High-Pressure Water Mist Fire Suppression in Marine and Offshore Applications

How Standards Helped Water Mist Become the Preferred Technology

Ann Micheli | IWMC Manchester 2025 | 24th September

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Introduction

> **Watermist technology boasts a robust track record within the marine and offshore sectors,** where its unique advantages have been extensively proven in challenging environments. However, in land-based applications, it is often still perceived as a relatively new or experimental technology, leading to hesitation in its wider adoption.

01

Water Mist has a strong track record in the marine sector

02

On land, it's still seen as new or unproven

03

Aim: challenge misconceptions using marine success stories

04

Highlight growing evidence of Water Mist reliability across sectors

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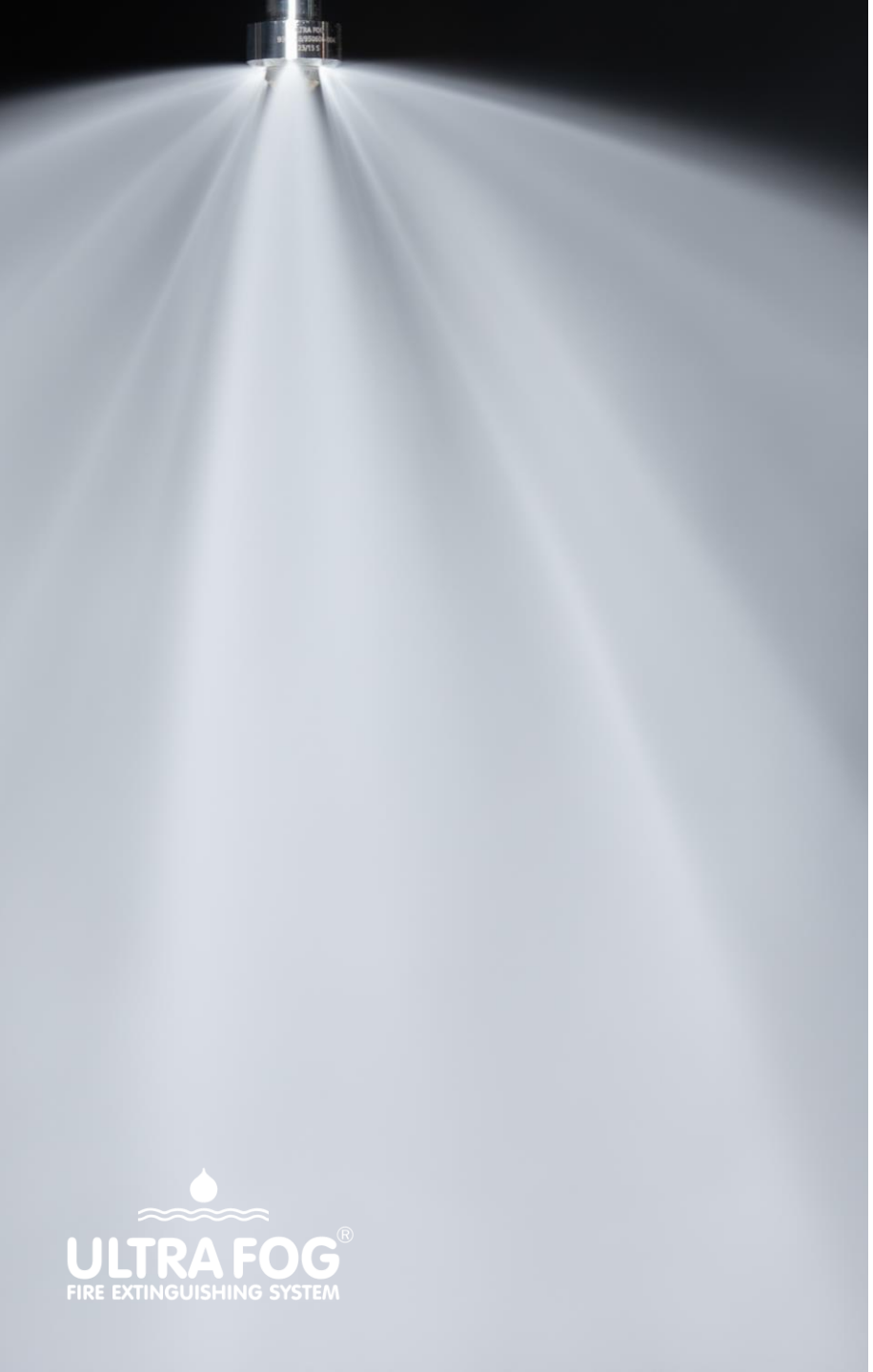

What is High-Pressure Water Mist?

