

**24th International Water Mist Conference  
Manchester, UK, on 24th and 25th September 2025**

**Conference Programme**

## **DESIGN of A WATER MIST SYSTEMS with 14972 series**

**The point of view of a Fire Engineer developing fire protection specifications**

**LUCIANO NIGRO – Technical Director for JENSEN HUGHES ITALY srl**

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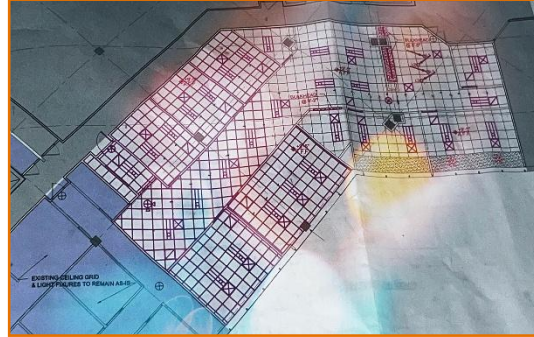
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**Code Consulting + Built Environment**



**Fire Engineering + Systems Design**



**Emerging Hazards**



**Energy + Utilities**



**Emergency Management + Response**

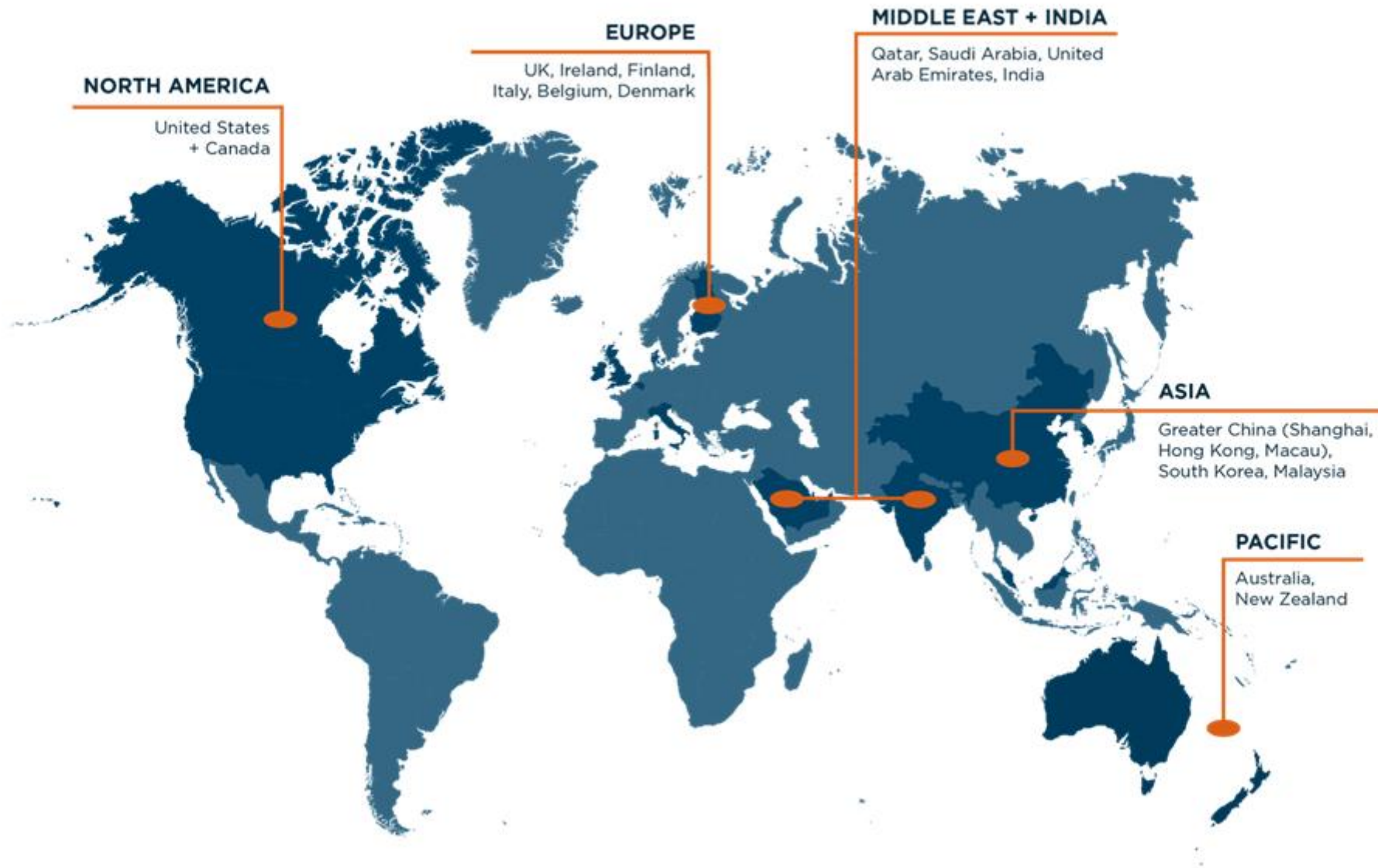


**Security Risk + Public Safety**



**Forensics**

# Global Reach, Local Presence







# Agenda

- + Foreword – the point of view of the Design Engineer
- + The Water Mist Standardization in Europe
- + The EN 14972 series project
- + The Design process for a water misty fire protection system
- + The Fire Test Protocols published
- + A guide to use the Protocol Tests
- + IWMA as a source of updated information
- + Conclusions



# The point of view of the design engineer 1/2

**The Fire Protection Engineer selects the most suitable protection for a given application and provides specification for the procurement process.**

- **The correct process for the protection against fire of a given building/application should start from the analysis of the fire hazard by a fire protection engineer**
- **According to such an analysis the Fire Protection Engineer selects the most appropriate fire protection system to be provided, taking into consideration not only the construction features of the systems but also the “loss expectancies”**
- **This last point is of utmost importance, it is expected that the Fire Protection Engineer takes into consideration the consequences of the intervention of the protection systems, as well as the management of the system and its operation.**



# The point of view of the design engineer 2/2

**The Fire Protection Engineer selects the most suitable protection for a given application and provides specification for the procurement process.**

- Then it is expected a complete specification of the fire protection system to be provided to be prepared by the engineer, to be used for the procurement process that will imply, in all cases, a bidding process involving two or more potential suppliers.
- The preparation of the specification is therefore a substantial part of the job of the Fire Protection Engineer who needs, for preparing it, the basic design data to dimension the system.
- In the normal engineering job this is made by consulting the applicable technical standards where it should be possible to find the basic information for the preliminary design of the required system.



# The European Standardization on Water Mist Systems 1/6

The need for a standard on water mist system was realized by the TC 191 – the European Fire Fighting System Committee.

