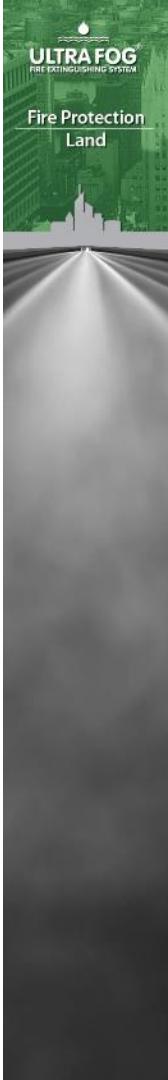
Installation Testing

ULTRA FOG
FIRE EXTINGUISHING SYSTEM
Fire Protection
Land

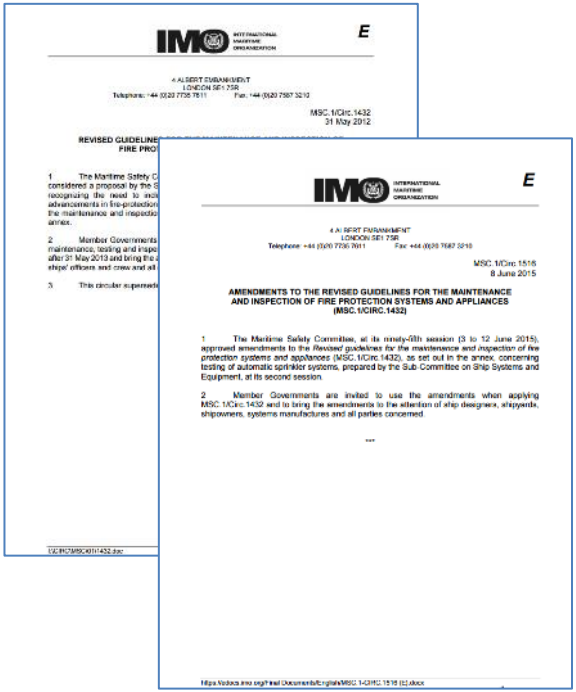
Installation Acceptance



System Maintenance.



Maintaining an Engineered Water Mist system.



E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1432
31 May 2012

REVISED GUIDELINE
FIRE PROT

1 The Maritime Safety C
considered a proposal by the S
recognizing the need to incl
advancements in fire-protection
the maintenance and inspectio
annex.

2 Member Governments
maintenance, testing and inspe
after 31 May 2013 and bring the
ships' officers and crew and all

3 This circular supersede

I:\CIRC\MSC\01\1432.doc

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1516
8 June 2015

AMENDMENTS TO THE REVISED GUIDELINES FOR THE MAINTENANCE AND INSPECTION OF FIRE PROTECTION SYSTEMS AND APPLIANCES (MSC.1/CIRC.1432)

1 The Maritime Safety Committee, at its ninety-fifth session (3 to 12 June 2015), approved amendments to the *Revised guidelines for the maintenance and inspection of fire protection systems and appliances* (MSC.1/Circ.1432), as set out in the annex, concerning testing of automatic sprinkler systems, prepared by the Sub-Committee on Ship Systems and Equipment, at its second session.

2 Member Governments are invited to use the amendments when applying MSC.1/Circ.1432 and to bring the amendments to the attention of ship designers, shipyards, shipowners, systems manufactures and all parties concerned.

***

https://edocs.imo.org/Final Documents/English/MSC.1-CIRC.1516 (E).docx

4	Weekly Inspection	HPWM (pump)
W1	verify all fixed fire-extinguishing system control panel indicators are functional by operating the lamp/indicator test switch;	
W2	verify all control/section valves are in the correct position.	
W3	verify all control panel indicators and alarms are functional;	Y
W4	visually inspect pump unit and its fittings; and.	Y
W5	check the pump unit valve positions, if valves are not locked, as applicable	Y

5	Monthly Inspection	HPWM (pump)
M1	Verify containers/cylinders fitted with pressure gauges are in the proper range and the installation free from leakage.	
M2	Verify all control, pump unit and section valves are in the proper open or closed position;	Y
M3	Verify sprinkler pressure tanks or other means have correct levels of water;	Y
M4	Test automatic starting arrangements on all system pumps so designed	Y
M5	Verify all standby pressure and air/gas pressure gauges are within the proper pressure ranges; and	Y
M6	Test a selected sample of system section valves for flow and proper initiation of alarms. (Note – The valves selected for testing should be chosen to ensure that all valves are tested within a one-year period.)	Y