High-pressure Water Mist fire suppression systems represent a cutting-edge approach to fire control.

Ultra-Fine Droplets

Discharges water as ultra-fine droplets, typically **less than 100 microns** in diameter, creating a vast surface area for heat absorption.

High Operating Pressure

Operates at **>34 bar pressure**, ensuring rapid and effective dispersion of the mist throughout the protected area.

Dual Suppression Mechanism

Suppresses fire by cooling and oxygen displacement (steam).

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Advantages Over Traditional Systems

Efficient Suppression

Rapid cooling and flame knockdown due to the high surface area of mist.

Minimal Water Use

Uses up to 90% less water than conventional sprinkler systems reducing collateral water damage.

Safe in Occupied Areas

Unlike gas systems (e.g., CO_2), HPWM systems are non-toxic and can be discharged safely in occupied spaces.

Compact Footprint

Smaller pipework and water tanks, ideal for space-constrained environments.

Multi-Class Effectiveness

Effective against Class A, B, and some electrical fires.

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Early Marine Adoption

Marine sector needed compact, low-water fire suppression

Scandinavian Star Disaster (1990):

- A devastating fire on a passenger ferry resulted in **159 fatalities**, primarily due to arson and poor suppression
- Highlighted critical deficiencies in existing fire safety systems, including **non-auto-activating sprinklers** and **limited coverage**.
- The tragedy underscored the **urgent need for enhanced marine fire safety regulations**.

Led to major IMO-led regulatory changes

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Regulatory Response to a Tragic Event

The lessons learned from the Scandinavian Star disaster prompted immediate and comprehensive regulatory changes within the maritime industry.

01

SOLAS Amendments (1992+)

- Mandatory detection & suppression in accommodation
- Structural fire protection upgrades

02

IMO Support for Alternatives

- Water Mist accepted as equivalent if performance proven

03

SOLAS Amendments (1992+)

- IMO MSC/Circ. 668/728, A.800(19)
- Support from classification bodies (e.g., DNV, Lloyd's)

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Ultra Fog - Complete Protection

