

Watermist

Low Pressure Water Mist Systems
For Building Protection
in Accordance with VdS / EN14972

June 2023

The power behind **your mission**

Agenda

- Water Mist Standard EN14972
 - Design, Installation, Inspection and Maintenance
- Water Mist Standard EN14972 parts 2-17
 - fire test protocols
- BUILDING PROTECTION areas according to EN14972
 - EN14972
 - Fire Test to VdS
 - Design criteria
- Project Application: OH3 fire testing to VdS 3883 Part 5:2020
 - Low pressure water mist system
 - Shopping/Sales Areas, Libraries, Archives, Technical Rooms, Storage areas and comparable risks
- Conclusion



Water Mist Standard – European Norm EN14972



- The EN14972 part 1 standard specifies requirements and gives recommendations for the **design, installation, inspection and maintenance of all types of fixed land-based water mist systems.**
- Water mist systems shall be designed for specific hazards or occupancies covered by **EN 14972 series (parts 2-17) fire test protocols** and being applied in accordance with information and limitations obtained from these fire test protocols and the manufacturers **DIOM (Design, Installation, Operation, Maintenance) manual**
- EN14972 is the European Water Mist Standard **equivalent to NFPA 750**
- EN14972 series includes established fire test protocols from all well-known approval and standardization bodies like **FM, VdS, LPCB and ISO**
- Water Mist component test procedures are in preparation under the **EN 17450 series**