7	Annual Inspection	HPWM (pump)
A11	verify proper operation of all water mist, water-spray and sprinkler systems using the test valves for each section;	Y
A12	visually inspect all accessible components for proper condition	Y
A13	Externally examine all high pressure cylinders for evidence of damage or corrosion;	Y
A14	check the hydrostatic test date of all high pressure cylinders	Y
A15	functionally test all fixed system audible and visual alarms;	Y
A16	flow test all pumps for proper pressure and capacity;	Y
A17	test all antifreeze systems for adequate freeze protection	Y
A18	test all system cross connections to other sources of water supply for proper operation.	Y
A19	verify all pump relief valves, if provided, are properly set;	Y
A20	examine all filters/strainers to verify they are free of debris and contamination;	Y
A21	verify all control/section valves are in the correct position;	Y
A22	blow dry compressed air or nitrogen through the discharge piping of dry pipe systems, or otherwise confirm the pipework and nozzles are clear of any obstructions. This may require the removal of nozzles, if applicable;	Y
A23	test emergency power supply switchover, where applicable	Y
A24	visually inspect all sprinklers focusing in areas where sprinklers are subject to aggressive atmosphere (like saunas, spas, kitchen areas) and subject to physical damage (like luggage handling areas, gyms, play rooms, etc.) so that all sprinklers are inspected within one year;	Y
A25	check for any changes that may affect the system such as obstructions by ventilation ducts, pipes, etc.;	Y
A26	test a minimum of one section in each open head water mist system by flowing water through the nozzles. The sections tested should be chosen so that all sections are tested within a five-year period; and	Y
A27	test automatic sprinklers and automatic water mist nozzles in accordance with the following flow chart:	Y
A28	during basic testing, and extended testing when applicable, of automatic sprinkler heads/nozzles as outlined in subparagraph .17, water quality testing should be conducted in each corresponding piping section. Note – should a tested sprinkler fail, assessing the corresponding water quality at that time would assist in determining the cause of failure."	Y

9	Five Year Inspection	HPWM (pump)
5Y2	flush all ro-ro deck deluge system piping with water, drain and purge with air;	Y
5Y3	perform internal inspection of all control/section valves, water quality testing should be conducted in all corresponding piping sections, if not previously tested as outlined in paragraph 7.5.18 within the last five years;	Y
5Y4	check condition of any batteries, or renew in accordance with manufacturer's recommendations.	Y
5Y5	for each section where the water is refilled after being drained or flushed, water quality should meet manufacturer's guidelines. Testing of the renewed water quality should be conducted and recorded as a new baseline reference to assist future water quality monitoring for each corresponding section	Y

Maintaining an Engineered Water Mist system.