Deep Fat Fryers and Galley Ducts
ISO 15371:2009 and type approvals

Galley and Stores
MSC. 265/84

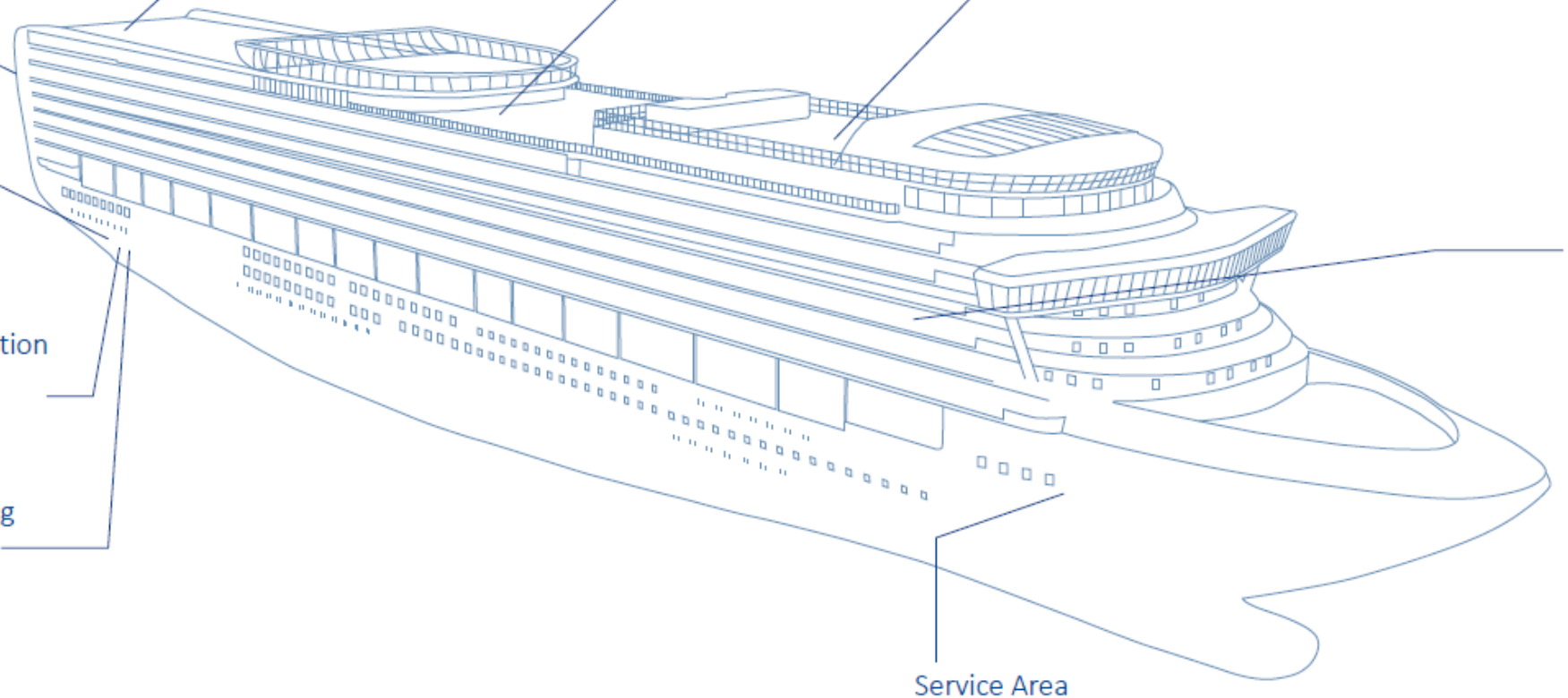
Public Spaces
MSC. 265/84

Cabin Balconies
MSC 1/Circ. 1268

RO-RO
and Special Category Spaces
MSC. 1/Circ. 1272

Machinery Space Local Application
MSC/Circ. 913

Machinery Space Total Flooding
MSC/Circ. 1165



Accommodation
MSC 265/84

Service Area
MSC 265/84

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Why Water Mist Succeeded at Sea

Water Mist's inherent characteristics aligned perfectly with the maritime sector's demanding requirements, ensuring its rapid and widespread adoption as the preferred fire suppression technology.

Auto-activation & fast response

Works in confined, occupied spaces

Less water = less vessel instability

Environmentally friendly (just water)

Gained global trust through performance-based approvals

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Standards: The Engine of Marine Adoption

The comprehensive development and rigorous application of international standards were instrumental in cementing Water Mist's position within the marine industry.

Key Drivers	Regulatory clarity, performance-based testing, and robust third-party certification paved the way for adoption.
Pivotal Standards	IMO MSC/Circ. 1165 & 913/1387 (machinery), IMO A.800(19) (accommodation/public areas), IMO1268 (balconies) IMO 1472 (ro-ro) established the benchmarks for design, testing, and approval.
Tangible Outcomes	Achieved global acceptance, ensured consistent system design and specification, and fostered strong market confidence in watermist technology.

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Proven Success:
Industry Endorsements

The efficacy and reliability of high-pressure Water Mist systems in marine environments are widely recognized and endorsed by leading maritime authorities and classification societies.

> "Water mist systems provide **effective fire suppression** with **minimal collateral damage**, which is critical in confined marine spaces."
>
> — Lloyd's Register

> „Our classification guidelines now **explicitly approve Water Mist technology** for a variety of shipboard fire scenarios, reflecting its reliability and performance."
>
> — DNV

> "We support the use of Water Mist as an **environmentally friendly**, efficient fire suppression system in passenger and cargo vessels."
>
> — International Maritime Organization (IMO)

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Marine vs. Land – What's the Gap?

Despite its proven success at sea, Water Mist still faces hurdles in land-based applications. Understanding these differences is key to broader adoption.

- **Unified Global Standards:** IMO-led regulations ensure consistent application and approval worldwide.
- **Mandatory Testing & Certification**: Performance is rigorously verified through standardized test.
- **Strong Adoption & Confidence:** Decades of successful deployment have built industry trust.

- **Fragmented Standards:** Lack of a single, consistent regulatory framework across regions.
- **Limited Recognition:** Insufficient awareness and acceptance of standards like EN 14972.
- **Conservative Mindset:** Resistance to new technologies due to historical reliance on traditional systems.
- **Slower Approvals:** Less familiarity among authorities leads to prolonged approval processes.

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Alignment with Established Fire Protection Standards

EN 14972 is designed to integrate seamlessly with existing fire protection standards, providing a consistent approach to fire safety engineering.

EN 12845: Sprinkler Systems

EN 14972 shares methodological principles with EN 12845, the European standard for fixed fire fighting systems - automatic sprinkler systems. This ensures a familiar framework for designers and regulators.