Water Mist Standard – EN14972 fire test protocols parts 2-17



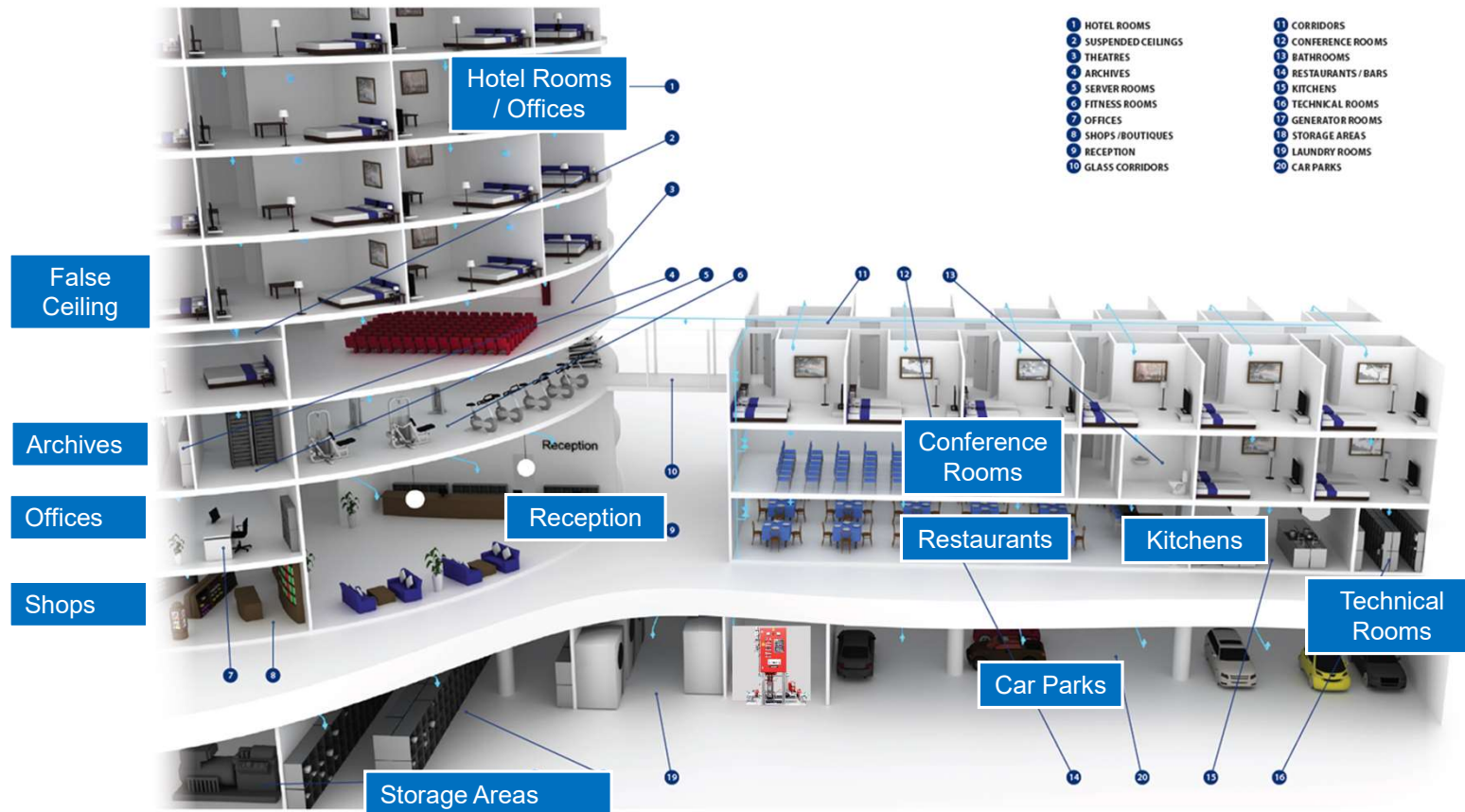
EN 14972 consists of the following parts:	Section name	Based on	Status May 2023
EN 14972 part 1	Design, Installation, inspection and Maintenance		published
EN 14972 part 2	Shopping and sales areas	VdS	task group started
EN 14972 part 3	Office, school and hotel	VdS	published
EN 14972 part 4	Non storage occupancies	FM5560	Enquiry
EN 14972 part 5	Car garage	VdS	Enquiry
EN 14972 part 6	False floor and ceiling	VdS	In publication
EN 14972 part 7	Commercial low hazard occupancies	BS8489	Formal Vote
EN 14972 part 8	Machinery enclosures>260m ³	FM5560	published
EN 14972 part 9	Machinery enclosures<260m ³	FM5560	published
EN 14972 part 10	Atrium	DFL	published
EN 14972 part 11	Cable tunnels	VdS	In publication
EN 14972 part 12	Commercial deep fat fryers	ISO	Enquiry
EN 14972 part 13	Wet benches and similar processing equipment	FM5560	task group formed
EN 14972 part 14	Combustion turbine enclosures>260m ³	FM5560	published
EN 14972 part 15	Combustion turbine enclosures<260m ³	FM5560	published
EN 14972 part 16	Industrial Oil cookers	FM5560	published
EN 14972 part 17	Residential and domestic occupancies	BS8458	comments received tbd



EN 17450 part 1-X: Requirements for watermist components such as nozzles, valves, filters/strainers, pumps