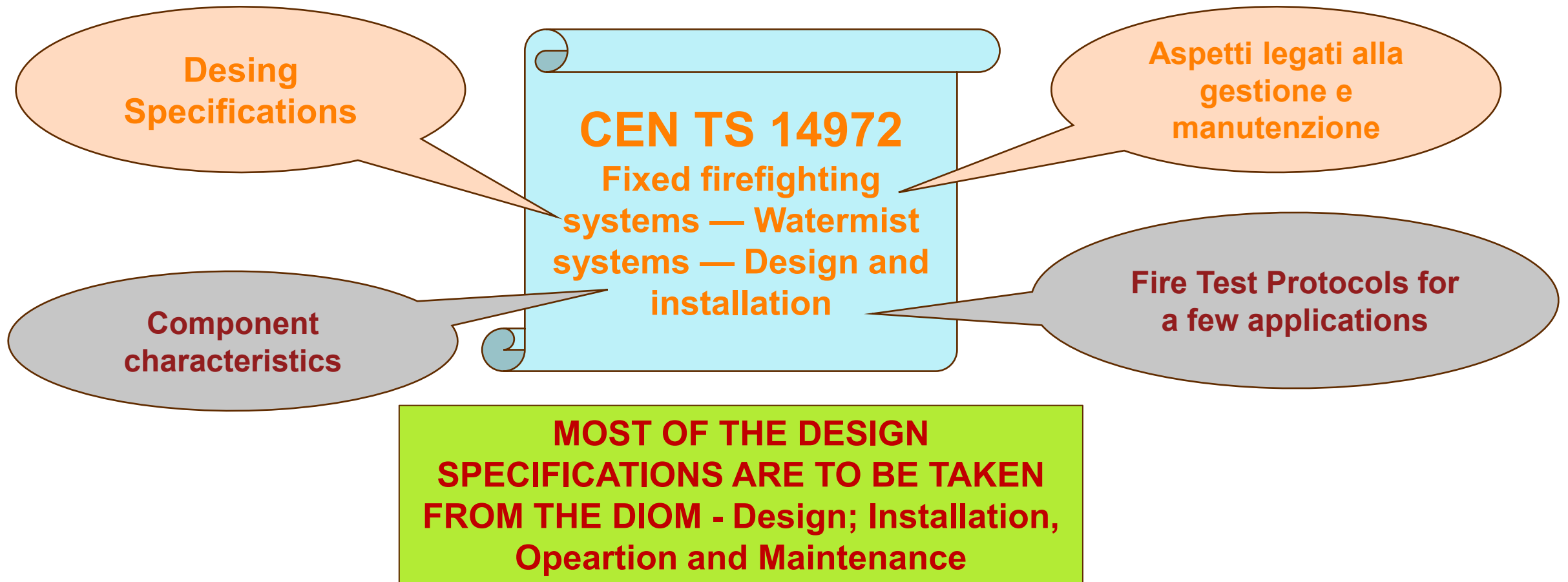
- In the early '90s a “task group” of TC191-WG5 – the sprinkler system working group was started and the works to develop a European water mist standard were started.
- The work was “intensive” with 10 to 20 delegates attending most of the meetings but the “speed” was not adequate for the development of the industry
- At the end, in 2008, a first document was published – the TS 14972, TS meaning Technical Specification, a sort of tentative standard to be confirmed in a few years.
- In the same time the main European countries developed national standards on water mist systems, including BSI in UK, DIN/VdS in Germany, Apsad/CNPP in France... and in US the NFPA 750 was at its third edition!





# The European Standardization for Water Mist 2/6

*The Technical Specification issued in 2010 as CEN/TS 14972*



# The European Standardization for Water Mist 3/6

*It is immediately clear the inadequacy of the document*

The concept of a water mist system is not clear in the original document, being still referred to the Halon replacement with detection and discharge!

The protocols included in the standard are quite limited and not coordinated with the international standardization that remains prevalent