ULTRAFOG®
FIRE EXTINGUISHING SYSTEM

SPARE PARTS FOR 1 YEAR SERVICE MASTER PUMP SYSTEM

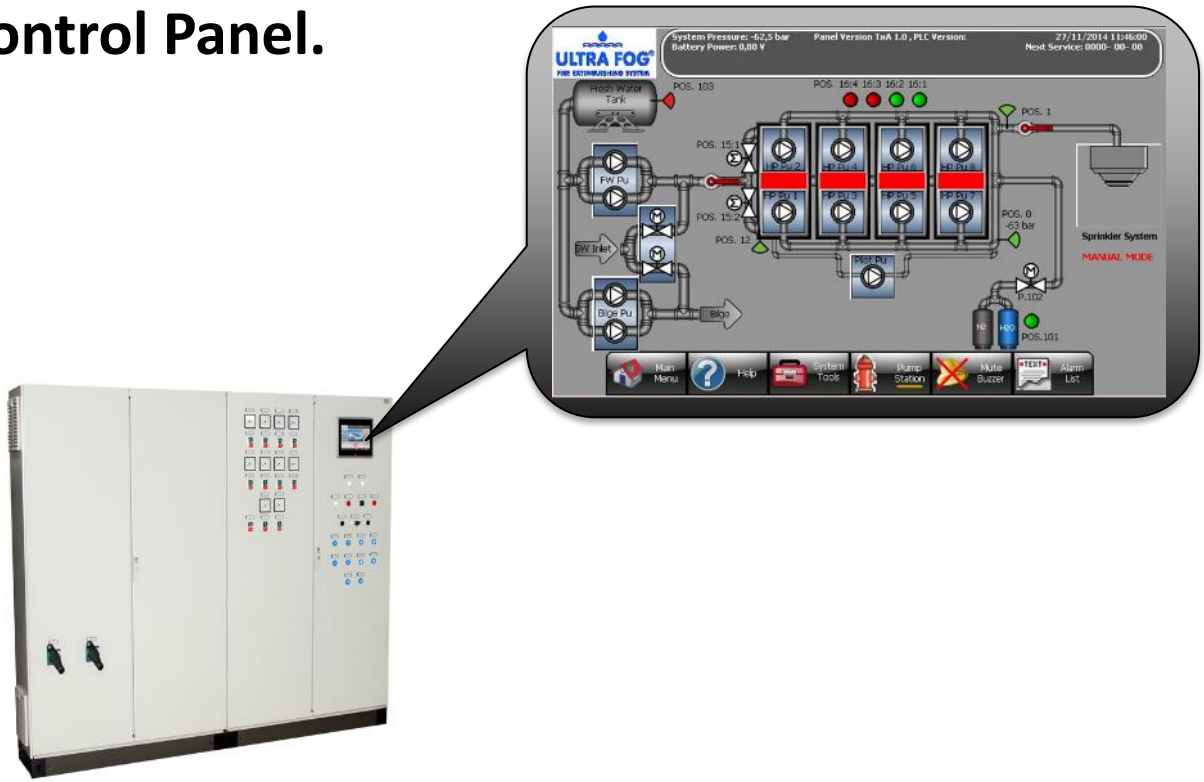
Marine and land Pattern	Marine Pump Station Parts required for a One Year Service
xx xx xx xx	Filter 25 micron O2
xx-xx-xx-xx	Foam 1% AFFF (Look in Project Folder for Quantity. To Construct Quotation Go To Spare Parts List)
xx xx xx xx	Nozzle Galley Duct (Look in Project Folder for Quantity. To Construct Quotation Go To Spare Parts List)
xx-xx-xx-xx	Nozzle Accommodation Single Flow (Look in Project Folder for Quantity. To Construct Quotation Go To Spare Parts List)
xx-xx-xx-xx	Nozzle Accommodation High Flow (Look in Project Folder for Quantity. To Construct Quotation Go To Spare Parts List)
xx-xx-xx-xx	Nozzle Total Flooding (Look in Project Folder for Quantity. To Construct Quotation Go To Spare Parts List)
xx-xx-xx-xx	Nozzle Local Application (Look in Project Folder for Quantity. To Construct Quotation Go To Spare Parts List)
xx xx xx xx	Antifreeze To Be Replaced Annually (Look in Project Folder for Quantity. To Construct Quotation Go To Spare Parts List)
Please note	
IMO 3.4	Yachts maintenance and testing inconjunction with UF technician annual service. The onboard maintenanceand inspection in conbination with the manufacturers maintenance and inspection guidelines should be followed as stated in the IMO guidelines.Records of water quality should be maintained onboard the vessel in accordance with the manufacturer guidelines
	Please request that the vessel has its Onboard Maintenance and Inspection Log Book available to the technician.
	Confirm with vessel there are no problems and no other spare parts required before servicing
IMO 7.4	Testing for foam system (note procedure required. Two gauges need to be installed either side of flow restrictor to measure pressure)
	All yachts need to have the foam changed annualy under new IMO guidelines
	Water level in all tanks and cylinder s must be checked
	Large Vessels: Note: Need to be notified their foam systems require foam samples taken for quality testing.
	A digital flow test and pressure reading needs to be conducted at each service. Fee applies P06 Form

IMO 7.3.1	Verify proper operation of all water mist, water-spray and sprinkler systems using the test valves for each section;	
IMO 7.3.2	Visually inspect all accessible components for proper condition;	
IMO 7.3.3	Externally examine all high pressure cylinders for evidence of damage or corrosion;	
IMO7.3.4	Check the hydrostatic test date of all storage containers;	
IMO 7.3.5	Functionality test all fixed system audible and visual alarms;	
IMO7.3.11	Verify all controlsection valves are in the correct position;	
IMO 7.3.6	Check the connections of all pilot release piping and tubing for tightness;	
IMO 7.3.7	Examine all flexible hoses in accordance with manufacturer's recommendations;	
IMO 7.3.8	Test all fuel shut-off controls connected to fire protection systems for proper operation;	
IMO 7.3.9	The boundaries of the protected space should be visually inspected to confirm that no modifications have been made to the enclosure that have created undesirable openings that would render the system ineffective	
IMO 7.4.1	Visually inspect all accessible components for proper condition	
IMO7.5.3	Externally examine all high pressure cylinders for evidence of damage or corrosion;	
IMO 7.5.4	Check the hydrostatic test date of all high pressure cylinders	
IMO 7.5.5	Functionally test all fixed system audible and vessel alarms;	
IMO7.5.6	Flow test all pumps for proper pressure and capacity: Flow test pumps, Pressure test pumps. Technicians have flowtester and digital pressure reading equipment with them	
IMO 7.5.7	Test all antifreeze systems for adequate freeze protection. Note: Antifreeze onboard yachts is to be replaced every service.	
IMO 7.5.8	Test all system cross connections to other sources of water supply for proper operation.	
IMO 7.5.9	Verify all pump relief valves, if provided, are properly set;	
IMO 7.5.10	Examine all filter/strainers to verify they are free of debris and contamination;	
IMO 7.5.11	Verify all controlsection valves are in the correct position;	
IMO 7.5.12	Blow dry compressed air or nitrogen through the discharge piping of dry pipe systems, or otherwise confirm the pipework and nozzles are clear of any obstructions, debris and contamination. This may require the removal of nozzles, if applicable; Large vessels: Note need to be notified their foam systems require foam samples taken for quality testing.	
IMO7.5.13	Test emergency power supply switchover, where applicable	
IMO 7.5.14	Visually inspect all sprinklers focusing in areas where sprinklers are subject to aggressive atmosphere (like saunas, spas, kitchen areas) and subject to physical damage (like luggage handling areas, gyms, play rooms, etc.) so that all sprinklers are inspected within one year;	
IMO 7.5.15	Check for any changes that may affect the system such as obstructions by ventilation ducts, pipes, etc.;	
IMO 7.5.16	Test a minimum of one section in each open head water mist system by flowing water through the nozzles. The sections tested should be chosen so that all sections are tested within a five year period;	
IMO 7.5.17	Test a minimum of two automatic sprinklers or automatic water mist nozzles for proper operation.	
IMO 7.5.18	During basic testing, and extended testing when applicable, of automatic sprinkler heads/nozzles as outlined in subparagraph .17, water quality testing should be conducted in each corresponding piping section. Note: - should a tested sprinkler fail, assessing the corresponding water quality at that time would assist in determining the cause of failure."	
IMO 7.4.3	Foam system: check flow test by checking system pressure. Ensure all piping is thoroughly flushed with flushed with fresh water after service	