Building Protection areas according to VdS / EN14972



Building Protection – Areas/Applications according to EN14972



EN 14972 part 2	Shopping and sales areas	Shops, Archives, Technical Rooms, Sales Areas, Storage Areas, Libraries and other comparable areas (heated parking) > OH2 & OH3	AM35 Nozzle	VdS 3883-5
EN 14972 part 3	Office, school and hotel	Hotel Rooms, Offices, Reception, Conference Rooms, Restaurants, Kitchens > LH/OH1	AM28 and AM34 (SW) Nozzles	VdS 3883-1 and 2
EN 14972 part 4	Non storage occupancies	Hotels, Offices, Laboratories, Care homes, Apartments, Schools, Universities, Stations, Museums, Libraries, Restaurants, Control Rooms, etc. > LH/HC1	AM27 and AM29 Nozzles	FM5560 G
EN 14972 part 5	Car garage	Cold parking (dry system) > OH2	To be developed	VdS 3883-4
EN 14972 part 6	False floor and ceiling	> OH1	AM30 Nozzle (Up)	VdS 3883-3
EN 14972 part 7	Commercial low hazard occupancies			BS8489
EN 14972 part 8	Machinery enclosures>260m ³	Machinery Spaces (MS)	AM4 Nozzle	FM5560 E
EN 14972 part 9	Machinery enclosures<260m ³	Machinery Spaces (MS)	AM4 Nozzle	FM5560 C
EN 14972 part 10	Atrium			DFL
EN 14972 part 11	Cable tunnels		AM4 Nozzle	PBD
EN 14972 part 12	Commercial deep fat fryers			ISO
EN 14972 part 13	Wet benches and similar processing equipment			FM5560 H
EN 14972 part 14	Combustion turbine enclosures>260m ³	Machinery Spaces (MS)	AM4 Nozzle	FM5560 F
EN 14972 part 15	Combustion turbine enclosures<260m ³	Machinery Spaces (MS)	AM4 Nozzle	FM5560 D
EN 14972 part 16	Industrial Oil cookers	Large Industrial Fryers (IFP)	AM31, AM4, AM10 Nozzle	FM5560 J
EN 14972 part 17	Residential and domestic occupancies			BS8458

VdS approval / testing

FM approval / testing



AquaMist ULF

A complete system for water mist building protection from Johnson Controls

- Low Pressure Water Mist
- Pump Based
- Control / Automatic
- System Supply



Pumps



Nozzles



Valves



G-Press

AquaMist ULF Nozzles for Building Protection

Full range of approved solutions



AM4



AM28



AM30 (Up)



AM34 (SW)



AM35



AM29



AM27



MS
12,8 bar
12,5 lpm

OH1
7 bar
31 lpm

OH1/HC2
7 bar
24 lpm

OH1
7 bar
71 lpm

OH2/OH3
7 bar
41 lpm

HC1/HC2
7.6 bar
24 lpm

HC1
9,7 bar
36,4 lpm

OH3 Testing: An Insight

AquaMist ULF Low Pressure Water Mist

VdS 3883 - Fire Test Protocol for Water Mist Systems



- Part 1 **Protection of office spaces and accommodation areas**
- Part 2 **Protection of office spaces and accommodation areas with water mist sidewall sprinklers**
- Part 3 **Protection of false ceilings and false floor of OH Group 1**
- Part 4 **Protection of car garages**
- Part 5 **Protection of selected sales and storage areas and mechanical floors (technical rooms)**
- Part 6 Protection of Paint Booths
- Part 7 Protection of Areas with Combustible Liquids
- Part 8 Protection of Cable Ducts

OH3 fire testing to VdS 3883 Part 5:2020

- Ceiling mounted water mist sprinklers to be used in **unlimited volumes/areas**
- Ceilings with heights of 2.6m and above to max tested ceiling heights
- Shopping/Sales Areas, Libraries, Archives, Technical Rooms, Storage areas and comparable risks
- **Reference testing** with a prescribed sprinkler system to indicate baseline testing

Shops

Archives

Technical
Rooms

Storage Areas

- EN14972 part 2 (in future based on VdS)
- Typical known as OH3 applications

VdS	VdS Guidelines for Water Mist Systems	VdS 3883-5en
<p>Fire Test Protocol for Water Mist Systems</p> <p>Part 5: Protection of selected sales and storage areas and mechanical floors</p>		

OH3 fire testing to VdS 3883 Part 5:2020

Pass Fail Criteria:

- Total **averaged damage** of water mist test is less than or equal to total **averaged damage** of sprinkler test series
- Total **averaged ceiling** gas temperatures of water mist test is less than or equal to total **averaged ceiling** gas temperatures of sprinkler test series
- Max allowed total no. activated and allowed no. activated in outer ring as specified

Shops

Archives

Technical
Rooms

Storage Areas

- EN14972 part 2 (in future based on VdS)
- Typical known as OH3 applications

VdS	VdS Guidelines for Water Mist Systems	VdS 3883-5en
<p>Fire Test Protocol for Water Mist Systems</p> <p>Part 5: Protection of selected sales and storage areas and mechanical floors</p>		