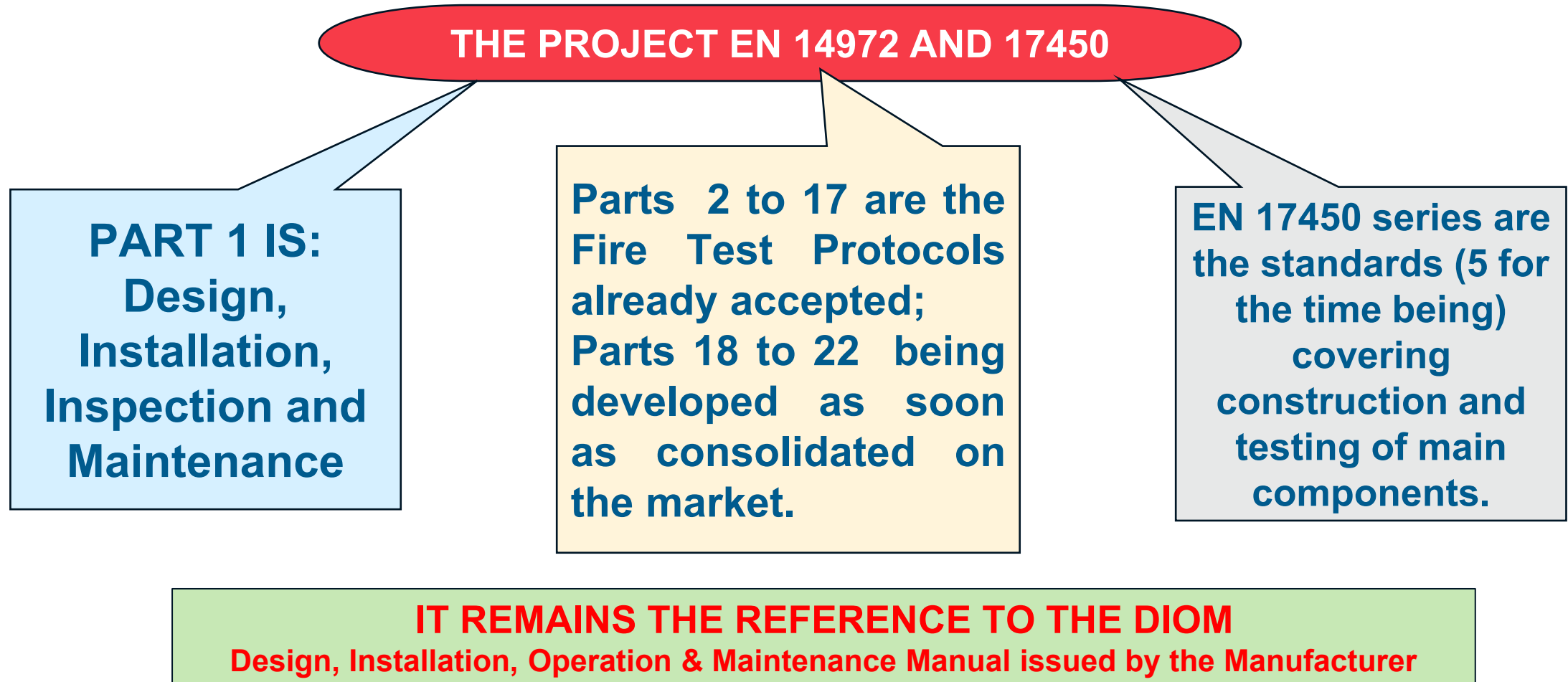
There is no indication about the certification rules for compliance with the standard

Only nozzles are considered among the components.

SPECIFICA TECNICA		Installazioni fisse antincendio Sistemi ad acqua nebulizzata Progettazione e installazione	UNI CEN/TS 14972
		Fixed firefighting systems Watermist systems Design and installation	
		La norma specifica i requisiti e fornisce informazioni sulla zione, installazione e prove e fornisce i criteri per l'accetta sistemi fissi ad acqua nebulizzata (watermist) per pericoli Sono forniti inoltre i protocolli di prova relativi a diversi pericoli.	
		6.10.0 Power supply to equipment in the protected area	20
		6.10.1 Enclosure requirements	20
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		7.1.3 Automatically movable	20
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		7.2.3 Pipe supports	21
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		7.3.1 General	22
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		7.3.8 Additives	22
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		7.3.12 Control systems	22
		7.3.13 Continuity	22
		7.3.14 General	22
		7.3.15 Frost protection	22
		7.3.16 Protection of equipment for water supplies	22
		7.3.17 Maximum and minimum water pressure	22
		7.3.18 Test devices	22
		7.3.19 Self-closing systems	22
		7.3.20 Pump and low water supplied systems	22
		7.3.21 Water supply	22
		7.3.22 Cylinders and storage tanks	22
		7.3.23 Installation systems	22
		7.3.24 Acceptance tests and maintenance	22
		7.3.25 Criteria for acceptance	22
		7.3.26 Acceptance of external systems	22
		7.3.27 Commissioning report	22
		7.3.28 Inspection, maintenance and training	22
		7.3.29 Maintenance	22
		7.3.30 Training	22
		7.3.31 Documentation for system type approval	22
		7.3.32 Documentation for acceptance of design, installation and commissioning	22
		7.3.33 Documentation of system calculations	22
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		7.3.35 Fuel and other combustibles used in the protected area	22
		7.3.36 Automatic shut-down	22
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# The European Standardization for Water Mist 4/6

*The European Standard EN 14972 – parts 1 to 17 e the EN 17450 parts 1 to 5*



# The European Standardization for Water Mist 5/6

## *The series of protocols published as EN 14972 – parts 2 to 17*

The most relevant innovation of the EN 14972 series is the publication as EN standard of the 14972-1 and of the fire test protocols that are officially recognized and EN Standards

They were selected according to a decision taken since the beginning of the works; they include only protocols already existing and used by one or more manufacturers that make them available on the market.

