Delivering High Quality Water Mist Solutions

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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, is not a new/risky technology/prototypes or scientific models.
✔ Water Mist, is a full scale, established solution that is produced globally.
✔ Water Mist, is a high quality proven solution.
Content.

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

- Product Design and Verification.
- Product Manufacture and Testing.
- System Installation and Testing.
- System 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

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<td>Inspection &amp; Maintenance</td>
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Note: The image contains a table with chapters and titles, but the content is not transcribed here due to its complexity and the focus on the defined quality standards.
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.
The Component Manufacture
The Component Inspection
The System Manufacture
The Component/System Manufacture

- External Control: Approved and witnessed.
- Internal Control: Testing & Traceability
  - Pump performance + cylinder test.
  - Leakage, Hydrostatic
  - Material Certs – EN10204
  - System operation
System Installation & Testing.
System installation and Testing.
Example Installations
Example Installations.
Example Installations
Example Installations
Example Installations
Installation Testing
Installation Acceptance
System Maintenance.
Maintaining an Engineered Water Mist system.

4 Weekly Inspection

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;

W4 visually inspect pump unit and its fittings; and

W5 check the pump unit valve positions, if valves are not locked, as applicable

5 Monthly Inspection

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;

M3 Verify high pressure cylinders or other means have the correct levels of water.

M4 Test automatic starting arrangements on all system pumps so designed

M5 Verify all standby pressure and air/gas pressure gauges are within the proper pressure range, and

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.)

7 Annual Inspection

A11 verify proper operation of all water mist, water-spray and sprinkler systems using the test valves for each section;

A12 visually inspect all accessible components for proper condition

A13 externally examine all high pressure cylinders for evidence of damage or corrosion;

A14 check the hydrostatic test date of all high pressure cylinders

A15 functionally test all fixed system audible and visual alarms;

A16 test all pumps for proper pressure and capacity

A17 test all high pressure cylinders for adequate fire protection

A18 test all system cross connections to other sources of water supply for proper operation;

A19 verify all pump relief valves, if provided, are properly set;

A20 examine all filters/strainers to verify they are free of dirt and contamination;

A21 verify all control/section valves are in the correct position;

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.

A23 test automatic sprinklers and automatic water mist nozzles in accordance with the following flow chart:

During basic testing, and extended testing when applicable, of automatic sprinkler heads/nozzles as outlined in subparagraph 4.17, 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.

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;

A25 check for any changes that may affect the system such as obstructions by ventilation ducts, pipes, etc.;

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

A27 test emergency power supply switcher, where applicable

A28 flush all ro-ro deck deluge system piping with water, drain and purge with air;

A29 perform a normal 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.

A30 check condition of any batteries, or renew in accordance with manufacturer’s recommendations.

A31 for each section where free water is re-identified 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

9 Five Year Inspection

S52 flush all ro-ro deck deluge system piping with water, drain and purge with air;

S53 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.

S54 check condition of any batteries, or renew in accordance with manufacturer’s recommendations.

S55 for each section where free water is re-identified 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
Maintaining an Engineered Water Mist system.

Spare Parts for 1 Year Service Master Pump System

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>01.05.01</td>
<td>Filter 15 Micron Q2</td>
</tr>
<tr>
<td>02.05.01</td>
<td>Foam &amp; Mist (Check in Project Folder for Quantity, To Construct Quotation Go to Spare Parts Ltd)</td>
</tr>
<tr>
<td>03.05.01</td>
<td>Nozzles (Check in Project Folder for Quantity, To Construct Quotation Go to Spare Parts Ltd)</td>
</tr>
<tr>
<td>04.05.01</td>
<td>Nozzles High Flow (Check in Project Folder for Quantity, To Construct Quotation Go to Spare Parts Ltd)</td>
</tr>
<tr>
<td>05.05.01</td>
<td>Nozzles Local Application (Check in Project Folder for Quantity, To Construct Quotation Go to Spare Parts Ltd)</td>
</tr>
</tbody>
</table>

**Notes:**

- All parts must be checked and operated against manufacturer's instructions.
- All parts must be replaced if damaged or worn.
- All parts must be stored in a dry, cool place.
- All parts must be cleaned and lubricated before installation.
- All parts must be inspected regularly for wear and tear.

**Maintenance:**

- Regular maintenance and testing in accordance with the manufacturer's guidelines.
- Any malfunction or damage must be reported immediately.
- All parts must be kept clean and free from dust and debris.

**Troubleshooting:**

- Check for any leaks or malfunctions.
- Check for any signs of wear or damage.
- Check for any signs of corrosion.
- Check for any signs of contamination.

**Safety:**

- Always wear appropriate personal protective equipment when working with water mist systems.
- Follow all safety guidelines provided by the manufacturer.
- Always ensure that all parts are properly installed.
- Always ensure that all systems are properly tested before use.

**Warranty:**

- All parts are covered by a one-year warranty from the date of installation.
- Any parts that fail to meet the manufacturer's specifications will be replaced free of charge.

**Installation:**

- All parts must be installed according to the manufacturer's instructions.
- All parts must be tested before installation.
- All parts must be tested after installation.

**Operation:**

- All parts must be operated according to the manufacturer's instructions.
- All parts must be operated with regular maintenance.
- All parts must be operated with regular testing.

**Repair:**

- All parts must be repaired according to the manufacturer's instructions.
- All parts must be repaired with new parts.
- All parts must be repaired with parts that meet the manufacturer's specifications.

**Disposal:**

- All parts must be disposed of properly according to the manufacturer's guidelines.
- All parts must be disposed of in a safe and environmentally friendly manner.
- All parts must be disposed of in accordance with local regulations.

**Upgrades:**

- All parts must be upgraded according to the manufacturer's guidelines.
- All parts must be upgraded with parts that meet the manufacturer's specifications.
- All parts must be upgraded with parts that are compatible with the existing system.
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

<table>
<thead>
<tr>
<th>Ion</th>
<th>Typical Seawater</th>
<th>Eastern Mediterranean</th>
<th>Arabian Gulf of Kuwait</th>
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<tbody>
<tr>
<td>Chloride (Cl⁻)</td>
<td>18,000</td>
<td>21,200</td>
<td>23,000</td>
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<tr>
<td>Sodium (Na⁺)</td>
<td>13,056</td>
<td>11,800</td>
<td>15,800</td>
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<tr>
<td>Sulphate (SO₄²⁻)</td>
<td>2,449</td>
<td>2,850</td>
<td>3,200</td>
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<tr>
<td>Magnesium (Mg²⁺)</td>
<td>1,262</td>
<td>1,033</td>
<td>1,760</td>
</tr>
<tr>
<td>Calcium (Ca²⁺)</td>
<td>420</td>
<td>429</td>
<td>500</td>
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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.