Two test scenarios:
Rack storage & block storage

Rack Storage

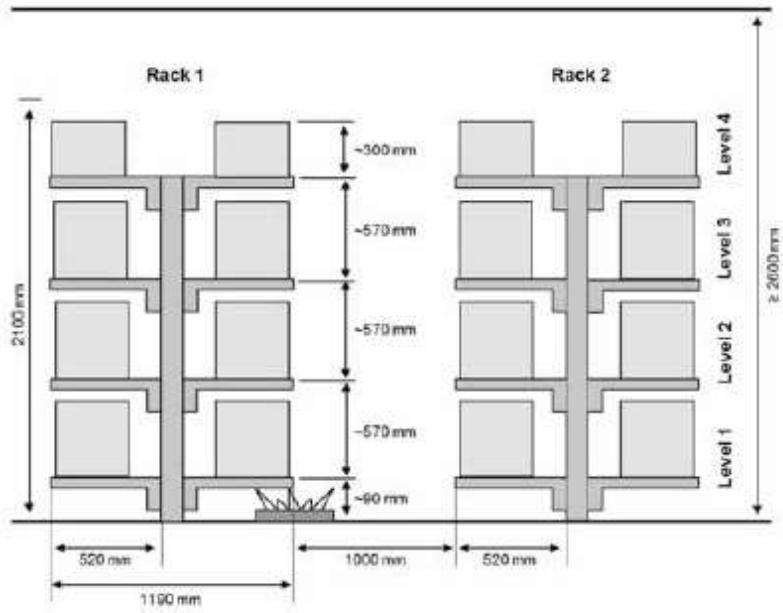


Figure 4-1: Layout of fire loads and position of ignition source for rack storage (side view)

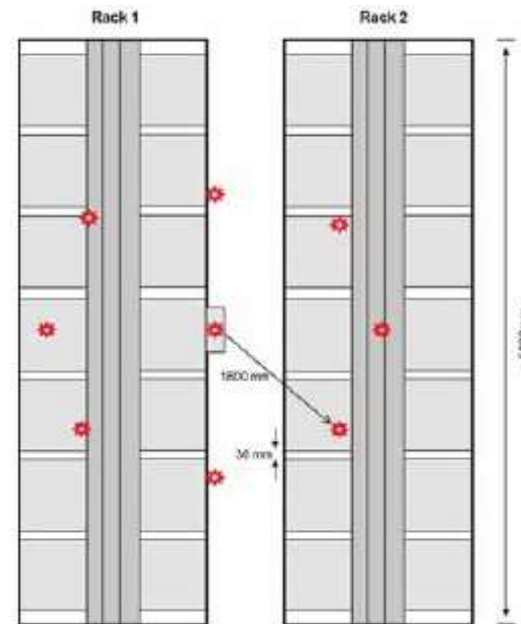


Figure 4-2: Layout of fire loads and position of ignition source for rack storage (top view)

Rack Storage

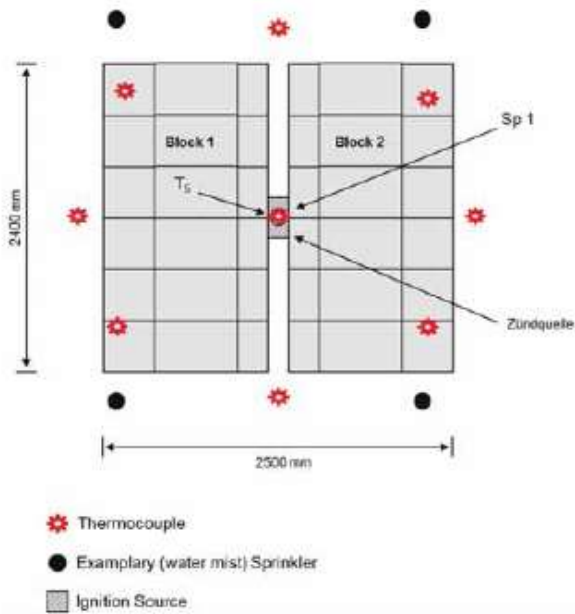


Figure 4-3: Layout of fire loads and position of ignition source for block storage (top view)