**They are NOT harmonized standards and then they do not follow the process of CE Marking by Notified Bodies.**

EN 14972, Fixed firefighting systems — Water mist systems, consists of the following parts:

- Part 1: Design, installation, inspection and maintenance;
- Part 2: Test protocol for shopping areas for automatic nozzle systems;
- Part 3: Test protocol for office, school class rooms and hotel for automatic nozzle systems;
- Part 4: Test protocol for non-storage occupancies for automatic nozzle systems;
- Part 5: Test protocol for car garages for automatic nozzle systems;
- Part 6: Test protocol for false floors and false ceilings for automatic nozzle systems;
- Part 7: Test protocol for commercial low hazard occupancies for automatic nozzle systems;
- Part 8: Test protocol for machinery in enclosures exceeding 260 m<sup>3</sup> for open nozzle systems;
- Part 9: Test protocol for machinery in enclosures not exceeding 260 m<sup>3</sup> for open nozzle systems;
- Part 10: Test protocol for atrium protection with sidewall nozzles for open nozzle systems;
- Part 11: Test protocol for cable tunnels for open nozzle systems;
- Part 12: Test protocol for commercial deep fat cooking fryers for open nozzle systems;
- Part 13: Test protocol for wet benches and other similar processing equipment for open nozzle systems;
- Part 14: Test protocol for combustion turbines in enclosures exceeding 260 m<sup>3</sup> for open nozzle systems;
- Part 15: Test protocol for combustion turbines in enclosures not exceeding 260 m<sup>3</sup> for open nozzle systems;
- Part 16: Test protocol for industrial oil cookers for open nozzle systems.
- Part 17: Test protocol for residential occupancies for automatic nozzle systems.

# The European Standardization for Water Mist 6/6

## *What is included in the new project 14972 and 17450*

Togheter with the standard on the **Design, Installation, Maintenance**, now completed with the **Inspection**, that is part of the EN 14972-1

There is also the EN 17450 series, from 1 to 5, here detailed, that covers the construction characteristics of the main components of the system, and the test to be passed to be considered **COMPLIANT** with the European standardization

EN 17450, *Fixed firefighting systems — Water mist systems*, consists of the following parts:

- Part 1: *Product characteristics and test methods for strainer and filter components*
- Part 2: *Product characteristics and test methods for nozzles*
- Part 3: *Product characteristics and test methods for check valves<sup>1</sup>*
- Part 4: *Product characteristics and test methods for control deluge valves and actuators*
- Part 5: *Product characteristics and test methods for pressure switches<sup>1</sup>*

**Also the above mentioned Component Standards are NOT harmonized standards and then they do not follow the process of CE Marking by Notified Bodies.**



# IS THE NEW STANDARD A REAL DESIGN TOOL?

**To which extent the new standard meets the Fire Protection Engineer's needs for the design of a water mist system “suitable for the application”?**

Let's have a look to the simple diagram here shown.

It gives an idea of the design process that the Fire Protection Engineer follows when selecting and specifying a fire protection system for a given application

The reference to the applicable standard is always involved together with the fire hazard classification and configuration.

**The general process includes some steps:**

**Fire Risk Analysis  
(Fire Hazard identification)**

**Fire Hazard Classification (OH, EH,  
Storage, etc...)**

**Fire Hazard lay-out and  
configuration (size, height, etc...)**

**In general, at this point, the fire  
protection specification can be  
deducted from the applicable standards.**

# USING EN 14972 standard series

## The specification process for a water mist system according to EN 14972

The process continues in two different ways

Conventional  
Standard, e.g.:  
EN 12845, EN  
15004, ecc..