Maintaining an Engineered Water Mist system.

- **Easy change RTI bulb**

Control Panel.



Maintaining an Engineered Water Mist system.

- **Ultra Fog Bulb nozzle Test Tool.**

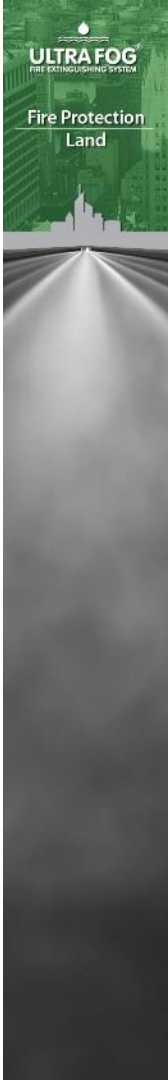
Maintaining an Engineered Water Mist system.

Connect test tool.

Raise the piston to enable flow/ bleed.

Lower piston and dis-connect.

Quality Improvements...



CIP - Water Quality Analysis.

- **>6 month Chloride (Cl^-) test.**

Concentration 100 mg/L Concentration 50000 mg/L

Major ion composition of seawater (mg/L)

	Typical Seawater	Eastern Mediterranean	Arabian Gulf at Kuwait
Chloride (Cl^-)	18.980	21.200	23.000
Sodium (Na^+)	10.556	11.800	16.850
Sulfate (SO_4^{2-})	2.649	2.950	3.200
Magnesium (Mg^{2+})	1.262	1.403	1.765
Calcium (Ca^{2+})	400	423	500

CIP - Water Quality Analysis.

- **>6 month Chloride (Cl^-) test.**

Concentration 100 mg/L

Concentration 50000 mg/L

Water mist quality – FAQ's.

Requires high purity water to avoid nozzle blockage.

- **N/A to Ultrafog, potable water, integrated filter within the nozzle, dual filter in pump station.**

Poor installation/maintenance.

- **DIOM, and manufacturers instructions must be followed.**

Water mist fire suppression systems are incompatible with electronics.

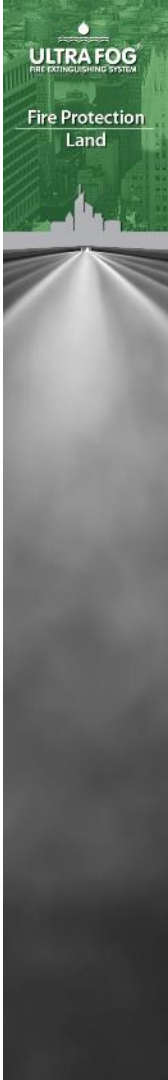
- **3rd Party IP23 Tests with DNV.**

Can there be Water Mist protection during construction?

- **Ship builders protect 1st decks during construction.**

SUMMARY

- **25 to 35 years old (new) …..**
- **Designed and tested to International standards.**
- **Not all systems/supplier are the same.**
- **Watermist needs to be given “the opportunity”.**
  - **“Specifications” can be restrictive: pressure/flow/piping.**
  - **What do you specify now? → How can we better it?**
- **Innovative.**
- **Established product, its not only the future, its now!**



Thank you for your attention.