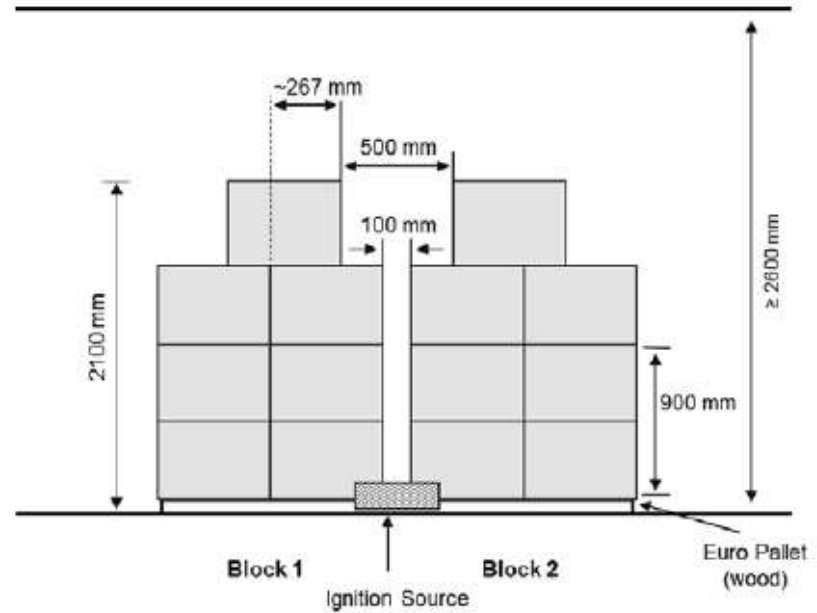


Figure 4-4: Layout of fire loads and position of ignition source for block storage (side view)