Answer to the  
question: is the fire  
hazard under  
consideration  
covered by a fire test  
protocol

COMPLETE DEFINITION OF THE  
SYSTEM USING THE APPLICABLE  
STANDARDIZATION.

si

no

Other

EN 14972, *Fixed firefighting systems — Water mist systems*, consists of the following parts:

- Part 1: Design, installation, inspection and maintenance;
- Part 2: Test protocol for shopping areas for automatic nozzle systems;
- Part 3: Test protocol for office, school class rooms and hotel for automatic nozzle systems;
- Part 4: Test protocol for non-storage occupancies for automatic nozzle systems;
- Part 5: Test protocol for car garages for automatic nozzle systems;
- Part 6: Test protocol for false floors and false ceilings for automatic nozzle systems;
- Part 7: Test protocol for commercial low hazard occupancies for automatic nozzle systems;
- Part 8: Test protocol for machinery in enclosures exceeding 260 m<sup>3</sup> for open nozzle systems;
- Part 9: Test protocol for machinery in enclosures not exceeding 260 m<sup>3</sup> for open nozzle systems;
- Part 10: Test protocol for atrium protection with sidewall nozzles for open nozzle systems;
- Part 11: Test protocol for cable tunnels for open nozzle systems;
- Part 12: Test protocol for commercial deep fat cooking fryers for open nozzle systems;
- Part 13: Test protocol for wet benches and other similar processing equipment for open nozzle systems;
- Part 14: Test protocol for combustion turbines in enclosures exceeding 260 m<sup>3</sup> for open nozzle systems;
- Part 15: Test protocol for combustion turbines in enclosures not exceeding 260 m<sup>3</sup> for open nozzle systems;
- Part 16: Test protocol for industrial oil cookers for open nozzle systems.
- Part 17: Test protocol for residential occupancies for automatic nozzle systems.

# HOW TO USE THE EN 14972

## How can we use the mentioned protocols and what do they represent

The series of protocols, those already published shown here and the 5 more under preparation, are not easy to use if the Fire Engineer is not an expert in water mist technology.

But we need to include the “normal” Fire Engineer in the number of engineers that can specify a water mist fire protection.

This condition is well known within the working group and therefore the following decision was taken “to bridge the gap”

**IT WAS THEN DECIDED, WITHIN WG10 TO PREPARE THE AMENDMENT 1 TO 14972-1 INCLUDING THE ADDITIONAL INFO REQUIRED**

EN 14972, *Fixed firefighting systems — Water mist systems*, consists of the following parts:

- Part 1: Design, installation, inspection and maintenance;
- Part 2: Test protocol for shopping areas for automatic nozzle systems;
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- Part 8: Test protocol for machinery in enclosures exceeding 260 m<sup>3</sup> for open nozzle systems;
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- Part 16: Test protocol for industrial oil cookers for open nozzle systems.
- Part 17: Test protocol for residential occupancies for automatic nozzle systems.

# THE AMENDMENT 1 TO EN 14972-1 - to help the Fire Engineers

## What is include in the Amendment 1

The index of the Annexes is given here;  
The annexes has been published as EN 14972-1:2020+A1:2025 and includes:

- Some “errata corrige” to the main text
- Information on the “operating areas” for automatic nozzle systems
- A more “engineered” description of the hazards covered by each of the protocols included in the currente version of the standard

**IN EACH OF THE ANNEXES FROM C TO R  
«ADDITIONAL INFORMATION» ON EACH OF THE  
PUBLISHED PROTOCOL IS GIVEN.**

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# ASSISTANCE TO THE FIRE PROTECTION ENGINEERS

# The EN 14972-1 + A1 help to answer the key question: Is the Protocol 14972-XX representing the fire hazard under consideration?

**As mentioned already, the key matter for the Fire Engineer in specifying a water mist fire protection is the identification of the Fire Test protocol representing that hazard**

**When this is accomplished, the specification of the water mist system will simply become: a system certified to have passed the protocol XX shall be provided.**