NFPA 13: Sprinkler Systems (US)

While a European standard, EN 14972 also draws parallels with NFPA 13, the North American standard for the installation of sprinkler systems, facilitating international understanding and application.

This alignment is crucial for fostering confidence and simplifying the adoption process across various regulatory landscapes.

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Tailored Application-Specific Testing

EN 14972's part-based structure allows for precise, application-specific testing, ensuring optimal performance for diverse environments. This approach moves beyond a 'one-size-fits-all' model.

Hotels & Accommodation

Specific tests validate water mist efficacy in protecting guest rooms, common areas, and service spaces, minimizing water damage and disruption.

Data Rooms & Server Facilities

Tailored protocols ensure high-pressure water mist effectively suppresses fires while safeguarding sensitive electronic equipment from excessive water exposure.

Commercial Fryers & Kitchens

Specialized testing addresses the unique challenges of kitchen fires, particularly those involving cooking oils, ensuring rapid and effective suppression.

This granular approach to testing builds confidence in the system's ability to perform under real-world conditions for each specific hazard.

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BS EN 14972-1:2020

Fixed firefighting systems. Water mist systems Design, installation, inspection and maintenance

Gaining Traction: Type Approval & Certification

EN 14972 strongly advocates for type approval and third-party certification of water mist systems. This focus on rigorous, independent verification is a cornerstone of its growing acceptance.

- **Enhanced Reliability:** Type approval ensures that specific system configurations and components meet the performance requirements of the standard under controlled test conditions.
- **Consumer Confidence:** Third-party certification by accredited bodies provides independent assurance that systems are manufactured, installed, and maintained to the highest standards.
- **Regulatory Acceptance:** This systematic approach to quality control significantly contributes to EN 14972 gaining increasing traction within building codes and regulatory frameworks across Europe.

EN 14972 vs. The Pre-Standard Era

The introduction of EN 14972 marks a significant paradigm shift in the Water Mist industry, moving from fragmented practices to a unified, reliable framework.

	Before	EN 14972
Design	Ad hoc, proprietary methods	Harmonized, performance-based
Testing	Bespoke, manufacturer-driven	Standardized, accredited labs
Certification	Inconsistent, self-declarations	Formal & repeatable, 3rd-party
Regulator Trust	Low-to-medium, skepticism	Rapidly increasing, evidence-based

This transformation enhances safety, reduces ambiguity, and accelerates the adoption of Water Mist as a viable fire protection solution.

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The Crucial Role of Accredited Training

Accredited training programs are vital for maximizing the benefits of EN 14972 and ensuring the effective implementation of High-Pressure Water Mist (HPWM) systems.

1 **Boosts Competence**
Equips designers, installers, and maintenance personnel with the specific knowledge and skills required for HPWM systems, preventing errors.

2 **Improves Consistency**
Ensures practices align with EN 14972, BS 8458, BS 8489, and NFPA 750, promoting uniform application and interoperability.

3 **Builds Trust**
Certified professionals lead to higher quality installations and maintenance, translating into more reliable systems and better safety outcomes.

4 **Drives Awareness**
Educates AHJs, architects, engineers, and consultants on the capabilities and appropriate applications of Water Mist systems.

5 **Enables Innovation**
Creates a feedback loop between practical application and standard development, fostering continuous improvement and adaptation.

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Bridging the Gap: What's Needed

Broader EN 14972 Adoption

Actively promote the integration and consistent application of EN 14972 across all EU and UK construction and fire safety regulations.

Code Integration

Ensure EN 14972 is explicitly referenced and incorporated into national building codes and British Standards, providing clear pathways for use.

Stakeholder Education

Launch targeted education campaigns for regulators, consultants, and insurers to demystify water mist and highlight its benefits.

Trade Body Promotion

Leverage the influence of industry associations to champion Water mist as a leading-edge fire protection solution.

Expand Training

Invest in and expand accredited training programs, ensuring a robust pipeline of qualified professionals for design, installation, and maintenance.

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Call to Action

Push for UK Standard Alignment

Advocate for the formal adoption and full integration of EN 14972 into UK national standards and regulatory frameworks to provide clear guidance and enhance market confidence.

Consider Water Mist in Fire Strategies

For all new projects and retrofits, comprehensively evaluate high-pressure water mist as a viable, efficient, and less disruptive alternative to traditional sprinkler systems.

Get Trained & Certified

Invest in accredited training and certification for yourself and your teams to ensure expertise in the design, installation, and maintenance of water mist systems according to EN 14972.

Thank You & Questions

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