Fire loads: cardboard boxes and plastic cups

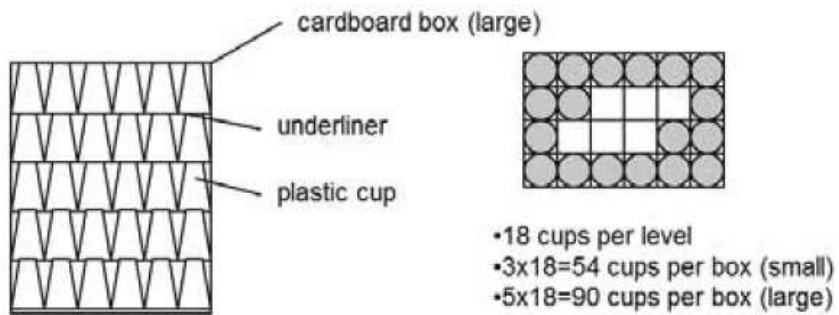


Figure 4-5: Packaging scheme of cups in the cardboard box



Figure 4-6: Prepared cardboard box

Four test scenarios for sprinkler baseline & water mist test series

Rack Storage

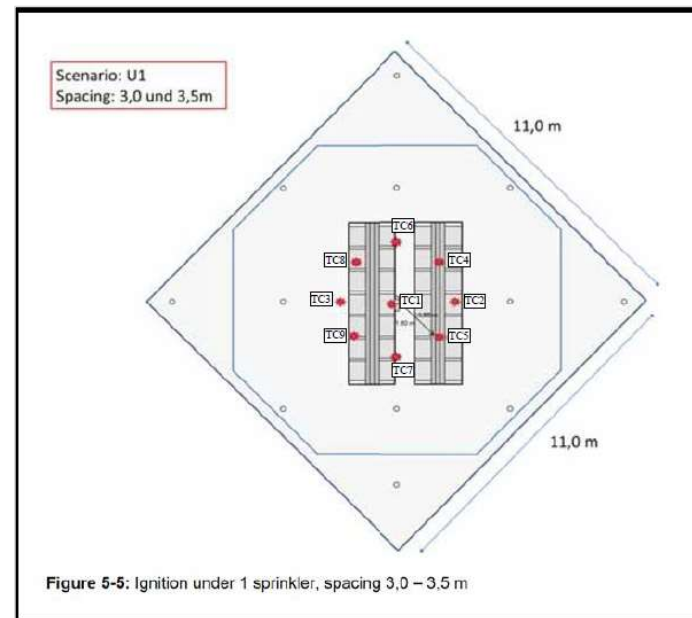
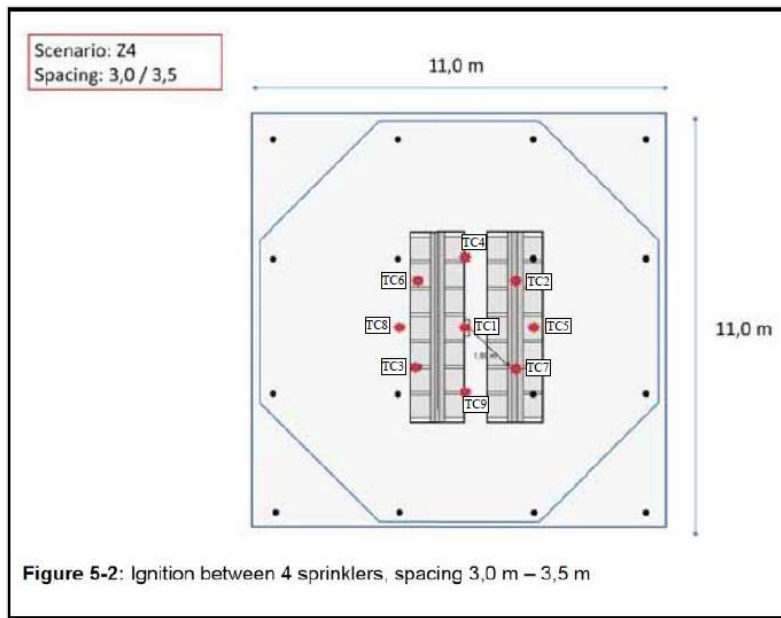
- Ignition under 1 sprinkler/nozzle (U1 Rack)
- Ignition between 4 sprinklers/nozzles (B4 Rack)

Block Storage

- Ignition under 1 sprinkler/nozzle (U1 Block)
- Ignition between 4 sprinklers/nozzles (B4 Block)

OH3 fire testing to VdS 3883 Part 5:2020

- Water mist test series (for block storage configuration same sprinkler grids are used)
- Max activated nozzles in outer ring ($9\text{m}^2 \rightarrow 12 \rightarrow 3$)
- **Unlimited volumes/areas**



OH3 fire testing to VdS 3883 Part 5:2020



WM U1 Block



OH3 fire testing to VdS 3883 Part 5:2020



WM B4 Block



OH3 fire testing to VdS 3883 Part 5:2020



WM U1 Rack



OH3 fire testing to VdS 3883 Part 5:2020



WM B4 Rack



Conclusion



- In general, it can be concluded that for the protection of Buildings Watermist systems, having executed the fire test protocols of the EN14972 parts 2-17 or equivalent test protocols like VdS 3883, FM5560, DFL etc, planned in accordance with 14972-1 and having validated/proved components in their systems (laboratory component test passed) are a valuable and economic alternative to sprinkler systems.
- Watermist systems have enhanced cooling capabilities compared to sprinkler systems (40-50% lower ceiling temperatures).
- Watermist Systems can provide the same safety and performance level by using up to 80% less water compared to a conventional sprinkler system to protect your buildings.

Thank you!



Hans Schipper

Technical Product Support & Training

Water Mist Systems

hans.schipper@jci.com