# The Matrix from IWMA is now being expanded with Amend.nt 1

			Standard	
			NFPA 704 - Emergency Services Rating System	
			EN 18657-2:2019 VES 3188:2019	Plant fire-fighting systems / Water mist systems Design and installation  Water Mist Systems for Fire Protection Systems and Water Mist Extinguishing Systems (High-Pressure System) ● Learning and Practice ●
			NFPA 750:2023	Standard on Water Mist Fire Protection Systems
			EN 18657-1:2019 Data Sheet NO. 2012	Water mist systems
Business Segment	Application		Pier Test Protocol	Type approval
		EN 14897-1:2019	Test protocol for residential occupancies for automatic nozzle systems	
		BS 9438:2015	Flood fire protection system – Residential and domestic, self-contained systems/Guide of practice for design and installation	LPGC
		UL 2147:2011	Water Mist Nozzles for Fire Protection Service Class – Residential area fire tests	UL
		EN 14897-2:2019	Test protocol for office, school classrooms and hotel for automatic nozzle systems	
		BS 14897-3:2014	Test protocol for non-residential occupancies for automatic nozzle systems	LPGC
		EN 14897-3:2013	Test protocol for common rooms based occupancies for automatic nozzle systems	LPGC
	Offices, schools, hotels, reception areas, etc. DHL, HSBC, JCB, Lufthansa	VES 1889-1:2019	Fire Test Protocol for Water Mist Systems, Part 1: Protection of offices and accommodation units	VES
		BS 9438-2:2016	Flood fire protection system – Industrial and commercial watermist systems Part 1: Fire performance tests and requirements for watermist system for the protection of fire hazard occupancies	LPGC
		FM 5560:2011	Approved Standard for Water Mist Systems, APPENDIX C: Fire tests for water mist systems for the protection of fire hazard occupancies, Hazard Category 1 (Low) & (Some Light Hazard Occupancies)	FM Approval
		UL 2147:2020	Water Mist Nozzles for Fire Protection Service Class – Shopfront public access fire tests & D-45 – Light Hazard area fire tests	
	Stores/Supermarkets	FM 5560:2011	Approved Standard for Water Mist Systems, APPENDIX C: Fire tests for water mist systems for the protection of fire hazard occupancies, Hazard Category 1 (Low) & (Some Light Hazard Occupancies)	FM Approval
		VES 388-Power:2019	Protection of Office Spaces and Accommodation Units with Water Mist Systems / Supermarkets	VES
		EN 14897-4:2018	Test protocol for false floors and false ceilings for automatic mobile systems	
	Retail floors and Retail settings	VES 388-Power:2019	Fire Test Protocol for Water Mist Systems, Part 1: Protection of Office Ceilings and False Floors of Office Space	VES
	Atrium	EN 14897-5:2012	Test protocol for atrium protection with active nozzle in the open roof systems	
		EN 14897-6	Test protocol for car garages for automatic mobile systems	
		VES 388-Power:2019	Fire Tests Protocol for Water Mist Systems, Part 1: Protection of Car Garages	VES
	Car garages / Parking garages (NFPA-GH)	UL 2147:2017	Water Mist Nozzles for Fire Protection Service Class – Ordinary Hazard Group 1 Test tests	UL
		EN 14897-6:2012 (as published document and as amended)	Test protocol for shopping areas for automatic mobile systems	
	Tobacco storage & shipping area NFPA-CR2	KIS 388-Security	Fire Test Protocol for Water Mist Systems, Part 1: Protection of tobacco sales and storage areas and mechanical floors	VES
		UL 2147:2017	Water Mist Nozzles for Fire Protection Service Class – Ordinary Hazard Group 2 Test tests	
	NewManager Occupancies, Hazard Category 2 (PWC)	FM 5560:2011	Approved Standard for Water Mist Systems, APPENDIX C: Fire tests for water mist systems for the protection of non-residence occupancies, Hazard Category 2 (PWC)	FM Approval
	FM 5560:2011	FM 5560:2011	Approved Standard for Water Mist Systems, APPENDIX C: Fire tests for water mist systems for the protection of data processing equipment occupancies, Hazard Category 2 (PWC)	FM Approval
	Data centre	FM 5560:2011	Approved Standard for Water Mist Systems, APPENDIX C: Fire tests for water mist systems for the protection of data processing equipment occupancies – Ambient ambient floor	FM Approval
	Mechanical/Electrical	VES 388-Power:2019	Test Setup and Requirements for Protection of mechanical floor	VES
	Commercial Deep Fat Fryers (Deep Fryer)	EN 18657-2:2019	Test protocol for commercial deep fat frying types for open/mobile systems	

[illegible]

**THE MATRIX FROM IWMA  
HAS BEEN PUBLISHED AND  
REGULARLY UPDATED**



# CURRENT STATUS AND DEVELOPMENTS

## Where are we now and which are the expected future developments

The EN 14972 series is now “REAL” and it represents the most comprehensive standard on water mist system available in the world

With the coming further protocols (see here) they will include almost all the available protocols for testing water mist systems

They are existing protocols “Endorsed by CEN”

With the Annex 1 most of the “doubts and questions” have been covered

There are of course some open points to address for a practical use of the standard...

Other protocols to be published:

Part 18: Local Application involving flammable liquids

Part 19: Areas with combustible liquids

Part 20: areas classified HC2 ed HC3 as per FM approval standard 5560

Part 21: Data Processing Areas

Part 22: Electronically activated nozzles for domestic use.

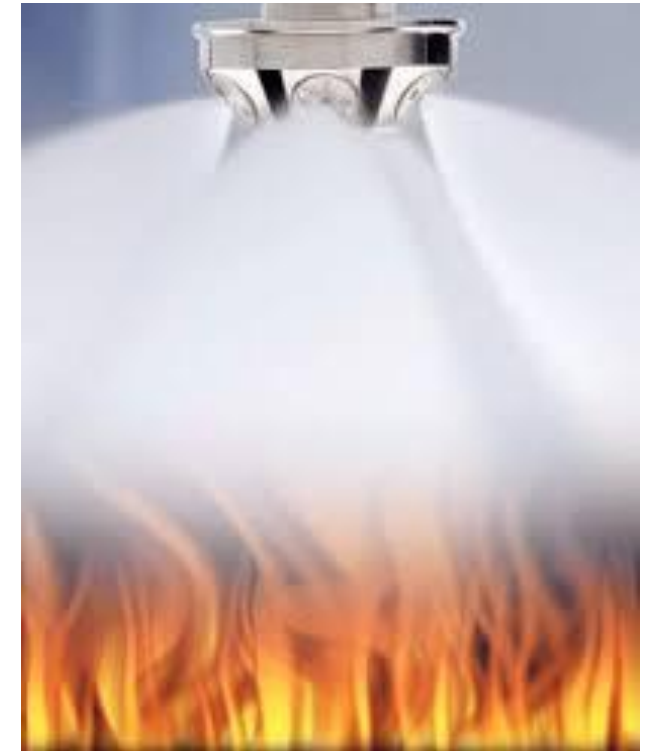
**THE STANDARD EN-14972 SERIES CURRENTLY REPRESENTS THE MOST COMPREHENSIVE STANDARD ON WATER MIST SYSTEM AVAILABLE WORLDWIDE**

# OPEN ISSUES FOR THE PRACTICAL APPLICATION

For the current use of the EN 14972 and 17450 series some open issues still exist, mainly to be solved at National Level. They include:

- The recognition of the authority/organization that can approve the system tested according to one of the fire test protocols published as EN 14972-2 to 17 by one recognized laboratory
- The recognition of the authority/organization that can approve the components, based on the report of the tests carried out in accordance with one of the EN 17450 test procedures
- The qualification of the water mist installer that can correctly complete the design and installation of the water mist system according to EN 14972-1 standard.

**The first two point are “vital” for the industry: a common framework is now available to avoid the need to run different fire test for the recognition in different countries. The third is more a national issue and is being developed in various countries.**



# CONCLUSION

**It was a long long task, but it is finished (almost). It will help the diffusion of one of the most promising fire protection technology of the recent years**

**The availability of recognized fire test protocols is a key issue for the use of a water mist fire protection system**

**They are now, and will be more and more, available as EN standards receiving the recognition of the International community**

**The current status of the standardization should now be a real help for the Fire Protection Engineers**

**IT WILL CERTAINLY GIVE A STRONG  
IMPULSE TO THE DIFFUSION OF  
THE TECHNOLOGY.**



*Thank You*

**Questions?**

